

BMUS

9th - 11th
December

Ultrasound 2015

47th Annual Scientific Meeting of the
British Medical Ultrasound Society

Final Programme



at City Hall, Cardiff

TOSHIBA
Leading Innovation >>>

Seeing the unseen

Toshiba Medical Systems has developed the advanced Doppler algorithm of Superb Microvascular Imaging (SMI) which allows non-invasive imaging of the microvasculature, reducing the need for contrast enhancement. The sensitivity and finer detail of the microvessels which can be visualised with SMI is significantly better, compared with Power Doppler, and rivals the results of contrast enhancement.

SMI is set to prove revolutionary, particularly in musculoskeletal imaging, and will also be helpful in the use of microbubbles to detect sentinel lymph nodes.

Visit Toshiba (**Stand 2**) at BMUS
for a live demonstration



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“Croeso i Gaerdydd, Prifddinas Cymru!”

“Welcome to Cardiff, capital city of Wales!”



We are delighted to welcome you to the 47th British Medical Ultrasound Society Annual Scientific Meeting in Cardiff City Hall. This is a beautiful venue providing easy access to all parts of the meeting.

The meeting follows what is becoming the established format of themed days, with integrated training sessions complementing the lecture sessions. Sessions are built around an excellent range of invited speakers. Two real highlights of the meeting this year will be the

Donald, MacVicar, Brown and Peter Twining Lectures, delivered by Professor Peter Wells from the University of Cardiff and Dr Trish Chudleigh from Cambridge, respectively.

This year we are pleased to host 2 CASE sessions and 2 satellite meetings, the Therapy Ultrasound Group on Thursday and a Translational Ultrasound meeting on Friday.

The exhibition is fully booked and should be lively, with all major manufacturers represented as well as many other exhibitors with products and services to offer the ultrasound community. We are grateful in particular for the support of this year's Platinum Sponsor, Hitachi Aloka Medical Systems Ltd, who are providing an educational session on Day 1 and are supporting the Annual Dinner and Awards Ceremony being held in the stunning National Museum next door to City Hall.

I should like to thank members of the Scientific and Education Committee and stream leads, listed below, for their hard work in supporting this meeting and in organising study days throughout the year. I should also like to thank Joy Whyte and her team in the BMUS Office; their dedicated organisational efforts and hard work ensure that the meeting actually happens, so if you see them give them a smile and a “thank you”.

Enjoy the meeting and enjoy your visit to Cardiff!

Nick Dudley

Chair, Scientific and Education Committee, 2015

BMUS would like to thank the following members of the Scientific Organising Committee and session leads for their contribution to the planning and delivery of this meeting.

Mr Peter Cantin,
Plymouth

Dr Rhodri Evans,
Swansea

Dr Simon Freeman,
Plymouth

Mrs Tracey Gall,
Manchester

Dr Catherine Gutteridge,
Plymouth

Mrs Alison Hall,
Stafford

Mrs Terry Humphrey,
Leeds

Mr Gerry Johnson,
Manchester

Dr Adrian Lim,
London

Mrs Alison McGuinness,
Wakefield

Dr Carmel Moran,
Edinburgh

Mr Tim Overton,
Bristol

Mrs Pam Parker,
Hull

Dr James Pilcher,
London

Prof Neil Pugh,
Cardiff

Mr Simon Richards,
Middlesborough

Prof Gail ter Haar,
London

Mrs Rachel Wilson,
Hull

General information

Venue address

Cardiff City Hall
Cathays Park
Cardiff, CF10 3ND

Conference times

Wednesday 9th December

09:00 - 17:00

16:45 Welcome reception, Exhibition Hall

Thursday 10th December

09:00 -17:00

19.00 BMUS Gala Dinner and drinks, The National Museum and Gallery of Wales (next door to City Hall)

Friday 11th December

09:00 -17:00

Delegate badges

Attendees are required to wear their badges at all times to gain access to any part of the event. Please leave your badges at the registration desk at the end of your meeting attendance.

Continuing Professional Development (CPD)

The meeting has been awarded the following BMUS CPD credits and Category I RCR CPD credits-

All 3 days - 21 credits

Day 1 - 7 credits

Day 2 - 7 credits

Day 3 - 7 credits

The integrated training sessions carry additional points with their e-learning packages

Feedback & CPD

Feedback will be conducted via the conference app this year. Your feedback is important and assists us to plan future events, so please take a few minutes to do this. In exchange for your feedback you will receive post-event electronic CPD forms.

Catering and refreshments

Lunches and refreshments are included in the registration fee. Catering and coffee points are located in the Exhibition Hall.

Cloakroom

A manned cloakroom is located by the registration area in the main foyer. Please do not leave bags or personal items unattended. While every effort is made to keep your belongings secure, neither City Hall, Cardiff or BMUS can be held liable for any loss or damage.

WiFi

Free WiFi is available throughout the venue. You just need to select the venue's network Cardiff Free Wifi.

Social media

We will be updating our social media throughout the conference. Our event hashtag is #Ultrasound2015. Feel free to get tweeting and posting! Our Twitter handle is @BMUS_Ultrasound. Our Facebook page is BMUS (British Medical Soc)

Conference app

We have developed a conference app for this year's event. Please check it out as it offers some great features to enhance your event experience.

You can download it from the App Store for Apple devices and Google Play store for Android devices by searching 'Ultrasound 2015'. There is no need to log-in to the app itself as it has free access to make it simple and speedy.

Here are some of the app features -

- Access all conference documentation
- View the full programme and personalise your agenda
- Save and email documents and notes taken in sessions
- Take part in a quiz to win prizes
- Submit questions to keynote and debate session speakers
- Vote in the debate sessions
- View speaker profiles
- Access exhibitor information and view floor plans
- Provide conference feedback in exchange for your CPD points
- Cardiff city guide

SIEMENS



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stand #3
to learn
more

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Feel the Innovation.

Workflow. Imaging Performance. Sustainability.

At BMUS meet the new ACUSON S Family™ of ultrasound systems, HELX™ Evolution with Touch Control, designed with a dedicated focus on the user experience. These new ultrasound image processing systems are working to create new levels of workflow efficiency, imaging performance, and sustainability. With Siemens pioneering ultrasound technologies, your patients can depend on you to provide accurate diagnoses and help them to make the best decisions for their care.

Attend our on-stand education sessions:

Wednesday 10:45

Virtual Touch Quantification of Liver Fibrosis
NICE Guidelines
Dr Paul Sidhu, Professor of Imaging Sciences
King's College Hospital

Wednesday 15:30

Scan smarter with Siemens

Friday 10:30

Unique features of Touch Control

List of Exhibitors

Main Exhibition Hall

Stand Number	Company
1	Hitachi Aloka Medical Systems
2	Toshiba Medical Systems
3	Siemens Healthcare
4	Philips Healthcare
7	MIS Healthcare
8	TTM Healthcare
9	FujiFilm Sonosite
10	Sonographers Medical
11	College of Radiographers
12	Casmed International Ltd
13	Globe Locums
14	PFE Medical
16	Rig Healthcare Recruit
17	Tristel Solutions Ltd
18	Bracco UK Ltd
19	Physiological Measurements Ltd
20	Diagnostic Health
21	Esaote
22	GARC
23	GE Healthcare
24	Carestream
25	Mindray
26	MedaPhor

Main Foyer

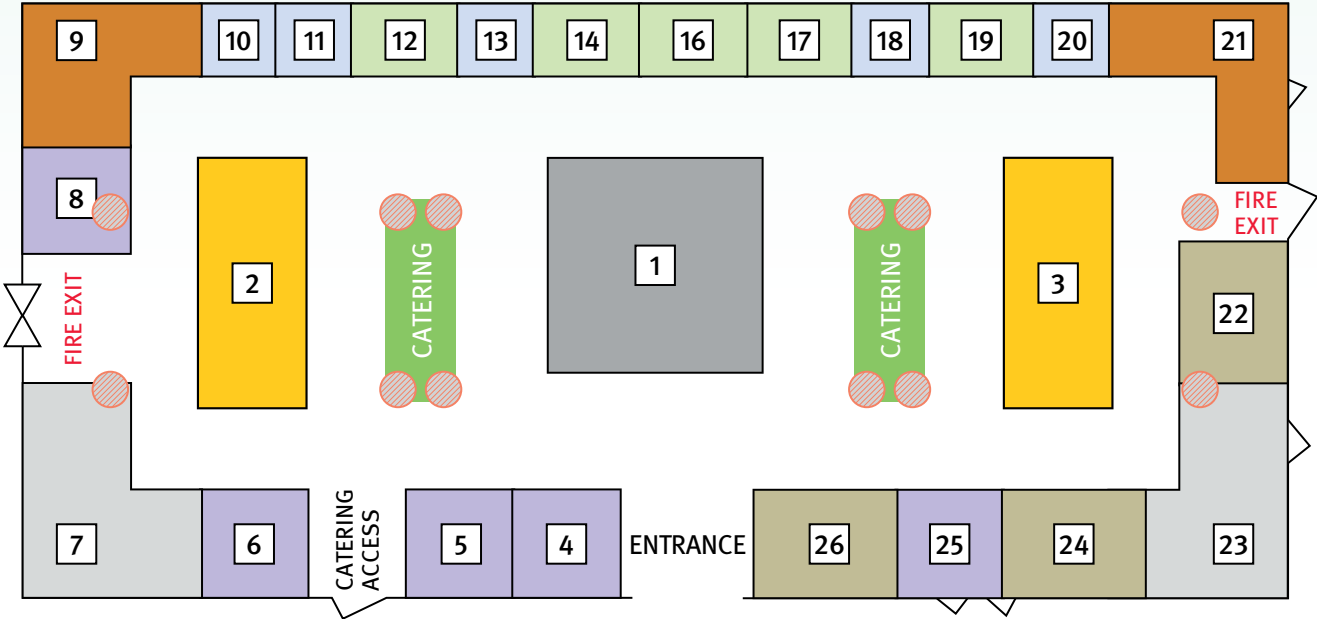
	BMUS including EFSUMB & SAGE Publications
29	Bond Salon

Marble Hall

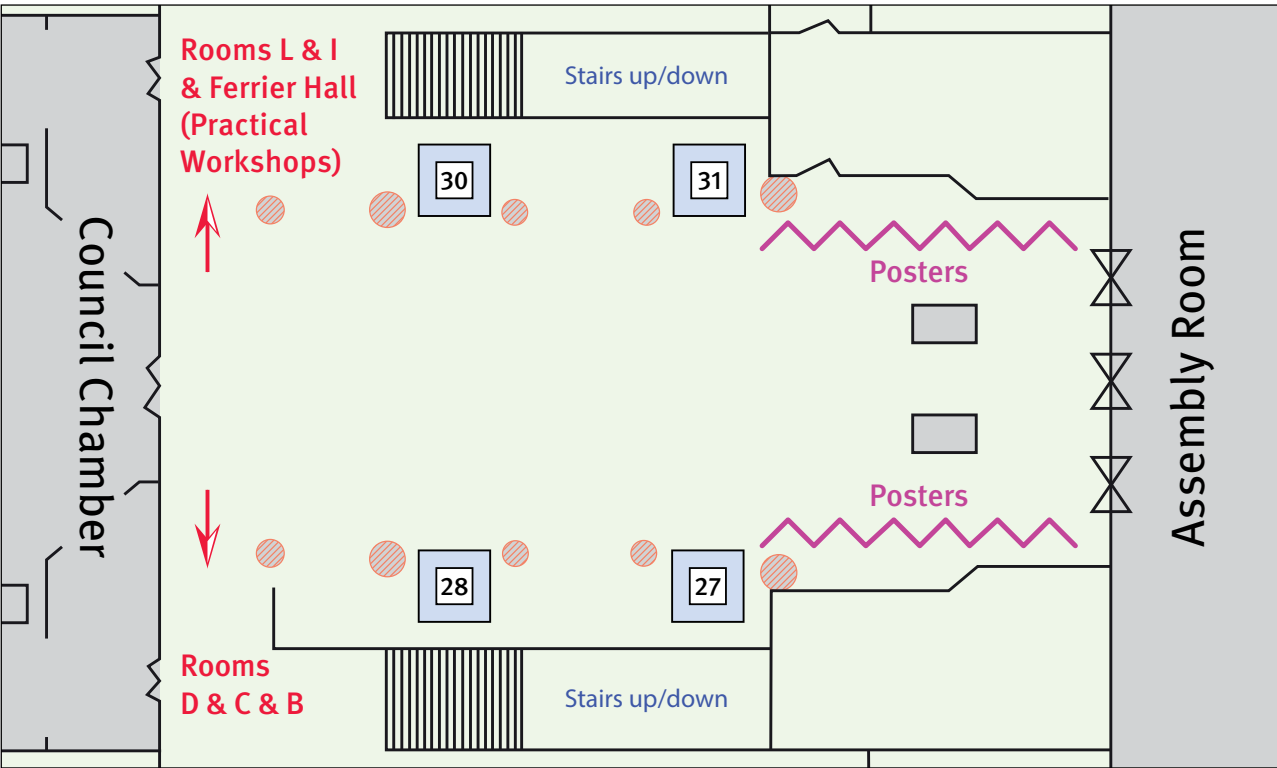
Stand Number	Company
27	Bowen Therapy
28	ID Medical
30	Nanosonics Europe Ltd
31	Day Webster

Floor Plan

Technical Exhibition - Lower Hall, Ground Floor



Technical Exhibition - Marble Hall, First Floor



Education on the Stand

Wednesday, 9th December 2015

SIEMENS

10.45 – 11.15 : Siemens Healthcare – Stand 3

VTQ quantification of Liver Fibrosis – the NICE Guidelines

Paul Sidhu - Professor of Imaging Sciences, King's College Hospital, London
A discussion of the application of VTQ and ARFI technology to the assessment of liver fibrosis will include technical aspects, clinical applications and evidence of the usefulness. A future perspective will be outlined.

TOSHIBA Leading Innovation >>>

13.15 – 13.45 : Toshiba Medical Systems - Stand 2

SMI - Seeing the Unseen

Adrian Lim – Professor of Radiology, Imperial College Healthcare NHS Trust
Ultrasound technology to visualise the microvasculature continues to improve where power and colour Doppler ultrasound remains a quick and non-invasive method of assessing the vascularity of tumours and tissue.

The advanced Doppler algorithm of Superb Microvascular Imaging (SMI) developed by Toshiba Medical Systems, allows imaging of the microvasculature without the need for contrast enhancement. The sensitivity and finer detail of the microvessels which can be visualised is significantly better when compared with Power Doppler, and rivals that depicted with contrast enhancement.

The clinical applications of this novel Doppler technique will be discussed and illustrated where it may prove revolutionary particularly with respect to musculoskeletal imaging.

SIEMENS

15.30 – 16.00 : Siemens Healthcare – Stand 3

Scan smarter with Siemens

Visit the Siemens healthcare stand to see their new ultrasound system which delivers high performance with intuitive interface.

Thursday, 10th December 2015

HITACHI Inspire the Next

ALOKA *illuminate the change*

10.30 - 11.00 : Hitachi Aloka Medical Systems Ltd – Stand 1

Technology Innovations – Stretching the Boundaries!

Ellison Bibby - International Product Manager Ultrasound, Hitachi Medical Systems
Two complementary methods in one ultrasound system: Shear Wave Measurement for enhancing the non-invasive diagnosis of liver disease and Strain Elastography for improving breast lesion differentiation.

HITACHI
Inspire the Next

ALOKA
illuminate the change

Thursday, 10th December 2015

12.45 - 13.15 : Hitachi Aloka Medical Systems Ltd – Stand 1

Fetal Cardiac Imaging Audit (FCIA) - is it worth it?

Cook K, DCRR DMU – Lead Sonographer FMU, St George's Hospital London

There is strong evidence from other screening programmes in the UK, such as the Nuchal Translucency, that show with continuing demonstration of competency, standards can be driven up. Yet there are no National or European standards for achieving competency in this form of ultrasound imaging.

St Georges Hospital FMU, have performed internal auditing of fetal cardiac images since 2006, published in 2009 and also audited a number of other local units. With the introduction of the 3 vessel trachea view into routine screening our scoring system has been revised.

Our aim with FCIA is to continue to raise current standards using an easy, robust system that can be used to audit any unit or individual sonographer quickly and easily.

Long term this should increase the confidence of screening sonographers to refer and this in turn may increase detection rates.

This presentation will clearly show how to perform FCIA. It will show how the audit works and the interpretation with this revised scoring system and show a clear method of feedback for any screening unit or individual.

CPD accreditation available

TOSHIBA
Leading Innovation >>>

15.00 – 15.30 : Toshiba Medical Systems – Stand 2

Does SMI help in EVAR Surveillance?

Neil Pugh – Consultant Medical Physicist and Head of Vascular Ultrasound, University Hospital of Wales, Cardiff

EVAR has rapidly become the treatment choice in the repair of AAA. EVAR surveillance is required due to the potential risk of late aneurysm rupture due to endo-leak. CTA and colour Doppler ultrasound are often used in combination in the surveillance of EVAR due to the lower sensitivity of CDI in detecting endo-leak when compared with CTA. This talk discusses the use of a new Doppler imaging technique, SMI, showing sensitivities comparable with CTA in the detection of endo-leak.

Friday, 11th December 2015

SIEMENS

10.30 – 11.00 : Siemens Healthcare – Stand 3

Unique features of Touch Control

The ACUSON S Family, HELX Evolution with Touch Control simplifies ultrasound imaging

At a Glance DAY 1

DAY 1 - WEDNESDAY 9th December 2015					
	Assembly Room	Rooms D&C	Room L	Council Chamber	Ferrier Hall
				Debates	Practical workshops
09.15	Presidents Welcome				
09.30	Abdominal 1 - Cross sectional imaging for dummies	Professional Issues 1 - Facing the facts - Discrepancy management and duty of candour in practice	Physics 1 - New technologies		
10.45 Morning refreshment break					
11.15	Abdominal 2 - New technologies: what's in it for me?		Physics 2 - Safety & standards	Professional Issues 2 - Medico-legal implications of clinical audit and its outcomes	Integrated Training DVT
12.45 Lunch break					
			13.00 - 13.30 BMUS AGM		
14:00	Abdominal 3 - Mistakes to avoid in abdominal ultrasound	Hitachi Aloka Symposium	Physics 3 - The sonography/physics interface		Integrated Training DVT continued
15:30 Afternoon refreshment break					
16:00	Donald MacVicar Brown				
16:45 End of Day 1					
Welcome Reception 16.45 - 18.30 - Exhibition Hall					

Scientific Programme 2015

Day 1 - Wednesday 9th December

Plenary 1 - Assembly Room

Opening & Presidential Address

09:15 Dr Carmel Moran, BMUS President

Abdominal 1 – Cross-sectional imaging for dummies

09:30- 10:45 Chairs – Dr Simon Freeman, Mr Peter Cantin, Derriford Hospital, Plymouth

Target audience: Sonographers

This session is aimed predominantly at sonographers and other professional groups who do not routinely review or report cross-sectional imaging.

The use of correlative imaging is being increasingly utilised within imaging departments, with a combination of CT, MRI and ultrasound being used to resolve equivocal imaging findings. This session will aim to provide guidance on when ultrasound imaging alone is sufficient, when additional imaging should be recommended and what is expected from ultrasound when it follows an indeterminate CT/MRI examination.

At the end of this session it is hoped that ultrasound practitioners will have a basic understanding of other imaging modalities, how and when to utilise them.

09:30 **The liver and pancreas**, Dr Toby Wells, Morrision/ Singleton Hospital, Swansea

09:55 **The female pelvis**, Dr Petra Williams, Derriford Hospital, Plymouth

10:20 **The renal tract**, Dr Emma Simpson, Brighton and Sussex University Hospitals

Abdominal 2 – New technologies, what's in it for me?

11:15 – 12:45 Chairs – Dr Simon Freeman, Dr Catherine Gutteridge, Derriford Hospital, Plymouth

Target audience: Sonographers, radiologists

Recent BMUS scientific sessions have been filled with high-powered scientific sessions describing the physics and research applications of new ultrasound technologies.

Although there is a growing literature base describing the potential clinical benefits of these applications, do they apply to your ordinary working life outside the academic environment?

This session will persuade you that it is worth your while learning how to use these technologies, and investing the time and money to implement them in your clinical practice.

SCIENTIFIC PROGRAMME

- 11:15 **Fusion**, Dr Oliver Byass, Hull and East Yorkshire Hospitals NHS Trust
- 11:40 **Elastography**, Dr Adrian Lim, Imperial College, London
- 12:05 **Contrast**, Dr Sean Tenant, Derriford Hospital, Plymouth
- 12:30 **Reproducibility of shear wave elastography liver measurements in healthy volunteers**, C Fang, E Konstantatou, O Romanos, GT Yusuf, PS Sidhu, King's College Hospital, London
- 12:40 **An unusual case of sub capsular liver infarction**, A Al-Khatib, B Stenberg, A McNeill, The Newcastle upon Tyne Hospitals

Abdominal 3 – Mistakes to avoid in abdominal ultrasound

- 14:00 - 15:30** **Chairs** - Dr Adrian Lim, Imperial College/ Charing Cross Hospital, London, Dr Petra Williams, Derriford Hospital Plymouth

Target audience: Radiologists, sonographers.

This session will review frequent or important errors in ultrasound practice based on many years of near-misses and discrepancies seen or perpetrated by the lecturers!

Pitfalls in urogenital and hepato-biliary ultrasound will be discussed.

There will be a further presentation on what not to forget to review when a specific abnormality has been found.

We hope that attending this session will help you not to repeat our mistakes in interpretation or reporting of ultrasound!

- 14:00 **Urogenital**, Dr Simon Freeman, Derriford Hospital, Plymouth
- 14:25 **Hepato-biliary ultrasound**, Mr Peter Cantin, Derriford Hospital, Plymouth
- 14:50 **Errors of omission**, Dr Catherine Gutteridge, Derriford Hospital, Plymouth
- 15:15 **Ultrasound in acute cholecystitis - is it as good as we think?** C Miller, J Bell, MJ Weston, Leeds Teaching Hospitals Trust
- 15:25 **Incidental Intussusception on USS; what you need to think about in adults and children?** R Williams, St Georges Hospital, London

16:00 – 16:45 Donald MacVicar Brown keynote lecture

Chairs – Dr Carmel Moran, University of Edinburgh, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust

- 16:00 **The joy of research: is necessity the best mother of invention?** Prof Peter Wells, Cardiff University

Plenary 2 - Rooms D & C

Professional Issues 1 - Facing the facts – discrepancy management and duty of candour in practice

09:30 – 10:45 **Chairs** – Mrs Pamela Parker, Dr Oliver Byass, Hull and East Yorkshire Hospitals NHS Trust

One outcome of the Francis report (2014) is the need for duty of candour in all aspects of healthcare to be realised and this includes radiological errors. This session will review how practice can be reviewed to ensure a quality service is being provided and how the error rate of a department can be monitored. Presentations within the session will also address how discrepancy meetings can be held in a multidisciplinary and multi specialist service and how learning from these meetings can be implemented. The final presentation will review the impact of the duty of candour on an ultrasound service. The practicalities and pitfalls of providing feedback and explanations to patients from such an operator dependent imaging modality will be addressed.

This session is aimed at any practitioner undertaking ultrasound practice.

This session compliments the quality assurance and audit workshop on day two of the meeting and the medico-legal debate following morning coffee on day one.

09:30 **Clinical audit and peer review: why, when and how?** Mrs Pamela Parker, Hull and East Yorkshire Hospitals NHS Trust

09:55 **Improving practice from discrepancy meetings,** Dr Peter Rodgers, University Hospitals of Leicester NHS Trust

10:20 **Duty of candour: facing the facts of error,** Dr Oliver Byass, Hull and East Yorkshire Hospitals NHS Trust

Council Chamber

Professional Issues 2 – Medico-legal implications of clinical audit and its outcomes

11:15 – 12:45 **Chairs** – Mrs Pamela Parker, Hull and East Yorkshire Hospitals NHS Trust, Dr Rhodri Evans, Morriston Hospital, Swansea

The Debating Chamber of Cardiff City Hall is the perfect venue to host the return of **Mr Andrew Andrews** from **Bond Solon**.

Mr Andrews, an esteemed lawyer specialising in medico-legal cases, is welcomed to Cardiff in what promises to be a thought-provoking, challenging but educational question and answer session.

The main themes being addressed are the impact of clinical audit processes, the implications of discrepancy meetings and the medico-legal impact of the duty of candour related to radiological errors.

SCIENTIFIC PROGRAMME

This session is aimed at any practitioner undertaking ultrasound practice.
This session compliments the first professional issues session and the quality assurance and audit workshop on day two.

11:15 **Medical legal issues facing ultrasound practice**, Mr Andrew Andrews, Bond Solon, London

11:45 **Q&A from the floor**

Hitachi Aloka Symposium

14:00 – 15:30 **Chairs** - Prof David Cosgrove, Imperial College London, Dr Emma Chung, University of Leicester

This Education Session has been kindly supported by Hitachi Aloka Medical Systems Ltd

14:00 **Thyroid ultrasound - BTA guidelines and elation (elastography trial)**, Dr Steve Colley, Queen Elizabeth Hospital, Birmingham

14:45 **Multiparametric ultrasound of the testis: role of strain elastography**, Prof Paul S Sidhu, King's College Hospital, London

Plenary 3 - Room L

Physics 1 – New technologies

09:30 – 10:45 **Chairs** - Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust, Dr Tony Evans, University of Leeds

The aim of this session is to explore selected new technologies, describing the science and discussing their potential clinical role.

09:30 **Physics & Clinical Applications of Microvascular Imaging**, Dr Catherine Gutteridge, Derriford Hospital, Plymouth

10:00 **Physics & Clinical Applications of Matrix Array Probes**, Dr Ben Stenberg, Freeman Hospital, Newcastle

10:30 **The use of SMI in surveillance of endovascular aneurysm repair (EVAR)**, B Gorrell, ND Pugh, University Hospital Wales

Physics 2 – Safety and standards

11:15 – 12:45 **Chairs** - Dr Tony Evans, University of Leeds, Mr Stephen Wolstenhulme, University of Leeds

The aim of this session is to discuss safety issues and standards relevant to ultrasound practitioners and scientific and technical staff.

11:15 **Safety of elastography**, Prof Gail ter Haar, Institute of Cancer Research, Sutton

- 11:35 Inter- and Intra- operator reproducibility of acoustic radiation force impulse elastography and factors which affect it,** C Watts¹, J Wilson, ¹Hull and East Yorkshire NHS Trust, ²University of Leeds
- 11:45 Safety of contrast agents in paediatrics,** Prof Gail ter Haar, Institute of Cancer Research, Sutton
- 12:05 RCR and SCoR Equipment Standards,** Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust
- 12:25 Early pregnancy ultrasound scanning: development of effective and clinically relevant quality assurance testing,** J Smith, V Pelling, L Harris, Brighton & Sussex University Hospitals
- 12:35 Quality Assurance of ultrasound probes,** B Segall, A-C Segall, BBS Medical AB, Vätö, Sweden

BMUS 32nd Annual General Meeting.

13:00 – 13:30 All members welcome.

Physics 3 – The sonography / physics interface

14:00 – 15:30 Chairs - Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust, Mr Stephen Wolstenhulme, University of Leeds

The aim of this session is to discuss the value of Physics to ultrasound practitioners.

14:00 What sonographers need to know about physics and technology and why, Dr Crispian Oates, Freeman Hospital, Newcastle

14:30 What have the physicists ever done for us? Dr Tony Evans, University of Leeds

15:00 The use of texture analysis in diagnosing ovarian masses, R Aldahlawi, ND Pugh, LDM Nokes, Cardiff University

15:10 Miniature transducers for real-time guidance in neurosurgical procedures, R McPhillips¹, Y Jiang², Z Qiu¹, SO Mahboob¹, H Wang¹, C Meggs², G Schiavone³, DR Sanmartin⁴, S Eljamel¹, MPY Desmulliez³, T Button², S Cochran¹, CEM Demore¹, ¹University of Dundee, ²University of Birmingham, ³Heriot Watt University, ⁴Applied Functional Materials Ltd

Practical Workshop Session - Ferrier Hall

DVT integrated training

11:15 – 15:30 Led by - Prof Neil Pugh, University Hospital of Wales, Cardiff

Faculty - Jean Bainbridge, Hull and East Yorkshire Hospitals NHS Trust, Rachel Wilson, Hull and East Yorkshire Hospitals NHS Trust, Alison McGuinness, Mid Yorks NHS Trust, David Spencer, Aneurin Bevan UHB, Newport, Declan Coleman, University Hospital of Wales, Cardiff

This ever popular practical training session returns for a further year. Includes technique, pathology and reporting advice. e-learning lectures provided 3 weeks in advance, for delegates to listen to with supporting literature and links.

Introduction: Q&A session with faculty.
Lower limb: fem-pop - paired femorals & challenging legs
Lower limb: calf veins - a magical mystery tour
Iliac veins and IVC - practical tips
Upper limb: arms and neck veins - a pragmatic approach

Technical Exhibition - Lower Hall

Welcome drinks reception

16:45 - 18:30 An opportunity to wind down at the end of the day in an informal setting, join BMUS for a Welcome drinks reception held in the Technical Exhibition.



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Young Investigator Session

The Young Investigator Session is a show-case of the best abstracts submitted by authors who are 39 years old or younger. The best presentation from this session wins the BMUS Young Investigator of the year award and is given the opportunity to present their work at the 2016 Euroson Meeting 26 - 29 October in Leipzig, Germany on behalf of BMUS.

Christopher Miller



Ultrasound in acute cholecystitis - is it as good as we think? C Miller, J Bell, MJ Weston, Leeds Teaching Hospitals Trust

Currently in my second year of radiology training in West Yorkshire, I have an interest in Paediatrics and general Ultrasound. In my spare time I can be found wandering around the Yorkshire Dales and Lake District or if the weather's not too cracking then sat in a pub with a pint!

Parag Raval



Does accuracy of ultrasound-guided corticosteroid injection predict outcome in pain and function in subacromial impingement syndrome? P Raval, N Foster, R Ogollah, A Hall, E Roddy, Keele University

I am currently a core surgical trainee in trauma and orthopaedics. I carried this research out as an academic foundation doctor during my 2 years at the Royal Stoke University hospital and Keele University musculoskeletal division. Although still very junior in the academic and clinical world I have a personal interest in upper limb orthopaedics stemming mainly from rugby related injuries! I enjoy sport both playing and observing and also exploring the world, most recently safarising in Tanzania.

Belinda Gorell



The use of SMI in surveillance of endovascular aneurysm repair (EVAR), B Gorell, University Hospital Wales

My name is Belinda Gorell and I am in my second year of the NHS Scientist Training Programme in Clinical Science, Medical Physics. I am based within Cardiff and Vale University Health Board.

This session takes place on Day 2 – Thursday 10th December 15:30 – 17:00 in Room L.

Steve Rogers



Carotid Plaque Volume: Can it be accurately measured using tomographic (3D) Ultrasound? S Rogers, J Burrough, S Ball, H Mohammad, C McCollum
University Hospital of South Manchester

After reading physiology at the University of Liverpool, Steven worked for BUPA for a brief period following graduation before starting work for Independent Vascular Services Ltd based at the University Hospital of South Manchester (UHSM). Steven is currently completing a PhD in the accuracy, utility and reproducibility of tomographic (3D) ultrasound within vascular surgery at the University of Manchester and is collaborating with clinical partners in Germany. Steven is currently providing clinical support to the company developing the tomographic ultrasound device.

Catherine Payne



Reliability of elastography measures of the Achilles tendon, C Payne,
University of Brighton

Catherine graduated with a BSc (Hons) in Sport Science and continued within academia to complete her MSc in Sport Science in 2007. Following University, Catherine was employed as a Sport Scientist by Lucozade Sport, before joining Nuffield Health as a Senior Health and Wellbeing Physiologist, later becoming the site's Clinic Manager. Catherine returned to academia in 2013 securing a full time Studentship at the University of Brighton under the supervision of Professor Nick Webborn and Dr Peter Watt, examining the clinical applications of shear wave elastography in tendon imaging.

Haniya Kazi



An audit on Ultrasound 'X' marking of site for subsequent aspiration or chest drain insertion remote from the radiology department, H Kazi, N Ahmed,
A Razack, Hull Royal Infirmary

I am one of the second year registrars from Hull and I am extremely excited to be presenting at the BMUS ASM!

Jonathan Mohajer



Comparison of internal carotid artery stenosis grading by CT angiography and Doppler Ultrasound, J Mohajer, K Bryant, ND Pugh, A Gordon, University
Hospital of Wales, Cardiff and Vale UHB

Jonathan Mohajer is a trainee clinical scientist based at Cardiff & Vale University Health Board. Jonathan obtained his Physics BSc from University of Leeds in 2012 and a Medical Radiation Physics MSc from Swansea University in 2014. He became interested in Doppler ultrasound carotid stenosis grading criteria whilst on a rotational training placement with Doppler Ultrasound at University Hospital of Wales, Cardiff, where he became involved in the research activities of the department.

At a Glance DAY 2

DAY 2 - THURSDAY 10th December 2015							
	Assembly Room	Rooms D&C	Room L	Council Chamber	Ferrier Hall	Room B	Room I
				Debates	Practical workshops	Satellite session	Satellite session
09.00 -	Professional Issues 3 - Managing demand	Paediatrics 1- The Paediatric Urinary Tract	Vascular 1 - Carotid		Integrated Training - Head & neck		Therapy Ultrasound (THUGs)
10:30 Morning refreshment break							
11.00 -		Paediatrics 2 - The acute abdomen in children	Vascular 2- Venous compression disorders	Professional Issues 4 Managing demand	Integrated Training - Head & neck continued		Therapy Ultrasound (THUGs)
12:30 Lunch break							
13.30 -	Gynaecology 1 - Current issues around ultrasound of the ovaries	Head & Neck 1 - Salivary glands and the larynx -revisited	Vascular 3 Assessment of non-atherosclerotic diseases		Quality and practical governance practical workshop	CASE - Education and training solutions to the current ultrasound workforce crisis	Therapy Ultrasound (THUGs)
15:00 Afternoon refreshment break							
15:30	Gynaecology 2 - Latest advances in ultrasound of the uterus	Head & Neck 2	Young Investigator session	Carotid debate	Quality and practical governance practical workshop continued	CASE 2	Therapy Ultrasound (THUGs)
17:00 End of Day 2							
19:00 BMUS Gala dinner, National Museum							

Scientific Programme 2015

Day 2 – Thursday 10th December

Plenary 1 - Assembly Room

Professional Issues 3 – Managing demand

09:00 – 10:30 **Chairs** – Mrs Pamela Parker, Hull and East Yorkshire Hospitals NHS Trust, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust

Demand for ultrasound imaging is relentless and rising. In some specialist fields demand has risen by 12% per annum in recent years and in most general imaging departments an annual rise of 5% is not uncommon. The reasons for this are multifaceted and complex but one thing is clear, demand for ultrasound services continues to grow. The ability to deal with this growth effectively is compounded by the national shortage of sonographers, the introduction of more independent service providers (ISP's) under the Any Qualified Provider contracts and a difficulty in departments being able to reject referrals with confidence.

The presentations within this session will review the latest solutions being implemented in a bid to cope with this increasing demand. This will include an overview of the 2015 JOINT SCOR and BMUS PROFESSIONAL STANDARDS DOCUMENT which, in conjunction with the RCR iRefer document, aims to assist departments manage referrals effectively.

This session is aimed at any practitioner undertaking ultrasound practice. This session compliments the following BMUS debate.

