

Incidental Findings on General Medical Ultrasound (US) Examinations

BMUS 

MANAGEMENT AND DIAGNOSTIC PATHWAYS

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Foreword

The introduction of this guidance document regarding the diagnosis and management of incidental findings on ultrasound examinations is timely. The changing landscapes of ultrasound practice combined with the significant communication challenges within a variety of referral sources can often add to the pressures exerted on the ultrasound practitioner. The demand for diagnostic ultrasound examinations is ever increasing. Faster patient throughput and increasing complexities of patient management, coupled with advancing ultrasound technologies lead to an inevitable increase in finding 'incidentalomas'. The challenges facing ultrasound practitioners include the redefinition of 'normal' due to increased resolution of imaging, dilemmas around reporting of incidental findings and managing the effects of this for patients and referring clinicians. These guidelines are a resource to be used as a basis for diagnostic pathways and reporting protocols, and can be modified as appropriate to align with locally agreed protocols

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Introduction

An incidental finding in a clinical imaging context is defined as a finding of an abnormality in a symptomatic patient where the abnormality is not apparently related to the patient's symptoms¹. It may also be defined as an abnormal finding in an individual who is healthy and asymptomatic, for example, in research participants or individuals being scanned for teaching or education purposes.

The key clinical question for practitioners will be; is this an abnormality, a normal variant or a finding within an expected range of normality? For example, the finding of a small volume of free fluid in the rectouterine pouch (Pouch of Douglas) in a young female patient.

The definition of normality is made harder for ultrasound practitioners with the rapidly advancing innovations in ultrasound technology that results in greater spatial resolution. Structures that were not previously commonly visible on ultrasound, e.g. the pancreatic duct are now easily seen on new models. A further dilemma for the operator is that whilst the vast majority of incidentalomas will be a normal variant or an incidental benign finding, there will be the rare occasion where a significant and possibly malignant incidental finding is detected that requires urgent action.² Before any decision is made by the practitioner it is, of course, vital that previous relevant imaging and reports have been cross-checked in case the incidentaloma is long-standing and well-documented. The reporting of benign incidental findings can prove difficult. It is good practice to identify and mention them in the radiology report, but then define the situation further by stating that this is an incidental finding and unlikely to be of any significance.

An example could be:

“Incidental finding of spongiform nodule within the left lobe of the thyroid, with typical benign characteristics (U2 classification). No further action required”

Where a suspicious incidental finding has been found, there may be a requirement for consultation with a senior colleague or radiologist.

“An incidental cystic mass measuring 4.6cm in maximum diameter is detected in the mid pole of the left kidney. Some solid vascular elements are identified within the lesion. Findings reviewed with,Consultant Radiologist/Sonographer. A small cystic carcinoma should be excluded. An urgent referral for a CT scan is required. Please refer (as per local referral processes).The patient was informed at the scan appointment that there is an incidental abnormality detected and further scans may be required.

Report has been communicated to referring clinical team on ... /../ 202...”

In addition to the significant healthcare costs of over investigation associated with incidentalomas, there is the increased and unwarranted anxiety that is induced in patients. The incidence of incidentalomas in all imaging tests (excluding ultrasound) may be as high as 25%³. The majority of current evidence refers to incidentalomas detected on CT, MRI or Nuclear Medicine (and in particular PET CT). At present, there is no robust evidence for the incidence of incidentalomas detected on ultrasound.

The increasing frequency of incidental findings means that medical practice is changing as a direct consequence of imaging. For example, urologists state that their nephrectomy case mix has changed significantly where the majority of patients now being seen and operated on are patients who have an incidental finding on imaging of a renal mass rather than the classical presentation of a symptomatic patient with haematuria. This is a good example of the importance of having systems in place to deal efficiently with potentially significant incidental findings in patients.

On finding an incidentaloma, the reporting practitioner is therefore faced with several questions and dilemmas:

Is this a true abnormality or is this a normal variant /within the range of normality?

How should this finding be reported?

Should further investigation be recommended and, if so, by whom?

What is the urgency of any action required?