- 09:00** **How is the NHS managing demand and the impact on service?** Dr Peter Rodgers, University Hospitals of Leicester NHS Trust
- 09:20** **Walk-in direct access ultrasound service – A means to managing demand?** L Alcock, PC Parker, Hull and East Yorkshire Hospitals NHS Trust
- 09:30** **Managing the service impact of rising demand – the ISP perspective,** Dr Nick Spencer, Mid York NHS Trust
- 09:50** **Education response – what can be done to support service growth?** Prof Sue Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President
- 10:10** **Q&A from presenters and the floor**
- 10:20** **ScOR / BMUS profession standards. Implementation and impact on practice,** Mrs Pamela Parker, Hull and East Yorkshire Hospitals NHS Trust

Gynaecology 1 – Current issues around ultrasound of the ovaries

- 13:30 – 15:00** **Chairs** – Mrs Alison McGuinness, Mid York NHS Trust, Mrs Rachel Wilson, Hull and East Yorkshire Hospitals NHS Trust
- 13:30** **The acute ovary**, Dr Andrea Sanderson, Mid York NHS Trust
- 14:00** **Scanning for the IVF patient**, Prof Sue Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President
- 14:30** **Ultrasound in endometriosis**, Prof Nazar Amso, Cardiff University School of Medicine

Gynaecology 2 – Latest advances in ultrasound of the uterus

- 15:30 – 17:00** **Chairs** – Mrs Alison McGuinness, Mid York NHS Trust, Mrs Rachel Wilson, Hull and East Yorkshire Hospitals NHS Trust
- 15:30** **3D ultrasound of the uterus**, Ms Nicola Kerr, Leeds Hospitals NHS Trust
- 16:00** **One-stop PMB clinic – is it worth it?** Mrs Alison McGuinness, Mid York NHS Trust
- 16:30** **Evaluating the indications for pelvis USS with suspected RPOC**, S Tangudu, Hull and East Yorkshire NHS Trust
- 16:40** **Cervical cancer**, A Harris, City University, London
- 16:45** **A case of hyperreactio luteinalis in early pregnancy complicated by torsion**, E Allen, A Appiah, A Hameed, O Nzelu, Y Sana, Kings College Hospital, London
- 16:50** **A rare case of post- partum secondary amenorrhoea**, B Guruwadayarhalli, N Nunes, West Middlesex University Hospital

Plenary 2 – Rooms D&C

Paediatrics 1 – The Paediatric urinary tract

- 09:00 – 10:30** **Chairs** – Mrs Terry Humphrey, Dr William Ramsden, Leeds Teaching Hospitals

The investigation of urinary tract infection is one of the most frequent indications for ultrasound referral in children. In this session we will start by reviewing imaging guidelines and findings in these patients, followed by a paediatric surgeon's perspective upon those cases requiring operative intervention. The session concludes with a talk on the ultrasound assessment of paediatric renal transplants.

The session is aimed at radiologists, trainees and sonographers with a paediatric interest.

- 09:00** **Surgical treatments in UTI: The paediatric urologist view**, Mrs Aruna Abhyankar, Cardiff & Vale University Hospital

09:30 **The investigation of urinary tract infection in children**, Dr William Ramsden, Leeds Teaching Hospitals

10:00 **Ultrasound of the paediatric renal transplant**, Dr Jim Carmichael, Evelina London Children's Hospital

Paediatrics 2 - The acute abdomen in children

11:00 – 12:30 **Chairs** - Mrs Terry Humphrey, Dr William Ramsden, Leeds Teaching Hospitals

This session will commence with a review of imaging the acute abdomen in children with guidance on the technique and appearances of common conditions such as appendicitis and intussusception. The theme of examining the acute abdomen will be developed further with discussion of the role of CEUS in paediatric abdominal trauma followed by a lecture covering the role of ultrasound in TB and unusual infections in the paediatric abdomen and chest.

This session is aimed at radiologists, trainees and sonographers with a paediatric interest.

11:00 **Ultrasound of the acute abdomen in children**, Mrs Terry Humphrey, Leeds Teaching Hospitals

11:30 **The role of CEUS in paediatric abdominal trauma**, Dr Maria Sellars, King's College Hospital, London

12:00 **The role of ultrasound in the diagnosis of paediatric tuberculosis**, Dr Karen Chetcuti, Alder Hey Children's Hospital, Liverpool

Head & neck 1 - Salivary glands larynx and thyroid

13:30 – 15:00 **Chairs** – Dr Rhodri Evans, Morriston Hospital, Swansea, Mrs Catherine Kirkpatrick, United Lincolnshire Hospitals NHS Trust

Ultrasound is well established in the initial triage of salivary masses and users of Ultrasound will be familiar with the many benefits of using Ultrasound in this field. This session however will explore the more advanced areas of ultrasound practice in which Ultrasound can yield specific diagnostic information which will aid diagnosis and help in the management of patients. The speakers will highlight key areas that need to be understood in order to understand the more complex nature of some of the conditions that afflict the salivary glands and larynx.

13:30 **Salivary glands - what to look for and how**, Dr Nick Drage, Dental School, University Hospital of Wales, Cardiff

14:00 **The larynx-how I do it and why?** Dr Tim Beale, University College Hospital, London

14:30 **Thyroid masses**, Dr Steve Colley, Queen Elizabeth Hospital, Birmingham

Head & neck 2**15:30 – 17:00****Chairs** – Dr Rhodri Evans, Morriston Hospital, Swansea, Mrs Catherine Kirkpatrick, United Lincolnshire Hospitals NHS Trust

Unfortunately Prof Anil Ahuja is unable to attend BMUS this year so the keynote lecture will be given instead by Dr Rhodri M Evans.

15.30

Head and Neck Ultrasound: the where and now, back to basics? Dr RM Evans, Morriston Hospital, Swansea

16:30

Lumps and locations, Dr Rhian Rhys, Royal Glamorgan Hospital, Llantrisant

An interactive question and answer session to end the day, which will stimulate, entertain and educate. Prizes will be awarded for correct, challenging and entertaining answers!

Plenary 3 – Room L**09:00 – 10:30 Vascular 1 – Carotid****Chairs** – Mrs Tracey Gall, University Hospital South Manchester, Mrs Teresa Robinson, Bristol Royal Infirmary

The vulnerable plaque: This session aims to consider the concept of the vulnerable carotid plaque. Plenary lectures will discuss the importance of plaque morphology, stresses and strains within the plaque and plaque blood flow, with a view to establishing their importance in deciding what is likely to represent a vulnerable plaque.

09:00

The vulnerable plaque and plaque morphology, Prof Neil Pugh, University Hospital of Wales, Cardiff

09:20

Ultrasound imaging of the carotid plaque: from B-mode to shear wave elastography, Dr Kumar Ramnarine, University Hospitals of Leicester NHS Trust

09:40

Blood flow in carotid plaques / vasa vasorum, Prof Edward Leen, Hammersmith Hospital & Imperial College, London

10:00

Comparison of internal carotid artery stenosis grading by CT angiography and Doppler ultrasound, J Mohajer, K Bryant, ND Pugh, A Gordon, University Hospital of Wales, Cardiff and Vale UHB

10:10

Carotid plaque volume: Can it be accurately measured using tomographic (3D) ultrasound? S Rogers, J Burrough, S Ball, H Mohammad, C McCollum University Hospital of South Manchester

Vascular 2 – Venous compression disorders

11:00 – 12:30 **Chairs** - Prof Neil Pugh, University Hospital of Wales, Cardiff, Dr Kumar Ramnarine, University Hospitals of Leicester NHS Trust

Getting back to basics, the vascular sessions this year have been divided into carotid, venous and arterial territory ultrasound. This session is looking for some good abstract submissions of all things venous in nature whilst the focus of the plenary lectures will be venous compression disorders, examining presentation, diagnosis and management of syndromes such as May-Thurner and Paget-Schroetter.

11:00 **Diagnosis and management of May-Thurner syndrome**, Dr Raza Alikhan, University Hospital Wales, Cardiff

11:20 **Ultrasound assessment of upper limb venous system**, Mrs Teresa Robinson, Bristol Royal Infirmary

11:40 **Klippel-Trenaunay syndrome - comparison of two cases**, Mrs Tracey Gall, University Hospital South Manchester

12:00 **Microbubbles – imaging the Peripheral Vascular Tree – a feasibility study**, A Smith, PC Parker, OR Byass, K Chiu, Hull and East Yorkshire NHS Trust

12:10 **Is D-dimer measurement a clinically useful screening test for the assessment of lower limb Deep Vein Thrombosis**, P Williams, ND Pugh, R Morris, C Bryant, D Coleman, Cardiff and Vale UHB

Vascular 3 - Assessment of non-atherosclerotic diseases

13:30 – 15:05 **Chairs** - Mrs Tracey Gall, University Hospital South Manchester, Prof Neil Pugh, University Hospital of Wales

The aims of this session are to examine some of the arterial complaints caused by non-atherosclerotic diseases such as popliteal entrapment, cystic adventitial disease and thoracic outlet syndrome. We will be reviewing the aetiology, protocols for ultrasound diagnosis and supporting physiological assessments as well.

13:30 **Cystic adventitial disease – a case presentation**, Miss Helen Dixon, King's College Hospital, London

13:55 **Musculature of popliteal fossa for assessment of popliteal entrapment**, Mrs Lorelei Waring, University of Cumbria

14:20 **Management and treatment of popliteal entrapment**, Mr Ian Williams, University Hospital, Cardiff

14:40 **Dynamic and morphologic evaluation of erectile dysfunction on penile Doppler sonography and contrast cavernosography**, I Anas, AM Tabari, Bayero University / Aminu Kano Teaching Hospital, Nigeria

14:50 **Colour Doppler ultrasound in the assessment of focal testicular lesions: influence of lesion size and pattern of vessel distribution in malignant and benign lesions**, EC Bartlett, ME Sellars, JL Clarke, SL Sriprasad, GH Muir, PS Sidhu, King's College Hospital NHS Trust, London

15:00 **AV fistula secondary to stab wound: a case study of a patient presenting with DVT**, A Pellew-Nabbs, AVS, Independent Vascular Services Ltd / Warrington & Halton Hospitals Foundation Trust

Young Investigator Session 2015

15:30 – 17:00 Chairs – Dr Carmel Moran, University of Edinburgh, Mrs Terry Humphrey, Leeds Teaching Hospitals

7 chosen presenters under the age of 39 will battle it out to become the UK representative at Euroson 2016 in Leipzig.

15:30 **Ultrasound in acute cholecystitis - is it as good as we think?** C Miller, J Bell, MJ Weston, Leeds Teaching Hospitals Trust

15:42 **Does accuracy of ultrasound-guided corticosteroid injection predict outcome in pain and function in subacromial impingement syndrome?** P Raval, N Foster, R Ogollah, A Hall, E Roddy, Keele University

15:54 **The use of SMI in surveillance of endovascular aneurysm repair (EVAR)**, B Gorell, ND Pugh, University Hospital Wales

16:06 **An audit on Ultrasound 'X' marking of site for subsequent aspiration or chest drain insertion remote from the radiology department**, H Kazi, N Ahmed, A Razack, Hull Royal Infirmary

16:18 **Carotid plaque volume: Can it be accurately measured using tomographic (3D) ultrasound?** S Rogers, J Burrough, S Ball, H Mohammad, C McCollum, University Hospital of South Manchester

16:30 **Reliability of elastography measures of the Achilles tendon**, C Payne, University of Brighton

16:42 **Comparison of internal carotid artery stenosis grading by CT angiography and Doppler ultrasound**, J Mohajer, K Bryant, ND Pugh, A Gordon, University Hospital of Wales, Cardiff and Vale UHB

Wednesday

Thursday

Friday



Council Chamber

Professional Issues 4 – Managing demand debates

11:00 – 12:30 **Chairs** – Dr Simon Freeman, Derriford Hospital, Plymouth, Mrs Pamela Parker, Hull and East Yorkshire Hospitals NHS Trust

The magnificent debating chamber of Cardiff City Hall provides an outstanding and perfect venue for the return of the BMUS debate.

This session is aimed at any practitioner undertaking ultrasound practice. It complements the Managing Demand professional issues session on day 2.

This year's motions are:

Debate 1: This house believes outsourcing ultrasound services to independent service providers leads to better service delivery.

11:00 – 11:15 **FOR** - Dr Ian Francis, Business Strategy Director, Medical Imaging Partnership, West Sussex
 Seconder - Dr Nick Spencer, Mid York NHS Trust

11:15 – 11:30 **AGAINST** - Dr Peter Rodgers, University Hospitals of Leicester NHS Trust
 Seconder - Mrs Jane Smith, Leeds Teaching Hospitals NHS Trust

11:30 – 11:45 **Debate and vote**

Debate 2: This house believes that undergraduate training of sonographers will relieve the current recruitment and retention staffing issues.

11:45 – 12:00 **FOR** - Mrs Alice Turner, University Hospital North Midlands / Royal Stoke University Hospital

12:00 – 12:15 **AGAINST** - Mrs Jean Wilson, University of Leeds

12:15 – 12:30 **Debate and vote**

Vascular – carotid debate

15:30 – 17:00 **Chairs** - Mrs Teresa Robinson, Bristol Royal Infirmary, Mrs Tracey Gall, University Hospital South Manchester

This house believes that we should follow SVT recommendations and measure the PSV, PSV ratio and the St Mary's ratio when assessing the degree of carotid artery stenosis on ultrasound.

15:30 **FOR** – Dr Crispian Oates, Freeman Hospital, Newcastle

16:00 **AGAINST** - Prof Neil Pugh, University Hospital of Wales, Cardiff

16:30 **Debate and vote**

Practical Workshop Sessions - Ferrier Hall

	Head & neck integrated training
09:00 – 12:30	<p>Led by: Dr Rhodri Evans, Morriston Hospital, Swansea, Dr Rhian Rhys, Royal Glamorgan Hospital, Llantrisant</p>
	<p>Faculty - Nick Drage, University of Wales, Cardiff, Tim Beale, University College Hospital, London, Lol Berman, Addenbrooke's Hospital, Cambridge, Catherine Kirkpatrick, Lincoln County Hospital, Jean Bainbridge, Hull and East Yorkshire NHS Trust</p>
	<p>The anatomy of the head and neck will be taught through a series of standard sweeps through the neck.</p>
	<p>The neck will be systematically covered outlining the key structures that need to be identified, starting with the submental triangle and ending with the larynx.</p>
	<p>Tips and pitfalls will be highlighted allowing a comprehensive scanning technique of the neck to be mastered under the guidance of the faculty.</p>
	Quality and practical governance practical workshop
13:30 – 17:00	<p>Led by – Mrs Pamela Parker, Hull and East Yorkshire NHS Trust, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust</p>
	<p>Faculty - Kim Aldworth, Hull and East Yorkshire NHS Trust, Kathryn Ruddy, Hull and East Yorkshire NHS Trust, Janet Taylor, Lincoln County Hospital, Sophie Cochrane, Pilgrim Hospital, Boston, Paul Williams, Doppler Ultrasound, Cardiff</p>
	<p>Medical imaging departments and services are increasing being scrutinised. With the advent of the RCR Imaging Services Accreditation Scheme (ISAS) and Care Quality Commission (CQC) inspections specifically reviewing imaging services there has never been a greater need for robust governance and quality processes and documentation. The aim of this workshop is to give advice and practical experience in the key aspects of governance and quality measures in ultrasound. The BMUS QA guidelines will be presented and there will be an opportunity for delegates to gain experience and confidence in undertaking these tests with a team of experts. The latest in infection control guidance will be presented as well as an overview of governance requirements for your ultrasound service.</p>
	<p>The faculty includes physicists and sonographers involved in everyday ultrasound practice ensuring this workshop is relevant, practical and fun.</p>
	<p>This session is aimed at any practitioner undertaking ultrasound practice.</p>
13:30 – 13:45	<p>Governance in ultrasound, what why how and when, Mrs Pamela Parker, Hull and East Yorkshire NHS Trust</p>
13:45 – 14:10	<p>QA - what, why, how and when, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust</p>
14:10 – 15:00	<p>Practical demonstrations of QA tests, Faculty</p>

- 15:30 – 15:55 **Microbial issues for ultrasound imaging**, Prof Sue Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President
- 16:00 – 17:00 **Practical demonstrations of QA tests**, Faculty

Satellite session - Room B

CASE - Education and training solutions to the current ultrasound workforce crisis

- 13:30 – 15:00** **Chairs** – Mr Simon Richards, Teesside University, Dr Vivien Gibbs, University of the West of England, Bristol

The traditional postgraduate model of ultrasound education and training is no longer able to keep pace with service delivery demands and the associated need for a larger sonographic workforce. The presentations within this session will explore some of the education and training solutions to the current workforce crisis which may alleviate some of the demands placed upon clinical placements whilst enhancing the students' educational experience. This session is aimed at any practitioner/educator with an interest in the design and delivery of ultrasound education.

- 13:30 **Title TBC**, Sue Hill, Health Education England
- 14:00 **The future of sonographic education and the University of Cumbria's experience of developing a graduate entry 2-year accelerated MSc in Clinical Ultrasound**, Mr Gareth Bolton, University of Cumbria
- 14:20 **The role and value of Focused Ultrasound courses in meeting service delivery demands**, Mrs Gill Dolbear, Canterbury Christ Church University
- 14:40 **Development of a draft career progression framework for ultrasound – a West Midlands approach**, L Stewart, Health Education West Midlands
- 14:50 **"Come fly with me and become a sonographer!"** C Oates, Freeman Hospital, Newcastle

CASE 2

- 15:30 – 17:00** **Chairs** - Mrs Gill Dolbear, Canterbury Christ Church University, Mr Gareth Bolton, University of Cumbria
- 15:30 **The Northern Regional Simulation Centre – experiences so far!** Mr Simon Richards, Teesside University
- 16:00 **The role and value of ultrasound simulation in formative and summative assessment**, Dr Vivien Gibbs, University of the West of England, Bristol
- 16:30 **Discussion**

Satellite session - Room I

Therapy Ultrasound (THUGs)

09:00 - 17:00 Led by: Prof Gail ter Haar, Institute of Cancer, Sutton

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Wednesday

Thursday

Friday





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Keynote Lectures

Donald MacVicar Brown

Each year BMUS hosts the Donald, MacVicar Brown Lecture at its Annual Scientific Meeting, to commemorate and celebrate the origins of medical ultrasound.

This plenary keynote lecture honours the 1958 publication of the Ian Donald, John MacVicar and Tom Brown paper in the British journal 'The Lancet'. their paper - 'Investigation of Abdominal Masses by Pulsed Ultrasound' - is credited with transforming maternity care.

The lecture is delivered by an invited speaker, recognised by BMUS for their inspirational work and contribution to medical ultrasound practice.

The 2015 lecture '**The Joy of Research; is Necessity the Best Mother of Invention?**' will be delivered by Prof Peter Wells, Cardiff in the Assembly Room on **Tuesday 11th December at 15:30.**



Professor Peter N.T. Wells is one of the most well-known and highly regarded figures in the world of medical ultrasound. After education at a highly respected Bristol school he was lured temporarily in 1954 into the

world of advanced technology offered by GEC, a prestigious electrical company. There he worked as a student apprentice and studied at the University of Aston. In 1958, he obtained the BSc in Electrical Engineering. He soon realised that medical physics presented a worthwhile career and he attended a course held at the General Hospital in Bristol by

Dr Herbert Freundlich. He took up appointment as a Physicist in the Bristol General Hospital with a special interest in ultrasound.

A treatment for Meniere's disease was under evaluation by the local ENT surgeons. It involved irradiating the semi-circular canals with ultrasound. The existing equipment was unsatisfactory and Peter was given the task to investigate the controlled production of ultrasound. He successfully developed not only a stable generator, but also a variety of measurement techniques and was awarded an M.Sc. for his thesis. His PhD came from investigation into the "biological effects of ultrasound", involving the study of nerve conduction in the giant squid axon. At that time interest in diagnostic uses of ultrasound was increasing and the application ideas were only limited by the available technology. Peter Wells with Ken Evans and Frank Ross built one of the World's first articulated arm B-scanner in 1964, modelled after the electronics from the bulky Dasonograph from the Donald group in Glasgow. He also constructed the first water-immersion automated ultrasonic breast scanner and developed the first catheter mounted endosonographic probe outside of Japan. In cardiology an accurate time-position recording instrument was built. Most of these devices were in clinical uses for many years until commercially available equipment appeared to replace them.

In 1969 he was one of three authors to demonstrate the feasibility of pulsed Doppler and became the first person to describe the directivities of Doppler transducers. His research on the applications of doppler ultrasound has continued until his retirement. His other important pioneering work included the design of dynamic focusing with annular array transducers, acoustic speckle and the

measurement of blood flow volume rate and the quantitation of Doppler blood flow signals

Gray-scale ultrasound was reinvented in the 1970s and Professor Wells was again at the forefront providing sound experimental reasons for its implementation. The boom in diagnostic use which followed was accompanied by an increasing awareness of the possibility of biological hazard resulting from scans. Again help was forthcoming in the form of a chart derived from a review of world literature. This chart formed the basis of several national standards and contributed significantly to the "100milliwatt guideline".

In 1972, he was appointed Professor of Medical Physics at the Welsh National School of Medicine in Cardiff. After a brief tenure, Professor Wells replaced Herbert Freundlich on retirement as Head of the Bristol Medical Physics Department. He returned to Bristol as Area Physicist and, in 1978, he was awarded a DSc by Bristol University. In 1982 he became Chief Physicist at United Bristol Healthcare NHS Trust, the post he held until his retirement.

Professor Wells has contributed to more than 15 books and 250 scientific articles, and is recognised as an exceptional mentor, teacher, scientist, researcher and friend. He has lectured extensively in the United Kingdom and in over 20 countries abroad. He has been President of the British Medical Ultrasound Society, the British Institute of Radiology, and the Institute of Physics and Engineering in Medicine. He has chaired the Science Council's Science in Health Group, Radiation and Oncology Congresses, and the Royal Academy of Engineering's Focus on Biomedical Engineering. His contribution to medical ultrasound has been outstanding, and this has been recognised by the honorary memberships and fellowships conferred upon him, including honorary membership of the Royal College of Radiologists and honorary fellowships of the Australasian College of Physical Scientists in Medicine, the American Institute of Ultrasound in Medicine, and the Fellowship of Engineering.

Peter Twining memorial lecture

A tribute to Dr Peter Twining Consultant Radiologist, Queens Medical Centre, Nottingham

The sudden and unexpected loss of Peter Twining in July 2009 was deeply felt by both friends and colleagues. The tremendous enthusiasm and considerable expertise he brought to his professional field remains well recognised. Very much admired by his colleagues and friends he will be remembered as a very special person who gave so much for the benefit of others and in such an unassuming, genuine manner. His enthusiasm and willingness to help, teach and inspire others in the field of ultrasound was second to none.

Peter was an internationally acclaimed clinician with a particular interest in medical ultrasound. He was well known to many in

the ultrasound community for his particular expertise in pre-natal diagnosis and general medical ultrasound. As a mark of respect and an ongoing tribute to Peter's tireless work for the Society, BMUS created a 'memorial obstetric lecture'.

This lecture is presented by an individual who has made a significant contribution to medical ultrasound in the field of obstetrics. The presenter is awarded the 'Peter Twining Medal' which Hitachi Aloka Medical has sponsored since its creation in 2009.

Dr Trish Chudleigh, Cambridge will deliver the lecture for 2015 in the Assembly Room **on Friday 11th December at 11:00.**



Dr Chudleigh is a sonographer with over 30 years of clinical experience in obstetric ultrasound. She graduated from Liverpool University with a degree in zoology and began her ultrasound career as a medical physics technician before moving to King's College Hospital, London where she worked as Stuart Campbell's research technician for many years.

She was awarded a PhD by the Faculty of Medicine, Kings College London, in 2000. She has been

involved in the academic and clinical teaching of ultrasound for almost as long as she has been scanning, and is the co-author of what has become one of the standard text books for students of obstetric ultrasound in the UK. The 4th edition of Obstetric Ultrasound – How, Why and When, now expanded to include gynaecological imaging, is currently in press. She has co-authored national Guidelines and Standards relating to ultrasound practice and continues to contribute significantly to the national Down's Screening and Fetal Anomaly Screening programmes in the UK.

Trish is currently employed by the Cambridge University Hospitals NHS Foundation Trust as Lead Sonographer and Advanced Practitioner Manager of the Ultrasound Department at the Rosie Hospital and has held this post since February 2006.



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At a Glance DAY 3

DAY 3 - FRIDAY 11th December 2015						
	Assembly Room	Rooms D&C	Room L	Council Chamber	Ferrier Hall	Room B
				Debates	Practical workshops	Satellite session
9.00am -	Obstetrics 1 - Fetal cardiac anomalies and FASP		Outreach 09.30 start IDIRISHA Asian Outreach projects	MSK 1 - Fundamentals	Integrated Training - Advanced MSK	Translational ultrasound imaging Full day course
10.30am Morning refreshment break						
11.00am -	Obstetrics 2 - Peter Twining Lecture	MSK 2 - Fundamentals continued	Image Review		Integrated Training - Advanced MSK	Translational ultrasound imaging continued
12.30am Lunch break						
1.30pm -	Obstetrics 3 - "Challenges in obstetric ultrasound - placenta, fetal" CNS and skeletal dysplasias	MSK 3 - Advanced MSK imaging	General imaging - Conundrums in ultrasound		Integrated Training - Basic MSK	Translational ultrasound imaging continued
3.00pm Afternoon refreshment break						
3.30pm	Obstetrics 4 - Fetal surgery	MSK Advanced MSK imaging continued			Integrated Training Basic MSK continued	Translational ultrasound imaging continued
5pm End of day 3						

Scientific Programme 2015

Day 3 – Friday 11th December

Plenary 1 - Assembly Room

Obstetrics 1 - Fetal cardiac anomalies and FASP

09:00 – 10:30 **Chairs** - Mr Tim Overton, St Michael's Hospital, Bristol, Dr Trish Chudleigh, Addenbrooke's University Hospitals NHS Trust, Cambridge

This session focuses on fetal anomalies, with a discussion of fetal cardiac abnormalities and an update on FASP.

09:00 **Improving the routine detection of fetal cardiac anomalies**, Dr Orhan Uzun, Cardiff and Vale UHB

09:45 **Fetal Anomaly Screening Programme Update**, Mr Pranav Pandya, University College Hospital, London

Obstetrics 2

11:00 – 12:30 **Chairs** - Mr Tim Overton, St Michael's Hospital, Bristol, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust

11:00 **Peter Twining Memorial Lecture**
Sponsored by Hitachi Aloka Medical Systems

Screening for serious fetal cardiac anomalies – friend or foe? Dr Trish Chudleigh, Addenbrooke's University Hospitals NHS Trust, Cambridge

11:45 **The impact of training and policy on the increased detection rate of cardiac anomalies in the fetus: the Welsh experience**, J Kennedy¹, E Kealaher¹, O Uzun², ¹Cardiff University, ²Cardiff & Vale UHB

11:55 **Accreta - How confident can you be?** P McTigue, A McGuinness, Mid Yorks NHS Trust

12:05 **A case of bilateral theca luteal cysts in pregnancy**, L Alcock, C Duthie, Hull and East Yorkshire Hospitals NHS Trust

12:15 **A Pictorial Review of Scar endometriosis of the Caesarean section and its presentation as mimics of acute abdominal emergencies**, J Furaide, R Mohanty, M Funi, H Butt, A Ashfaq, L Khalid, London Northwest Hospitals NHS Trust

Obstetrics 3 - Challenges in obstetric ultrasound - placenta, fetal CNS and skeletal dysplasias

- 13:30 – 15:00** **Chairs** - Mr Tim Overton, St Michael's Hospital, Bristol, Mrs Alison McGuinness, Mid Yorks NHS Trust
- This session addresses some of the challenges in Obstetric Ultrasound, covering scanning of the placenta, fetal CNS and skeletal dysplasias.
- 13:30** **From praevia to accreta – challenges in placental scanning**, Mr George Attilakos, UCH London
- 14:00** **Challenges and pitfalls in scanning the fetal CNS**, Mr Alec McEwan, Queen's Medical Centre, Nottingham
- 14:30** **Skeletal dysplasias**, Miss Rachel Liebling, St Michael's Hospital, Bristol

Obstetrics 4 – Fetal surgery

- 15:30 – 17:00** **Chairs** – Mr Tim Overton, St Michael's Hospital, Bristol, Mrs Alison McGuinness, Mid Yorks NHS Trust
- This session covers the challenging area of fetal surgery, followed by case based discussions in Fetal Medicine.
- 15:30** **Fetal surgery – a realistic challenge?** Mr Ruwan Wimalasundera, UCH London
- 16:10** **Case based discussions in fetal medicine**, Mr Tim Overton, St Michael's Hospital, Bristol

Plenary 2 - Council Chamber

MSK 1 – Fundamentals

- 09:00 – 10:30** **Chairs** – Mrs Alison Hall, Keele University/The Royal Wolverhampton NHS Trust, Mr Steve Savage, Yeovil District Hospital
- This session is aimed at those with an interest in MSK ultrasound, but little practical experience.
- The session aims to educate delegates in rotator cuff pathology and cover ultrasound appearances of benign and malignant 'lumps and bumps'. Training in ultrasound of the shoulder and governance in point of care ultrasound will be discussed and the unique advantages of dynamic ultrasound assessment.
- The session would be useful for all ultrasound practitioners with a good back ground of ultrasound instrumentation, but little experience in musculoskeletal ultrasound. It would also be useful for those requiring more background in the development of ultrasound services.
- 09:00** **Shoulder ultrasound training – a comprehensive approach to supporting the trainee sonographer and their trainer**, Mr Mike Smith, Cardiff University

- 09:30 **The mystery of rotator cuff pathology – diagnosis and management**, Mr Timothy Matthews, University Hospital of Wales, Cardiff
- 10:00 **Don't forget you can move it!** Dr Mark Maybury, Heart of England NHS Trust

Plenary 2 - Rooms D&C

MSK 2 – Fundamentals continued

- 11:00 – 12:30** **Chairs** - Mrs Alison Hall, Keele University/The Royal Wolverhampton NHS Trust, Mr Steve Savage, Yeovil District Hospital
- 11:00 **Scanning lumps and bumps – when should the alarm bells ring?** Dr Simon Davies, Morriston Hospital, Swansea
- 11:30 **Integration of musculoskeletal ultrasound imaging into patient assessment**, S Innes, University of Essex
- 11:40 **Does accuracy of ultrasound-guided corticosteroid injection predict outcome in pain and function in subacromial impingement syndrome?** P Raval, N Foster, R Ogollah, A Hall, E Roddy, Keele University
- 11:50 **Ultrasound-guided dry needling and injection of the deep layer for Plantar Fasciitis: Results in our patients group and review of literature**, M Thavendran, T Akbari, H Ali, R Mohanty, M Johnson, A Sahu, London Northwest Hospitals NHS Trust
- 12:00 **Clinical governance in Point of Care ultrasound – Challenges in developing a Point of Care Service**, Mr Gafin Morgan, Ms Lisa Medhurst, Ms Helen Welch, Prince Charles Hospital & Royal Glamorgan Hospital, Cwm Taf Health Board

MSK 3 – Advanced MSK imaging

- 13:30 – 15:00** **Chairs** – Mrs Nicki Delves, Royal Surrey County Hospital NHS Foundation Trust, Mr Steve Duffy, Norfolk & Norwich University NHS Trust

This session is aimed at those who already work in MSK ultrasound, wishing to further and broaden their experience. It is suitable for radiologists, registrars, sonographers, physiotherapists, rheumatologists and orthopaedic surgeons with experience in musculoskeletal ultrasound.

The speakers in this session reflect the diversity of professions now using ultrasound both for diagnostic and therapeutic procedures. Speakers include sonographers, radiologists, rheumatologists and orthopaedic surgeons/sports physicians.

- 13:30 **Advanced groin ultrasound: Difficult hernias, post op recurrence and alternative diagnoses**, Dr Peter Mullaney, University Hospital of Wales, Cardiff
- 14:00 **US guided MSK injections - the evidence?** Dr Phillip Wardle, Royal Glamorgan Hospital
- 14:30 **Ultrasound guided interventions in the foot and ankle**, Dr Andrew Carne, Royal Surrey County Hospital NHS Foundation Trust

MSK 4 – Advanced MSK imaging continued

-
- 15:30 – 17:00** **Chairs** – Mrs Nicki Delves, Royal Surrey County Hospital NHS Foundation Trust, Mr Steve Duffy, Norfolk & Norwich University NHS Trust
- 15:30** **Ultrasound in the diagnosis and assessment of RA**, Dr Robert Thompson, Aintree Hospital, Liverpool
- 16:00** **Impact of time of day on measures of Achilles tendon stiffness using shear wave elastography**, C Payne, University of Brighton
- 16:10** **Reliability of elastography measures of the Achilles tendon**, C Payne, University of Brighton
- 16:20** **The use of diagnostic imaging in Rugby World Cup year: WRU National Team doctor's perspective**, Dr Geoff Davies, Welsh Rugby Union

Plenary 3 - Room L**Outreach projects - iDirisha and Asian outreach**

-
- 09:30 – 10:30** **Chairs** – Dr Rhodri Evans, Morriston Hospital, Swansea, Dr Nick Dudley, United Lincolnshire Hospitals NHS Trust

BMUS is proud to be an active and supportive participant of this joint collaborative project which is designed to reduce maternal mortality within East Africa. Maternal mortality is one of the biggest factors in reducing life expectancy in East Africa and this project aims to address the issue through innovative satellite technology facilitating the use of Ultrasound in remote communities and facilitate improved antenatal care.

BMUS members will have the opportunity to be involved in teaching projects, fieldwork, and design of teaching modules that can be transmitted via satellite.

The two projects below will be discussed.

- 09:30** **iDirisha Project: Tele-Radiology and education - maternal health benefits in East Africa**, Dr Ian Francis, Business Strategy Director, Medical Imaging Partnership, West Sussex
- 10:00** **Asian (Indonesia, Philippines & Nepal) outreach**, Prof Sue Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President

Image review session

-
- 11:00 – 12:30** **Led by:** Dr Simon Freeman, Mr Peter Cantin, Derriford Hospital, Plymouth

This interactive session is aimed at sonographers and radiology registrars wishing to refine their general ultrasound observational skills and knowledge.

The session will be led by a faculty of expert sonographers and radiologists working with delegates in small groups and is intended to be instructive and fun.

General imaging – conundrums in ultrasound

- 13:30 – 15:00** **Chairs** – Dr Adrian Lim, Imperial College/ Charing Cross Hospital, London, Dr Simon Freeman, Derriford Hospital, Plymouth
- 13:30** **Is patient preparation still necessary for an ultrasound of the abdomen or pelvis?**
Dr Mary Roddie, Imperial College Healthcare NHS Trust
- 13:55** **What is a normal lymph node ultrasonically?** Dr Keshthra Satchithananda, King's College Hospital NHS Foundation Trust, London
- 14:20** **What to do with GB polyps and wall thickening,** Dr Tony Higginson, Queen Alexandra Hospital, Portsmouth
- 14:45** **Does Ultrasound have value in the management of patients with elevated ALT alone?**
P Rodgers¹, ²J Smith, ¹Leicester royal infirmary, ²Leeds Teaching Hospitals NHS Trust

Practical Workshop Sessions - Ferrier Hall

Advanced MSK hands-on workshop

- 09:00 – 12:30** **Led by** – Mrs Nicki Delves, Royal Surrey County Hospital NHS Foundation Trust

This workshop is intended for those with sound knowledge of ultrasound instrumentation and basic MSK scanning techniques, who are extending their scope of practice.

Faculty – Peter Mullaney, University Hospital of Wales, Cardiff, Dr Phillip Wardle, Royal Glamorgan Hospital, Andrew Carne, Royal Surrey County Hospital NHS Foundation Trust, Robert Thompson, Aintree Hospital, Liverpool, Nicki Delves, Royal Surrey County Hospital NHS Foundation Trust, Steve Duffy, Norfolk & Norwich University NHS Trust, Rachel Wilson, Hull and East Yorkshire Hospitals NHS Trust, Katie Simm, St Helens and Knowsley Hospitals NHS Trust

Fundamentals of MSK hands-on workshop

- 13:30 – 17:00** **Led by** – Mrs Alison Hall, Keele University/ The Royal Wolverhampton NHS Trust

This workshop is aimed at those with sound knowledge of ultrasound instrumentation but little or no experience in MSK U/S scanning.

Faculty – Mark Maybury, Heart of England NHS Trust, Simon Davies, Morriston Hospital, Swansea, Clare Drury, Hull and East Yorkshire Hospitals NHS Trust, Lorelei Waring, University of Cumbria, Steve Savage, Yeovil District Hospital, Mike Smith, Cardiff University

Satellite Session - Room B

Inaugural translational ultrasound imaging day

- 09:30 – 16:30** **Led by** – Dr Carmel Moran, University of Edinburgh
- 10:00** **Microfluidics generated microbubbles for accelerated sonothrombolysis with application in stroke**, Prof John Hossack, University of Virginia
- 10:30** **Integration of Tomographic Ultrasound into both preclinical and clinical optoacoustic imaging systems**, Dr Stefan Morscher, iThera Medical and Institute of Biological and Medical Imaging, Helmholtz Centre
- 11:30** **Assessment of novel therapeutics for abdominal aortic aneurysm with 3D ultrasound in mice**, Dr. Marc Bailey, Leeds University
- 12:00** **Translating photoacoustic imaging for clinical application**, Dr Jeff Bamber, Institute of Cancer Research, Sutton, Surrey
- 14:00** **Sounding out Bubbles: ultrasound triggered drug delivery for cancer therapy**, Dr Louise Coletta, Leeds University
- 14:30** **Interrogating response to approved anti-angiogenics in oncology using pre-clinical ultrasound and multi-modality imaging**, Dr. Annette Byrne, Royal College of Surgeons in Ireland
- 15:30** **Metastatic status of sentinel lymph nodes in melanoma using integrated optoacoustic/ultrasound (OPUS) imaging**, Dr Joachim Klode, University Hospital Essen
- 16:00** **Photoacoustics**, Dr Jithin Jose, Visualsonics





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Poster Exhibition 2015

Quality and governance

1. **Is there a relationship between ultrasound scanning ability (sonography) and visuospatial perception or psychomotor ability?** E Chapman, Scanavia Ltd. Edinburgh

Is there a relationship between ultrasound scanning ability (sonography) and visuospatial perception or psychomotor ability?

Getting the right people for training presents challenges for recruiters. Trainee selection for ultrasound training programs may be enhanced through the identification of potential evaluations that could be implemented at the selection stage. Competent sonography includes a unique combination of skills including visuospatial perception and psychomotor skills not yet defined. Little is known about the relationship between these abilities and scanning ability. This feasibility study explored possible relationships.

A sample of thirty experienced sonographers and thirty trainees before and after training were administered five visuospatial perception tests, two psychomotor tests and an Obstetric Structured Assessment Test (OSAT) to evaluate scanning ability. The two psychomotor tests employed measured dexterity for gross movement of arms, hands, and fingers, fingertip dexterity and hand to eye coordination or speed and accuracy of hand movement.

No significant relationship between trainees' visuospatial ability or psychomotor abilities and scanning abilities were found. The results for visuospatial perception tests suggested that three of the tests were influenced by sonography training so they were not measuring innate skills. However, two of the tests were not influenced by training therefore they may measure the innate skills of sonographers and therefore may be useful to identify those trainees who may benefit from more intense training and support. The ranges of scores for each of the eight tests for the profession of sonography were established including a measure of dexterity for gross movement of arms, hands, and fingers and fingertip dexterity for this particular group, adding to the current body of knowledge in this area.

Performance on the OSAT combining all the skills required for sonography pre-training gave the best indication of post training scanning performance so this may be a useful tool for initial assessment of potential trainees, however abilities require further investigation.

2. **One year, one Consultant Sonographer and 10,000 ultrasound examinations,** A McGuinness, Mid Yorkshire Hospitals NHS Trust

Background:

At the author's Trust, all newly qualified sonographers have a six month probationary period and during that time all the non-obstetric examinations they perform are double reported. Historically this was undertaken by Consultant Radiologists. But over the last 5 years the number of Radiologists with a special interest in ultrasound has diminished and in this Trust, the role has been transferred to a Consultant Sonographer.

Method:

Since 2013, 9 newly qualified staff have been appointed at this Trust and between 1st April 2014 and 31st March 2015 the Consultant Sonographer double reported almost 10,000 examinations. This presentation will outline the issues encountered and discuss the potential pros and cons associated with this change in roles.

Results:

A breakdown of the examinations will be provided and examples of common issues and discrepancies will be discussed along with the methods used for mentoring and ensuring these newly qualified sonographers achieve and maintain competency in independent reporting.

3. **Direct Entry Ultrasound – Changing the face of ultrasound training**, S Smart, L Waring, G Bolton, University of Cumbria

Background and purpose of study:

There is a well-documented crisis within the ultrasound workforce in the UK due to a shortage of qualified sonographers in addition to increased workloads because of expanding services and working hours. This is leading to increasing difficulties for many NHS Trusts in meeting the demands on Ultrasound Departments. There have been many consultations over the last 10 – 15 years on this issue, and it is clear that there is no quick fix for this problem. However failure to address this current crisis will mean a number of risks will continue to exist and further manifest themselves. Several models of Sonographic Education have been proposed offering both long term and short term solutions to the issue and the University of Cumbria through close consultation with their local stakeholders have spent the last 12 months developing a full time Direct Access MSc in Medical Ultrasound Programme to run in conjunction with the traditional part time route open to current healthcare practitioners.

Methods:

Following a sonography workforce meeting held in Manchester in November 2014 in which HENW highlighted the local issues with sonographer shortages, the University of Cumbria arranged a stakeholder meetings aimed at discussing the development of an additional training route that would welcome applications from non-healthcare based applicants. Following this meeting it was decided that the University would look to develop a full time direct access MSc in medical ultrasound. Throughout the development process continued close consultation with the local stakeholders was maintained. In spring 2015 HENW commissioned a report which investigated the findings arising from in-depth interviews with twenty Ultrasound department leads throughout the North West of England including participants from both the NHS and independent sectors from Merseyside, Greater Manchester, Lancashire and Cumbria. The issues under investigation included current staffing status, preferred model of education and HCPC issues.

Results:

The stakeholder consultations and commissioned report highlighted the regions desire for action on this issue and reassured the faculty team that the programme would be welcomed and well supported within the region. It also helped to secure some funding for the course. The investment of time into discussing and researching the views of the local stakeholders is vital to ensure the programme and resultant sonographers are fit for purpose. It is hoped that this new and innovative course will over time help to support the current ultrasound education provision and help to ease the current crisis.

Conclusions:

The national shortage in the Sonography workforce has led to development of the Direct Entry MSc by the University of Cumbria. The process has involved close liaison between the University of Cumbria and their stakeholder in order to ensure the needs of the local area are met by the programme.



4. **An innovative approach to ultrasound training**, S Anderson, Norfolk and Norwich University Hospitals Foundation Trust

There is a requirement for us as health education providers to deliver innovative approaches to teaching, learning and assessment. This is in response partly to government guidance, a challenging economic climate and the time-poor society we inhabit. Ultrasound is a widely used diagnostic tool with transvaginal ultrasound (TVUS) being performed on most gynaecological investigations in our institution. This is in keeping with a survey of many institutions in the United Kingdom performed in 2015. TVUS is an intimate examination meaning that training has to be given great consideration.

In view of all these facts, it was decided that training for the radiology specialist trainees in TVUS needs to be updated. Until recently this has been entirely clinical based and somewhat fragmented.

A TVUS simulator has been chosen to aid our trainees with the acquisition of the skills they require. This is a haptic device which provides kinaesthetic and tactile sensation resulting in high physical fidelity. The simulation session will be structured to include various activities aiming to encourage group interaction, reinforce anatomy and link theory to practice.

Assessments will be completed before commencing departmental training. Results of workplace based assessments that have been always performed at the end of each ultrasound block will be compared to previous cohorts to determine whether the simulator use has improved results.

As this will be a new method of ultrasound education for our institution, comprehensive feedback will be sought.

The use of technology for medical education has rapidly developed over recent years. As a result of increasing pressures to integrate this technology into our training, there is a growing interest in the use of simulation. Can simulation training replace initial ultrasound training?

5. **Quantifying the impact of increasing ultrasound workload on patient waiting times using multiple time series analysis: An NHS Trust experience**, B Olisemeke¹, K Hemming², A Girling², ¹Heart of England NHS Foundation Trust, ²University of Birmingham

Background and Purpose:

The demand for diagnostic imaging is increasing [1, 2]. There is yet an assessment of the quantitative impact of increasing demand on ultrasound waiting times, a key quality indicator. Our study attempts to fill that gap.

Methods:

Our study was performed using multiple time series analysis (MTSA). MTSA refers to a group of statistical models for describing the relationships between two or more time series. The choice of a particular model is a function of the statistical characteristics and relationship between the series [3, 4]. Structural vector auto-regression (SVAR) is indicated if the assumption of weak exogeneity between the series is violated[3].

Weekly workload and waiting time data were retrieved from the radiology information system (RIS) of the Heart of England NHS Foundation Trust from June, 2008 to September, 2013. The data was log transformed and tested for stationarity using the Dickey Fuller augmented test as described in Box, Jenkins and Reinsel [5]. SVAR model was specified in iterative manner [3]. All analyses were done on STATA 13TM.

Results:

314,667 patient episodes were recorded within the study period. Five clinical specialties generated over 70% of the ultrasound workload: General Practice (37%), General Surgery (14%), General Medicine (9%), Gynaecology (8%) and Urology (6%). The mean weekly workload increased by 32% from 936 (SD 102) to 1240 (SD 135) over the study period. The impulse response function (IRF) computed from the SVAR model indicated that 1% increase in workload is associated with a subsequent increase of 0.07% (CI 0.043, 0.102) in median waiting time. A graphical presentation of the IRF is shown in fig 1

6. **Peer Review Audit of Independent Reporting Sonographers 2013-2015**, K Lomas, S Riley, Bradford Teaching Hospital Foundation Trust

This poster illustrates the methods and results of an on-going peer review audit of image quality and reporting accuracy introduced in April 2013 in Bradford Teaching Hospitals NHS Foundation Trust; following a scheme of work implemented in 2011 to increase the number of sonographers with capacity to independently report.

Aim of audit:

To ensure high standards of reporting and image quality are maintained.

Methods:

Inclusion - All sonographers able to independent report (SIR) gynaecology and general medical ultrasound.
Peer review - Ten scans every month for each SIR reviewed for image quality and agreement with the report.
Review performed by another SIR and a grade of agreement allocated to the examination report and the quality of images.

Grade of agreement - 1 Total agreement, 2 minor changes, unlikely to alter patient care, 3 potentially significant discrepancy and 4 definite, significant discrepancy likely to have adverse consequences for patient care.

Image quality - 1 good quality, 2 satisfactory and 3 poor.

Results:

Audit findings distributed to each sonographer. Cases of Grade 3 or 4 agreements were discussed with the sonographer and an addendum added to the report where necessary.

Comparison of results from two yearly audit cycles April 2013 - March 2014 and April 2014 - March 2015 show an overall increase in reporting agreement and image quality.

7. **Accident and emergency ultrasound – does it provide effective patient management and financial efficiency in the NHS?** SR Chunilal, Royal Bolton Hospital

Introduction:

A&E US is an examination performed at the bedside that may assist in the assessment of a patient's symptoms and answer focused questions. The aim is to improve patient management and reduce costs to benefit the organisation. A retrospective audit of patients referred for a US scan through an A&E US service has been undertaken, in order to evaluate the efficiency and discuss the value of the service.

Method:

Utilising the patient information systems, all patients that presented in A&E between 1st January 2012 and 31st July 2014, and consequently had an US scan in A&E, were identified. There were 304 patients included in this study. Data and information was obtained via the patient information systems currently used at the Trust. An Excel spreadsheet was composed encompassing all of the collected data and costs and times were calculated using the figures.

Results:

It was found that a breach of the 4 hour A&E waiting target was not caused by a delay in US response times. All scans were performed within one hour of the request time. The cost of an A&E attendance plus an A&E US scan was considerably lower than that involving any number of nights stay on a ward; maximum possible cost that could be incurred is £789,792 for 304 patients over 3 years. The costs incurred were greater when a Computed Tomography (CT) scan was performed instead of US; the total additional cost of having a CT scan as opposed to an ultrasound scan in A&E equated to between £10,196 and £21,663 over the 3 years.

Conclusion:

A&E US positively assists in the efficient and safe management of patients and provides efficiency for the Trust in terms of timeliness and financial benefits.

Key words:

A&E (Accident and Emergency), US (Ultrasound), efficiency, effective, savings.

8. **Security of patient data when transferring ownership of ultrasound systems**, J Moggridge, University College London Hospitals

Loss of patient data can cost an NHS Trust up to £500,000. Although ultrasound systems generally archive to PACS, their archiving workflow will typically involve storage of images to an internal hard disk before it is transferred onwards. Deleting records from the local system will delete entries in the database and from the file allocation table or equivalent but, as when deleting files from a PC, files can be recovered. Great care is taken with disposal of PC media from a healthcare organisation to prevent data breaches but ultrasound systems are routinely returned to lease companies, sold on to third parties or donated to charity without such controls.

In this project, we tried 3 methods of hard disk erasure on 9 ultrasound systems being decommissioned. We used the typical method of full reinstallation of system software (including wiping of archive partition); the manufacture's own disk wiping service; and open source disk wiping software. We then attempted to recover data using open source recovery tools.

All methods successfully deleted all patient data as viewable from the ultrasound system and from browsing the disk from a PC. However jpeg images with patient details and DICOM headers with full examination details could be recovered following the reinstallation method. No files could be recovered using the manufacture's service or the disk wiping software.

The typical method of reinstalling an ultrasound system's software will not prevent patient data from being recovered. When transferring ownership, care should be taken that an ultrasound system's hard disk has been cleaned to a sufficient level with guidance from the manufacturer as to what method is appropriate particularly if the scanner is to be returned with approved parts and in a fully working state.

Obstetrics

9. **Why your ultrasound scan may not show everything we would like to see**, C Oates¹, P Taylor², ¹Freeman Hospital, Newcastle, ²Royal Victoria Infirmary, Newcastle

Poor visualisation is a problem sonographers often face. This limits their ability to make clear observations and accurate measurements. Within the realm of obstetric ultrasound, the need to see the developing organs and make fine measurements, such as nuchal translucency, is crucial. Where poor visualisation prevents this, the reasons must be noted in the scan report. From the expectant mother's point of view, they may see the report of a sub-optimal scan and interpret it as blaming them for being overweight, when that is not how they perceive

themselves, or they may blame the sonographer for not being up to the job. There is anecdotal evidence that such comments have been shared on Facebook.

There are sound physical reasons why there may be poor visualisation and it was thought that by explaining the reasons to expectant mothers, they may understand and not blame themselves or the sonographers.

A poster was designed to explain the two main causes of poor visualisation in simple basic language. The position the baby is lying in and a type of fatty tissue that distorts the sound beam in the way “wobbly” bathroom glass distorts light. The poster was displayed in the obstetric ultrasound waiting room. A questionnaire was used to obtain feedback on whether the patients found the poster helpful. A leaflet that can be given to patients to take away has also been developed.

10. **Pulsatility and resistivity indices of the uterine artery in pregnancy: comparison of magnetic resonance imaging and Doppler ultrasound**, R Hawkes, D Lomas, G Harrison, Cambridge University Hospitals NHS Foundation trust

Purpose:

Doppler ultrasound is used to predict pre-eclampsia and intrauterine growth restriction using the uterine artery pulsatility index (PI) and resistivity index (RI) as markers of increased resistance to blood flow in the placenta. MRI is routinely used for identifying placenta accreta, however, there is limited research into placental blood flow. Early studies found identification of the uterine arteries difficult and evaluation of flow impossible. The aim of this work was to identify the uterine arteries on MRI, measure RI and PI, and compare these results with same day Doppler ultrasound.

Methods and materials:

35 normal singleton pregnancies at 28-32 weeks underwent Doppler examination, followed by a phase contrast MRI study. Doppler ultrasound recorded the RI and PI of each artery. Vessels meeting set criteria on MRI were identified as likely uterine arteries and in-house flow analysis was used to measure RI and PI. Exclusions were made if an artery was not identified or motion artefact occurred. Results were compared with ultrasound using Bland Altman statistics.

Results:

At MRI 76 arteries were identified. After exclusions, 69 vessels in 34 patients were available for analysis. Bland-Altman analysis demonstrated a relatively small bias for the results.

Discussion:

It proved possible to identify uterine arteries in the majority (80%) of patients and obtain a flow profile and a PI and RI value similar to the ultrasound. This is the first report of PI and RI being successfully measured using MRI and results compare well with the reference standard ultrasound.

Conclusion:

This study demonstrates that the uterine arteries can be identified at MRI in a majority of healthy pregnancies in the early third trimester, with a small measurement bias when compared with same day Doppler US measurements. Future studies involving patients with abnormal Doppler findings are needed to further validate this MR based technique.

11. **Caesarean Scar Ectopic: Sonographic findings and management dilemmas**, H Hughes^{1,2}, C Mulcahy¹, M Moran², ¹National Maternity Hospital, Dublin, Ireland, University College Dublin, Dublin, Ireland.

Background:

The last decade has seen an increase in caesarean section rates with a concomitant rise in the incidence of caesarean scar ectopics. The prevalence is thought to be 1 in 2000 pregnancies. Greater awareness of the common sonographic presentations of caesarean scar ectopic at different gestational ages may improve

detection rates. Hysterectomy and termination of pregnancy can be a life saving measure. However the use of methotrexate or expectant management can be advantageous to reduce morbidity and preserve future fertility if detected at an earlier gestation. Four cases identified in an Irish tertiary referral centre over 4 years demonstrate the differing presentations of caesarean scar ectopic and the management dilemmas discussed in the setting of Irish legislation in relation to termination of pregnancy.

Ultrasound presentation:

Case 1- A 6 week pregnancy identified within the caesarean scar with no embryo seen. Expectant management was successful.

Case 2- A live 7 week pregnancy with significant trophoblastic flow on vascular Doppler, managed with methotrexate, conserving fertility.

Case 3- A live pregnancy at 14 weeks gestation. In this case surgical management was the treatment choice (hysterectomy and termination of pregnancy).

Case 4- Presentation of substantial antepartum haemorrhage with a live pregnancy in the caesarean scar at 16 weeks, resulting in hysterectomy and termination of pregnancy.

Discussion:

The management of a caesarean scar ectopic pregnancy particularly in later gestations posed significant ethical dilemmas in a country where termination of pregnancy is only permissible where a significant threat to the mother's life exists. Information obtained from ultrasound images facilitated clinical decision making regarding management.

Conclusion:

The knowledge of the ultrasound presentation of caesarean scar ectopic is an essential skill of all obstetric sonographers for accurate diagnosis of this dangerous complication in the current climate of high rates of caesarean section delivery.



12. **Caesarean Scar Ectopic Pregnancy: A waiting game...?** C Conneely^{1,2}, M Moran², MC DeTavernier¹, A Keane³,
¹Portiuncula Hospital, Ballinasloe, Co. Galway, Ireland, ²University College Dublin, Ireland, ³University Hospital Galway, Co. Galway, Ireland

Background:

We present the case of a caesarean scar ectopic pregnancy (CSEP) from initial presentation, diagnosis and management to complete resolution. The patient presented to the Accident and Emergency Department at 6 weeks gestation with lower abdominal pain and a positive pregnancy test. This immediately raised the suspicion of a possible ectopic pregnancy. A prompt referral was made to the Early Pregnancy Unit (EPU) where transvaginal scanning (TVS) coupled with serum biochemistry were integral to her care and management.

Ultrasound findings:

Initially a transabdominal ultrasound scan (TAS) was performed, however due to limited views of the uterus, we proceeded to a TVS. The familiar sonolucent, circular gestational sac was observed, however it appeared to be abnormally implanted adjacent to the more echogenic scar tissue of a previous caesarean scar. A yolk sac and embryo were also present, no cardiac pulsations were detected. The endometrial thickness nearer the fundus was assessed, measuring 15.5mm, while the ovaries and adnexa appeared normal.

Initially, the possibility of an incomplete miscarriage could not be out-ruled. However, serial TVS in conjunction with serum BhCG tests confirmed a CSEP. In view of the location of the ectopic pregnancy, Methotrexate was deemed the most prudent management option. This was repeated as per Royal College of Physicians of Ireland guidelines when the BhCG levels failed to decrease as desired.

Conclusion:

Consultation with peers endorsed the need for a 'hands-off' approach to this lady's care. Hence, there ensued a period of 21 weeks of repeated TVS combined with serial BhCG to monitor this pregnancy to its conclusion. Transvaginal ultrasound imaging was the optimum tool for monitoring this case, utilised to support serial blood data, thus enabling the provision of conservative care for this woman, and minimising the risk of potential morbidity.

Keywords:

Caesarean scar, ectopic pregnancy, transvaginal ultrasound

13. **Sonographic soft markers in the second trimester: subtle indicators or significant findings?** K Mc Carthy^{1,2}, G Gallagher¹, M Moran², Letterkenny General Hospital, Co Donegal, Ireland, ²Diagnostic Imaging, School of Medicine, University College Dublin, Ireland

Background:

Advances in obstetric ultrasound expertise over recent years, mean that the once controversial area of aneuploidy detection is becoming a popular topic for sonographers worldwide. Improvements in ultrasound resolution now mean that subtle anatomic variations referred to as "soft markers" are more detectable, often leaving practitioners in a dilemma regarding referral for further testing and follow up care pathways. When combined with laboratory testing and risk assessment tools, early detection of these soft markers can provide a rationale for the diagnosis and management of chromosomal abnormalities.

Ultrasound Findings:

The literature is abundant with information defining soft markers and the inclusion criteria varies throughout institutions; however the majority of sources have a classification list comprising of - choroid plexus cyst, echogenic intracardiac foci, echogenic bowel, pyelectasis, shortened femur, single umbilical artery, mild ventriculomegaly and talipes. This poster presents a visual analysis of these particular soft markers providing a critique for recognition and standard for ultrasound diagnosis. Referral for further management will depend on institutional guidelines and client preference, however the majority of settings advocate further investigations if two or more anatomic variations are noted on ultrasound.

Current Practice:

Although amniocentesis remains the most accurate diagnostic test in the detection of aneuploidy, recent advances in the field of non-invasive prenatal screening of maternal cell free DNA boast significant results without the added risks to the fetus. Information regarding these tests in Ireland is readily available; nonetheless current provision of this investigation remains a personal cost to the client. In relation to ultrasound diagnosis the inclusion of the nasal bone length as part of the detailed anomaly scan is also advocated, particularly in the diagnosis of Down syndrome.

Keywords:

ultrasound; soft markers; Non-invasive pre-natal screening; nasal bone length

Gynaecology

14. **Investigating the possible relationship between post-surgical adhesions, reported pain and scar tissue quality following Caesarean section using transabdominal Ultrasound**, K Spens, Greenwich University, London, European School of Osteopathy, Maidstone

Introduction:

Caesarean section is an increasingly popular procedure in the UK with post –surgical adhesions cited as a major complication and the leading cause of secondary infertility in women. The use of transabdominal ultrasound for assessment of quality of scar tissue and adhesions following C-section is limited. This study's aim was to determine the association between these surgical adhesions and perceived clinical symptoms.

Method:

In this observational causative study, women that had undergone between 1-3 transverse lower-segment Caesareans were included. Women with existing gynaecological conditions, who had undergone previous abdominal/pelvic surgery or who were pregnant were excluded. Two transabdominal ultrasound techniques were performed; visceral slide and adhesion criteria. Visceral slide facilitated dichotomisation into positive adhesions (<1cm movement) and negative adhesions (>1cm movement). Scar tissue quality of the Caesarean sample was assessed using patient and observer scar assessment scale (POSAS); these were scaled 1-10 over 6 scales and dichotomised into low (1-5) and high (6-10) quality. Clinical symptoms were collated with a questionnaire using numerical rating scales (NRS), 6 scales (0-10) were dichotomised into low (0-5) and high (6-10) categories. The relationship between adhesions and symptoms was explored using Fishers Exact test.

Results:

Twenty-two participants aged 29-47 (mean 35.27(±5.37)) were recruited: 91% had 1 Caesarean; 4.5% had 2; 4.5% had 3 Caesareans. Reduced visceral slide was found to have an association with pelvic pain ($p<0.043$) and scar pain ($p<0.004$) within the study population. All other symptoms were not significantly associated with adhesion type.

Conclusion:

Transabdominal ultrasound in the detection of post-operative Caesarean adhesions showed significant associations to aspects of pain symptomology. A comprehensive adhesion assessment needs to be developed to improve effective long term treatment and management of post-operative adhesions. The study design requires minor modification for validation and inter-rater reliability, before a larger scale study is.



15. **Ovarian prolapse 17yrs after abdominal hysterectomy: A very rare case**, S Tangudu, Hull and East Yorkshire NHS Trust

Vault dehiscence and adnexal prolapse after hysterectomy is a very rare event with an incidence of 0.03 to 1.2%. Though rare case reports of small bowel, omentum, fallopian tube, appendix have been reported in literature, a case of ovarian prolapse 17yrs after hysterectomy is not yet been published. The risk of vault dehiscence post hysterectomy is more commonly associated with robotic or laparoscopic hysterectomy.

We present a case of a 51yr old lady who presented to the gynecology department with history of vaginal discharge for few weeks. She had a history of abdominal hysterectomy 17years ago for a benign disease and one of her ovaries removed. On speculum examination there was a mass at the vaginal vault. An USS pelvis showed a 17x36x48mm mass of ovarian origin with a heterogeneous component. This mass was likely causing degree of irritation of the cyst wall and causing the vaginal discharge. She then went on to have a laparotomy and left oophorectomy with an uneventful recovery.

The histology of the ovary showed a borderline mucinous tumor of FIGO stage 2a.

16. **The use of transvaginal US in confirmation of Essure coil placement**, G Miles, P Scott, P Cantin, Derriford Hospital, Plymouth

Since European approval for use in 2001, the Essure uterine tubal occlusion device is being increasingly used for patients requesting permanent sterilisation. Its popularity amongst practitioners and patients is growing given the lack of general anaesthetic and incision and relatively quick hysteroscopic insertion time.

The flexible nickel coil is inserted into each fallopian tube hysteroscopically. Each coil incites a local fibrotic reaction which leads to tubal occlusion. The device is not however considered functional until imaging confirmation has been obtained approximately three months post insertion.

Since 1st July 2015 the Food and Drug Administration in the USA have approved the use of transvaginal ultrasound in the confirmation of Essure coil placement. Previously a plain abdominal radiograph and hysterosalpingiography were required. The use of TVUS negates the need for exposure to either radiation or contrast dye. It is clearly essential however that appropriate placement is determined accurately to avoid unwanted pregnancy. We therefore present a review of the essential salient features to identify on ultrasound scanning and a selection of imaging potential pitfalls to avoid as well as some of the recognised complications.

17. **Ultrasound of a twisted teratoma**, Y Green^{1,2}, M Walsh², T Herlihy¹, ¹University College Dublin, Ireland, ²Mater Misericordiae University Hospital, Dublin, Ireland

Background:

This poster discusses the case of a 30 year old female who attended our Accident and Emergency (A&E) department. She presented with sudden onset of severe left lower quadrant (LLQ) pain. She was exquisitely tender on palpitation and blood tests revealed leucocytosis. The emergency team assessing her requested a pelvic ultrasound scan to out rule a tubo-ovarian abscess, an ovarian torsion or least likely an acute appendicitis.

Ultrasound scan:

A trans-abdominal (TA) pelvic ultrasound scan was performed. Immediately, a large fluid filled structure which resembled a full bladder extended across the screen. The uterus and right ovary appeared normal with an enlarged oedematous left ovary visualised (9.5cmx6cm). Upon closer inspection it became apparent that the fluid filled structure, which initially was believed to be the bladder, was in fact a large cyst. It contained both solid and cystic components and arose from the left ovary. There was a small amount of free fluid within the Pouch of Douglas and a complete lack of vascularity within the left ovary despite optimisation of settings. With

a definitive diagnosis of ovarian torsion made, a trans-vaginal (TV) scan was deemed unnecessary. The patient was immediately referred for gynaecological review and scheduled for theatre that day. During the laparoscopic surgery it was observed that the ovary had a necrotic appearance. A left sided salpingo-oophorectomy was performed. Post-op histological assessment of the removed cyst confirmed it to be a dermoid cyst. An ovary containing a large dermoid cyst, such as this, is predisposed to torsion due to the increase in mass.

Conclusion:

This case demonstrates the classic sonographic characteristics of ovarian torsion. It proved the usefulness of ultrasound in completing the clinical picture to arrive at a diagnosis of ovarian torsion.

Keywords:

Ovarian torsion, LLQ pain, ultrasound, dermoid cyst

18. **Simply a ureterocele - on transabdominal pelvic ultrasound**, M Kingston^{1,2}, L Carpenter², T Herlihy¹, ¹University College Dublin, Ireland, ²The Adelaide and Meath Hospital incorporating the National Children's Hospital, Dublin, Ireland

Objectives:

This case study describes an incidental finding of a ureterocele while performing a pelvic ultrasound on an lady with pelvic pain. A ureterocele is an uncommon finding in adults and most found at this stage are asymptomatic. Characterisation of a ureterocele and the identification of any related pathology is important for patient management. This poster describes the sonographic appearances of a simple ureterocele. It shows the benefits of transabdominal ultrasound imaging and the importance of renal imaging in the diagnosis and characterisation of ureteroceles.

Background:

A 48 year old female attended the ultrasound department with a referral from her GP. She complained of pelvic pain which was slightly worse on the left side. Transabdominal and transvaginal ultrasound of the pelvis was performed, followed by a renal ultrasound.

Ultrasound Findings:

The ovaries and uterus appeared normal. On transabdominal ultrasound a tubular structure was identified in the left adnexa which represented a moderately dilated distal ureter. On examination of the bladder, a ureterocele measuring up to 3cm was identified within. Real time imaging allowed visualisation of its expansion and contraction. Colour Doppler was used to observe ureteric jets of urine within the bladder and to therefore rule out obstruction. Imaging of the left kidney revealed no duplex system and no significant collecting system dilatation. No other complications of the ureterocele were identified. The dilated distal ureter was also identified on transvaginal ultrasound. Urology opinion was recommended as the patient's pain was predominantly on the left side.

Conclusion:

In this case it was found that the dilated distal ureter and the associated ureterocele were best visualised on transabdominal ultrasound. Pelvic and renal ultrasound led to a diagnosis of a simple ureterocele with no apparent complications.

Key Words:

Transabdominal ultrasound; renal ultrasound; ureterocele

19. **Ultrasound: turning inflammation into information! The role of ultrasound in the imaging of pelvic inflammatory disease**, E Maughan^{1,2}, A Kelly², D Quinn², T Herlihy¹, ¹University College Dublin, ²St Vincent's University Hospital, Dublin

Background:

This poster documents the case of a 33-year old female presenting to the Emergency Department at our institution, with sudden onset of acute RIF pain. Physical examination revealed tenderness in the right lower abdomen with adnexal tenderness on vaginal examination. A full blood work-up disclosed leukocytosis and an elevated inflammatory marker, C-Reactive Protein. A negative serum β -hCG excluded an obstetric etiology. As result of abnormal blood test values and physical symptoms, the patient was immediately referred for a pelvic ultrasound scan to out rule ovarian or appendiceal pathology.

Ultrasound findings:

The initial transabdominal (TA) survey exposed an abnormality in the right adnexa, which prompted a transvaginal scan (TV) for more thorough investigation. An axially positioned uterus and adjacent ovaries appeared normal, however a well-circumscribed structure was identified opposing the right ovary in the right adnexa. TV Ultrasound illustrated the distinctive 'cog-wheel' sign characterised by thickening of endosalpingeal folds that is associated with acute pelvic inflammatory disease. An additional feature confirming acute disease included hypereamia of the structural wall by colour Doppler. A distended fallopian tube with low-level internal echoes suggestive of a pyosalpinx further reinforced the diagnosis. The patient was treated conservatively with intra-venous (IV) anti-biotic therapy. Laboratory examination confirmed bacterial vaginosis of the lower genital tract. Furthermore, a Polymerase Chain Reaction (PCR) test excluded *Neisseria gonorrhoeae* or *Chlamydia trachomatis* as the source of the infection.

Conclusion:

Ultrasound proved valuable in narrowing the alternative diagnosis and assessing the extent of disease in this young reproductive female. The early diagnosis and initiation of antibiotic therapy reduced the threat to wellbeing by preventing the onset of long-term sequelae including: infertility, increased risk of ectopic pregnancy and chronic pelvic pain.

Keywords:

Pelvic inflammatory disease; Acute pelvic pain; Transvaginal ultrasound.



Head & neck

20. **Renal cancer metastases to the thyroid: case studies, review of literature and new thyroid ultrasound signs,** S Colley, E Mcloughlin, A Aziz, Queen Elizabeth Hospital Birmingham

Renal cell carcinoma (RCC) is an unpredictable tumour that can metastasise to uncommon sites, occurring both at the time of original diagnosis or many years later. RCC metastasis to the thyroid gland is a rare but recognised occurrence and is considered one of the more common neoplasms to metastasise to the thyroid gland with a number of cases described in the literature.

Metastasis into a thyroid neoplasm – tumour-to-tumour metastasis – is extremely rare with renal cell carcinoma also being the most common associated neoplasm.

We present 2 cases of metastatic RCC to the thyroid gland, and believe our cases have merit as they demonstrate markedly different clinical presentations, and both describe new thyroid ultrasound signs – a ‘nodule within a nodule’, and a ‘pulsatile thyroid nodule’. These unique ultrasonographic findings are previously undescribed in the medical literature to the best of our knowledge.

Specific imaging findings characterising renal cell metastases in the thyroid gland have not previously been described, with diagnosis usually based upon pathology – especially in the setting of ‘tumour-to-tumour metastasis’. We present the first case of a tumour-to-tumour metastasis described on pre-operative imaging, with pathological correlation following thyroidectomy.

21. **Thyroid ultrasound: correlation between U grading, fine needle aspiration result and histology,** D Thorley, G Johnson, Tameside General Hospital, Manchester

Thyroid Nodules are common, occurring in up to 70% of the population on ultrasound scan. Of these only a small proportion will contain a malignancy. Given this a good way to determine which nodules need further investigation is required. Ultrasound has always been the gold imaging for thyroid nodules, with a number of different features being looked at to suggest the possibility of malignancy. More recently the British Thyroid Association in their 2014 guidelines introduced the U grade for ultrasound with the intention of simplifying reporting and making it easier to decide if further investigation with fine needle aspiration (FNA) cytology is required.

To assess how well the U grading system reflects final results obtained from FNA or histology a retrospective study was performed to assess U grade, FNA result where applicable and when available final histology. The study period was for 4 months from April 2014 to July 2014. Initial patient lists were obtained from both histology and radiology. The lists were combined and then reviewed. Patients who had undergone ultrasound but no thyroid nodules were excluded, as were those under 18 years of age. For each patient the ultrasound images were reviewed by a Consultant Sonographer and assigned a U grade, the FNA results were also collected using the Royal College of Pathologists Thy classification. Histology, where available was recorded as either benign or malignant.

Within each U grade the percentage of each Thy category will be assessed, along with final histology to determine whether there is any correlation between the grading systems. Additionally the percentage of FNAs performed in the U2 category will be looked at, as will patients determined to have a U3 or above nodule who did not receive an FNA, this will determine whether the U grade will reduce the number of FNAs performed.