Those who practise ultrasound regularly will be aware of the difficulties that are commonly encountered. This section will outline common clinical scenarios of incidental findings and offer a suggested pathway. These are guidelines that can be used where necessary as a start point for pathway development and can be modified accordingly to reflect local practice. Guidelines approved and endorsed by BMUS serve as a guide to good practice but are not intended to be prescriptive. They should be used in conjunction with the BMUS/SCoR Guidelines for Professional Ultrasound Practice⁴.

References

1. O'Sullivan JW, Muntinga T, Grigg S, Ioannidis JPA. Prevalence and outcomes of incidental findings: umbrella review. 2018 BMJ 2018;361:k2387
doi:10.1136/bmj.k2387
2. Royal College of Radiologists. Standards for the communication of radiological reports and fail-safe alert notification. London. 2016.
https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr164_failsafe.pdf
3. Lumbreras B, Donat L, Hernández-Aguado I. Incidental findings in imaging diagnostic tests: a systematic review. Br J Radiol 2010;83:276-89. doi:10.1259/bjr/98067945.
4. BMUS. <https://www.bmus.org/policies-statements-guidelines/professional-guidance/>

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Hepatic Haemangioma

- Hepatic haemangiomas are common (reported in 0.4%-20% of the population).
- They are seen frequently on abdominal ultrasound examination.
- In patients **at low risk of hepatic malignancy**, where ultrasound appearances are typical and lesions are less than 3cm, the risk of mistaking a hepatic malignancy for a haemangioma is remote.

Incidental liver lesion typical for haemangioma.
Characteristic features include all of the following:

- Well-defined
- Uniformly hyperechoic
- No hypoechoic halo

Risk Factors for hepatic malignancy requiring further investigation

- Greater than 3cm
- Previous or current extra-hepatic malignancy
- Clinically known or suspected chronic liver disease
- Abnormal liver function tests (particularly GGT, ALP and ALT)
- Abnormal liver echogenicity or morphology at ultrasound
- Atypical features

No risk factors for hepatic malignancy 3cm or less in diameter. With typical US features for haemangioma

Report as haemangioma. No follow up advocated.

Report example;

'Ultrasound findings are consistent with a haemangioma, no further follow up required.'

Haemangiomas are most often asymptomatic incidental discoveries that may change in size benignly during long term follow up.

Further investigations may include Contrast Enhanced Ultrasound (CEUS), CT or MRI dependent on local protocols or expertise