22. **Traditional versus ultrasound-guided neck fine needle aspiration technique: outcomes and patient experience**, A Walden, J Bainbridge, J England, Hull and East Yorkshire NHS Trust

Background and Aims:

Ultrasound guided fine needle aspiration (USFNA) has been shown to be more accurate than traditional fine needle aspiration (TFNA) in some studies, with lower false negative rates. FNA accuracy is, to an extent, operator dependent. Patient experience of the procedure has not been previously explored. We aimed to assess the outcomes of accuracy of thyroid USFNA versus TFNA undertaken by two experienced practitioners. Our secondary aim was to assess for any differences in patient experience between the two techniques.

Methods:

Fifty consecutive new patients who underwent thyroid FNA were assessed. All of the USFNAs and TFNAs were performed by the lead head and neck ultrasonographer and the ENT thyroid specialist consultant respectively. All patients completed a McGill pain score questionnaire regarding the FNA procedure. Outcome measures included the assessment rates of inadequate FNAs, correlation to final histology, (where appropriate) and patient pain scores.

Results:

Final results are being correlated and will be given in the poster presentation.

Conclusion:

Conclusions will be given in the poster presentation.

MSK

23. **Comparison between vertical on printed paper with horizontal on screen measurements for the assessment of Developmental Dysplasia of the infant hip**, D Walden, Salisbury Hospital

Developmental Dysplasia of the Hip (DDH) describes a problem with hip joint formation in children. The location of the problem can be either the hip joint (femoral head), the socket of the hip joint (the acetabulum) or both. Abnormal hip development or developmental dysplasia of the hip is the commonest problem found in a baby's musculoskeletal system.

The author describes the Graf Technique for the assessment of DDH. This assessment is based on the appearance of the acetabulum in a coronal neutral position and describes measurements of the acetabular slope (alpha angle)

The first measurement technique involves printing out the images on thermal paper and drawing the appropriate lines. The alpha angles of both hips are then calculated in the vertical plane using a sonometer and classified using the Graf method. The second technique involves plotting the relevant lines on screen in the horizontal plane using electronic callipers and using the hip tools pre-set.

The author's research compared scans of the alpha angle performed using these two methods on the same group of infants. The research showed that there was a high level of agreement between the values obtained using the manual (vertical plane) and computer aided (horizontal plane) methods for the critical alpha angle. 87.5% of the scans performed with the two methods were in agreement.

The high level of agreement between the two methods leads the author to conclude that the computer based method should be adopted leading to a more efficient, less wasteful, and more reproducible examination.

24. **Spinoglenoid notch - a relatively under imaged area in ultrasound**, S McGarry, R Botchu, Royal Orthopaedic Hospital Birmingham

Shoulder examination is one of the most commonly performed examinations of musculoskeletal Ultrasound. This is a cost effective, dynamic and patient friendly method to image a shoulder.

Generally used to evaluate the integrity of the rotator cuff and assess for tears, tendinopathy and impingement, a complete examination should include assessment of the Spinoglenoid notch

A systematic methodology should be followed to identify the underlying pathology. Spinoglenoid notch is easy to identify and examine by ultrasound and should be a part of the routine shoulder examination. We present the technique to examine this and present few pathologies.

25. **Ultrasound guided intervention in the foot and ankle: a pictorial guide of tips and techniques**, D Roberts, S Kamath, K Mukherjee, University Hospital of Wales

Ultrasound can be key in the diagnosis and management of musculoskeletal pathologies in the foot and ankle. The high-resolution images created with the high-frequency linear transducer, enable the practitioner to accurately visualise the soft tissue structures of the foot and ankle. Ultrasound guided injections are commonplace, and the real time nature of ultrasound can result in precise, targeted injections.

We present a pictorial guide of how we perform various foot and ankle ultrasound guided interventions. We aim to aid those that will be, or those that have recently started to perform these potentially quality of life changing procedures. The ultrasound-guided interventions displayed will include Morton's neuroma injection, small joint injection, plantar fasciitis injection, tenosynovitis injection, as well as hydrodissection for refractory Achilles tendinosis.

26. **Severity scoring for quadriceps tendon tears on Ultrasound-aiding recognition of the more severe, traumatic disruptions of the quadriceps tendon in the DGH setting**, G Constantinescu¹, A Tindall², J Smith¹, S Morgan¹, MS Gulati², K Chettiar¹, ¹Darent Valley Hospital NHS Trust, ²Lewisham & Greenwich NHS Trust

Purpose:

Ultrasound (US) examination is the first line modality to investigate/detect tears of the quadriceps tendon (QT) following trauma in many DGH Imaging Departments in the UK(1).The severity of the US detected QT partial tears is often difficult to quantify and is frequently underestimated. We attempted scoring the tear severity using the observed tear of the QT and indirect signs such as patella tendon (PT) buckling and the size of the posttraumatic haematoma (PTrH).

Methods and Materials:

27 consecutive cases of suspected QT tears were studied by 3 dedicated MSK Radiologists, in two, large DGH's within a 15 months' interval. 22 were male patients (n1=22) and 5 female patients (n2=5). The age range was 16 to 57 years. We recorded the presence/ absence of PT buckling, the severity of the QT tear (percentages as < 50%, >50% but <80% tears, and > 80% tears) and the presence/severity of PTrH (grading of haematomas recorded as mild, moderate and severe). Feedback was obtained from all operated patients.

Results:

Twenty patients had significant QT tears(50 % or more of the QT fibers). Nineteen patients underwent surgical repair of the ruptured tendon. Thirteen surgically treated patients had buckling of the PT and associated severe partial tears of the QT. Four patients had no PT buckling, but had severe tears and two patients presented equivocal PT buckling, but had severe QT partial tears (this subgroup of 6 patients also had MRI evaluation). All operated patients had variable sized (usually moderate or large) haematomas in the suprapatellar bursa.

Conclusion:

The buckling of the PT and moderate-, and large size PTrH are seen in a large proportion of patients with posttraumatic QT disruption.

Although not sufficiently specific and/or sensitive alone, the combination of these features could be used to score objectively the QT disruption and select the patients' sub-group requiring surgery.

27. **Ultrasound detected coracoid-tip pathology- a less common cause of anterior shoulder pain,**

G Constantinescu¹, R Singh¹, MS Gulati², ¹Darent Valley Hospital NHS Trust, ²Lewisham & Greenwich NHS Trust

Purpose:

A variety of causes and/or processes related to bone and soft tissues structures around the shoulder joint can generate pain. Relatively uncommon pathological processes of the short head of the biceps and the coracobrachialis tendons, at the coracoid process, are less frequently evaluated, but can be a source of localized anterior shoulder pain.

Methods and Materials:

Within an 18 months' interval, among the patients referred to our Imaging Department with anterior shoulder pain, we evaluated eight patients (n=8) for localized tenderness on the coracoid process. The evaluated patients had limitation of motion caused by pain. Most patients had jobs involving lifting. The small cohort included 5 females (n1=5) and 1 male (n2=3) patients. All patients were reviewed in the Department at 3 months following their first assessment.

Results:

We detected significant tendinopathy of the short head of biceps in six patients (6), whereas two patients presented tendinopathy of both short head of the biceps-, and coracobrachialis tendons. No tendon tear was seen. The Doppler flow map showed prominent new vessel formation in the affected areas of the tendons, just below their insertions at the coracoid process. The rotator cuff tendons were normal and no impingement was present. All patients underwent US-guided radiological therapeutic intervention via a combination of fenestration and steroid injections, followed by physiotherapy, with good short-term improvement.

Conclusion:

Coracoid-based, well localized, anterior shoulder pain may result from proximal tendinopathy of the short head of biceps and/or coracobrachialis tendons. The tendons demonstrate abnormal Ultrasound features. The tendinopathy showed response to minimal, ultrasound guided radiological intervention. There is limited experience and relatively few published data with regards to coracoid process tendinous insertion pathology. In our experience this area (coracoid process tip) is often under-investigated on both US and MRI and these findings highlight the need for more dedicated and targeted evaluation.

28. **A pictorial review of de Quervains tenosynovitis following pregnancy and recommendations of preventive measures during postnatal period,**

T Akbari, H Ali, M Thavendran, R Mohanty, M Johnson, A Sahu, London Northwest Hospitals NHS Trust

Introduction:

De Quervain's tenosynovitis is an inflammatory condition characterised by localised tenosynovitis of the first extensor compartment of the wrist. It is associated with occupational risk factors, repeated strain injury, during and after pregnancy. It happens due to performing rapid repeated activities involving the grasping, pulling and pushing are considered at increased risk. Repeated postures with a thumb base doing abduction and extension is considered at risk.

Aims and Objectives:

To review the presentation of de Quervain's tenosynovitis in females during post-partum period and to suggest precautionary measures to avoid it as a perinatal care advise. Ultrasound was used as the imaging modality of choice followed by guided injections for symptomatic cases.

Material and Methods:

We will focus on the review of imaging-based cases from our institution. We would highlight the clinical presentations of patients with problem in their wrist and later mimics de Quervain's tenosynovitis. Emphasis will be put on the best way to separate between incidental findings and real pathology bringing on symptoms.

Conclusion:

We will give sonographic and MRI findings of de Quervain's tenosynovitis and pictorial demonstrations of preventive measures as a learning tool.

We propose that certain positions of the wrist while holding the baby may predispose or trigger this condition. We recommend mothers to modify their activities such as avoid repetitive movements and sustained positions. For example carry things with a shoulder bag instead of hands, breastfeeding position and position baby's head by forearm instead of hands etc. In UK, we provide a lot of guidance regarding antenatal, perinatal and post-natal care for the well fare of the mother and the baby and we would like to give a message here regarding this particular clinical condition, which can make a difference in outcome by making little changes.

29. **Hydrodilatation for the frozen shoulder**, Y Mei Koay, C Footitt, S Rymaruk, M Stott, N Phillips, R Braham, M Mubashar, W Bhatti, University Hospital of South Manchester

Background:

Adhesive capsulitis (frozen shoulder) causes severe pain and stiffness of the glenohumeral joint. It has a 3-5% incidence rate in the general population. It is often self-limiting, but symptoms may last up to 3 years. Treatments include analgesia, steroid injections, regular physiotherapy, manipulation under anaesthesia and surgical release.

Our department routinely performs ultrasound-guided hydrodilatation for the frozen shoulder, a method which involves distending the shoulder capsule using a mixture of steroid, long-acting local anaesthetic and saline solution. We audited the outcomes of orthopaedic patients who have undergone ultrasound-guided shoulder hydrodilatation within an 11 month period.

Method:

A retrospective review of patients who have undergone hydrodilatation within an 11 month period were identified. Their clinical letters were then reviewed for outcome following intervention.

Results:

63 patients were referred by the orthopaedics teams for shoulder ultrasound-guided hydrodilatation. Of these, 39 patients had clinic letters before and after the procedure with interpretable data. 7 patients underwent further procedures to relieve their symptoms, and 1 patient had a repeat intervention. 84% of the patients report an improvement in their symptoms, with up to 25 degrees of external rotation improvement. The discharge rate of patients post-hydrodilatation is 46%.

Conclusion:

Ultrasound-guided shoulder dilatation offers a high success rate, which is comparable to the current literature. It carries a relatively lower health risk to the patient, compared to the surgical release method. We recommend that a larger cohort of patients for a re-audit, with a standardised scoring system e.g. oxford test at appointments to allow a better outcome assessment of improvement.

30. **Comparison of radiological and histopathological diagnosis in the soft tissue sarcoma MDT from 01/04/13 to 30/01/2014**, Y Al-Radhi, D Taylor, Hull and East Yorkshire NHS Trust

Objectives:

Imaging plays a vital role in the characterization of soft tissue lesions. The purpose of this study is to determine the accuracy of radiological characterization of soft tissue lesions, the frequency of specific diagnoses, anatomical location and the age distribution in a soft tissue sarcoma MDT setting in our trust.

Design:

Retrospective. Unblinded study.

Method:

Retrospective data analysis of 64 patients who were referred to the soft tissue sarcoma MDT from 01/04/13 to 30/01/14 and had US/MRI and histopathological biopsy. Radiological characterization was categorized into benign, malignant and indeterminate.

Results:

54 (84%) were characterized as definite benign / malignant. Meanwhile, 10 cases (16%) were characterized as indeterminate. Diagnostic accuracy of all lesions, benign and malignant, is 82%. There were 15 (23%) sarcoma cases of which 14 (94%) were correctly characterized. 4 (6%) benign cases were overdiagnosed as possibly malignant. The spectrum of diagnoses included: schwannoma (4.6%), haemangioma (3.1%), gout tophi (1.6%), sarcoma (23%), lipoma (31%), leiomyoma (1.6%), giant cell tumours (6.2%), hibernoma (1.6%), endometriosis (3.1%), cyst (10.9%), nodular fasciitis (1.6%), tissue necrosis (3.1%), fibromatosis (1.6%), myopericytoma (1.6%), desmoid tumour (1.6%) and none found (2%).

Conclusion:

Radiological characterization of soft tissue lesions is accurate and reliable despite the challenging large number of pathological possibilities. Sarcoma represents 23% of our cohort, although it is a rare diagnosis, reflecting the effectiveness of using imaging characterization as a triaging tool in soft tissue sarcoma MDT.

Abdominal

31. **Study looking at the reliability of using elastography as an indicator of liver fibrosis**, S Tangudu, PC Parker, L Corless, Hull and East Yorkshire NHS Trust

Elastography is a non-invasive, ultrasonographic method for determining the liver fibrosis. It is the most commonly used method in assessing liver fibrosis, especially in Europe. It uses a 5-MHz ultrasound transducer probe mounted on a vibrator. The vibrator emits painless vibrations of 50 Hz frequency and an amplitude of 2 mm. This leads to an elastic shear wave propagating through the skin and the subcutaneous tissue to the liver. The shear wave velocity is directly related to the stiffness of the tissue.

Elastography has been implemented in our Trust as part of the hepatology assessment for patients with liver disease. The hepatologists have adopted this assessment method in preference to liver biopsy and since introducing the technique over 1500 examinations have been undertaken.

The aim of this study is to review the reliability of using shear wave elastography as an indicator of liver fibrosis. The propagating shear wave velocity has been correlated with other clinical markers and the ultrasound features of hepatic fibrosis. These include liver appearance, platelet count: spleen ratio and liver function tests.

A retrospective study of 100 patients who had elastography done is currently being undertaken. All patients attended a one-stop hepatology and ultrasound clinic between 1st January 2015 and 28th February 2015. The results are currently being analysed.

32. **Determining mucosal perfusion using trans-rectal contrast ultrasound: A novel approach**, F Khoyratty, MJ Weston, D Miskovic, Leeds Teaching Hospitals

Background:

The process of healing is predominantly a vascular phenomenon. With more than 70% of the rectal blood supply being confined to its microvascular mucosal bed, the ability to assess this compartment's kinetics can be the approach of choice to investigate rectal healing in humans.

Methods:

Ten healthy human volunteers were challenged intravenously with microbubbles (SonoVue, Bracco, Italy - mean size 2.5 μ m; concentration: 1 to 5 \times 10⁸ per ml). Using an end-firing endocavity probe (MI:0.05,DR:60dB), standardised rectal mucosal views were obtained and the resulting mucosal enhancement was recorded. The effect of dosing (0.5ml to 5ml) and gain (60dB to 82dB) on the ultrasound signal was tested to inform optimal clinical image quality.

Results:

Time intensity curves for each study were derived from the linearised video images using CHI-Q (Toshiba), with the region of interest (ROI) isolating the mucosal/ submucosal vascular space. Parameters such as peak intensity and area under the curve were dependent on bolus volume as reported in vitro studies. Clinical image quality was superior when using at least 2.5mg of SonoVue with the gain setting at 70dB. These settings dampened the signal to noise ratio, which was significant at higher settings. Though the phenomenon of recirculation could not be excluded, the first portion of the time intensity curve remains uncontaminated and clinically relevant.

Conclusion:

The assessment of contrast enhanced mucosal perfusion is feasible using a directly applied trans-rectal probe. Parameters of perfusion can be derived and are influenced by similar scan settings as in vitro models. However, in order to produce accurate, sensitive and reproducible data in longitudinal studies, the scanner settings should not be altered but optimized prior to imaging the organ of interest. It is only then that dynamic processes such as tissue healing can be tracked and assessed appropriately.

33. **SonoVue (sulphur hexafluoride microbubbles) clinical re-audit**, A Al-Khatib, A McNeill, B Stenberg, T Hoare, The Newcastle upon Tyne Hospitals

The background and purpose of the study:

SonoVue is an ultrasound contrast agent consisting of sulphur hexafluoride microbubbles that improves display of the blood vessels, thus allowing more specific characterisation of liver lesions. NICE guidelines recommend the use of SonoVue to characterise focal liver lesions in an adult with cirrhosis, investigate potential liver metastases as well as characterise incidentally detected indeterminate focal liver lesions on unenhanced ultrasound at the same appointment. The purpose of the audit is to review current practice and identify potential aspects of service improvement.

Methods:

Retrospective review of contrast-enhanced ultrasound scans (CEUS) performed November 2014 – April 2015, collected from the PACS database in two screening centres. Suitability for CEUS was determined using locally developed work flow guidelines. Standards used were local guidelines based on NICE suggestions: when an incidental liver lesion is detected, a CEUS is performed as a "same-day appointment" or within 7 days if this is unavailable.

Results obtained:

43 CEUS were identified. Average age was 52 years (range 22-83). There was an overall 77% compliance rate with the 7 day local guidelines. Delay in CEUS (range 2-9 weeks). The spectrum of diagnoses included haemangioma, liver metastasis, hepatocellular carcinoma, FNH and other benign conditions.

Conclusions drawn from the work:

The department performance of CEUS to further characterize liver lesions and conform to local and NICE guidelines is to a good level although there is room for further improvement in care delivery.

Good staff satisfaction has been perceived regarding the current "Focal liver lesion ultrasound pathway" flowchart. CEUS has proved to be a very efficient and robust way of quickly characterizing liver lesions by confirming or ruling out benignity expediting patient care.

34. **Renal Transplant USS; Are we doing it correctly and uniformly in a transplant centre?** R Williams, St Georges Hospital, London

Background:

Kidney transplantation is evidenced to improve quality of life and be of financial value for the greater health economy. (1) Following Organ Donation Taskforce recommendations in 2008, an increase of 50% of deceased organ and living donor transplants.

Imaging evaluation is essential to a recipient's care pathway, with USS usually the main modality from initial post-operative to surveillance period. Early diagnosis/intervention of complications is vital to limit risk and optimise long term function. Review of transplant cases in recent discrepancy meetings prompted discussion on operator variability.

Methods:

Renal transplant USS cases July 2014- November 2014 were evaluated. All cases were assessed on optimisation and accuracy of 5 parameters relating to Doppler display/measurements.

1. Position of resistive indices (RI's) (interlobular vessels)
2. Quality of spectral trace (2/3 of display)
3. Scale settings on colour Doppler imaging (between 20-30cm3)
4. Spectral gate size (within main transplant artery)
5. Angle correction when measuring peak systolic velocity-PSV (below 60°)

Errors in parameters can compromise quality of display, under/overestimate complications.

Results:

Over five months sixty ultrasound studies (portable and departmental) from 30 renal transplants were evaluated. These included post-operative, early and late follow-up surveillance imaging. Angle correction for PSV was the most incorrectly measured parameter 22 cases (37%). Quality of trace was incorrect in 22% (13 cases). Both RI's and gate size were incorrect in 10 cases (17%). Scale settings errors in 4 cases, (7%). Patients with over 4 USS (5 patients), further imaging with nuclear medicine was carried out.

Conclusion:

Renal transplant USS can prove challenging, knowledge of technical parameters is crucial. Both missing pathology and inappropriate 'overcalling' in transplants is important. Vascular flow rates were overestimated alongside poor quality traces with little attempt of optimisation. Interpretation may lead to invasive inappropriate investigation. Clear operator education is imperative to provide accurate safe services.

35. **Targeted fusion biopsy: the way forward in investigating suspected prostate cancer**, H Joshi, PC Parker, OR Byass, Hull and East Yorkshire Hospitals NHS Trust

Background:

Prostate cancer is the commonest cancer in men in the UK, affecting approximately 42,000 new patients a year. Commonly, clinically suspected cancer would be investigated and diagnosed through a route of clinical examination, PSA levels, prostate biopsy and MRI examination under the 2 week wait (2WW) pathway.

Failure to meet the 2 WW target is often due to MRI unavailability, where appointment times can be as long as 6 weeks. In our centre, we have developed a protocol where patients deemed to be at high risk of prostate cancer are offered the MRI scan first. If prostate cancer remains clinically suspected, a focused Fusion trans-rectal ultrasound (TRUS) guided biopsy is offered in order to obtain targeted histology samples. As MRI is offered prior to biopsy, there is no requirement for a time lag between the two investigations.

Method:

We implemented the new protocol in February 2015 and collected prospective data on all targeted fusion TRUS biopsies performed to date. Data collection included MRI findings, time to TRUS biopsy from MRI and histology results. In all cases, both targeted and non-targeted biopsies were performed.

Findings:

Between February 2015– June 2015, 21 targeted fusion biopsies were performed. Patients underwent fusion TRUS biopsy as quickly as 3 days following their MRI study. Quantitative analysis of the histology results is currently not available due to the low numbers of cases obtained. The data at present shows targeted biopsy samples to have equal or higher Gleason scores and an increase in the proportion of the sample being histologically malignant compared to non-targeted samples.

Conclusion:

Our early experience in targeted TRUS prostate biopsy has shown to be positive. Patients can undergo TRUS biopsy quickly following MRI which improves the patient pathway and we are obtaining more accurate Gleason scores allowing clinicians to formulate a more focused treatment plan.

36. **Colonic Diverticulosis and Diverticulitis: An ultrasound perspective**, Y Mei Koay, C Footitt, R Magennis, S Sukumar, V Rudralingam, University Hospital of South Manchester

Introduction:

Ultrasound is often the primary imaging modality used to investigate the cause of abdominal pain and a broad range of gastrointestinal symptoms in patients. It is therefore important that the operator has a fundamental understanding of the ultrasonographic appearance of common underlying gastrointestinal tract-related diagnoses, such as acute diverticulitis.

Discussion:

Acute diverticulitis is caused by inflammation of colonic diverticula. This results from an impacted faecolith within a diverticulum, with resultant surrounding inflammation and micro-perforation. Clinical presentation is usually a combination of acute lower abdominal pain, pyrexia and rectal bleeding. Diverticula are localised sac-like out-pouching arising from the colonic wall. In the absence of clinical symptoms, this is referred to as diverticulosis. It is estimated 5% of people have diverticula by the time they are 40 years and up to 50% by 80 years old. Up to 25% will develop acute diverticulitis.

With a systematic approach using both the curvilinear and high-resolution linear transducer, ultrasound can demonstrate the hallmarks of diverticulosis and acute diverticulitis. Trans-vaginal ultrasound can also be used to assess the pelvic colon. The findings seen in acute diverticulosis include a thickened colonic wall notably with hypertrophy of the muscularis propria layer and presence of diverticula. In acute diverticulitis, there is surrounding hyper-echoic inflamed fat centred on a segment of colonic diverticulosis, accompanied with

localised tenderness. Doppler ultrasound may show hyperaemia. Complications such as abscess and fistula can be demonstrated. Typical features are diagnostic of acute uncomplicated diverticulitis and, where inconclusive, can triage the need for further imaging with CT.

Conclusion:

The poster aims to highlight the imaging findings of colonic diverticulosis and acute diverticulitis. Given the low risk and ability for dynamic assessment of the bowel on ultrasound, an awareness of the findings is crucial to prevent unnecessary morbidity.

37. **Ascites: It's all about the fluid!** C Footitt¹, V Rudralingam², B Layton¹, ¹Royal Bolton Foundation Trust, ²University Hospital South Manchester

The excess accumulation of intra-peritoneal fluid, referred to as ascites, is an important clue to a significant underlying illness. This may be due to a pathological event within the peritoneal cavity or secondary to an underlying systemic condition. Ascites is broadly classified into transudate and exudate based on protein content with a potential wide range of underlying differential diagnosis.

Traditionally Computed Tomography (CT) has been regarded as the imaging modality of choice to demonstrate ascites and diagnose the underlying cause. However, ultrasound (US) can reliably detect small volumes of fluid and is a useful first line imaging modality for clinical triage. For instance, in the emergency setting, the detection of a trace of free fluid in the dependant aspect may be the earliest indicator of an acute abdomen needing surgery. US can quantify the volume of ascites and aid the decision process for fluid drainage. US is superior than CT at qualitative assessment of fluid. In general, simple fluid is anechoic whereas complex fluid may appear particulate, layered or with septations, typically from an inflammatory or neoplastic cause. On CT, both have a uniform hypo-dense appearance and are often indistinguishable. Given US in comparison to CT, is safe, relatively inexpensive and readily available, it is a valuable tool in the assessment of ascites.

Hence, once ascites is detected on US, it is imperative for the operator to have a systematic approach to attempt to provide an underlying diagnosis. Common diagnosis includes portal hypertension from underlying liver cirrhosis, carcinomatosis or peritonitis.

Through a series of cases, this poster aims to increase awareness and reaffirm the role of US in the assessment of ascites.

38. **A pictorial review of focal Splenic lesions on sonography with review of literature and their correlation,** M Funi, J Furaide, H Butt, A Ashfaq, L Khalid, R Mohanty, A Sahu, London Northwest Hospitals NHS Trust

Introduction:

The spleen is rarely the primary site of a malignant disease. The incidence of focal splenic lesions ranges from 0.1- 0.2 %. The ratio of benign versus malignant focal splenic lesions is 1:3. The benign splenic lesions are often solitary but the malignant lesions (lymphoma, metastasis) are more frequently multiple and grow at rapid pace. The solitary metastasis is usually very rare. The cysts are the most common benign disease of the spleen. The congenital cysts account for 64.7 %, post-traumatic cysts 11.6 %, and dermoid cysts for 5.8 %. Amongst these lesions, true cysts account for 21 %, angiomas 14%, calcification and infarctions 9 %, pseudocysts 8 %, lymphomas and abscesses 7 %, and metastases 4 %. The ability of ultrasound to depict focal or multiple splenic lesions depends on several factors such as the size of the lesions and their appearances.

Aims and Objectives:

To briefly look at some of the presentations of focal splenic lesions. Ultrasound is the preferred first line imaging modality to locate these benign and malignant splenic lesions.

Material and Methods:

We will present a pictorial review of focal splenic lesions cases from our institution. We will highlight some of the clinical presentations and incidentally detected focal splenic lesions. Emphasis will be placed on how to differentiate between incidental findings and real pathology causing symptoms.

Conclusion:

Our aim is to provide the range of splenic lesions in order to remind about common and rare lesions seen in the clinical practice. Contrast enhanced ultrasound (CEUS) helps to differentiate benign and malignant lesions with sensitivity and specificity of 90% and 100% respectively. The use of ultrasound guided FNA biopsy of other abdominal masses has been accepted as a common diagnostic procedure however other modalities or core biopsy may be required for inconclusive.

39. **Anomalies associated with horseshoe kidney**, L Khalid, J Furaide, H Butt, A Ashfaq, R Mohanty, A Rafique, A Sahu, London Northwest Hospitals NHS Trust

Introduction:

Horseshoe kidneys are found in approximately 1 in 400-500 adults and are more frequently encountered in males (M:F 2:1). The vast majority of cases are sporadic, except for those associated with genetic syndromes. It is the most common type of renal fusion anomaly. They render the kidneys susceptible to trauma and are an independent risk factor for the development of renal calculi and transitional cell carcinoma of the renal pelvis. Horseshoe kidneys are frequently associated with other genitourinary and non-genitourinary malformations, and are also seen as part of a number of syndromes. Most of them are asymptomatic and they are usually identified incidentally.

Aims and Objectives:

To briefly demonstrate incidental congenital anomalies associated with horseshoe kidney detected on ultrasonography and later confirmed on different imaging modalities.

Material and Methods:

We will focus on the review of imaging-based cases from our institution. We would highlight the clinical presentations of patients with horseshoe kidney and emphasis will be placed on how to differentiate between incidental findings and real pathology causing symptoms. We suggest that to look for skeletal anomaly, cardiovascular anomaly, anorectal malformation, CNS anomaly, genitourinary anomaly like hypospodia, undescended testis, bicornuate uterus, ureteral duplication, and chromosomal abnormalities like downs syndrome, trisomy 18, Turner syndrome (60%). In 50% patients they presents with caudal ectopia, vesicoureteral reflux, hydronephrosis secondary to pelviureteric obstruction.

Conclusion:

We suggest that if we find horse shoe kidney on abdominal ultrasound, we should try to look for these other associated anomalies. If these are looked carefully during initial radiological scans, then we can make difference in early detection of other medical problems in future and outcome of the patient.

40. **A hard nut to crack – A case of the rare Nutcracker Syndrome**, A Isherwood, P Parker, O Byass, A Myatt, Hull and East Yorkshire Hospitals Trust

Introduction:

The nutcracker phenomenon refers to the compression of the left renal vein, usually between the superior mesenteric artery (SMA) and the aorta. If combined with symptoms such as haematuria, loin pain or varicocoele, it is known as the nutcracker syndrome. Venous compression results in left renal hypertension and the rupture of small venules into the collecting system. The condition can present at any age though there is a correlation with low BMI. Although rare, it is thought to be an underdiagnosed cause of persistent haematuria and Doppler ultrasound can be helpful in the diagnosis.

Case presentation:

A 23 year old gas fitter with low body fat density presented to the haematuria clinic for persistent frank haematuria, worse on exercise and heavy lifting. Initial renal ultrasound showed structurally normal kidneys, as did CT which also excluded renal calculi. Cystoscopy revealed that blood was entering the urinary bladder from the left ureteric orifice only. Left ureteroscopy failed to demonstrate any abnormality and there was no arteriovenous malformation apparent on renal artery angiography.

Review of the CT images indicated that the proximal left renal vein was dilated towards the renal hilum but became compressed as it passed between the SMA and the aorta consistent with nutcracker phenomenon. Follow up Doppler ultrasound confirmed the anatomical findings of venous impingement and an increased resistive index (RI) in the left kidney during increased abdominal pressure (RI reduced on the right). A diagnosis of nutcracker syndrome was made.

Conclusions:

This gentleman underwent significant investigation before the diagnosis of nutcracker syndrome was made. Doppler ultrasonography is thought to have a high specificity for nutcracker syndrome and can be utilised as an initial imaging technique in those in whom it is clinically suspected.

41. **Emphysematous Pyelonephritis**, N Fitzgerald^{1,2}, K Buckley², T Herlihy¹, ¹University College Dublin, Dublin, Ireland, ²Cork University Hospital, Cork, Ireland

Background:

This poster documents the transition of a 45year old woman through the hospital from entering Accident and Emergency to diagnosis and intervention. She presented with neutropenic sepsis, fever and flank pain. She had a history of horseshoe kidney, acute myeloid leukaemia and was 101 days post bone transplant. She was referred for a renal ultrasound scan.

Ultrasound findings:

Moderate hydronephrosis within the right kidney was seen on the ultrasound scan, as well as echogenic debris within some of the calyces. Non dependant echogenic shadowing foci (dirty shadows) within the calices were seen which were suspicious for air. No discrete calculus was identified. Diagnostic considerations included emphysematous pyelonephritis/ emphysematous pyelitis. The findings were discussed with the radiologist and an urgent CT scan was requested.

The CT scan demonstrated multiple locules of air within the collecting system with perinephric fat stranding. Emphysematous pyelonephritis was diagnosed. The findings were discussed with the Haematology and Urology team.

Intervention:

The patient commenced IV antibiotics for ten days and had a nephrostomy tube inserted for one week to resolve the infection. The patient's urine cultures were investigated which were positive with Escherichia coli which caused the infection.

It was believed that the patient developed this infection as she was immunosuppressed (101 days post bone marrow transplant). Having a horseshoe kidney also left her susceptible to infection.



Conclusion:

Ultrasound proved to be successful in demonstrating the “dirty shadows” which is a typical feature seen with emphysematous pyelonephritis. It is an important ultrasound finding as emphysematous pyelonephritis can be potentially life threatening if left untreated due to septic complications. Thus, early detection enabling quick intervention is crucial.

Keywords:

Shadowing foci; Emphysematous pyelonephritis.

Vascular

42. **The application of using quantitative ultrasound parameters of erythrocytes aggregation echogenicity as a prognostic indicator of the incidence of deep vein thrombosis, A Al-obaidi, Cardiff University**

Background:

Deep vein thrombosis (DVT) is a severe medical condition that can happen in isolation or as a consequence of other diseases. Break-up of the thrombus can cause other serious disease called pulmonary embolism (PE). DVT has an annual incidence of about 1 to 3 individuals per 1,000. Thus, it is considered to be the third most common cause of death after coronary artery and stroke [1, 2]. There are many factors contributing to DVT incidence. However, it has been shown that the initial stage of thrombus formation is highly dependent on the presence of the red blood cells (RBCs). One approach to investigate this relationship is to construct flow phantoms to link cell aggregation to ultrasonic appearance [3]. However, their construction is complicated by the need to mimic the flow and aggregation properties while needing acoustic properties that are close to those of real blood. Building of flow phantom will be done in steps, in each the influence of different factors on quantitative texture descriptors have been determined. This poster considers some of them, including concentration, depth and velocity.

It has been argued that the operator-dependent techniques are regarded as subjective, variable, unreliable and inaccurate method to classify most of diseases such as DVT [4]. Thereby, quantification of the ultrasound image by using the statistical texture parameters would reduce the errors resulting from the operator-dependent evaluation and would provide more quantitative and objective method to differentiate an organ towards its pathological alterations [5]. MaZda software was used for extracting the image textural features, five categories of textural features were calculated in MaZda with 300 different parameters. These are first-order description statistics (gray level, variance, skewness, kurtosis), second-order description statistics (gray level co-occurrence matrix (GLCM), grey level run length matrix (RLM) and gradient), model-based texture analysis parameters (autoregression models) and wavelet-transform features [6] [7] [8].

Purpose: To investigate the influence of changing concentration, depth and velocity on the texture parameters of the B-mode ultrasound images.

Method:

A flow phantom was built, consists of reservoir, gear pump, blood mimicking fluid (BMF) and tissue mimicking material (TMM) as well as the Doppler ultrasonic system. As an initial BMF, sephadex particles in deionized water were used [9] [10] [11]. For an initial TMM, glycerol solution was used with 90% water and 10% glycerol. This glycerol-water mixture has an acoustic velocity, which matches that of real soft tissue (1540 m s⁻¹) [12]. The gear pump was used to circulate a BMF through this system in a continuous loop. The pump was controlled by data acquisition card (or called DAC card) within a dedicated computer attached to the gear pump that allowed the generation of a variable voltage and flow rate.

A velocity waveform, mimicking blood flow in the deep veins, was generated by the gear pump under LabVIEW control. However, there is a huge variation in the appearance of the normal venous waveforms between people. These differences are attributed to the variations in the rate and depth of respiration, the function of the right atrium and the tricuspid valve, intravascular volume, body habits and other physiological variations. Moreover, the position of the waveform within the deep vein where for a given individual and as the waveform approach to the heart, the amplitude of the waveform increases [13].

Results:

Texture parameters of the B-mode ultrasound images showed significant correlation with the concentration change. This means that these parameters can be considered to be concentration-dependent descriptors. However, as the depth change, two of these parameters, GLCM and RLM, showed their robustness to the depth change. These parameters were also proved to be robust with the velocity change.