References

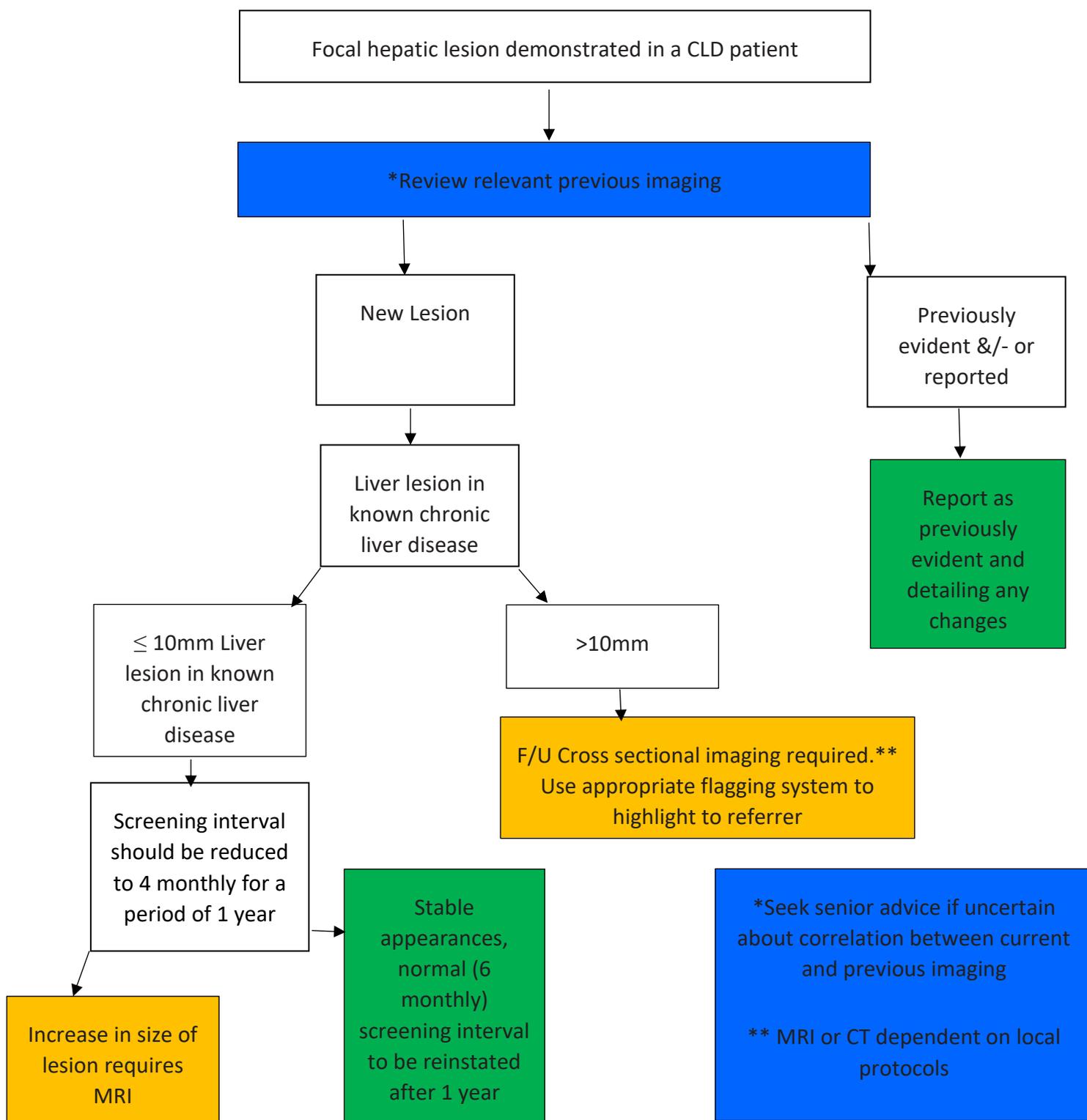
Cao R, Wang LP. Serological Diagnosis of Liver Metastasis in Patients with Breast Cancer. *Cancer Biol Med.* 2012; 9(1): 57–62

EASL Clinical Practice Guidelines on the management of benign liver tumours. *Journal of Hepatology.* 2016;65:386–398

Wilson and Withers. The liver. In Rumack CR, Wilson S, Charboneau J and Levine D. *Diagnostic Ultrasound.* 4th ed. St Louis: Mosby 2011.

Lesions in Chronic Liver Disease

- Chronic liver disease (CLD) is a progressive condition leading to fibrosis and cirrhosis and is caused by myriad liver pathologies
- Most cases of hepatocellular carcinoma (HCC) occur in patients with established risk factors for chronic liver disease, including hepatitis C virus (HCV) infection, heavy alcohol drinking, hepatitis B virus (HBV) infection, and non-alcoholic fatty liver disease (NAFLD). These HCC risk factors lead to cirrhosis, which is present in 90% of patients with HCC in the Western world
- Small regenerative hepatic nodules and other benign focal lesions can mimic HCC in this patient demographic and may cause a reporting conundrum