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Physics

43. **Performance assessment of a shear wave elastography imaging system using the Leicester (Elastography) Pipe Phantom**, K Ramnarine¹, P Ummur², R Shah¹, H Charadva¹, A Khetia¹, ¹University Hospitals of Leicester NHS Trust, ²University of Leicester

Background:

The imaging performance of conventional greyscale ultrasound scanners can be assessed by test objects and phantoms such as The Edinburgh Pipe Phantom. The purpose of this study was first, to develop a new test

phantom to assess the performance of emerging elastography imaging modalities, and second to demonstrate its application by assessment of a shear wave elastography imaging system.

Methods:

Analogous to The Edinburgh (B-mode) Pipe Phantom, The Leicester (Elastography) Pipe Phantom has been developed which consist of 5 soft pipes (made of PVA cryogel of diameters from 1 to 13mm), surrounded by a block of stiffer agar based tissue mimicking material (TMM). This was used to assess the imaging performance of a Shear Wave Elastography (SWE) scanner with L15-4 linear array probe (Supersonic Imagine, Aix en Provence, France). Longitudinal and transverse sections of each soft pipe were imaged at different depths and at different scanner settings.

Results:

The Leicester (Elastography) Pipe Phantom was able to quantify a number of image performance parameters and help determine optimum scanner settings. The Young's Modulus of the surrounding agar TMM was measured as approximately 280kPa compared to the largest cryogel pipe of approximately 70kPa. A number of features or artefacts of SWE imaging were also highlighted and will be presented. Examples include: penetration depth through the agar TMM block (4.5, 4 and 3.5cm for Penetration, Standard and Resolution optimisation settings respectively), and through different pipe diameters; resolution performance assessment capability; effect of pipe depth and diameter on Young's Modulus estimates within a 2mm region of interest measurement circle. Interesting artefacts were visualised in prototype phantoms, related to scatter concentration and scanner settings.

Conclusions:

The Leicester (Elastography) Pipe Phantom was able to demonstrate interesting artefacts and features of SWE imaging and quantify performance aspects of a SWE scanner.

44. **Investigating unwanted nerve damage in regional anaesthesia with micro-ultrasound imaging**, A Chandra¹, P Felts¹, R Eisma¹, G Corner¹, C Demore¹, G McLeod², ¹University of Dundee, ²Ninewells Hospital

Introduction:

Regional anaesthesia (RA) is used to delivering anaesthetic around peripheral nerves via a needle to perform nerve blocks for many surgical procedures. RA offers quick patient recovery, lower cost and improved pain management. Peripheral nerve stimulation and ultrasound imaging are used for guiding the needle, but there remains a considerable (10%) chance of nerve damage mainly caused by needle penetrating the nerve. The aim of this paper is to identify the fascicles (bundles of nerve fibres) using micro-ultrasound imaging (frequencies greater than 30 MHz), validate these findings with histology, and identify changes in the nerve caused by the needle penetration.

Materials and Methods:

The nerve specimens used were dissected from Thiel embalmed human cadavers and fresh cadavers. Micro-ultrasound images of the nerves were obtained by scanning the specimens with high frequency (30 MHz and 40 MHz) transducers. The nerve specimens were fixed and stained for histological processing. RA needles were inserted into the nerve to simulate the clinical problem, and 3D micro-ultrasound images acquired with needles in place and after removal.

Results:

The micro-ultrasound imaging was able to visualise the substructures of the nerve showing fascicles of size, 0.5 mm diameter and greater. Statistical analysis of the fascicle dimensions along the length of the nerve was done. The anatomical structures were found to be similar in both micro-ultrasound and histology images. The position of needles within the nerves, and fascicles split by inserted needles were easily visualised in the micro-ultrasound images.

Conclusion:

The micro-ultrasound results were validated with histology demonstrating its use for studying the morphology of peripheral nerves. The needle insertion pilot study indicated that there is mechanical damage caused when the needle was inserted within and without the fascicles.

45. **High frequency measurement of the speed of sound and attenuation of small animal soft tissue**, A Rabell¹, SD Pye², T Anderson¹, CM Moran¹,¹University of Edinburgh, ²NHS Lothian, Royal Infirmary of Edinburgh

Background:

Commercially available ultrasonic test phantoms are manufactured from tissue-mimicking materials (TMMs) and are used to calibrate, assess and quantify the performance of clinical ultrasound scanners. The properties of the TMMs used in these phantoms are based on IEC recommendations based on the acoustic properties of clinical soft tissue obtained at frequencies 2-10 MHz (speed of sound (SoS) = 1540 ± 15 ms⁻¹ and attenuation = 0.5 ± 0.05 dB cm⁻¹ MHz⁻¹).

Currently, our lab is developing a high frequency performance test phantom manufactured from a new TMM, the acoustic properties of which will mimic small animal soft tissue at the higher frequencies (15-40MHz) which are most routinely used to ultrasonically scan these animals.

Aim:

To determine the magnitude of the speed of sound and attenuation of small animal soft tissue.

Methods:

Within 5 minutes of euthanasia, 10 fresh, non-perfused mouse livers and kidneys were extracted, sliced (~2mm thick) and immersed in a PBS tank maintained at 37°C. A high frequency ultrasound scanner Vevo 770 (Visualsonics, Inc) was used to collect the RF data in the frequency range of 12 to 35MHz. The acoustic power output from the transducer probe was set at 10% corresponding to a peak negative pressure of 1.0MPa (Sun, PhD thesis 2013).

Results:

Initial measurements from 5 livers showed a mean SoS of 1617 ± 22.3 ms⁻¹. The measured liver attenuation values (uncompensated for the PBS) were found to vary with frequency as $0.0122f^2 + 0.577f$ (R²=0.99).

Conclusion:

The SoS results obtained from liver were outside the recommended values provided by the IEC, 2001 guideline (1540 ± 15 ms⁻¹) for low frequency (2 to 10MHz). Nevertheless our results were in good agreement when compared with measurements undertaken in human and bovine liver at low frequency (1 to 7MHz) by Bamber et al., 1979 where the SoS was found to be 1614.3 ± 16.1 ms⁻¹.



Paediatrics

46. **GIST presenting as cystic mass in a child**, J Coates, Leeds Teaching Hospital Trust

Background:

We present a case of an 8 year old that was referred by his GP for investigation of a left upper quadrant mass. Ultrasound showed a large complex cyst which was proven to be a Gastro intestinal stromal tumour (GIST) after excision.

Case Report:

An 8 year old boy presented to his GP with a cough and fatigue. On examination a left upper quadrant mass was noted and an urgent referral made for abdominal ultrasound. The ultrasound demonstrated a large left-sided complex cystic mass. The lesion was further assessed with an MRI scan which confirmed a large complex cystic mass, containing haemorrhage.

On referral to a regional paediatric surgical centre the child underwent laparotomy and a 1kg mass was excised from his stomach. This was found to be a GIST on histological examination.

Discussion:

Paediatric GIST is a very rare diagnosis, accounting for between 1-2% of all patients diagnosed with GIST. The majority of these patients are female and it usually starts in the stomach. When compared with adult GIST they tend to be slower growing and less aggressive and patients are less likely to show certain genetic mutations. Imaging findings are variable, depending on size, location and amount of cystic change, haemorrhage and necrosis.

47. **Neonatal Cerebral Doppler - What it is for (and what it isn't)**, JR Fernandez Alvarez, L Mahoney, B Reulecke, H Rabe, Brighton & Sussex University Hospitals NHS Trust

Background and Purpose:

Cranial ultrasound is the most common sonographic investigation in neonatal intensive care. Cerebral Doppler sonography has become a valuable additional modality in the assessment of the new-born brain. Its clinical application is increasingly extending, providing even information about organ systems outside the brain. We aim to review and illustrate the current and future role of cerebral Doppler ultrasonography in new-borns.

Methods:

We searched the literature using the terms “neonates”, “sonography”, “ultrasound”, “Doppler” and “brain”. We also reviewed imaging textbooks and cross-referenced with our literature search looking for applications of cerebral Doppler sonography in the management of sick or premature new-borns. We use partly our own images from our tertiary referral neonatal unit to illustrate the findings.

Results:

Cerebral Doppler sonography helps assessing congenital and acquired brain problems directly and indirectly involving the brain vessels. In term infants with hypoxic-ischemic injury the arterial flow pattern and resistance index are abnormal. Assessment of the arteries can help predict severity of brain injury and neurodevelopmental outcome. In preterm infants cerebral autoregulation is very primitive. Hypo-/hypercapnia can alter cerebral blood flow to the extent that the risk of brain injury is increased. Similarly poor cardiac output or significantly low blood pressure can be reflected in abnormal Doppler traces in the brain. The flow pattern and resistance index in the cerebral arteries can help determine the clinical significance and guide the management of a patent ductus arteriosus. Ischemic and venous infarctions as well as vein thrombosis can easily be seen using colour Doppler in addition to pulsed wave Doppler.

Conclusion:

Cerebral Doppler ultrasonography is a valuable addition to the standard B-mode assessment of the neonatal brain. It has the potential to help assess the severity of a clinical problem remote to the brain, guide clinical management and predict outcome in certain conditions.

48. **Sonographic determination of splenic volume in children with sickle cell anaemia in steady state**, N Irurhe, YI Caleb, FO Olowoselu, C Esezobor, E Temiye, Lagos University Teaching Hospital, Nigeria

Background:

Accurate non-invasive assessment of splenic volume is used in the clinical management of patients with these diseases. Previously, techniques for measuring splenic size have relied on nuclear scintigraphy and computerized tomography. However, ultrasonography (US) is now the imaging modality of choice because it does not use ionizing radiation; in addition, it is sensitive, cheap, and readily available. The purpose of the study is to determine the splenic volume in children with sickle cell anaemia in steady state.

Methodology:

200 children with sickle cell anaemia in steady state attending the paediatric sickle cell clinic and 200 age and sex matched controls (normal children) attending the general paediatric outpatient clinic. All patients were scanned at the Radiology department of the Lagos University Teaching Hospital by transabdominal ultrasonography. Calculations of the splenic volume were based on measurement of splenic length (L) width (W) and thickness (T) as obtained on two images placed side by side on the monitor utilizing the standard ellipsoidal formula ($L \times W \times T$).

Results:

The relationship between age and sex of the subjects ranging from 1-15 year old (mean 7.9 and 8.1 years) were analysed. Splenomegaly was observed in 113 (56.5%) of the patients. Fifteen (7.5%) had autosplenectomy. The mean splenic volume in the patients ranged between 36 and 331 cm³ compared with 21 - 239 cm³ in the controls. No gender variation in both groups. No significant correlation between splenic volume and the frequency of blood transfusion. However, a strong correlation between age and splenic volume was established.

Conclusion:

This study has provided standard values of normal splenic volume in sickle cell anaemia children in our environment. It has also confirmed the age and sex related changes in the spleen.

Keywords:

ultrasonography, splenic volume, sickle cell anaemia, children, steady state.

General imaging

49. **Lung ultrasound: time to inflate our skills?** C Williams, University of Portsmouth

Lung ultrasound (LUS) is now an accepted extension of the focused assessment with sonography in trauma (FAST) examination and is routinely used in this setting for the detection of both haemo- and pneumothoraces. In addition, a recent review by Lichtenstein (2014) concluded that LUS is a suitable replacement for chest x-ray and, in many cases, computed tomography (CT), not only for trauma patients but also in the critical care setting. LUS has also been shown to detect the following diseases of the pleura: pneumonia, pulmonary oedema, pulmonary embolism, asthma and chronic obstructive pulmonary disease with a 90-100% sensitivity and specificity range (Touw et al, 2015). This technique enables rapid diagnosis and treatment as it can be performed at the bedside avoiding the hazards involved in patient transfer. In addition, it is repeatable, non-invasive, inexpensive and can provide an excellent opportunity for procedural guidance. LUS is relatively easy to learn and could be a valuable adjunct in the assessment of many inpatients, yet despite its many uses and advantages LUS currently remains underused, with sonographers receiving little or no training in this technique.

This poster will provide a basic how to guide with relevant images detailing both technique and image interpretation. Topics covered will include indications, patient position, probe type, machine settings, basic scanning technique along with relevant normal and abnormal images.

50. **Facilitating the use of ultrasound scanning in general medical practice in the National Health Service**, D Lukey, HIG (Healthcare Innovations Group) Ltd (UK)

Introduction:

The purpose of this study was to determine the feasibility of promoting ultrasound scanning in general medical practice across the UK as an additional GP skill.

Although ultrasound training has been offered to GPs for the past two decades, there are very few GPs who have undergone training and an even smaller number who regularly practice the skill.

The aim of the research was to determine why so few GPs have taken up training and to assess whether anything could be done to promote the service if there was sufficient enthusiasm amongst students, trainees and GPs.

Research methodology:

The major component of the research was quantitative in nature, i.e. in the form of questionnaires to assess the opinions of GPs, GP trainees, medical students, radiologists/ sonographers and commissioners.

The second part was the structured interviews conducted with providers of equipment and an academic at a medical school.

The final component was the unstructured interviews/discussions with members of the focus group.

Results:

The enthusiasm of the GPs, trainees and students was evident from the findings of the survey (43% positive - 25 respondents).

The commissioners (50% positive - 2 respondents) would have to be persuaded to view GP USS as a worthwhile investment on the evidence of fewer cases referred to hospital for USS and fewer patients attending A&E

The career sonographers, in particular the latter (33% positive - 6 respondents), would require considerable persuasion in order to convince them of the non-threatening nature of GP USS.

The providers of equipment (100% positive - 3 respondents) showed considerable interest in the undertaking.

Conclusion:

The introduction of GP USS would require a change in culture, a veritable paradigm shift, but it can be hoped that on the evidence presented such a change is not only possible, but desirable, if not inevitable.

51. **What lurks beyond the renal pelvis? A case of pyoureter detected in a pregnant patient with urosepsis**, A Neary, Mater Hospital, Dublin

Background:

Renal ultrasound is routinely requested for investigation of urosepsis and is usually undertaken with the primary purpose of demonstrating the kidneys and bladder. The ureter is often presumed to be obscured by bowel on ultrasound and so minimal or no focus may be directed to the ureter as the potential source of infection. However, if successful, evaluation of the ureter can have a significant impact on patient management.

Case report:

This case involves a 36-year-old pregnant patient at 12 weeks gestation who presented to the emergency department with nausea, fever, RIF tenderness and dysuria, and an elevated CRP and WCC.

Renal ultrasound imaging with a curvilinear probe revealed a right-sided hydronephrosis. Pelvic organs were unremarkable with a viable foetus confirmed.

High-frequency imaging with a linear probe was then used to examine the right flank and RIF with higher resolution. Settings were optimized including focus, depth, beam narrowing, high-definition zoom and colour tint.

A tortuous cystic structure with mobile internal echoes was detected in the RIF. Differential included a dilated vein with sluggish flow but closer inspection with colour Doppler confirmed a dilated ureter containing pus (pyoureter).

The patient was subsequently referred for emergency nephrostomy procedure for relief of symptoms.

Discussion:

This poster highlights the value of not overlooking the ureter as a part of the renal ultrasound examination, especially in potential cases of urosepsis. It also illustrates the importance of optimizing the use of all available image settings to maximise detection of ureteric pathology. This is particularly valuable in pregnant patients for whom other diagnostic tests are limited and who have a high mortality rate from sepsis. Successful early diagnosis of pyoureter with ultrasound will enable timely treatment and intervention.

52. **Interventional ultrasound techniques replacing surgery in breast radiology – considerations, benefits and pitfalls**, J Lee, S Bhuvu, M Bhattacharyya, Oxford University Hospitals NHS Trust

Advances in technology have significantly improved ultrasound-guided interventions in breast radiology. With real-time ultrasound-guided core biopsy and vacuum-assisted excisions biopsy, the sonographer is now not only able to diagnose, but also to treat, breast lesions with increasing accuracy.

This approach has led to a significant reduction in surgical biopsies and excisions. New guidelines and training requirements for ultrasound-guided interventions in breast radiology have also been released.

Knowledge of the appropriate considerations, benefits and pitfalls of ultrasound-guided intervention in breast radiology will enable the sonographer to communicate confidently with the patient, optimise the ultrasound-guided intervention, and to enhance the patient's clinical pathway.

We shall present:

Considerations and technique of ultrasound-guided intervention in breast radiology, including appropriate case selection and current guidelines.

Advantages, including an analysis of its accuracy, potential cost-savings and impact on the patient's clinical pathway.

Pitfalls and training requirements for the sonographer.

A few cases to illustrate how the clinical context influences the ultrasound-guided interventional procedure.



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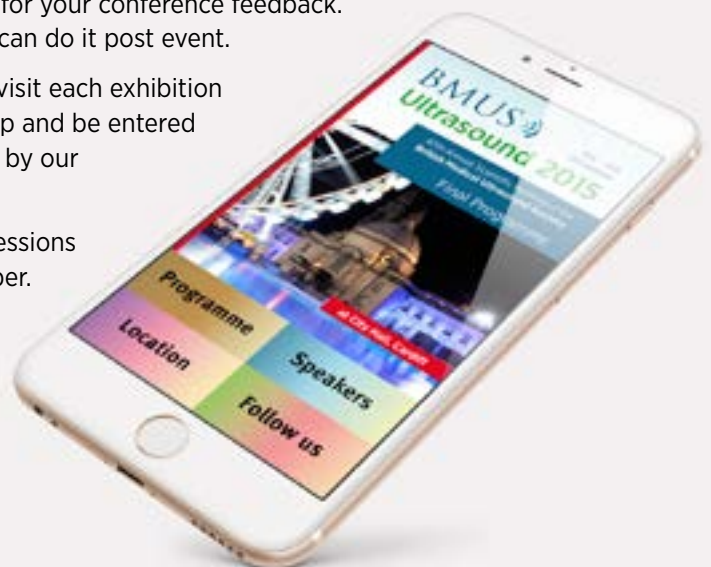


Ultrasound 2015 conference app

As you might have seen on the General info page we have developed a conference app for this year's event. Please do embrace this technology as it does many useful nifty things to make your life and ours easier!

1. It will generate your CPD certificate in exchange for your conference feedback. If you don't have time to do this at the time you can do it post event.
2. There is also a quiz on the app. You will need to visit each exhibition stand in order to answer the questions on the app and be entered into a daily prize draw. Prizes are kindly donated by our exhibitors and sponsors.
3. You can also use the app to vote in the debate sessions taking place daily in the beautiful Council Chamber.

You can download it from the App Store for Apple devices and Google Play store for Android devices by searching 'Ultrasound 2015'.



Exhibitor Profile

▶ BOND SOLON

Stand 29 - Main Foyer

www.bondsolon.com



Bond Solon is the UK's leading training company for non-lawyers. We train thousands of Healthcare professionals each year and work extensively with over 350 Adult and Children's Social Care departments, Acute Trusts, CCG's, CSU's, Ambulance Trusts, and Mental Health Trusts.

Bond Solon also provides specialist training for health practitioners acting as expert witness role compliantly and to best practice standards. We offer a number of well recognised expert witness qualifications which are accredited by Cardiff University Law School.

▶ BOWEN THERAPY

Stand 27 - Marble Hall

www.bowentherapy.org.uk



**Bowen
Therapy
Professional
Association**

Bowen Therapy Professional Association (BTPA), is an independent non-profit making organisation. Practice standards are set by an elected committee of members. The group is part of the national Complementary and Natural Health Care (CNHC) council, which is a voluntary regulator for practitioners, set up in 2008 with government funding.

Bowen Therapy is a gentle technique using the pads of fingers and thumbs to roll over soft tissue and ligaments. Bowen is suitable to be used in all age groups and especially where pain is present. It does not attempt to force change; rather it asks the body to recognise and make changes necessary to bring it back to homeostasis. Experience has shown that Bowen Therapy is very relaxing and in cases of emotional stress, where relaxation is a prime factor in easing pain and anxiety, it may often help in improving the quality of life.

Email : ask@bowentherapy.org.uk

Tel : 0844 561 7173



▶ THE BRITISH MEDICAL ULTRASOUND SOCIETY

Main Foyer

www.bmus.org



Drop by the BMUS Stand and check out all the latest news on our about the new website, on-line CPD tests and 2016 workshops/ASM.

Help influence the work and future of the Society by filling in our questionnaire.

▶ BRACCO UK

Stand 18

www.bracco.com



Bracco UK Limited is the UK subsidiary of Bracco Imaging Spa, a multinational group active in the healthcare sector with a total of 2,800 employees operating in more than 80 countries around the world.

Over the years Bracco has intensified its commitment to innovative specialised research in imaging agents for diagnostic medicine alongside the further development of medical devices and advanced injection systems for radiology and cardiology.

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▶ CARESTREAM

Stand 24

www.carestream.co.uk



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Stand 12

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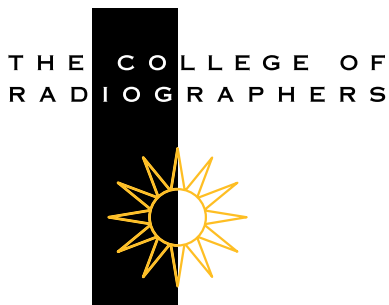
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Unit C, Blenheim House, Epsom, Surrey KT19 9AP

▶ THE COLLEGE OF RADIOGRAPHERS

Stand 11

www.sor.org



The College of Radiographers is committed to developing and promoting the science and practice of medical imaging and radiation therapy. We put the unified voice of sonographers in the UK to good effect in developing and promoting policy on current and emerging educational, professional and workforce issues related to sonography.

A major feature of our educational work recently has been the development of e-LfH learning units for obstetric and non-obstetric ultrasound – come and see these excellent resources on our stand. The SCoR has also been working with Health Education England and other stakeholders to try and resolve the current shortage of sonographers.

We welcome visitors to our stand where representatives will be on hand to discuss a wide range of topics, including regulation, workforce shortages and development, work-related injuries, continuing professional development, etc.

Please visit us – members and non-members are all very welcome and enter our prize draw.

For more information please contact us at info@sor.org

▶ DAY WEBSTER

Stand 31 - Marble Hall

www.daywebster.com



Day Webster are a trusted, multidisciplinary, approved multiple Framework provider of professional health care workers both to the NHS and private healthcare institutions in the UK and internationally.

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▶ DIAGNOSTIC HEALTHCARE

Stand 20

www.diagnostichealthcareltd.com



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Training is a key philosophy engrained in our company providing opportunities for clinical placements and professional development.

Visit our stand 20 at BMUS and say hello

▶ EFSUMB

BMUS Stand - Main Foyer

www.efsumb.org



Euroson 2016, 28th Congress of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB), will take place in Leipzig Germany from 26 -29 October 2016

For more information on the congress please visit www.ultrasound2016.org/en/home

For on-line training courses and European Standards visit the EFSUM website

▶ ESAOTE

Stand 21

www.esaote.com



Come and visit the Esaote stand at BMUS to see our new compact cart system, the MyLabSix, other systems on display will be the MyLabAlpha as approved by the National AAA Screening Programme (NAAAST) and the MyLabTwice with Virtual Navigator taking fusion imaging to the next level.

With a workforce of over 1500 people and an annual turnover in excess of €350M the Esaote Group is one of the world's leading producers of diagnostic medical systems. These include a full range of Ultrasound platforms. Dedicated Musculoskeletal MRI systems and Healthcare IT Systems.



▶ FUJIFILM SONOSITE

Stand 9

www.sonosite.co.uk



FUJIFILM SonoSite, is the innovator and world leader in bedside and point-of-care ultrasound, designing its products with extensive input from their customers.

Bedside ultrasound has become a valuable tool in anaesthesia environment to obtain immediate clinical information, help improve patient care, increase efficiency, and decrease complications during procedures requiring needle placements.

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Since its inception in April 1998, SonoSite's ultra lightweight and robust products have led the point-of-care ultrasound market with more than 75,000 systems installed worldwide. Headquartered near Seattle, the company is represented by 26 subsidiaries and a global distribution network in over 100 countries. SonoSite's portable, compact, systems are expanding the use of ultrasound across the clinical spectrum by cost-effectively bringing high performance ultrasound to the point of patient care.

For more information, visit our stand to see the very latest state-of-the-art point of care ultrasound.

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▶ GARC MEDICAL LTD

Stand 22

www.garcmedical.com



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GARCMedical will be launching Sonoscape's products at BMUS 2015. Any enquiries regarding Sonoscape or second user options please contact Nick Lemon.

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▶ GE HEALTHCARE

Stand 23

www.gehealthcare.co.uk



GE Healthcare provides transformation medical technologies and services to meet the demand for increased access, enhanced quality and more affordable healthcare around the world.

GE Healthcare helps medical professionals deliver great healthcare to their patients.

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▶ GLOBE LOCUMS

Stand 13

www.globelocums.co.uk



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Globe Locums is clinician owned and run allowing our ethical focus to grow with our company, making us unique in a very busy marketplace.

We are always available for an informal chat.

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Tel : 0207 229 2620



HITACHI ALOKA

Stand 1

www.hitachi-medical-systems.co.uk

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As pioneers of the world's first commercially available Elastography system in 2003, Hitachi now extend the utility of their systems even further with the implementation of Shear Wave Measurement (SWM) in combination with Real-time Tissue Elastography (RTE). Advanced technologies and unique algorithms ensure accurate and reliable velocity measurements. Non-invasive diagnosis of liver disease immediately becomes more accessible.

ID MEDICAL

Stand 28 - Marble Hall

www.id-medical.com

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Supplying over 5 million hours to the NHS per annum and holding preferred supplier contracts with over 90% of Trusts nationwide means ID Medical can offer you rewarding opportunities in the locations and hospitals of your choice.

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▶ MEDAPHOR

Stand 26

www.medaphor.com



MedaPhor is a global provider of advanced ultrasound training simulators for medical professionals. Founded in 2004, the company is headquartered in Cardiff, UK and San Diego, USA, with customers in over 16 countries across the world.

ScanTrainer, MedaPhor's revolutionary ultrasound simulator, offers a realistic ultrasound simulation experience like other system in the world. Combining 'real-feel' haptic technology with real patient scans, real-time 1:1 expert guidance and curriculum-based interactive learning, it offers trainees a flexible self-learning experience without the need for patients and with minimal expert supervision required. This makes ScanTrainer both resources efficient and highly cost effective.

▶ MINDRAY

Stand 25

www.mindray.com



We offer an expansive portfolio of products including ultrasound systems, patient monitoring systems and anaesthesia delivery systems. Mindray can provide ultrasound solutions across a wide range of diagnostic imaging applications from Radiology through to 'Point of Care'.

Our policy of continuous, innovative product development means that we deliver the products that you need in today's challenging healthcare environment, backed by the support you need, whether it is user-training or technical service and advice.

For more information, on our ultrasound range visit Stand 25 at BMUS 2015 in Cardiff.

▶ MIS HEALTHCARE

Stand 7

www.medical-imaging-systems.co.uk



At BMUS 2015, MIS Healthcare is showcasing the dynamic stimulus Samsung offers ultrasound relationships and textural curs to retained; researchers pioneering its application will be present to discuss their experience.

Addressing the challenge of improving the screening detection rate of congenital heart defects, 5D Heart creates standard cardiac planes from a single volume acquisition; its developer will be available to explain the underlying goals and principles. Your opinion is important to help MIS and Samsung to channel these and other innovations so please visit the stand and help us to help ultrasound improve healthcare.

▶ NANOSONICS

Stand 30 - Marble Hall

www.nanosonics.co.uk



Nanosonics Europe Ltd develops easy to use, environmentally friendly and quality assured products for the infection control market. Nanosonics is committed to preventing HAIs, through our first product - trophon®, trophon® is the next generation in ultrasound probe disinfection.

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Stand 14

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▶ PHILIPS HEALTHCARE

Stand 4

www.philips.co.uk/healthcare



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▶ PHYSIOLOGICAL MEASUREMENTS

Stand 19

www.physiologicalmeasurements.com



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With our community-based diagnostic screening services we work in partnership with the NHS to meet their objective of reducing the need for hospital-based testing by improving access to NOUS, MSK and Cardiology diagnostics in a care setting closer to home.

We are committed to introducing innovative technology to improve patient care in the UK and are distributors for the OsCare Sono™, a device that uses ultrasound to assess the risk of osteoporosis.

For more information about any of products or services, please visit stand 19.

▶ RIG HEALTHCARE RECRUIT

Stand 16

www.righealthcare.co.uk



RIG Healthcare Recruit provide the latest locum vacancies with the Ultrasound Market.

Operation since 2002, RIG Healthcare are on ALL NHS Frameworks including the London Procurement Partnership, Crown Commercial Suppliers and Health Trust Europe so you can be assured of all the latest vacancies across the UK enabling you to find the perfect job, whilst our highly experienced consultants assist with every aspect of settling into you position.

▶ SAGE

BMUS Stand - Main Foyer

www.sagepub.co.uk



SAGE is a leading international publisher of journals, books, and electronic media for academic, educational, and professional markets. Since 1965, SAGE has helped inform and educate a global community of scholars, practitioners, researchers, and students spanning a wide range of subject areas including business, humanities, social sciences, and science, technology and medicine. An independent company, SAGE has principal offices in Los Angeles, London, New Delhi, Singapore and Washington DC.

▶ SIEMENS

Stand 3

www.siemens.co.uk/ultrasound

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▶ SONOGRAPHERS MEDICAL

Stand 10

www.sonographersmedical.com

SONOGRAPHERS medical

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▶ TOSHIBA

Stand 2

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www.toshiba-medical.co.uk/diagnostic_medical_imaging_events.asp

▶ TRISTEL

Stand 17

www.tristel.com

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▶ TTM HEALTHCARE

Stand 8

www.ttmhealthcare.com

ttm
healthcare

TTM Healthcare is the UK and Ireland's premier specialist healthcare recruitment company. Winner of 'Best Healthcare Recruitment Agency' at the National Recruitment Federation Awards 2013 & 2014, TTM was also shortlisted as the UK's 'Recruitment Agency of the Year' by the Recruiter Awards for Excellence 2015.

TTM Healthcare is a Tier 1 supplier to the NHS, an exclusive supplier to the HSE and the go to' agency for many leading providers of Allied Health Services. The team at TTM Healthcare provides expert professional support to radiographers of all levels and specialisations who wish to further their careers.



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2 - 4 years' experience	£43
4 - 6 years' experience	£44
6 years + experience	£45
Vascular	
Newly qualified	£46
1 - 2 years' experience	£47
2 - 4 years' experience	£48
4 - 6 years' experience	£49
6 years + experience	£50
MSK	
Newly qualified	£51
1 - 2 years' experience	£52
2 - 4 years' experience	£53
4 - 6 years' experience	£54
6 years + experience	£55
MSK Injections	
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Proceedings of the British Medical Ultrasound Society 47th Annual Scientific Meeting 9th - 11th December 2015, Cardiff City Hall, UK

Day 1 - Wednesday 9th December

Abdominal 1 – Cross-sectional imaging for dummies

The liver and pancreas, T Wells, Morriston/ Singleton Hospital, Swansea

Very brief introduction to the physics of CT and MR imaging. Advantages and disadvantages of CT and MR imaging compared to ultrasound. Tips for choosing the best modality to further assess a finding on ultrasound. Review of common liver and pancreatic pathology in a case based format, demonstrating how and when CT and MRI are useful to further assess ultrasound findings.

To cover specifically:

Liver -

Malignant: Metastases, Hepatocellular carcinoma, Cholangiocarcinoma, Lymphoma

Benign: Focal fat, Haemangiomas, Adenomas, FNH, Hepatitis, Cirrhosis, Abscesses, Cysts including Hydatid (this is Wales!), Haemochromatosis

Pancreas -

Adenocarcinoma, Neuroendocrine tumours

Cystic Pancreatic masses - IPMN, Serous and mucinous cystadenomas

Acute and chronic pancreatitis and its complications.

The female pelvis, P Williams, Derriford Hospital, Plymouth

The session is aimed at sonographers to help them understand when ultrasound alone is enough and when abnormal ultrasound requires a CT/MR for clarification, also when can US help after an equivocal CT/MR.

The renal tract, E Simpson, Brighton and Sussex University Hospitals

Understanding CT scans.

Basic renal protocols.

Basic CT appearances of common renal pathology, with correlation to ultrasound findings.

Abdominal 2 – New technologies, what's in it for me?

Fusion, O Byass, Hull and East Yorkshire Hospitals NHS Trust

Elastography, A Lim, Imperial College, London

Contrast, S Tenant, Derriford Hospital, Plymouth

Contrast Enhanced Ultrasound (CEUS) is now considered routine for the characterisation of liver lesions and robust guidelines have been published regarding its use in other organs. The software to perform these studies is present in most new ultrasound machines. Despite this, take up of CEUS in many imaging departments has been minimal or non-existent. Common perceptions are that it is a difficult skill to master and that other modalities can perform the same task but better.

ABSTRACTS

This talk is intended as an introduction to CEUS for the beginner. It will start with the basics of the technique. It will be pictorially based, illustrating the most useful examinations and the typical imaging appearances of both normality and commonly occurring pathology. It will explain how, in the correct circumstances, CEUS is superior to other imaging modalities. It will hopefully enthuse delegates to adopt the technique in their own departments or to consider expanding their own practice to new areas having seen the benefits CEUS can have in everyday clinical work.

Reproducibility of shear wave elastography liver measurements in healthy volunteers, C Fang, E Konstantatou, O Romanos, GT Yusuf, PS Sidhu, King's College Hospital, London

Purpose:

2-D shear wave elastography (2D-SWE) (Logic E9, GE Healthcare, Barrington, Illinois) is a new imaging technique for the non-invasive assessment of tissue stiffness. We assessed the reproducibility of 2D-SWE in quantifying liver elasticity in healthy volunteers, using Acoustic Radiation Force Impulse (ARFI) imaging (Acuson S3000; Siemens, Mountain View, CA) as a reference control.

Methods:

Eleven healthy volunteers were examined twice, by four experienced operators, separated by a 1-week interval. Ten 2 D-SWE and ARFI measurements, expressed in meters per second, were obtained from deep portions of liver segments 5 and 6 away from vascular structures. Each volunteer was examined on two occasions, with observers blinded to elastography measurements. Inter- and intra-observer agreement was assessed by the Cronbach alpha statistic, with values ≥ 0.7 considered to be reliable.

Results:

880 2 D-SWE and ARFI velocity measurements were recorded from 4 operators. Mean values \pm standard deviation from the four operators ranged between 1.188 ± 0.14 m/s and 1.196 ± 0.15 m/s for 2 D-SWE and 1.170 ± 0.23 m/s to 1.207 ± 0.23 m/s for ARFI. Inter-observer agreement between measurements performed in the same subject on the same day for the four observers were similar for 2 D-SWE (Cronbach alpha 0.964 and 0.982 for day 1 and 2, respectively) and ARFI (0.966 and 0.971). Similarly, the intra-observer agreement performed in the same subject on different days among the 4 operators were reliable for 2 D-SWE (Cronbach alpha 0.820, 0.884, 0.864, and 0.915, respectively) and ARFI (0.727, 0.917, 0.828, and 0.841, respectively). For both the inter- and intra-observer variability, the Cronbach alpha statistic was ≥ 0.7 , indicating the results were reliable.

Conclusion:

This study shows that 2D-SWE is a reliable and reproducible method for elasticity in healthy volunteers.

An unusual case of sub capsular liver infarction, A Al-Khatib, B Stenberg, A McNeill, The Newcastle upon Tyne Hospitals

Background & Case Report:

A patient was admitted with 2 month history of weight loss, malaise and obstructive jaundice. On admission, B-mode US and subsequent CT pancreas and MRI liver demonstrated proximal common hepatic duct obstruction due to an enhancing soft tissue growth involving the proximal CHD, proximal cystic duct and gallbladder neck with evidence of infiltration through the hilar fat. The appearances favoured a neoplastic process. The patient proceeded to PTC demonstrating strictured proximal CHD & an internal external drain was inserted. Subsequently the patient underwent extended right hemi-hepatectomy, cholecystectomy and portal vein resection. Histopathology confirmed the diagnosis of moderate-poorly differentiated adenocarcinoma of the gallbladder. On day 5 post surgery, the remnant left hepatic artery ruptured and an emergency patch repair was performed. A subsequent US Doppler showed intrahepatic arterial flow. However, the clinical picture of the patient and the blood tests were not reassuring. Therefore a CEUS was performed to assess liver perfusion. This revealed central enhancement in the remaining left lobe, though, there was no enhancement in the peripheral liver parenchyma globally in keeping with peripheral sub capsular infarction.

Discussion:

The applications of ultrasound contrast are ever growing, particularly with regard to the assessment of abdominal organs. Here, we present a case of global sub capsular left liver infarction post a complicated extensive right liver resection and the subsequent use of contrast US in confirming the diagnosis. This pathological process is thought to be due to ischaemia during the hepatic artery rupture, similar to cortical necrosis in kidneys and is more commonly seen in post-transplantation kidneys. It is a safe, easy and efficacious investigative modality to stratify those patients with deteriorating clinical picture despite a reassuring post procedure US liver Doppler.

Abdominal 3 – Mistakes to avoid in abdominal ultrasound

Urogenital, S Freeman, Derriford Hospital, Plymouth

In this talk cases will be shown and discussed that demonstrate potential pitfalls in urogenital ultrasound including the kidney (infection, normal variants, echogenic masses), bladder (masses, stones and urachal abnormalities) and testis (trauma, torsion, non-malignant masses). The cases presented are intended to share the experience of ultrasound discrepancies from a large teaching hospital with the aim of minimising the chances of you repeating our mistakes in your own practice.

Hepato-biliary ultrasound, P Cantin, Derriford Hospital, Plymouth

This talk will discuss possible sources of error in hepato-biliary ultrasound. The importance of good sonographic technique will be emphasised. By reviewing some errors within our own large department, the importance of assessing patient presentation and history while undertaking an ultrasound examination will be described as well as the importance of placing scan findings into clinical context.

Errors of omission, C Gutteridge, Derriford Hospital, Plymouth

Where the other two talks in this session look at pitfalls in interpretation, this talk will look at 'Errors of omission'. There are times when it is appropriate to deviate from the scan that has been requested, taking into account additional information gleaned during your examination. This session will show examples of where using additional information and initiative can allow an alert US practitioner to adapt their study in order to get to the bottom of the clinical problem, thus providing a more useful report.

Ultrasound in acute cholecystitis - is it as good as we think? C Miller, J Bell, MJ Weston, Leeds Teaching Hospitals Trust

Background:

Ultrasound is widely used as a first line investigation for suspected acute cholecystitis in line with national guidance (NICE). However this is based on opinion with the evidence limited to three low powered studies. What is the sensitivity of ultrasound in our practice and how else are patients being diagnosed?

Methods:

Retrospective analysis of patients admitted to a large teaching hospital over a three month period with a diagnosis of acute cholecystitis. The discharge summaries, imaging reports, biochemistry/haematology and histology results were reviewed. The order of imaging and the imaging findings were recorded and the sensitivity of ultrasound was calculated.

Results:

99 cases of acute cholecystitis were identified of which 74 had an USS as the first line imaging with a sensitivity of 80%. Of the 13 false negative cases, 5 had a diagnosis confirmed with CT and 8 were diagnosed clinically. The 5 discordant cases were reviewed, with the potential reasons including rapid interim progression, satisfaction of search and operator dependency identified.

The remaining cases were diagnosed with CT as a first line investigation (12) or had a previous diagnosis of gallstones and were treated empirically (13).

Conclusions:

Our sensitivity is comparable to studies referenced in the national guidance. USS provides an available and safe method of diagnosing acute cholecystitis and should continue as the first line investigation. However the limitations of ultrasound should be recognised and further investigation should be undertaken if there is clinical suspicion.

Incidental Intussusception on USS; what you need to think about in adults and children? R Williams, St Georges Hospital, London

Background:

Outside the realm of the acute paediatric present of intussusception it is not common to see intussusception incidentally on an ultrasound examination. Intussusception is seen in both adults and children with a varied breadth of causative diagnoses that should be considered and excluded in each patient group.

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Case Report:

Cases were reviewed whereby incidental intussusception was identified on USS examination, these included both adults and children. Often the patients complained of symptoms of intermittent abdominal pain, meriting further investigation. In all cases abdominal USS was the first line radiological investigation, often due to radiation protection in young patients. Intussusception was seen in 3 young adults, a diagnosis of Coeliac Disease was made. Case images include echogenic abdominal lymph nodes, jejunisation of the ileum and intussusception. 3 further paediatric cases of intussusception proved the intussusceptum to be nodal leading points, with Burkitts lymphoma being the final diagnosis.

Discussion:

In the cases discussed the underlying diagnosis and cause of intussusception was coeliac disease (in young adults) and malignancy (in children). This underlines the importance of when an intussusception is witnessed on USS, even if intermittent/transient it is a pertinent finding. It should prompt thought from the operator, alongside possible further investigations. Most operators are aware of the relevance of intussusception found in an adult, malignancy must be excluded and often patients will have a biopsy. These cases highlight malignancy should be considered as a possible, although unusual, cause of intussusception in children. While significant benign disease can also be the cause of adult intussusception.

Donald MacVicar Brown keynote lecture

The joy of research: is necessity the best mother of invention? P Wells, Cardiff University

Professional Issues 1 - Facing the facts – discrepancy management and duty of candour in practice

Clinical audit and peer review: why, when and how? PC Parker, Hull and East Yorkshire Hospitals NHS Trust

There is an increasing need for peer review to be undertaken within clinical ultrasound departments. There is much evidence available to support this and many tools have been described. However, finding an audit tool that is suitable for the dynamic and operator dependent imaging modality of ultrasound can be difficult.

The BMUS recommended audit tool has been developed from various peer review tools available. This tool has been tested by a group of ultrasound experts who form the BMUS Professional Standards Group.

The aim of this presentation is to give an overview of audit in everyday clinical practice, how the BMUS recommended tool came about and when it's use can change practice.

The BMUS recommended audit tool is available to all BMUS members via the BMUS website.

Improving practice from discrepancy meetings, P Rodgers, University Hospitals of Leicester NHS Trust

Elevated ALT is frequently associated with hepatic steatosis. Risk factors for raised ALT and steatosis include obesity, excess alcohol consumption, diabetes and chronic medication. The new BMUS Guidelines state that US has no value in the management of symptomless patients with raised ALT. Although it is accepted that US is able to diagnose fatty liver, there is no evidence to support the use of US in the management of patients with elevated ALT. Despite this, ultrasound services receive large numbers of referrals for US, most of which simply confirm a fatty liver.

The records of 100 GP and OP referrals for elevated ALT alone were retrospectively examined to establish what proportion had steatosis, what proportion demonstrated other relevant pathology and whether the ALT normalised following management of findings over a period of up to 12 months. The results will be presented.

The obesity epidemic has increased the number of US scans for elevated ALT with consequent pressure on department resources. Eliminating an US scan from the pathway of these patients has considerable potential resource savings for the health service.

Duty of candour: facing the facts of error, O Byass, Hull and East Yorkshire Hospitals NHS Trust

Professional Issues 2 – Medico-legal implications of clinical audit and its outcomes

Medical legal issues facing ultrasound practice, A Andrews, Bond Solon, London

Hitachi Aloka Medical Systems Symposium

Thyroid ultrasound - BTA guidelines and elation (elastography trial), S Colley, Queen Elizabeth Hospital, Birmingham

Firstly, the talk will cover the use of Guidelines and Scoring systems for the assessment of thyroid nodules and risk of thyroid cancer, and cover the latest British Thyroid Association U -Classification for Thyroid Nodules. The second aspect of the talk will be the Elation Trial and use of Elastography in assessing thyroid nodules and thyroid cancer.

Multiparametric ultrasound of the testis: role of strain elastography, PS Sidhu, King's College Hospital, London

Ultrasound remains the standard for the evaluation of scrotal abnormalities, with B-mode and colour Doppler well established in the diagnosis of intra-testicular lesions. Limitations exist to a full characterization of these lesions, and often malignant and benign lesions overlap. Most intra-testicular lesions are malignant and the surgical management is an orchidectomy. However newer ultrasound techniques of contrast-enhanced ultrasound (CEUS) and strain elastography (SE), grouped with B-mode and colour Doppler ultrasound under the umbrella term multiparametric ultrasound (MPUS), may be important. These techniques allow assessment of the internal vascularity of the lesion (CEUS), allows for assessment of the blood flow kinetics (enhancement curves) and the lesion stiffness can be ascertained (SE). A more confident diagnosis of the lesion type may allow for testis sparing surgery or 'watchful waiting' avoiding orchidectomy.

This lecture will detail current status of MPUS in the assessment of testicular lesions, review the literature and the probable clinical implications.

Physics 1 – New technologies

Physics & clinical applications of microvascular imaging, C Gutteridge, Derriford Hospital, Plymouth

A recent development in ultrasound, Superb Microvascular Imaging (SMI - Toshiba Medical Systems) claims to improve sensitivity to very low velocity flow in small vessels by eliminating artefacts from tissue motion. Clinical experience with SMI is still limited and the indications for the use of this new technology and its diagnostic value are not yet clearly established, but in this session I will show some examples of where our department have found it most beneficial, having given an overview of the science behind this new development.

Matrix technology, B Stenberg, Freeman Hospital, Newcastle

This talk will discuss the principles behind matrix probe design and their advantages and disadvantages. From the conception and early models to recent probe design utilizing more than 9,000 elements allowing for rapid near-isovoxel capture and display of data and multiple simultaneous scan planes.

The clinical applications of the matrix technology will also be discussed and how it can increase diagnostic confidence, increase accuracy of measurements, potentially reduce the risk of repetitive strain injury and provide information and data not previously accessible with conventional ultrasound.

The use of SMI in surveillance of endovascular aneurysm repair (EVAR), B Gorell, ND Pugh, University Hospital Wales

Background and Purpose:

EVAR surveillance is recommended for the detection of endoleaks or aneurysm growth, usually using a combination of colour Doppler ultrasound (CDUS) and computed tomography angiography (CTA). Questions have been raised regarding the sensitivity of CDUS and contrast-enhanced ultrasound (CEUS) has been proposed as an alternative. CEUS is more sensitive than CDUS, but more invasive, costly and carries the potential risks of adverse reactions. SMI (Superb Microvascular Imaging) is a novel imaging technique developed by Toshiba Medical Corporation which demonstrates improved spatial resolution and low flow capabilities. In this audit, the applicability of SMI in an EVAR surveillance programme was tested.

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Methods:

A retrospective analysis was conducted on 136 patients comparing the success rate in diagnosing endoleaks with CTA, CDUS and SMI. The maximum diameter of the aneurysm sac was measured and the presence of endoleaks on CDUS, SMI and contemporaneous CTA scans was analysed.

Results:

Of the 136 patients, 36 also had CTA. 18 and 17 patients respectively showed no endoleak on ultrasound (CDUS & SMI) and CTA. Ultrasound failed to demonstrate 1 endoleak compared with CTA. 18 patients were found to have an endoleak on ultrasound (13%). Further analysis showed CDUS alone failed to demonstrate 8 of these endoleaks. Of the 18 patients displaying an endoleak on SMI, 12 proceeded to CTA with only 8 demonstrating an endoleak. Therefore, SMI detected 4 more endoleaks than CTA. In addition, 2 of these 4 patients with SMI endoleaks had an expanding sac size.

Conclusions:

SMI outperformed CDUS and was comparable to CTA for the detection of endoleaks. SMI is a non-invasive technique, with additional cost and safety benefits. The sample size was limited but agrees with trends found with CEUS and CTA in the literature.

Physics 2 – Safety and standards

Safety of elastography, G ter Haar, Institute of Cancer, Sutton

Elastography is rapidly gaining increased acceptance in a number of areas of medical imaging, and comes as a standard mode on many modern ultrasound scanners. It is therefore important that its safety implications are considered seriously.

Changes in tissue stiffness can be interrogated in a number of ways. These are broadly divided into free hand elastography, acoustic radiation force imaging (ARFI) and shear wave elastography. In considering elastography safety it is only necessary to think of concerns introduced over and above those presented by conventional imaging modes. That said, free hand elastography introduces no additional concerns as the impulse needed to form the elastogram comes from mechanical pressure created by the transducer being pushed against the skin surface.

An ARFI pulse sequence consists of both 'tracking' beams and 'pushing' beams. The tracking beams are conventional B-mode ultrasound beams (A-lines), and the pushing beams produce an "acoustic push pulse" which is transmitted along the same A-line and have higher intensity. These pushes may last 100-500 microseconds, and have a spatial peak, pulse average intensity well in excess of 100 Wcm⁻². It has been calculated that temperature rises (which are greatest at the focus of the pushing beam) may be 0.35 oC in soft tissue, ~8 oC at bone.

Shear wave elastography also uses acoustic push pulses, but because of the ultrafast imaging techniques used to reconstruct the image, the biological effects are likely to be less than with ARFI.

These techniques will be discussed, as will be the implications for the relevance of the thermal and mechanical indices displayed.

Inter- and Intra- operator reproducibility of acoustic radiation force impulse Elastography and factors which affect it, C Watts¹, J Wilson², ¹Hull and East Yorkshire NHS Trust, ²University of Leeds

Aim:

The aim of this research project is to assess intra- and inter-operator reproducibility of acoustic radiation force impulse imaging (ARFI) elastography of the liver and to identify any factors which affect this.

Introduction:

Liver disease, which encompasses a wide range of pathological processes, is increasing and is likely to cause significant pressure and cost to the NHS. Accurate and streamlined staging, monitoring and management of liver disease are vitally important however invasive testing is not without risk. ARFI elastography is a non-invasive tool which can be used for the assessment of liver fibrosis in addition to abdominal ultrasound and hepatic Doppler assessment and has become a key component in a dedicated service including access to one-stop appointments at the time of consultant appointments in our trust.

Whilst the body of evidence relating to the reliability of ARFI elastography of the liver is increasing, as part of Masters study, a project to assess intra- and inter-operator reproducibility locally and identify any affecting factors has been carried out to add to this body of knowledge.

Methodology:

Using convenience sampling, patients have been recruited at the time of their routine ultrasound appointment as part of consultant care. 3 Sets of ARFI elastography readings have been acquired by two operators. 17 patients as a non-blinded pilot study and 41 patients as a blinded study. Patient demographics and measurements have been recorded and detailed analysis performed.

Results and Conclusions:

Results are still being analysed using statistic programmes to create Bland-Altman plots for all results and whilst this is a small scale study, it is hoped that conclusions can be drawn about both inter- and intra- operator reproducibility but also identify any affecting factors which can affect reproducibility.

Safety of contrast agents in paediatrics, G ter Haar, Institute of Cancer, Sutton

Pre-clinical studies have demonstrated a number of biological effects that can be induced by the exposure of contrast microbubbles to a diagnostic ultrasound beam. These arise because these bubbles act as nucleation sites for cavitation, which in turn can lead to microstreaming and/or inertial cavitation. Microvascular damage and premature ventricular contractions have been seen following exposure to diagnostic ultrasound.

Paediatric use of contrast agents does not present significantly different risk than their use in adults, but they are off label for children, and no reference doses or standard protocols exist. Their bio-effects must therefore be carefully documented and understood.

RCR and SCoR equipment standards, NJ Dudley, United Lincolnshire Hospitals NHS Trust

Objectives:

The Royal College of Radiologists and the Society and College of Radiographers in the United Kingdom (UK) published "Standards for the provision of an ultrasound service", including equipment standards with application specific limiting values for resolution and penetration. No measurement methods were detailed, so we aimed to develop and test a measurement protocol and explore the theoretical basis of the standards.

Methods and Results:

In developing a protocol manual/visual methods were found to be time consuming with a high level of uncertainty with a maximum standard deviation of 14%. Automated measurements were more efficient with a maximum standard deviation of 9%. Current testing methods for axial resolution are not fit for purpose. The final protocol was implemented on 4 new ultrasound scanners (8 probes). All 8 probes failed to meet the standards for axial and lateral resolution and 4 failed to meet the standard for low contrast penetration. Since application specific standards fail to account for probes of different frequency used for the same application and since no evidence for the standards was provided we have developed new generic standards. A generic standard for penetration was developed based on scanner dynamic range and test object attenuation. Generic standards for resolution were developed from a combination of beam width calculations and direct measurement. The standards were tested on 15 probes, 4 probes failing to meet the new standards. Only 1 of the new probes failed to meet the standards.

Conclusions:

Automated methods are more efficient and accurate compared with manual/visual methods. New generic standards with a theoretical basis have been proposed. Further work is required to refine standards and evaluation methods and to determine the appropriate relative contributions of objective and subjective methods in equipment selection.

Early pregnancy ultrasound scanning: development of effective and clinically relevant quality assurance testing,

J Smith, V Pelling, L Harris, Brighton & Sussex University Hospitals

Early pregnancy ultrasound scans are often a traumatic experience for patients. There is the extreme anxiety connected with the on-going viability of a pregnancy. The outcome can be heart-breaking. It is essential for equipment to meet exacting requirements to image the flickering foetal heart, the early gestational sac, and the developing foetus. While there are exacting requirements, it appears to be commonplace for early pregnancy scans to be undertaken on ageing, low specification equipment. Clinically significant failings have been experienced, when the standard quality assurance programme had not highlighted any issues. As a result, an

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investigation was performed to investigate whether the apparent limitations of a machine was due to the machines quantifiable performance or whether it was a more nuanced issue due to a 'relative quality' difference against newer machines that could potentially influence the sonographer's experience when using the equipment.

At BSUH, a novel clinically focused quality assurance system has been developed to determine the limit of resolution of several machines used in early pregnancy scanning at two NHS trusts. A semi-automated MATLAB script to assess the contrast-to-noise ratio (CNR) in phantom cysts was developed. Preliminary results of Kruskal Wallis testing shows significance ($P < 0.000$) between the CNR of clinically failing and performing machines. Results have highlighted the limitations of the current quality assurance programme and support the need to implement specific early pregnancy scanning guidelines to include recommendations for regular quality assurance testing alongside standards for machine specification. A suggested technique to ensure ultrasound machines are fit for purpose has been suggested. A CNR limitation of voids should be included in a quality assurance programme whereby the clinical requirements include assessment of small anechoic objects.

To further understand the process causing this issue an investigation into the gradient and uniformity of intensity profiles across the voids is underway.

Quality Assurance of ultrasound probes, B Segall, A-C Segall, BBS Medical AB, Vätö, Sweden

This Abstract is referring to studies and conclusions performed during 13 years within the area of testing multi brand ultrasound probes in daily use at hospitals in the Nordic countries. The Abstract describes the importance of frequently validating ultrasound probe performance for patient safety.

Background:

Studies * have shown that 35-40% of the ultrasound probes, independent of brand and type, at a non-tested hospital, have defects and needs to be attended to.

Common reasons for defective probes

- handling (dropping, transport)
- wrong gel or cleanser used
- the performance of an ultrasound probe decreases over time
- mistakes during production process

Common faults

- Element damages
- Cable breakage
- Lens problems, cracks
- Strain relief

Studies showed that Biomed Engineers relied either on regular maintenance from the manufacturer or on evaluation of the ultrasound scanners by their own testing protocols.

The dynamic range is about 50dB this makes it almost impossible for a clinician to see in the 2D image few missing elements.

The abstract will describe:

- That it is possible to bring the faulty frequency 40% down to 10%
- The clinical impact of defective probes
- Testing methods
- Why defects does not show on the image
- The impact of missing few elements
- All elements working is very critical for a good Doppler
- Why defects will have even greater importance in mode Elastography, Pulsed Doppler CFM Color flow, CW Doppler
- Ultrasound industry reactions
- BioMed Engineers and hospitals are not aware of the problems
- That clinical studies will have more accurate results if probes are monitored
- Recommendations for the healthcare sector to bring the faulty frequency down. Guidelines, Standard for testing, recommended frequency of testing, responsibility.

Physics 3 – The sonography / physics interface

What sonographers need to know about physics and technology and why, C Oates, Freeman Hospital, Newcastle

In using ultrasound, a sonographer is sending energy into the body, obtaining an echo signal back, which is then processed and presented for interpretation as an image or a waveform. The user has a lot of control over what that image looks like, and the processing used, that may affect the quality of the image, and therefore how useful it is for clinical interpretation and making measurements from. As specialist users of ultrasound, who make it their profession for several sessions each week, sonographers should have a good, in depth, knowledge of how ultrasound images are produced; how to interpret them from a physical point of view; and to know what the limitations of ultrasound imaging are. It is also important to understand why machines may differ from one another and what new technologies might be doing.

The level of knowledge and understanding should be at an expert user competency and need not be mathematically intense or highly technical, as a design engineer would need. The concepts and principles needed can be made accessible in teaching through the use of narrative explanation with pictorial diagrams and analogy with commonly understood examples from the everyday world. The key test of successful understanding is whether the sonographer can accurately and clearly explain and answer appropriate questions relating to the physics and technology of ultrasound in their own words and can practically demonstrate proper control of the machine and interpret the images correctly.

What have the physicists ever done for us? T Evans, University of Leeds/ Leeds Hospitals NHS Trust

At every stage of the development of medical ultrasound, progress has been made only with the key intervention of physical scientists. Probably the first of these was the discovery of the piezoelectric effect by Jacques and Pierre Curie. The subsequent history includes a very long list of people including materials scientists, theoretical and experimental physicists, mathematicians and electronic engineers. The pioneers who were responsible for the invention of the B-scanner, grey scale display, real-time scanning, the various Doppler modes, harmonic imaging, elastography and contrast agents to list but a few, should be recognised for their great contributions. The use of ultrasound in medicine continues to grow at a rapid rate but it might be argued that such fundamental developments have ceased or at least stalled. It follows that the key players now are those involved in applications development such as clinicians and sonographers and that the role of the physicist has come to an end.

It seems that in practice the physicist's role has gradually petered out. Arguably this is true of the development of any new technology when it reaches the maturity in which it is widely accepted and at least partially automated. However some fundamental questions arise:

1. Who is going to provide the evidence to ensure value for money and fitness for purpose and how is this to be done?
2. How is the problem with optimisation of display and viewing conditions going to be addressed and by whom?
3. How can the unsatisfactory nature of the evidence base for ultrasound safety be addressed?
4. Is there a need for ongoing QA? How and why?
5. How are therapeutic ultrasound developments such as HIFU and targeted drug delivery introduced and governed?

The use of texture analysis in diagnosing ovarian masses, R Aldahlawi, ND Pugh, LDM Nokes, Cardiff University

Background:

Ovarian cancer has the highest mortality rate of all gynaecologic cancers and is the fifth most common cancer in UK women. Amongst various imaging modalities, ultrasound is considered the main modality for ovarian cancer triage. Like other imaging modalities, the main issue is that the interpretation of the images is subjective and observer dependent. Texture analysis has been shown to have potential in the objective assessment of ovarian cancer in a preliminary study.

Purpose:

To assess prospectively the diagnostic performance of texture analysis in discriminating between benign and malignant adnexal masses and between different types of benign masses.

Materials and methods:

Ultrasound images were collected from participants and transformed to a PC as a BMP files for off-line analysis. MaZda software was used to perform the texture analysis. In a preliminary study two texture analysis features

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showed usefulness in differentiating benign from malignant masses which are grey-level co-occurrence matrix (GLCM) and wavelet and were applied to masses (Hamid et al., 2011). Then readings were compared to histology results of participants. P-value was calculated for the significance.

Results and Conclusions:

Masses were divided into benign, malignant and simple cysts. Benign masses were sub-classified to dermoid, fibroid, endometrioma and suspicious benign masses. Preliminary results showed a significance difference between benign and malignant masses $p = .007$, $p = .04$ for GLCM and wavelet respectively. Significance differences were found between the subgroups as well. The results of the full cohort will be discussed and explained in the meeting.

References:

Hamid, B, Pugh, ND, Coleman, DP & Nokes, LDM, 2011. The Reliability of B-mode transvaginal probe image for the quantitative texture analysis and the dependence of extracted features on region of interest size for ovarian cancer detection. PhD, Cardiff University.

Miniature transducers for real-time guidance in neurosurgical procedures, R McPhillips¹, Y Jiang², Z Qiu¹, SO Mahboob¹, H Wang¹, C Meggs², G Schiavone³, DR Sanmartin⁴, S Eljamel¹, MPY Desmulliez³, T Button², S Cochran¹, CEM Demore¹, ¹University of Dundee, ²University of Birmingham, ³Heriot Watt University, ⁴Applied Functional Materials Ltd

Background:

In current neurosurgical practice, guiding interventional tools such as biopsy needles relies predominantly on preoperative MRI or CT imaging. These modalities can be costly, time consuming, and do not account for brain shift which can occur during intervention. Therefore, there is a need for real-time, minimally invasive imaging to guide the procedures. The aim of this paper is to explore the potential for real-time imaging using single element transducers integrated in the tip of a neurosurgical biopsy needle.

Methods:

Two single element probes were fabricated using advanced microfabrication techniques to overcome the considerable manufacturing challenges, and placed within neurosurgical biopsy needles of 1.8 mm inner diameter. One device has a forward facing transducer at the tip of the needle; the second has a side facing transducer a few millimeters from the tip. An imaging system was programmed to allow real-time M-mode imaging. Plasticine targets were inserted into the brain of a Thiel embalmed cadaver and a fresh porcine model. The needle probes were inserted and maneuvered manually within both specimens and the M-mode imaging used to guide the needle tip to the target position.

Results:

Both fabricated transducers yielded strong signals from the targets within the Thiel embalmed cadaver and porcine brain tissue. The distance between the target and needle tip was changed continuously, and the acquired real-time M-mode images show the change of position of the target relative to the needle. MRI scans obtained of the Thiel cadaver and fresh porcine brain before and after intervention showed there was no significant change in the state of the brain tissue as a result of the experiments.

Conclusions:

The M-mode images acquired from the transducers were used to navigate the needle towards the target. These results indicate the potential of miniature micro-ultrasound devices for guiding interventional tools during neurosurgery.

DVT integrated training

Led by – ND Pugh, University Hospital of Wales, Cardiff

This ever popular practical training session returns for a further year.

Includes technique, pathology and reporting advice.

Introduction: Q&A session with faculty.

Lower limb: fem-pop - paired femorals & challenging legs

Lower limb: calf veins - a magical mystery tour

Iliac veins and IVC - practical tips

Upper limb: arms and neck veins - a pragmatic approach

Day 2 – Thursday 10th December

Paediatrics 1 – The paediatric urinary tract

Surgical treatments in UTI: The paediatric urologist view, A Abhyankar, Cardiff & Vale University Hospital

The investigation of urinary tract infection in children, W Ramsden, Leeds Teaching Hospitals

This talk discusses the important role of ultrasound in imaging children with urinary tract infections, both during the acute episode and afterwards. The role of sonography is situated within overall guidelines for the imaging of children of varying ages with urinary tract infections due to both typical and atypical organisms. Situations where further imaging is required are highlighted, as are important findings which may necessitate specialist referral or long-term follow-up.

Ultrasound of the paediatric renal transplant, J Carmichael, Evelina London Children's Hospital

Paediatrics 2 - The acute abdomen in children

Ultrasound of the acute abdomen in children, T Humphrey, Leeds Teaching Hospitals

This talk will give guidance on the ultrasound technique and findings in children who present with an acute abdomen. The ultrasound appearances of conditions such as appendicitis and intussusception will be reviewed in conjunction with practical advice on avoiding common pitfalls.

The role of CEUS in paediatric abdominal trauma, M Sellars, King's College Hospital, London

The role of ultrasound in the diagnosis of paediatric tuberculosis, K Chetcuti, Alder Hey Children's Hospital, Liverpool

Ultrasound is widely available, inexpensive and provides high quality images that allow for rapid diagnosis and ease of assessment for disease progression. These qualities, as well as the fact that ultrasound can be performed at the bedside with hand-carried ultrasound machines, make it appealing for use in low resource environments. Radiology expertise is frequently limited in these settings, however the relative ease of use of ultrasound makes it available to non-radiologists, who, with basic ultrasound training are able to utilise ultrasound to significantly improve patient management. Ultrasound is generally well tolerated, does not incur any ionising radiation, and seldom requires sedation, making its use particularly attractive to the paediatric cohort.

Point of care ultrasound for the diagnosis of chest tuberculosis (TB) is more accurate in the identification of consolidation, pleural and pericardial effusions and mediastinal lymphadenopathy than auscultation or chest radiography (which is often the only imaging modality available in low resource settings). Although ultrasound imaging of the mediastinum is challenging anatomically, in one study, mediastinal lymphadenopathy diagnosed on ultrasound (later confirmed on computed tomography) was detected in 67% of children who were otherwise deemed to have a normal chest x-ray. Focused assessment with sonography for HIV/TB (FASH) is sensitive for demonstrating signs of extrapulmonary TB that is particularly prevalent in young children.

This presentation will outline the value of ultrasound in the diagnosis of pulmonary and extrapulmonary TB in children with illustrations of the various manifestations of paediatric TB also demonstrated.

Head & neck 1 - Salivary glands, larynx and thyroid revisited

Salivary glands - what to look for and how, N Drage, Dental School, University Hospital of Wales, Cardiff

The larynx-how I do it and why? T Beale, University College Hospital, London

The lecture will start with an introduction on why I started looking at the larynx with ultrasound. I will then demonstrate the technique (sweeps) I use to assess the larynx highlighting the anatomy that is visible with each sweep.

I will concentrate on the ultrasound assessment of squamous cell carcinoma (SCC) of the larynx but will also show a variety of malignant and benign laryngeal pathology and peri-laryngeal pathology including laryngocoeles, vocal cord cysts, benign and malignant cartilage tumours, tracheal stents, thyroglossal remnants etc.

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I hope that by the end of the lecture the laryngeal ultrasound anatomy and technique will be clearer as will the advantages of performing ultrasound in this region.

If there is any time remaining I may briefly highlight the advantages of ultrasound in other areas of the head and neck where ultrasound is underutilised such as the oral cavity and tonsils.

Thyroid masses, S. Colley, Queen Elizabeth Hospital, Birmingham

This talk will review the local anatomy of the peri-thyroid region, outlining the tips and key structures that need to be highlighted in order to be able to assess this region when looking for the extra thyroid masses that exist in this region – e.g. parathyroid adenoma, para-tracheal lymph nodes.

Common pathology that may present as a “thyroid” mass on Ultrasound lists will be covered and presented. Tips and tricks for the Ultrasound diagnosis of alternative pathology will be highlighted. The interaction with other imaging modalities is crucial in this region and the factors that influence the decision when to proceed to further imaging are to be discussed. Biopsy in this region can be problematic, tips and problems to avoid will be revealed.

Head & neck 2

Head and Neck Ultrasound: the where and now, back to basics? RM Evans, Morriston Hospital, Swansea

The leaps in technology that have occurred in Ultrasound have resulted in a plethora of new techniques, software applications and innovations for the practitioner in the head and neck. As always in medicine we forget where we were a short time ago and sometimes fail to remember the fundamental lessons we have learnt on the way. Looking back and reviewing the “where we have come from” and asking the question “why?”: is important if we are to reinforce and refresh the fundamental knowledge needed and the skills that enhance our practice.

As such this talk will take us back to the basics of head and neck Ultrasound and identify key areas where retrospection and review will help our current practice. Once we understand the fundamental principles of assessing the neck with Ultrasound we can use the new applications now available to us more efficiently. Integration of new technology can then be pragmatic and valuable.

This presentation will show the key lessons that I have learnt during my experience and will be presented with a view to question, review and enhance practice in head and neck Ultrasound. Hopefully by showing my mistakes and the lessons I have learnt along the way, these tips will allow the practitioner to advance more efficiently along their learning curve and enhance their practice.

Lumps and locations R Rhys, Royal Glamorgan Hospital, Llantrisant

Professional Issues 3 – Managing demand

How is the NHS managing demand and the impact on service? P Rodgers, University Hospitals of Leicester NHS Trust

Walk-in direct access ultrasound service – A means to managing demand? L Alcock, PC Parker, Hull and East Yorkshire Hospitals NHS Trust

Community non-obstetric ultrasound services are well established. With the impetus towards more care being delivered closer to home the demand for community based services is growing. Non-obstetric ultrasound imaging is an important tool for GP's as it offers a first line investigation for many patients thereby aiding future management plans.

Demand for non-obstetric ultrasound is increasing and in our institution there have been an increase in referrals of 5% year on year since 2008. One aspect of the service that hasn't changed is the DNA rate which runs at 6% despite changes to opening times and appointment booking. Given this high DNA rate different ways of working and offering appointments have been reviewed

The aim of this pilot study was to offer a walk-in open access service for patients with non-obstetric ultrasound referrals from their GP's with a view to reducing the DNA rate and reducing impact on services within secondary care.

The pilot study ran for eight weeks from 7th April to 31st May 2015. An approximation of required daily capacity was calculated based on previous demand data. 10 appointment slots were allocated per day for this new service.

The service was offered at a primary care community hospital. All scans were performed by sonographers experienced in non-obstetric ultrasound in primary care. Local GP's were informed of the pilot study via the East Riding Clinical Commissioning Group

From a patient perspective, the walk-in scheme provided an excellent service. On several occasions' patients with previously unsuspected significant pathology saw their GP, had their ultrasound examination and were reviewed by the GP with a faxed report on the same day.

This presentation outlines the benefits and productivity of this walk-in direct access service. Limitations and disadvantages are also discussed.

How are ISPs managing demand and the impact on service? I Francis, Medical Imaging Partnership, West Sussex

Education response – what can be done to support service growth? S Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President

SCOR / BMUS profession standards. Implementation and impact on practice, PC Parker, Hull and East Yorkshire Hospitals NHS Trust

The 2008 UKAS Guidelines for Professional Working Practice in Ultrasound have been a much treasured document in most departments. However, the service and profession have developed since the guidelines were first written and this document is in need of review. The BMUS Professional Standards Group working in conjunction with members of the Society of Radiographers have updated and revised these guidelines and are proud to launch them today at this ASM.

The aim of the presentation is to give an overview of the revised guidelines and highlight key developments which will provide useful support for ultrasound practitioners working in the modern healthcare setting.

Professional Issues 4 – Managing demand debates

Debate 1:

This house believes outsourcing ultrasound services to independent service providers leads to better service delivery.

FOR – I Francis, Medical Imaging Partnership, West Sussex; N Spencer, Mid Yorks NHS Trust

AGAINST – P Rodgers, University Hospitals of Leicester NHS Trust; J Smith, Leeds Teaching Hospitals NHS Trust

Debate 2:

This house believes that undergraduate training of sonographers will relieve the current recruitment and retention staffing issues.

FOR - A Turner, University Hospital North Midlands / Royal Stoke University Hospital

AGAINST - J Wilson, University of Leeds

Gynaecology 1 – Current issues around ultrasound of the ovaries

The acute ovary, A Sanderson, Mid York NHS Trust

Acute pelvic pain is a common emergency presentation. It is a nonspecific symptom with a broad range of gynaecological and non-gynaecological causes. Imaging is frequently required to narrow the differential diagnosis and TVUS is the most widely accepted initial imaging modality when a gynaecological cause is considered most likely.

The main differentials in the non-pregnant patient include ruptured or haemorrhagic ovarian cysts, pelvic inflammatory disease, ovarian or adnexal torsion, mal-positioned intrauterine devices and fibroid complications. The clinical presentation and the imaging findings of each condition will be presented with particular emphasis on ultrasound. The Ultrasound appearances may be complex and the importance of correlation with the clinical findings will be emphasised.

ABSTRACTS

The role of other imaging modalities including CT and MRI will be presented particularly where used as an adjunct to ultrasound.

Scanning for the IVF patient, S Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President

Ultrasound in endometriosis, N Amso, Cardiff University School of Medicine

Gynaecology 2 – Latest advances in ultrasound of the uterus

3D ultrasound of the uterus, N Kerr, Leeds Hospitals NHS Trust

Background:

3-dimensional (3D) transvaginal ultrasound produces a volume of data containing any desired anatomical plane through the uterus. A reconstructed coronal slice through the uterus is rarely obtained with standard 2-dimensional ultrasound, but is commonly produced from the 3D volume. This additional view of the uterus has proven to be accurate in the diagnosis and classification of congenital uterine anomalies, aiding in the management of subfertility and pregnancy complications. Another main role of the 3D coronal view includes determining the position of intrauterine devices within the uterus and identifying myometrium perforation. In some cases the 3D coronal view can display thickening and disruption of the junctional zone associated with uterine adenomyosis.

Learning points:

This presentation will explain the basic techniques for obtaining a 3D volume of the uterus and a simple method of manipulating the volumes to produce the reconstructed coronal view. Interpretation of the 3D coronal view of the uterus will be discussed, including how to classify congenital uterine anomalies. The use of the 3D transvaginal ultrasound in assessing the position of intrauterine devices, along with case reports on malpositioned intrauterine devices will be included. Finally the potential benefit of the 3D coronal view of the uterus in the assessment of uterine adenomyosis will be discussed.

Summary:

3D transvaginal ultrasound is rapidly becoming an essential imaging technique in the diagnosis of congenital uterine anomalies and in determining the position of intrauterine devices. By the end of this presentation delegates should feel confident to obtain and interpret the 3D reconstructed coronal view of the uterus with the objective of implementing 3D transvaginal ultrasound into everyday ultrasound practice.

One-stop PMB clinic – is it worth it? A McGuinness, Mid York NHS Trust

Evaluating the indications for pelvis USS with suspected RPOC, S Tangudu, Hull and East Yorkshire NHS Trust

A pelvis USS is a very common investigation performed in investigating the cause of abnormal vaginal bleed or pain abdomen after a delivery to rule out RPOC (retained products of conception). Though the incidence of RPOC is low at 0.4 to 3.8% it is a very important cause to be ruled out.

There is no clear definition, indication and diagnosis on USS and management of RPOC in practice. The false positive rate in the diagnosis on USS is quite high at 28% after a miscarriage and 54% after a term delivery. The risks of ERPC (evacuation of retained products of conception) are well known and are only done as a last resort if conservative or medical management fails.

We retrospectively evaluated 80 patients who have had a USS pelvis to rule out a RPOC from Jan 14 to Sept 14. The aim of the study was to mainly look at the interpretation of the report by the requesting clinician and the indications for intervention to evacuate the diagnosed or suspected RPOC. The study is underway and will be published soon.

Cervical cancer, A Harris, City University, London

Background:

Although deaths from cervical cancer are decreasing in the United Kingdom, (Cancer Research UK, 2014) and survival rates have improved (Cancer Research UK, 2014) in younger women (aged under 40 years). Women over 65 years are at greater risk of cervical cancer if they have not had regular negative smear tests between ages 50-64 (Castañón et al., 2014). Other risk factors for cervical cancer are HPV (Human papillomavirus), smoking, multiple sexual partners, parity, lower age at first pregnancy and immunosuppression (Public Health England, 2015).

Case Report:

A 74 year old woman was referred by her GP (General Practitioner) for an ultrasound scan because of lower urinary tract symptoms (frequency and nocturia). On scan a large cervical mass was found with extension into the bladder. A follow up MRI scan correlates well with the ultrasound findings.

Discussion:

The most common symptom of cervical cancer is bleeding. In this case the only symptoms were urinary and non-specific. Risk factors for this patient were smoking, parity (3 children), first child at age 18yrs and non-attendance for smear tests since periods had stopped at age 50years. Smear tests are more difficult to tolerate when postmenopausal and women who have been monogamous may not feel that they are at risk of cervical cancer (Castañón et al., 2014).

References:

Cancer Research UK (2014) Cervical Cancer. Available at: http://publications.cancerresearchuk.org/downloads/Product/CS_KF_CERVIX.pdf. (Accessed: 5 August 2015).

Castañón, A., Landy, R., Cuzick, J. and Sasieni, P. (2014) Cervical screening at age 50–64 years and the risk of cervical cancer at age 65 years and older: population-based case control study. *PLoS Medicine*, 11(1): e1001585. doi:10.1371/journal.pmed.1001585.

Public Health England (2015) What are the risk factors of cervical cancer? Available at: <http://www.cancerscreening.nhs.uk/cervical/risk-factors-cervical-cancer.html> (Accessed: 5 August 2015).

A case of hyperreactio luteinalis in early pregnancy complicated by torsion, E Allen, A Appiah, A Hameed, O Nzelu, Y Sana, Kings College Hospital, London

Background:

Hyperreactio Luteinalis refers to moderate to marked cystic enlargement of the ovaries due to multiple benign theca lutein cysts. In 25% cases, it is associated with molar pregnancies or choriocarcinoma. The key differential diagnosis is ovarian malignancy. Typical ultrasound appearance is of multiple thin walled cysts enlarging the ovaries bilaterally.

The case:

We describe a case of a 34 year old multiparous woman who presented to the early pregnancy department with a history of right sided abdominal pain. She was diagnosed with hyperreactio luteinalis and a viable intrauterine pregnancy of six weeks' gestation. She then presented the next day with symptoms and scan findings suggestive of adnexal torsion. At laparoscopy, diagnosis of torsion and rupture of luteal cysts causing haemoperitoneum of 400mls was confirmed. De-torsion of the adnexa was performed conserving the ovary as well as the involved fallopian tube. Follow up ultrasound showed a smaller, less cystic appearance of the ovary and an ongoing pregnancy, with a persistent corpus luteum.

Conclusion:

This case highlights the significance of accurate diagnosis and counselling of patients with this condition. An early diagnosis of torsion allowed clinicians to perform surgery to conserve the ovary containing corpus luteum.

A rare case of post- partum secondary amenorrhoea, B Guruwadayarhalli, N Nunes, West Middlesex University Hospital

A 29 year lady presented to A&E with secondary amenorrhoea, lower abdominal pain and feeling unwell 10 weeks post ventouse delivery and episiotomy repair. Vulva and vagina were reported to be friable at the procedure. She was breast feeding. The patient's husband gave a history of difficulty having sexual intercourse and described feeling an obstruction. Patient's urine pregnancy test was negative.

Pelvic examination was impossible as patient was very tender and the vaginal introitus appeared completely occluded. Abdominal ultrasound scan revealed a large haematocolpos, haematocervix and haematometra. A trans-perineal scan showed vagina to be completely occluded about one centimetre from the introitus. A trans-rectal ultrasound scan performed demonstrated a large haematocolpos and ruled out any further septations or occlusions further up in the vagina. Both ovaries appeared normal.

Patient underwent an EUA, incision of occlusion, drainage of vaginal collection and was discharged home on combined oral contraceptive pills. At follow up two weeks post-operatively she was still unable to have sexual intercourse and advised to use vaginal dilators to prevent further recurrence. Abdominal pelvic ultrasound scan was essentially unremarkable with complete resolution of haematocolpos and haematometra.

ABSTRACTS

Discussion:

Secondary amenorrhoea due to vaginal obstruction is very rare. Cases of haematocolpos have been described after Stevens – Johnson syndrome (Murphy and Brant 1998) and bone marrow transplantation (Tauchmanova et al. 2004; DeLord et al. 1999). In cases where they occur after bone marrow transplantation, they are thought to represent a manifestation of chronic graft vs host disease.

Cases reported are commonly from Africa. It may occur rarely as complication of female circumcision (Davis et al. 1999) or more commonly from chemical vaginitis (Arowojolu et al. 2001; Uchil et al. 2006).

Our case was unusual as a post instrumental delivery complication.

Vascular 1 – Carotid

The vulnerable plaque and plaque morphology, ND Pugh, University Hospital of Wales, Cardiff

Ultrasound imaging of the carotid plaque: from B-mode to shear wave elastography, K Ramnarine, University Hospitals of Leicester NHS Trust

Technological innovations and developments in diagnostic medical ultrasound have a long history of exploitation in the vascular clinic. Current clinical practice for assessing stroke risk and treatment options is heavily reliant on ultrasound B-mode imaging and Doppler assessment of blood flow velocity to estimate carotid plaque degree of stenosis. Unfortunately plaque size is not a good predictor of the unstable plaque. This presentation will consider a wide range of ultrasound techniques that have been investigated to help identify the vulnerable carotid plaque, with a particular focus on our experience in Leicester.

Ultrasound techniques include:

- Conventional B-mode imaging, utilised for assessment of Greyscale median (GSM), plaque burden, ulceration (surface irregularity), image texture features for tissue characterisation and assessment of dynamic plaque behaviour;
- Tissue Doppler Imaging (TDI) for plaque wall motion and stress/strain assessment;
- Shear wave elastography (SWE) for quantification of tissue stiffness;
- Multigate Doppler and vector Doppler for improved blood velocity assessment;
- Emboli; contrast agents and others.

Whilst these techniques provide additional information on plaque static characteristics or plaque dynamic behaviour, only some have demonstrated significant clinical benefit. Ultrasound techniques have impressive capabilities and unique advantages compared with competing imaging modalities and technological innovations are on-going. Their implementation into the vascular clinic will benefit patients and the NHS.

Blood flow in carotid plaques / vasa vasorum, E Leen, Hammersmith Hospital & Imperial College, London

Comparison of internal carotid artery stenosis grading by CT angiography and Doppler Ultrasound, J Mohajer, K Bryant, ND Pugh, A Gordon, University Hospital of Wales, Cardiff and Vale UHB

Background:

The 2009 recommendations for reporting carotid ultrasound investigations, aimed to improve and standardise UK practice. However, confusion remains as to which measures provide the most accurate diagnosis, particularly around the >50% and >70% stenosis levels.

Although not a gold standard, CT angiography is considered reliable for carotid imaging. This study aims to compare the results of CT angiography with the 2009 recommendations and the 2003 SRU consensus for carotid ultrasound.

Methods:

A retrospective evaluation of carotid artery imaging was performed at the University Hospital of Wales, Cardiff. Scan results for 136 patients who had undergone both carotid CT angiography and carotid Doppler imaging were analysed. The ultrasound scans were graded into <50%, 50–69%, 70–89% and 90% stenosis bands, using the 2003 SRU criteria of PSV and B-mode appearance. 46 patients had velocity criteria measured for PSV, PSVR and St Mary's ratio, and were also graded using the 2009 UK recommendations. The CT angiography scans were graded using NASCET criteria. The stenosis grading by CT angiography, and Doppler ultrasound using the 2003 and 2009 recommendations, were compared.

Results:

Overall, the ultrasound grading using 2003 SRU criteria matched the CT angiography grading in 93% of cases in the >70% stenosis bands. Doppler grading using SRU recommendations matched the CT angiography grading in around 20% more cases than the 2009 UK recommendations.

Conclusion:

There is a degree of variability in the grading of carotid artery disease by CT angiography and Doppler ultrasound. Grading of ultrasound scans using SRU 2003 criteria provided the best correlation with CT. However, CT is not a gold standard, and more evidence is needed to improve the reliability of carotid imaging.

Carotid plaque volume: Can it be accurately measured using tomographic (3D) Ultrasound? S Rogers, J Burrough, S Ball, H Mohammad, C McCollum University Hospital of South Manchester

Background:

Current European Society of Vascular Surgery (ESVS) guidelines recommend carotid endarterectomy (CEA) for a symptomatic severe carotid stenosis (> 70%; NASCET criteria). However, in asymptomatic patients, the severity of carotid stenosis is a poor predictor of stroke, with a <2% risk of ipsilateral stroke per year for a severe stenosis. The Manchester carotid plaque study group has proven that Carotid Plaque Volume (CPV) – the volume of atherosclerotic disease within the artery or atherosclerotic burden – is significantly higher in symptomatic compared with asymptomatic patients undergoing CEA.

We investigated whether CPV can be accurately measured using tomographic (3D) ultrasound and if it is reproducible.

Methods:

All patients admitted to UHSM for a CEA were recruited and underwent pre-operative 3D carotid ultrasound by a trained vascular scientist. CPV was measured by two trained observers using a standardised technique. The volume of the endarterectomised plaque was precisely measured using a water immersion technique, based on Archimedes' Principle, by dividing the suspended weight with the density of the fluid.

Results:

CPV measurements by two trained observers have been performed on 40 patients, but results on 10 patients are presented now (3 asymptomatic, 7 symptomatic). The mean CPV was (\pm sd) 728.9 \pm 206.7mm³. Initial results showed a strong correlation between the CPV measured by 3D ultrasound and the actual CPV, as measured by the immersion technique, with a mean difference (\pm sd) 99.3 \pm 63.7mm³; rs (10) = 0.82, p<0.0058. Interrater reliability between the two observers was excellent, with a mean difference (\pm sd) 22.5 \pm 42.4mm³; rs (10) = 0.92, p<0.0005. The results on all 40 (or more) will be available by December.

Conclusion:

While this sample size is small, tomographic (3D) ultrasound may be used to measure CPV accurately and has excellent reproducibility. The results from paired measurements in over 40 carotid patients will be presented at the meeting.

Vascular 2 – Venous compression disorders

Diagnosis and management of May-Thurner syndrome, R Alikhan, University Hospital Wales, Cardiff

Ultrasound assessment of upper limb venous system, T Robinson, Bristol Royal Infirmary

Klippel-Trenaunay syndrome - comparison of two cases, T Gall, University Hospital South Manchester

Microbubbles – imaging the Peripheral Vascular Tree – a feasibility study, A Smith, PC Parker, OR Byass, K Chiu, Hull and East Yorkshire NHS Trust

Background:

DVT is potentially a fatal and debilitating condition causing PE and post thrombotic syndrome. It affects 1-2% of the population. Ultrasound (USS) is the investigation of choice providing a 94% specificity, and sensitivity of 95% and 64% in the proximal and distal leg respectively.

ABSTRACTS

Peripheral oedema and obesity may cause suboptimal imaging in many groups. Additionally, patients at high risk of DVT are initiated on anticoagulation, increasing risk of haemorrhage and heparin induced thrombocytopenia. Both mean multiple attendances to clinics and increased cost. Uncertainty of diagnosis also causes patient anxiety.

A method that would improve image specificity and sensitivity would be beneficial to the patient and NHS. We aim to assess the feasibility of utilising Sonovue™ to effectively visualise the deep veins of the lower limb.

Materials and Methods:

12 patients high risk for DVT were selected.

A fundamental scan was performed with the patient supine utilising B-mode imaging and a 3-5Mhz probe. Visualisation of the veins was recorded and calf veins measured from the crease of the popliteal fossa.

A single bolus 5 mls of Sonovue™ was then administered and the process repeated.

The images were stored on Agfa-Impax.

Results:

The maximum gain in visualisation was 28 cm.

Improved visualisation to 100% in the proximal lower limb in all candidates.

Improved visualisation in the calf veins from 54% to 79% (Posterior Tibial Vein ($p=0.01$) and Peroneal Vein ($p=0.03$)).

Combined improved length of visualisation in the calf veins ($p= 0.003$).

Conclusion:

This study demonstrates that contrast enhanced ultrasound (CEUS) is a valid method for visualisation of vessels in the lower limb.

CEUS is a potential adjunct to help in the visualisation of the deep veins in difficult to scan patients.

Pending further study, we hope to give high risk patients contrast at their initial scan to avoid the need for repeat investigation and to reduce patient anxiety.

Is D-dimer measurement a clinically useful screening test for the assessment of lower limb Deep Vein Thrombosis, P Williams, ND Pugh, R Morris, C Bryant, D Coleman, Cardiff and Vale UHB

Background:

For the last 25 years, GP patients with suspected deep vein thrombosis (DVT) have undergone first line venous ultrasound scans at the University Hospital of Wales (UHW). Following new NICE guidance, the patient pathway was changed; since July 2013 patients are now referred to a nurse led DVT Clinic. Patients undergo an initial Wells score and D-dimer measurement to provide an indication to the likelihood of a positive DVT. Patients with a Wells score of ≥ 2 are referred for an ultrasound scan, patients with a Wells score of ≥ 1 have a D-dimer measurement. If the D-dimer is negative, the patient is discharged. If the D-dimer is positive the patient has an ultrasound scan. This approach has the potential to reduce the number of patients requiring an ultrasound scan. However the suitability of the D-dimer test has been questioned due to its high false positive rate.

Methods:

This retrospective study aimed to determine whether the D-dimer test significantly reduces the number of negative DVT ultrasound scans. Results from patients with a Wells score ≥ 1 combined with a positive D-dimer were analysed.

Results:

Results showed that out of 314 patients with a Wells score of ≥ 1 and a positive D-dimer test only 16 were diagnosed with a positive DVT by ultrasound, a post test probability of 12.4% (87% false positive rate).

Conclusion:

D-dimer has a very high false positive rate and therefore does not significantly reduce the number of unnecessary scans performed, considering the additional cost of the D-dimer test and the increased waiting time for the patient.

Vascular 3 - Assessment of non-atherosclerotic diseases

Cystic adventitial disease – a case presentation, H Dixon, King's College Hospital, London

Cystic adventitial disease is a vascular condition that mainly affects the popliteal artery and is also most common in men in middle age. Cystic adventitial disease usually presents with symptoms of claudication similar to presentation of popliteal entrapment as it also results in flow obstruction during exercise.

In this case a 51 year old male was referred to the DVT clinic complaining of right calf pain with a history of previous DVT. The patient was referred to the vascular lab for a duplex ultrasound to assess for DVT. On attendance at the vascular lab, during clinical history taking, the patient also described claudication symptoms. During the duplex scan a cystic mass was identified in the popliteal fossa adjacent to the popliteal artery. Dynamic studies of the popliteal artery showed the vessel to be patent during flexion of the knee and compressed by the cystic mass on extension of the knee. The patient had a normal resting ankle brachial pressure index (ABPI) however post exercise testing a reduction in the ABPI value was seen. The vascular laboratory report suggested this was a presentation of cystic adventitial disease and the patient went on to have a CT scan to examine the mass and confirm the diagnosis.

Surgical treatment of cystic adventitial disease was offered to the patient. Surgical intervention involves excision of the cyst and repair of the artery with saphenous vein. The patient declined to have surgery at this stage.

This case shows that cystic adventitial disease should be considered in the assessment of younger patients presenting with claudication with normal ABPI values at rest.

Musculature of popliteal fossa for assessment of popliteal entrapment, L Waring, University of Cumbria

Management and treatment of popliteal entrapment, I Williams, University Hospital, Cardiff

This presentation will be a discussion around the presentation, investigation and treatment of popliteal entrapment syndrome which usually presents in young non atherosclerotic patients. Also covered are other rare causes of lower limb ischaemia including popliteal adventitial cysts and iliac endofibrosis.

Dynamic and morphologic evaluation of erectile dysfunction on penile Doppler sonography and contrast cavernosography, I Anas, AM Tabari, Bayero University / Aminu Kano Teaching Hospital, Nigeria

Background:

Erectile dysfunction (ED) is the persistent inability to attain or maintain penile erection sufficient for sexual intercourse. Majority of cases have organic aetiology, most commonly vascular disease. This study combines the use of penile Doppler sonography and cavernosography to determine the pattern of vascular cause of ED in Kano, Nigeria.

Materials and methods:

Twenty one patients who were referred from urology clinics on account of suspected vasculogenic ED were reviewed. The cavernosal arteries were examined with 7.5 MHz linear transducer in grey scale and duplex Doppler modes before and after intra cavernosal injection of 60 mg papaverine. Serial peak systolic velocity (PSV), end diastolic velocity (EDV) and diameter measurements were done at five minutes intervals for 30 minutes. Contrast cavernosography was obtained following the preliminary film and intra cavernosal injection of contrast medium and papaverine.

Results:

The mean age of the patients was 43.14±9.84 years. Out of the 21 patients examined, five showed normal findings while ten had evidence of venous leakage. Five patients had arterial insufficiency; out of which three patients showed calcifications of the tunica albuginea, suggesting Peyronie's disease. Interestingly, one patient showed combining features of arterial insufficiency and that of venous leakage.

Those with arterial insufficiency are relatively older than other patients. They also had compounding medical conditions of diabetes and hypertension.

Conclusion:

Vascular aetiologies are important contributors of ED in our setting. Papaverine-induced Doppler Sonography and cavernosography showed promise in accurate assessment and overall care of these patients.

ABSTRACTS

Colour Doppler Ultrasound in the assessment of focal testicular lesions: influence of lesion size and pattern of vessel distribution in malignant and benign lesions, EC Bartlett, ME Sellars, JL Clarke, SL Sriprasad, GH Muir, PS Sidhu, King's College Hospital NHS Trust, London

Background and purpose:

Increased vascularity is the hallmark of malignancy in focal intra-testicular abnormalities. Colour Doppler ultrasound assessment is reported of limited use in lesions <16mm. We assessed the capability of colour Doppler in focal testicular abnormalities, to ascertain lesion volume that allows confident lesion vascularisation.

Methods:

A departmental database identified 135 focal testicular lesions (in 100 patients) examined by a single observer, over a 10 year period, using an Acuson Sequoia 512 and a 15MHz transducer. Examinations were performed with Grey scale and colour Doppler images and video clips recorded. Images were retrospectively reviewed: size/volume, grey-scale features (echogenicity/calcification/ border configuration/cystic change), colour Doppler appearances (presence/absence) and distribution of vessels (linear/criss-cross) were assessed for each lesion. All lesions had histological diagnosis.

Results:

The mean age was 37 years (range 1-76 years). The mean lesion volume was 8mls (range 0.004 – 142mls). Histology was: seminoma (n=54), non-seminomatous germ cell tumour (GCT) or mixed GCT (n=35), malignant non GCT or metastases (n=9), benign non GCT (Leydig cell tumour/hyperplasia) (n=16), ischaemic/inflammatory, post inflammatory/infective lesions or fibrosis (n=21). 50/54 seminomas (93%) showed increased vascularity, with criss-crossing intra-lesional vessels; 3/54 (5%) were hypovascular. One lesion was isovascular to normal testis. No relationship was seen between size and vascularity.

Non-seminomatous/mixed GCTs demonstrated a variety of vascular patterns; 29/35 (83%) showed increased vascularity, either criss-crossing or disorganised. No relationship was seen between size and vascularity.

Nine focal lesions represented ischaemia and/or infarction or fibrosis. All were avascular. Cystic lesions and abscesses were avascular.

Conclusion:

Increased vascularity, with criss-crossing intra-lesional vessels, was demonstrated in 93% of seminomas and in 90% of mixed GCTs with a seminomatous component. 85% of malignant lesions demonstrated increased vascularity. Vascularity was demonstrated in lesions of all sizes. The absence of internal vascularity, in conjunction with typical B-mode findings, correctly prospectively identified benign ischaemic, fibrotic and cystic lesions.

AV fistula secondary to stab wound: A case study of a patient presenting with DVT, A Pellew-Nabbs – AVS, Independent Vascular Services Ltd. / Warrington & Halton Hospitals Foundation Trust

Background:

A 44 year old male presented via the ambulatory care clinic with generalised pain to the left leg and was subsequently sent to the Vascular Studies department for a left lower limb venous duplex. The patient complained of pain to the left calf when walking long distances or up steep inclines.

Case Report:

The duplex scan revealed an aneurysmal common femoral and superficial femoral artery, and a large calibre common femoral vein with arterialised flow. A wide-necked superficial femoral artery to superficial femoral vein AV fistula was identified in the mid-thigh as the source of the aberrant venous flow, and reduced flow was identified distal to the fistula in the SFA and popliteal arteries.

The patient revealed that he had sustained a stab wound to the left thigh more than 10 years previously which had been treated, but had never been investigated for signs of damage to the underlying vasculature. The patient confirmed that his symptoms had been present since around the time of the injury, and had become progressively worse.

The patient was clearly experiencing claudication symptoms, exacerbated by exercise as a result of the untreated AV fistula, with associated detriment to arterial flow distal to the injury.

Discussion:

In this unusual case, duplex ultrasound successfully characterised an AV fistula that had been overlooked in the patient's clinical presentation during several visits to the GP – and was only incidentally detected as the result of a misinterpretation of the symptoms as a potential DVT.

The patient is now awaiting surgical ligation of the AV fistula, which will hopefully fully alleviate the patient's claudication symptoms.

Vascular – carotid debate

This house believes that we should follow SVT recommendations and measure the PSV, PSV ratio and the St Mary's ratio when assessing the degree of carotid artery stenosis on ultrasound.

FOR – C Oates, Freeman Hospital, Newcastle

AGAINST – ND Pugh, University Hospital of Wales, Cardiff

Young Investigator Session 2015

Ultrasound in acute cholecystitis - is it as good as we think? C Miller, J Bell, MJ Weston, Leeds Teaching Hospitals Trust

Background:

Ultrasound is widely used as a first line investigation for suspected acute cholecystitis in line with national guidance (NICE). However this is based on opinion with the evidence limited to three low powered studies. What is the sensitivity of ultrasound in our practice and how else are patients being diagnosed?

Methods:

Retrospective analysis of patients admitted to a large teaching hospital over a three month period with a diagnosis of acute cholecystitis. The discharge summaries, imaging reports, biochemistry/haematology and histology results were reviewed. The order of imaging and the imaging findings were recorded and the sensitivity of ultrasound was calculated.

Results:

99 cases of acute cholecystitis were identified of which 74 had an USS as the first line imaging with a sensitivity of 80%. Of the 13 false negative cases, 5 had a diagnosis confirmed with CT and 8 were diagnosed clinically. The 5 discordant cases were reviewed, with the potential reasons including rapid interim progression, satisfaction of search and operator dependency identified.

The remaining cases were diagnosed with CT as a first line investigation (12) or had a previous diagnosis of gallstones and were treated empirically (13).

Conclusions:

Our sensitivity is comparable to studies referenced in the national guidance. USS provides an available and safe method of diagnosing acute cholecystitis and should continue as the first line investigation. However the limitations of ultrasound should be recognised and further investigation should be undertaken if there is clinical suspicion.

Does accuracy of ultrasound-guided corticosteroid injection predict outcome in pain and function in subacromial impingement syndrome? P Raval, N Foster, R Ogollah, A Hall, E Roddy, Keele University

Introduction:

Subacromial corticosteroid injection is widely used for treatment of Subacromial Impingement Syndrome (SIS). There is increasing interest in using ultrasound (US) to improve the accurate placement of injections. This study investigated whether accuracy of placement of US-guided subacromial corticosteroid injections influences patients' outcome of pain and function.

Method:

Secondary analysis of data from a 2x 2 factorial randomised controlled trial investigating exercise and corticosteroid injection for pain and function in SIS. Video images were reviewed to categorise accuracy of injection into the subacromial bursa into 3 accuracy groups using pre-defined criteria: 1) not in the subacromial

ABSTRACTS

bursa; 2) probably in the subacromial bursa; and 3) definitely in the subacromial bursa. The primary outcome measure was the self-reported Shoulder Pain and Disability Index (SPADI) total score, compared at 6 weeks and 6 months. Secondary outcomes included SPADI pain and function subscales and participant global rating of overall change from baseline. A mixed effects model was used to compare accuracy groups' outcomes at 6 weeks and 6 months, adjusted for baseline covariates.

Results:

US-guided injection accuracy data were available for 114 participants; with 22 participants in group 1, 21 in group 2 and 71 in group 3. There were no significant differences in mean SPADI scores among the three injection accuracy groups at 6 weeks (group 2 vs. 1: 8.22 (95% CI -4.01, 20.50); group 3 vs. 1: -0.57 (-10.27, 9.13)) and 6 months (group 2 vs. 1: 12.38 (-5.34, 30.10); group 3 vs. 1: 3.10 (-11.04, 17.23)). Similarly, no differences between groups were seen in SPADI pain, SPADI function or participant global rating of change.

Conclusion:

The accuracy of US-guided subacromial corticosteroid injection in SIS does not influence clinical response, questioning the need for guided injections. Larger, adequately powered studies are required to explore this further.

The use of SMI in surveillance of endovascular aneurysm repair (EVAR), B Gorell, ND Pugh, University Hospital Wales

Background and Purpose:

EVAR surveillance is recommended for the detection of endoleaks or aneurysm growth, usually using a combination of colour Doppler ultrasound (CDUS) and computed tomography angiography (CTA). Questions have been raised regarding the sensitivity of CDUS and contrast-enhanced ultrasound (CEUS) has been proposed as an alternative. CEUS is more sensitive than CDUS, but more invasive, costly and carries the potential risks of adverse reactions. SMI (Superb Microvascular Imaging) is a novel imaging technique developed by Toshiba Medical Corporation which demonstrates improved spatial resolution and low flow capabilities. In this audit, the applicability of SMI in an EVAR surveillance programme was tested.

Methods:

A retrospective analysis was conducted on 136 patients comparing the success rate in diagnosing endoleaks with CTA, CDUS and SMI. The maximum diameter of the aneurysm sac was measured and the presence of endoleaks on CDUS, SMI and contemporaneous CTA scans was analysed.

Results:

Of the 136 patients, 36 also had CTA. 18 and 17 patients respectively showed no endoleak on ultrasound (CDUS & SMI) and CTA. Ultrasound failed to demonstrate 1 endoleak compared with CTA. 18 patients were found to have an endoleak on ultrasound (13%). Further analysis showed CDUS alone failed to demonstrate 8 of these endoleaks. Of the 18 patients displaying an endoleak on SMI, 12 proceeded to CTA with only 8 demonstrating an endoleak. Therefore, SMI detected 4 more endoleaks than CTA. In addition, 2 of these 4 patients with SMI endoleaks had an expanding sac size.

Conclusions:

SMI outperformed CDUS and was comparable to CTA for the detection of endoleaks. SMI is a non-invasive technique, with additional cost and safety benefits. The sample size was limited but agrees with trends found with CEUS and CTA in the literature.

An audit on Ultrasound 'X' marking of site for subsequent aspiration or chest drain insertion remote from the radiology department, H Kazi, N Ahmed, A Razack, Hull Royal Infirmary

Background:

We wanted to assess our local practice of US assessment of pleural effusions and marking of site for remote aspiration or chest drain insertion (RACD) with review of overall outcome of the procedures and associated complication rates. Our comparative standard was the British Thoracic Society Pleural Procedures Guideline 2010, which suggests that RACD should only be considered in large pleural effusions.

Material and methods:

Patients with suspected pleural effusions who were referred for ultrasound assessment and 'X'-marking of a suitable site between January 2012 and June 2013 were analysed. Parameters assessed included patient demographics, pre-procedure CXR findings, volume of effusion and nature of effusion (simple vs complex) on ultrasound, presence of loculations and pleural thickening, skin to pleura distance and post-procedure complications.

Results:

72/109 patients assessed were deemed suitable for 'X'-marking while 37 were not marked (28 due to small size, 4 due to loculated/complex effusion and 5 due to unfavourable location). 60/72 underwent an RACD, (19= pleural aspiration, 41= chest drains). Pleural aspiration was successful in all patients with no associated complications. 3/41 drains were unsuccessful (drain tip in the subcutaneous tissue outside the pleural cavity in 1 case and kinked in 2 cases). 1/41 had a small apical pneumothorax. A common variable in all 4 /41 patients with unsuccessful procedure/ complication was the complex nature of effusion or presence of pleural thickening.

Conclusion:

Our results indicate that in appropriately selected patients as per guidelines, 'X'-marked RACD may be an acceptable strategy although ideally real time US guidance should be used. Our data also suggests that 'X'-marking should perhaps be avoided even in large effusions, if there is discernible pleural thickening or loculations/complexity.

Carotid plaque volume: Can it be accurately measured using tomographic (3D) Ultrasound? S Rogers, J Burrough, S Ball, H Mohammad, C McCollum University Hospital of South Manchester

Background:

Current European Society of Vascular Surgery (ESVS) guidelines recommend carotid endarterectomy (CEA) for a symptomatic severe carotid stenosis (> 70%; NASCET criteria). However, in asymptomatic patients, the severity of carotid stenosis is a poor predictor of stroke, with a <2% risk of ipsilateral stroke per year for a severe stenosis. The Manchester carotid plaque study group has proven that Carotid Plaque Volume (CPV) – the volume of atherosclerotic disease within the artery or atherosclerotic burden – is significantly higher in symptomatic compared with asymptomatic patients undergoing CEA.

We investigated whether CPV can be accurately measured using tomographic (3D) ultrasound and if it is reproducible.

Methods:

All patients admitted to UHSM for a CEA were recruited and underwent pre-operative 3D carotid ultrasound by a trained vascular scientist. CPV was measured by two trained observers using a standardised technique. The volume of the endarterectomised plaque was precisely measured using a water immersion technique, based on Archimedes' Principle, by dividing the suspended weight with the density of the fluid.

Results:

CPV measurements by two trained observers have been performed on 40 patients, but results on 10 patients are presented now (3 asymptomatic, 7 symptomatic). The mean CPV was (\pm sd) 728.9 \pm 206.7mm³. Initial results showed a strong correlation between the CPV measured by 3D ultrasound and the actual CPV, as measured by the immersion technique, with a mean difference (\pm sd) 99.3 \pm 63.7mm³; rs (10) = 0.82, p<0.0058. Interrater reliability between the two observers was excellent, with a mean difference (\pm sd) 22.5 \pm 42.4mm³; rs (10) = 0.92, p<0.0005. The results on all 40 (or more) will be available by December.

Conclusion:

While this sample size is small, tomographic (3D) ultrasound may be used to measure CPV accurately and has excellent reproducibility. The results from paired measurements in over 40 carotid patients will be presented at the meeting.

Reliability of elastography measures of the Achilles tendon, C Payne, University of Brighton

Background:

Elastography provides a direct, real-time assessment of tissue elasticity and is valuable in tumour tissue differentiation, used for detection and diagnosis of many cancers and liver fibrosis. Its value in musculoskeletal imaging is less well defined. The purpose of this study was to determine the reproducibility and repeatability of two common types of elastography, compression (CE) and shear wave elastography (SWE), in depicting the mechanical properties of the in vivo Achilles tendon.

Methods:

Data from CE and SWE were collected from 8 healthy participants at the relative tendon mid-point in two blocks including five consecutive measurements taken in a one hour period and one measure taken every day for a five day period.

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Results:

For CE, all Coefficient of Variation (CV) scores were above 53%, correlations indicated no correlation to weak correlations, and Intra-Class Correlation Coefficient (ICC) values were all in the poor category. For SWE, CV scores were 3.70% - 7.37%, correlations ranged from 0.15 - 0.85 and ICC ranged from 0.34 - 0.89. No significant differences were noted with respect to protocol or time, no significant differences were found in transverse data for foot position, but significant differences were shown between fixed and relaxed foot positions for longitudinal scanning ($p=0.003$). ICC between two separate operators was 0.70 for transverse and 0.80 for longitudinal scanning.

Conclusions:

Given the wide variation in CE results, it was deemed to have a low level of reliability for depicting mechanical properties of the Achilles tendon and not applicable for this particular purpose. In comparison, SWE was shown to be reproducible and repeatable at depicting and quantitatively assessing the mechanical properties of the human Achilles tendon. There was no additional benefit to securing the foot during SWE examination and there is a high level of agreement between different operators.

Comparison of internal carotid artery stenosis grading by CT angiography and Doppler Ultrasound, J Mohajer, K Bryant, ND Pugh, A Gordon, University Hospital of Wales, Cardiff and Vale UHB

Background:

The 2009 recommendations for reporting carotid ultrasound investigations, aimed to improve and standardise UK practice. However, confusion remains as to which measures provide the most accurate diagnosis, particularly around the >50% and >70% stenosis levels.

Although not a gold standard, CT angiography is considered reliable for carotid imaging. This study aims to compare the results of CT angiography with the 2009 recommendations and the 2003 SRU consensus for carotid ultrasound.

Methods:

A retrospective evaluation of carotid artery imaging was performed at the University Hospital of Wales, Cardiff. Scan results for 136 patients who had undergone both carotid CT angiography and carotid Doppler imaging were analysed. The ultrasound scans were graded into <50%, 50-69%, 70-89% and 90% stenosis bands, using the 2003 SRU criteria of PSV and B-mode appearance. 46 patients had velocity criteria measured for PSV, PSVR and St Mary's ratio, and were also graded using the 2009 UK recommendations. The CT angiography scans were graded using NASCET criteria. The stenosis grading by CT angiography, and Doppler ultrasound using the 2003 and 2009 recommendations, were compared.

Results:

Overall, the ultrasound grading using 2003 SRU criteria matched the CT angiography grading in 93% of cases in the >70% stenosis bands. Doppler grading using SRU recommendations matched the CT angiography grading in around 20% more cases than the 2009 UK recommendations.

Conclusion:

There is a degree of variability in the grading of carotid artery disease by CT angiography and Doppler ultrasound. Grading of ultrasound scans using SRU 2003 criteria provided the best correlation with CT. However, CT is not a gold standard, and more evidence is needed to improve the reliability of carotid imaging.

Head & neck integrated training

Led by: RM Evans, Morriston Hospital, Swansea, R Rhys, Royal Glamorgan Hospital, Llantrisant

The anatomy of the head and neck will be taught through a series of standard sweeps through the neck.

The neck will be systematically covered outlining the key structures that need to be identified, starting with the submental triangle and ending with the larynx.

Tips and pitfalls will be highlighted allowing a comprehensive scanning technique of the neck to be mastered under the guidance of the faculty.

Quality and practical governance practical workshop

Led by – PC Parker, Hull and East Yorkshire NHS Trust, NJ Dudley, United Lincolnshire Hospitals NHS Trust

Medical imaging departments and services are increasing being scrutinised. With the advent of the RCR Imaging Services Accreditation Scheme (ISAS) and Care Quality Commission (CQC) inspections specifically reviewing imaging services there has never been a greater need for robust governance and quality processes and documentation. The aim of this workshop is to give advice and practical experience in the key aspects of governance and quality measures in ultrasound. The BMUS QA guidelines will be presented and there will be an opportunity for delegates to gain experience and confidence in undertaking these tests with a team of experts. The latest in infection control guidance will be presented as well as an overview of governance requirements for your ultrasound service.

Governance in ultrasound, what why how and when, PC Parker, Hull and East Yorkshire NHS Trust

QA - what, why, how and when, NJ Dudley, United Lincolnshire Hospitals NHS Trust

Practical demonstrations of QA tests, Faculty Microbial Issues for ultrasound imaging, S Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President

Satellite sessions

CASE - Education and training solutions to the current ultrasound workforce crisis

Title TBC, S Hill, Health Education England

The future of sonographic education and the University of Cumbria's experience of developing a graduate entry 2-year accelerated MSc in Clinical Ultrasound, G Bolton, University of Cumbria

The role and value of Focused Ultrasound courses in meeting service delivery demands, G Dolbear, Canterbury Christ Church University

Development of a draft career progression framework for ultrasound – a West Midlands approach, L Stewart, Health Education West Midlands

Background:

The sonography profession is in crisis, with increasing service demand exceeding available workforce supply. Evidence from national and regional staff surveys reinforces this and has led to sonography being identified as a shortage occupation. The Department of Health Mandate to Health Education England requires a solution to be created. Health Education West Midlands convened a clinically-led ultrasound group to develop a regional response. The group is also represented on the national ultrasound steering group with NHS England and professional bodies.

Purpose:

The regional ultrasound group considered the workforce and service challenges and has developed a programme of work-streams.

Methods:

The group identified significant barriers to entry because traditional recruitment and training model is demanded by trusts requiring secondment of clinical professionals into training. The majority of sonographers are from a diagnostic radiography background, and increased demand for radiography services means that it is no longer tenable. The current career structure is flat; majority of staff (AfC band 7) with limited scope to extend into advanced and consultant practice. This has led to competitive recruitment strategies, increased demand for agency staff, associated with increased risk to quality of patient care.

Results:

A number of components for career progression structure are being worked up by the group. This includes a pilot of a direct entry undergraduate programme, limited scope practice in obstetrics for assistant practitioners and embedding the West Midlands advanced clinical practice curriculum for sonographers.

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Conclusion:

The West Midlands clinically-led ultrasound group is developing innovative solutions to manage the crisis in the ultrasound workforce, which will support the development of a clear career progression pathway for sonographers. This work is being shared with the national steering group and has been developed as a result of a group of committed and engaged clinical staff recognising that change needs to take place.

“Come fly with me and become a sonographer!” C Oates, Freeman Hospital, Newcastle

With a national shortage of trained sonographers there is a need to train sonographers as quickly as possible. One option currently being introduced is direct graduate entry by those with no previous health service experience. For all trainees, a particular bottleneck in training is the need for one-to-one hands-on training to master scanning and achieve the necessary competencies to scan. This can place a high demand on a department that may have limited staff and a heavy workload. The number of trainees they can cope with is limited. Consequently, the time taken for a trainee to begin to gain some confidence in scanning is often prolonged because they have to fit learning to scan into busy clinic schedules.

This paper draws inspiration from the airline industry to propose a novel model for the initial training of sonographers. Would-be pilots have to master a set of practical and theoretical skills that may be compared with the physical and mental complexity of sonography. The basic training of an airline pilot to gain their commercial pilot's licence is 12 weeks. The full theory and experience will take longer, but at that stage they can fly a commercial plane. This paper proposes an intensive 12 week training programme for sonographers that will take someone from zero experience to a point where they can operate a scanner and be able to scan an abdomen, recognising and obtaining clinical views of normal anatomy and simple pathology. During this time they would gain 250 hours of hands-on scanning time using simulators and real patients. It requires a dedicated trainer to train students on a 2:1 basis. At the end of this period the trainees would immediately begin to be useful to a department and could move onto a more advanced phase of recognising pathology straight away.

CASE 2

The Northern Regional Simulation Centre – experiences so far! S Richards, Teesside University

The role and value of ultrasound simulation in formative and summative assessment, V Gibbs, University of the West of England, Bristol

Therapy Ultrasound (THUGs)

This stream is led by G ter Haar, Institute of Cancer Research, Sutton

Day 3 – Friday 11th December

Obstetrics 1 - Fetal cardiac anomalies and FASP

Improving the routine detection of fetal cardiac anomalies, O Uzun, Cardiff and Vale UHB

Fetal Anomaly Screening Programme Update, P Pandya, University College Hospital, London

Obstetrics 2

Peter Twining Memorial Lecture

Screening for serious fetal cardiac anomalies – friend or foe? T Chudleigh, Addenbrooke's University Hospitals NHS Trust, Cambridge

The impact of training and policy on the increased detection rate of cardiac anomalies in the fetus: the Welsh experience, J Kennedy¹, E Kealaher¹, O Uzun², ¹Cardiff University, ²Cardiff & Vale UHB

Background:

Congenital heart disease is a leading cause of congenital-defect related death in childhood with improved antenatal detection of cardiac abnormalities, especially those of the outflow tracts, being key in improving outcomes. Due to wide acceptance that additional views of the heart improve diagnostic accuracy, from 2001 various training programmes were undertaken in Wales culminating in the mandatory inclusion of outflow tracts as part of the fetal anomaly scan in 2010. This study was undertaken to assess detection rates of outflow tract anomalies in each period, and the current status of training requirements.

Method:

Retrospective analysis of cases in South Wales from 2001 – 2013 was undertaken via Departmental (n=2958) and national (CARIS - n=5420) databases. A training needs analysis questionnaire was undertaken to assess current sonographer fetal echo training requirements.

Results:

During 2001-2009 the mean number of outflow tract anomalies detected per year was 14.4 whereas during the period 2010-2013 it was 21.2 (p=0.008). The mean referrals per year for these two periods was 196.2 and 208 respectively (p=0.65).

The rate of antenatal detection of outflow tract abnormalities during these periods also increased (47% vs 70%, p= 0.0005). Detection rates peaked in 2011 reaching 80.6% before dipping to 70% and 66% in 2012 and 2013 respectively.

60% (n=41) of sonographers described themselves as very competent at the examination of outflow tracts. However, 77% (n=30) of these still professed a need for further training updates.

Conclusion:

The detection rate of outflow tract anomalies throughout South Wales has improved substantially. A major increase is seen after the initial training program, and continues with the All Wales training programme and subsequent mandatory implementation of outflow tract examination policy. It has, however, shown a decreasing trend since the cessation of training, indicating that successful screening policies must be combined with continuing structured training programs.

Accreta - How confident can you be? P McTigue, A McGuinness, Mid Yorks NHS Trust

Background:

This is a case study of an interesting case of morbidly adherent placenta (Accreta).

A 34y patient attended for a dating scan with a previous history of C section. BMI 47.

Our department had been exploring the equipment requirements for assessing placenta accreta and whether specialist training, high frequency linear probes or both were necessary to confidently rule this condition out. This case was influential at a local level and occurred at a time when evidence and experience from this case was used to develop obstetric protocols and placental assessment pathways in the Trust.

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Case Report:

There was some difficulty performing all of her scans due to body habitus. The initial dating scan highlighted evidence of accreta at 16 weeks GA. Subsequent scans contradicted this finding before it was finally agreed that it was a case of accreta after USS at 29 weeks and MRI at 31 weeks.

To obtain a better appreciation of what the scans represent, a sonographer will be present during planned C. Section on 13/08/15 as well as the obstetric and vascular teams. It is expected that intra-operative sonography will be necessary to plan incision sites due to maternal body habitus and anterior placenta.

At least 5 sonographers performed or assisted scans on this patient and this has benefitted them and the wider department.

Discussion:

This case explores some of the difficulties sonographers face in obstetrics in a condition which is becoming more prevalent. Expectations of higher diagnostic confidence in assessing accreta is an issue with many sonographers today as higher quality imaging has led to some ambiguity over what to look for and how. Ultrasound signs of accreta, present at 16 weeks, were highlighted in this case but this may not have been detected in following scans and potentially resulting in an unfavourable outcome.

A case of bilateral theca luteal cysts in pregnancy, C Duthie, L Alcock, Hull and East Yorkshire Hospitals NHS Trust

Background:

A 29 year old female, gravida 2, para 1, attended for a 20 week routine anomaly scan. She had previously had a dating scan at 8 weeks and 3 days. Normal ovaries were visualised.

She presented with a singleton gestation with normal anatomy, growth parameters and liquor volume. NO fetal congenital abnormality was detected.

However there were bilateral simple ovarian cysts present.

The cysts measured 172 x 70 x 98mm on the right side and 107 x 70 98mm on the left.

Discussion:

The cysts are most likely theca luteal cysts.

These are a common finding with molar pregnancy and other trophoblastic tumours. They are also associated with ovarian induction (hyperstimulation syndrome), twin pregnancy and fetal hydrops. There have been a few recorded cases with a normal pregnancy.

The mechanism that causes theca luteal cysts in normal pregnancy is not known, but it may be related to the increased sensitivity of the ovarian stroma to bHCG.

There have been reported cases of large theca luteal cysts associated with hypothyroidism or chronic renal failure.

It is of interest that all cases reported in the literature to date have been associated with a female fetus however this is a male fetus.

References:

Stany MP, Hamilton CA. Benign disorders of the ovary. *Obstetric Gynaecol Clin North Am.* 2008 June;35 (2): 271-84
Glanc P, Salem S, Farine D. adnexal masses in the pregnant patient: a diagnostic and management challenge. *Ultrasound Q.* 2008 Dec. 25 (4): 225-40.

A pictorial review of scar endometriosis of the caesarean section and its presentation as mimics of acute abdominal emergencies, J Furaide, R Mohanty, M Funi, H Butt, A Ashfaq, L Khalid, London Northwest Hospitals NHS Trust

Introduction:

Scar endometriosis represents endometriosis occurring in a Caesarean section scar. Its incidence is 0.03-0.6%. Most patients have cyclical pain (up to 70%), which is usually intermittent and associated with the menstrual cycle. It is caused by implantation of endometrial stem cells at the surgical site at the time of surgery.

Sonographic shows non-specific subcutaneous nodule having relatively irregular borders, a heterogeneous echotexture with internal scattered hyperechoic echoes surrounded by a hyperechoic ring of variable width, and vascularity may be present. CT demonstrates well-defined soft tissue nodule with heterogeneous post-contrast

enhancement and streakiness in the surrounding tissue. MRI is the most sensitive imaging modality, accurately locates the lesion in relation to a previous C Section scar, with signal characteristics similar to that of background endometriosis.

Aims and objectives:

To briefly demonstrate some of the presentations of scar endometriosis on abdominal ultrasonography and other imaging modalities address the disease and aid in recognition between them.

Material and methods:

Reviewing of imaging-based cases from our institution, emphasising on how to differentiate between incidental findings and real pathology causing symptoms.

Conclusion:

Abdominal sonography is the first line investigation/ screening tool when a female presents with acute abdominal pain because of easy access and no radiation risk. Most of the time scar endometriosis may be asymptomatic however it can become symptomatic. The dilemma arises whether can we safely class it as Scar endometriosis and rule out any possibility of soft tissue sarcoma. It can be concluded that the diagnosis by using ultrasonography is the mostly depending on clinical presentation and history however MRI is more specific but can cause delaying in the diagnosis and subsequent management. Moreover, biopsy is always saved for obscured cases after discussing the issue with MDT.

Keywords:

Scar endometriosis, Caesarean section

Obstetrics 3 - Challenges in obstetric ultrasound - placenta, fetal CNS and skeletal dysplasias

From praevia to accreta – challenges in placental scanning, G Attilakos, UCH London Placenta accreta can be described as a “modern” disease with a dramatic increase in incidence over the last few years. The lecture will explore the diagnosis and management of this serious clinical problem.

According to the RCOG guideline, the main diagnostic ultrasound criteria on greyscale are:

- loss of the retroplacental sonolucent zone
- irregular retroplacental sonolucent zone
- thinning or disruption of the hyperechoic serosa–bladder interface
- presence of focal exophytic masses invading the urinary bladder
- abnormal placental lacunae.

The main diagnostic ultrasound criteria with colour Doppler are:

- diffuse or focal lacunar flow
- vascular lakes with turbulent flow (peak systolic velocity over 15 cm/s)
- hypervascularity of serosa–bladder interface
- markedly dilated vessels over peripheral subplacental zone.

Early suspicion or diagnosis is important because it allows more time for pre-operative planning. Multidisciplinary input prior to delivery is extremely important.

Challenges and pitfalls in scanning the fetal CNS, A McEwan, Queen’s Medical Centre, Nottingham

Skeletal dysplasias, R Liebling, St Michael’s Hospital, Bristol

Obstetrics 4 – Fetal surgery

Fetal surgery – a realistic challenge? R Wimalasundera, UCH London

Case based discussions in fetal medicine, T Overton, St Michael's Hospital, Bristol

MSK 1 – Fundamentals

Shoulder ultrasound training – a comprehensive approach to supporting the trainee sonographer and their trainer, M Smith, Cardiff University

Diagnostic ultrasound of the shoulder is recognised as being one of the most technically challenging aspects of musculoskeletal ultrasound to master. It has a steep learning curve and makes gaining competency a time-intensive training process for both the trainee and their trainer.

This talk will present a training, assessment and feedback package developed within the framework of a Consortium for the Accreditation of Sonographic Education approved post-graduate ultrasound course and published in the journal "Ultrasound" earlier this year.

The package comprises: (i) a shoulder diagnostic ultrasound scan protocol with definition of findings, differential diagnosis and pro forma for recording scan findings, (ii) an assessment form for performance of shoulder diagnostic ultrasound scans with assessment criteria and (iii) a combined performance assessment and scan findings form, for each tissue being imaged.

The package was developed using medical education principles and provides a mechanism for trainees to follow an internationally recognised protocol. Supplementary information includes the differential diagnostic process used by an expert practitioner, which can otherwise be difficult to elicit.

The package supports the trainee with recording their findings quickly and consistently and helps the trainee and trainer to explicitly recognise the challenges of scanning different patients or pathologies. It also provides a mechanism for trainers to quantify and trainees to evidence their emerging competency. As well as being used in shoulder ultrasound training, the package and its principles could be adapted for other musculoskeletal regions or other ultrasound disciplines.

As well as presenting the training package, it is hoped that this talk will stimulate discussion regarding the challenges of Sonographer training and potential solutions that the Ultrasound community can develop.

The mystery of rotator cuff pathology – diagnosis and management, T Matthews, University Hospital of Wales, Cardiff

It is not clear who first described the rotator cuff of the shoulder, and that lack of clarity continues today in terms of understanding its pathology and subsequent dysfunction and treatment. It is not infrequent that patients are encountered with significant degeneration but are asymptomatic and unaware of their condition, and others, with what appears to be identical pathology, suffer with intractable pain and debilitating dysfunction.

Initial treatment often includes anti-inflammatory cortisone injections for a non-inflammatory condition!? Surgical treatment has concentrated on honing techniques together with the continuous pursuit of "failsafe" implants despite the knowledge that the pathology usually determines the outcome rather than the procedure!?

Thankfully 3 dimensional imaging of the rotator cuff has remained one of the few relatively stable pillars in its management with high diagnostic accuracy levels, for both MRI and Ultrasound, although not without their limitations. Understandably there is an increasing trend for musculoskeletal practitioners to take up ultrasound assessment of the shoulder as an adjunct to their clinical evaluation and provide a "one stop shop" diagnostic clinic.

So what is the point in providing accurate imaging assessment of a structure, the integrity of which and the extent of pathology seen, does not predict the eventual outcome?

Don't forget you can move it! M Maybury, Heart of England NHS Trust

The presentation uses a mix of live scanning and PowerPoint presentation to remind MSK sonographers that ultrasound is a dynamic imaging modality, which can be used to answer a number of questions not necessarily answered by taking standard views. The use of motion, in combination with basic orthopaedic tests can highlight, tears, and subluxations in various MSK structures which may be difficult to visualise with a standard MSK ultrasound examination. The presentation highlights some of these tests used in the examination of both the upper and lower limbs, and the rationale behind when to use dynamic movement testing in a standard MSK ultrasound examination.

MSK 2 – Fundamentals continued**Scanning lumps and bumps – when should the alarm bells ring?** S Davies, Morriston Hospital, Swansea**Integration of musculoskeletal ultrasound imaging into patient assessment,** S Innes, University of Essex**Background:**

A diverse range of professionals have expressed interest in musculoskeletal ultrasound, (MSKUS) in the last decade. Existing literature has emphasised the requirement for all clinicians to receive adequate training but has not fully explored these professionals' educational experiences or motivations to use the modality. The process of integrating MSKUS imaging findings into patients' assessment process has also rarely been discussed in literature.

Method:

The professional group physiotherapists was chosen as the basis for a mixed-methods doctorate study. The initial quantitative study involved a questionnaire that was distributed via several professional channels and explored each professional's interest and education in MSKUS: 75 responses were received. A purposeful sampling strategy followed to identify a group of subjects for the second qualitative stage of the study; in-depth interviews.

Eleven clinicians were interviewed to explore their personal experiences of accessing education and the role of MSKUS in their practice. The interview data was analysed thematically.

Results:

A number of themes were identified in the analysis; several themes related to clinical reasoning and the integration of MSKUS into practice. The role of MSKUS in relation to holistic clinical reasoning models including the biopsychosocial approach was raised by many subjects. Clinicians highlighted the need for a comprehensive knowledge of musculoskeletal medicine and pain physiology to support discussions with patients when there was an absence of tissue-based findings on imaging.

Conclusions:

MSKUS was reported to be a valuable imaging modality by the subjects in the study. They placed significance on communication between the scanning clinician and the patient to ensure imaging findings were placed within a multidimensional assessment. MSKUS services are offered by a wide variety of professional groups, this specific professional group integrated the imaging findings with a biopsychosocial approach and raised concerns about the impact of poor communication on the patients' experience and potential clinical outcome.

Does accuracy of ultrasound-guided corticosteroid injection predict outcome in pain and function in subacromial impingement syndrome? P Raval, N Foster, R Ogollah, A Hall, E Roddy, Keele University**Introduction:**

Subacromial corticosteroid injection is widely used for treatment of Subacromial Impingement Syndrome (SIS). There is increasing interest in using ultrasound (US) to improve the accurate placement of injections. This study investigated whether accuracy of placement of US-guided subacromial corticosteroid injections influences patients' outcome of pain and function.

Method:

Secondary analysis of data from a 2x2 factorial randomised controlled trial investigating exercise and corticosteroid injection for pain and function in SIS. Video images were reviewed to categorise accuracy of injection into the subacromial bursa into 3 accuracy groups using pre-defined criteria: 1) not in the subacromial bursa; 2) probably in the subacromial bursa; and 3) definitely in the subacromial bursa. The primary outcome measure was the self-reported Shoulder Pain and Disability Index (SPADI) total score, compared at 6 weeks and 6

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months. Secondary outcomes included SPADI pain and function subscales and participant global rating of overall change from baseline. A mixed effects model was used to compare accuracy groups' outcomes at 6 weeks and 6 months, adjusted for baseline covariates.

Results:

US-guided injection accuracy data were available for 114 participants; with 22 participants in group 1, 21 in group 2 and 71 in group 3. There were no significant differences in mean SPADI scores among the three injection accuracy groups at 6 weeks (group 2 vs. 1: 8.22 (95% CI -4.01, 20.50); group 3 vs. 1: -0.57 (-10.27, 9.13)) and 6 months (group 2 vs. 1: 12.38 (-5.34, 30.10); group 3 vs. 1: 3.10 (-11.04, 17.23)). Similarly, no differences between groups were seen in SPADI pain, SPADI function or participant global rating of change.

Conclusion:

The accuracy of US-guided subacromial corticosteroid injection in SIS does not influence clinical response, questioning the need for guided injections. Larger, adequately powered studies are required to explore this further.

Ultrasound-guided dry needling and injection of the deep layer for Plantar Fasciitis: Results in our patients

group and review of literature, M Thavendran, T Akbari, H Ali, R Mohanty, M Johnson, A Sahu, London Northwest Hospitals NHS Trust

Introduction:

Plantar fasciitis is a disorder resulting in pain in the heel and bottom of the foot. Etiology of plantar fasciitis is still not clear. Risk factors include overuse such as from long periods of standing, an increase in exertional activities, prolonged standing and high BMI.

There are several modalities of treatment including corticosteroids injection, Extracorporeal shockwave therapy (ESWT), plantar iontophoresis and dry needling (+/-injection). Plantar iontophoresis involves anti-inflammatory substances such as steroid and acetic acid applied topically to the foot and transmitting these substances through the skin via electric current. Dry needling involves repeatedly passing a fine needle through the abnormal fascia under local anaesthesia. This is done to stimulate an inflammatory response followed by formation of reparative tissue, which strengthens the tendon.

Aims and Objectives:

We looked into our practice of percutaneous dry needling and injection as a novel treatment for this condition. Thirty-two patients with sonographically - confirmed Plantar fasciitis were analysed after their treatment. All were symptomatic for >4 months and have failed alternative conservative treatments like foot wear with gel pads, NSAIDs, topical application and physiotherapy. Ultrasound-guided dry needling was performed by two dedicated musculoskeletal radiologists. Sonographic assessment of the plantar Fascia thickness and neovascularity was undertaken in the procedure. Pain scores were obtained before and after the procedure for 4 weeks.

Results:

Out of 27 patients 22 plantar fascia were successfully treated and rest are still being followed in the long term. Our combined therapeutic intervention led to a significant improvement in pain scores and most of the patients >85% are satisfied with their outcome.

Conclusion:

Percutaneous dry needling and injection of the deep layer under ultrasound guidance promises to be an alternative treatment. Patients prefer this treatment as surgery has a longer recovery process and is more invasive with higher risks attached.

Clinical governance in Point of Care ultrasound – Challenges in developing a Point of Care Service, G Morgan, Prince Charles Hospital & Royal Glamorgan Hospital, Cwm Taf Health Board

The Clinical Musculoskeletal Assessment and Treatment Service (CMATS) provide the provision of advanced conservative care and may prevent surgical intervention or inform and prepare for appropriate surgical pathways.

The use of Point of Care (POC) diagnostic and interventional musculoskeletal ultrasound within the CMATS service may assist and inform patient pathways without the potential delay with traditional models.

However, POC musculoskeletal ultrasound is still an emerging field. Setting up a POC musculoskeletal ultrasound service within the CMATS model provided many challenges.

This presentation aims to illustrate the development of a POC service along principles of prudent healthcare from the ground up, and highlights the challenges met along the way.

Main Presenter: Gafin Morgan, ESP Podiatrist – Trauma & Orthopaedics

Assisting and Questions:

Lisa Medhurst, ESP Physiotherapist

Helen Welch, Clinical Lead ESP Physiotherapist

MSK 3 – Advanced MSK imaging

Advanced groin ultrasound: Difficult hernias, post op recurrence and alternative diagnoses, P Mullaney, University Hospital of Wales, Cardiff

The diagnosis of groin hernias is a significant technical and clinical challenge for the ultrasound operator. Inguinal anatomy is complex and visualisation of vital anatomic landmarks can be difficult. A decreasing clinical experience of non-specialist referrers and the evolving epidemic of obesity in the population are resulting in an increasing reliance on imaging to confirm and characterise groin hernias. In addition, an increasing number of patients are referred after previous hernia surgery. The presence of an indwelling mesh repair and post-operative scarring represent a significant challenge to the diagnosis or exclusion of hernia recurrence. This talk aims to present a simple, reproducible method for the ultrasound assessment of groin hernias. Defining anatomic landmarks will be highlighted and reasons for their non-visualisation discussed. The ultrasound appearances of post-operative patients will be reviewed including mesh repairs, and ways to increase diagnostic yield in this challenging patient group will be emphasised. Finally, the differential diagnosis of groin pathology and alternative imaging techniques will be discussed.

US guided MSK injections - the evidence? P Wardle, Royal Glamorgan Hospital

Ultrasound guided musculoskeletal injections are widely employed in nearly all Radiology departments in the UK. The demand on these services is continuing to increase but their role is occasionally questioned. The presentation will discuss the variety of intervention that are currently practiced, focusing on a few examples with relevant evidence and reflection

Ultrasound guided interventions in the foot and ankle, A Carne, Royal Surrey County Hospital NHS Foundation Trust

MSK 4 – Advanced MSK imaging continued

Ultrasound in the diagnosis and assessment of RA, R Thompson, Aintree Hospital, Liverpool

Early diagnosis and prompt treatment to suppress inflammation is vital to prevent joint damage in rheumatoid arthritis (RA). Ultrasound and MRI are more sensitive than clinical examination in detecting synovitis. Clinic based ultrasound is a valuable tool in the diagnosis, assessment of prognosis and response to treatment of patients with RA. Every rheumatology unit should have ready access to an ultrasound machine and a trained person able to use it.

Impact of time of day on measures of Achilles tendon stiffness using shear wave elastography, C Payne, University of Brighton

Background:

There is a noted lack of systematic reports with regards to the mechanical properties of tendon structures, and whether stiffness alters throughout the course of a normal day. Morning stiffness is a commonly reported symptom in patients with Achilles tendinopathy. This is the first study to directly assess whether stiffness of the human in vivo Achilles tendon and wider gastrocnemius-soleus complex alters throughout a day, as measured using shear wave elastography (SWE).

Methods:

Fifteen healthy men and women (Mean \pm SD) 27.7 \pm 4.1 years, height 176.1 \pm 7.7cm and weight 71.3 \pm 7.1 kg were measured at 08:00, 12:30 & 17:00. Shear wave elastograms taken at varying points in the gastrocnemius-soleus complex. To assess transducer orientation, 4 different measures were taken of medial and lateral gastrocnemius muscles on dominant side. All measures were taken with a Siemens ACUSON S3000™ HELX EVOLUTION Ultrasound System (Siemens Medical Solutions, USA).

ABSTRACTS

Results:

No significant differences ($p > 0.05$) over the three measured time points in the shear wave velocity of participants dominant musculo-tendinous junction ($p = 0.114$), mid soleus muscle ($p = 0.223$), ($p = 0.648$) or lateral gastrocnemius muscle ($p = 0.159$) or non-dominant Achilles tendon ($p = 0.143$). Possible trends noted for alterations in shear wave velocity of dominant Achilles tendon & junction of soleus and gastrocnemius muscles ($p = 0.094$ $\eta_p^2 = 0.16$ & $p = 0.050$ $\eta_p^2 = 0.19$ respectively).

Results obtained from four different transducer orientations were significantly different from each other for medial ($p < 0.001$ $\eta_p^2 = 0.56$), and lateral gastrocnemius muscles ($p = 0.00$ $\eta_p^2 = 0.53$).

Conclusions:

The results demonstrate that time of day does not significantly alter the stiffness of the Achilles tendon and wider gastrocnemius soleus complex in normal subjects. This still needs to be evaluated in pathological tendons. Significant alterations were noted with different probe orientations, therefore orientation should be standardised when assessing results from pennate muscles.

Reliability of elastography measures of the Achilles tendon, C Payne, University of Brighton

Background:

Elastography provides a direct, real-time assessment of tissue elasticity and is valuable in tumour tissue differentiation, used for detection and diagnosis of many cancers and liver fibrosis. Its value in musculoskeletal imaging is less well defined. The purpose of this study was to determine the reproducibility and repeatability of two common types of elastography, compression (CE) and shear wave elastography (SWE), in depicting the mechanical properties of the in vivo Achilles tendon.

Methods:

Data from CE and SWE were collected from 8 healthy participants at the relative tendon mid-point in two blocks including five consecutive measurements taken in a one hour period and one measure taken every day for a five day period.

Results:

For CE, all Coefficient of Variation (CV) scores were above 53%, correlations indicated no correlation to weak correlations, and Intra-Class Correlation Coefficient (ICC) values were all in the poor category. For SWE, CV scores were 3.70% - 7.37%, correlations ranged from 0.15 - 0.85 and ICC ranged from 0.34 - 0.89. No significant differences were noted with respect to protocol or time, no significant differences were found in transverse data for foot position, but significant differences were shown between fixed and relaxed foot positions for longitudinal scanning ($p = 0.003$). ICC between two separate operators was 0.70 for transverse and 0.80 for longitudinal scanning.

Conclusions:

Given the wide variation in CE results, it was deemed to have a low level of reliability for depicting mechanical properties of the Achilles tendon and not applicable for this particular purpose. In comparison, SWE was shown to be reproducible and repeatable at depicting and quantitatively assessing the mechanical properties of the human Achilles tendon. There was no additional benefit to securing the foot during SWE examination and there is a high level of agreement between different operators.

The use of diagnostic imaging in Rugby World Cup year: WRU National Team doctor's perspective, G Davies, Welsh Rugby Union

WRU team Doctor & Consultant Sports Physician, Dr Geoff Davies, will give an overview of his use of imaging in the build-up and during the eventful 2015 RWC. His use of ultrasound in relation to other imaging modalities will be discussed. An interesting array of injuries sustained during this period will be presented.

Outreach projects - iDirisha and Asian outreach

iDirisha Project: Tele-Radiology and education - maternal health benefits in East Africa, I Francis, Medical Imaging Partnership

iDirisha is a overseas development project that is planning to use satellite technology to support UN development goals in Sub-Saharan Africa.

The projects focus is to reduce maternal death in rural areas by healthcare capacity building through education and development of local health care workers to allow intervention where appropriate.

The opportunity to be part of this development to educate and empower healthcare benefits through increased access to ultrasound services will be discussed.

Asian (Indonesia, Philippines & Nepal) outreach, S Campbell Westerway, Australian Society for Ultrasound in Medicine (ASUM) President

Image review session

This interactive session is aimed at sonographers and radiology registrars wishing to refine their general ultrasound observational skills and knowledge.

General imaging – conundrums in ultrasound

Is patient preparation still necessary for an ultrasound of the abdomen or pelvis? M Roddie, Imperial College Healthcare NHS Trust

Patient feedback to imaging departments and on internet forums makes it clear that preparation for imaging tests can be distressing and uncomfortable. Although bowel purgation and dietary restriction for colonic imaging tests scores most highly in terms of patient discomfort and embarrassment, the requirement to attend appointments for pelvic or renal tract ultrasonography with a full bladder comes a close second. This is particularly difficult for patients who have lower urinary tract symptoms.

The GI radiology community has made great strides in producing more acceptable preparation regimes for CT imaging of the colon with the introduction of faecal tagging, electronic colon cleansing and reduced purgation. The distress caused to much greater numbers of patients undergoing prolonged fasting and bladder filling regimes (largely drawn up in the 1970s) for routine ultrasonography, however, has been largely ignored despite published evidence that it does not improve diagnostic quality and is therefore unnecessary in most patients.

This presentation will review evidence that questions current practice and propose the argument that patients having ultrasonography of the abdomen and pelvis require no specific preparation other than, at most, a suggestion that they do not empty their bladder in the hour before their appointment.

What is a normal lymph node ultrasonically? K Satchithananda, King's College Hospital NHS Foundation Trust, London

The understanding of the morphology and functional anatomy of lymph nodes allows ultrasound to be used to image and aid management decisions in both malignant and inflammatory conditions.

Ultrasound allows lymph nodes to be mapped in relation to the pathological nidus (sentinel node imaging) and also to try to distinguish pathological nodes so that they can be targeted for histological/cytological examination.

We will review how the use of grey scale characteristics with advanced functions such as Colour Doppler, RI, B-Flow imaging, elastography and contrast enhanced imaging can help to increase our accuracy in differentiating malignant from non-malignant nodes with Ultrasound imaging.

What to do with GB polyps and wall thickening, T Higginson, Queen Alexandra Hospital, Portsmouth

Does Ultrasound have value in the management of patients with elevated ALT alone? P Rodgers¹, J Smith,² ¹Leicester royal infirmary, ²Leeds Teaching Hospitals NHS Trust

Elevated ALT is frequently associated with hepatic steatosis. Risk factors for raised ALT and steatosis include obesity, excess alcohol consumption, diabetes and chronic medication.

ABSTRACTS

The new BMUS Guidelines state that US has no value in the management of symptomless patients with raised ALT. Although it is accepted that US is able to diagnose fatty liver, there is no evidence to support the use of US in the management of patients with elevated ALT. Despite this, ultrasound services receive large numbers of referrals for US, most of which simply confirm a fatty liver.

The records of 100 GP and OP referrals for elevated ALT alone were retrospectively examined to establish what proportion had steatosis, what proportion demonstrated other relevant pathology and whether the ALT normalised following management of findings over a period of up to 12 months. The results will be presented.

The obesity epidemic has increased the number of US scans for elevated ALT with consequent pressure on department resources. Eliminating an US scan from the pathway of these patients has considerable potential resource savings for the health service.

Advanced MSK hands-on workshop

Led by – N Delves, Royal Surrey County Hospital NHS Foundation Trust

This workshop is intended for those with sound knowledge of ultrasound instrumentation and basic MSK scanning techniques, who are extending their scope of practice.

Fundamentals of MSK hands-on workshop

Led by – A Hall, Keele University/The Royal Wolverhampton NHS Trust

This workshop is aimed at those with sound knowledge of ultrasound instrumentation but little or no experience in MSK U/S scanning.

Satellite meeting Inaugural translational ultrasound imaging day

Led by – Dr C Moran, University of Edinburgh

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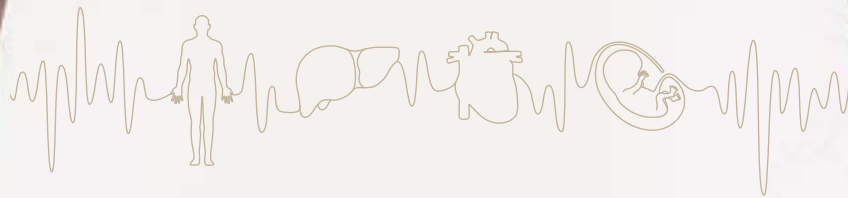
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