References

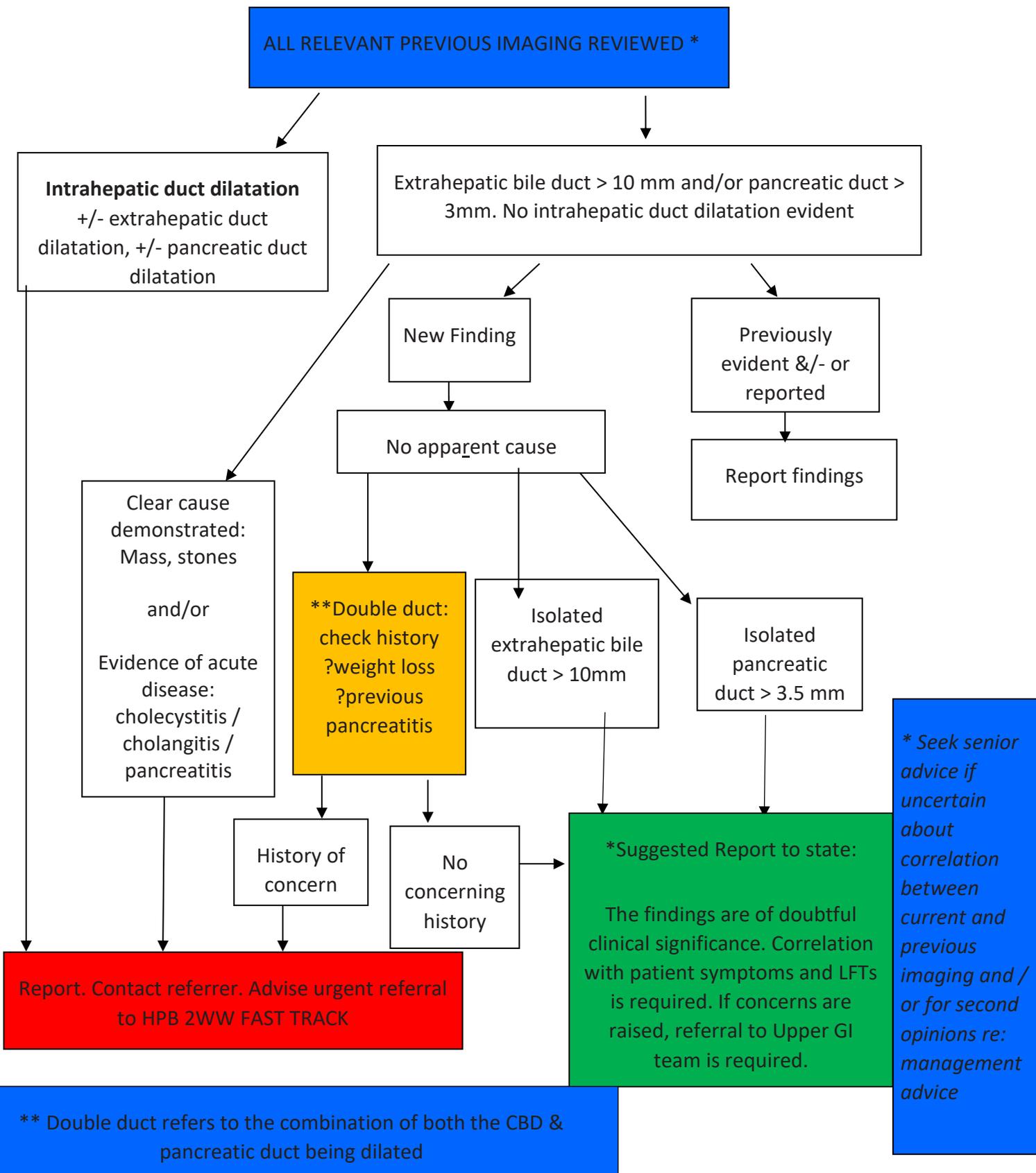
EASL–EORTC Clinical Practice Guidelines: Management of hepatocellular carcinoma; *Journal of Hepatology*. 2012;56:908–943

Kanwal F, Singal AG. Surveillance for Hepatocellular Carcinoma: Current Best Practice and Future Direction. *Gastroenterology* 2019;157:54–64

Hirschfield GM, Dyson JK, Alexander GJM, Chapman MJ, Collier J et al. The British Society of Gastroenterology/UK-PBC primary biliary cholangitis treatment and management guidelines. *Gut*. 2018;67:1568–1594. doi:10.1136/gutjnl-2017-315259

Imaging Management of Biliary and Pancreatic Duct Findings

- Generally, the upper limit of the CBD is <10 mm and pancreatic duct of <3.5 mm (at the pancreas head) in the absence of intrahepatic duct dilatation.
- Ensure imaging is optimised to assess duct dilatation adequately- reduce processing, increase edge enhancement, reduce dynamic range, measure inner to inner wall



**** Double duct refers to the combination of both the CBD & pancreatic duct being dilated**

** Seek senior advice if uncertain about correlation between current and previous imaging and / or for second opinions re: management advice*

References

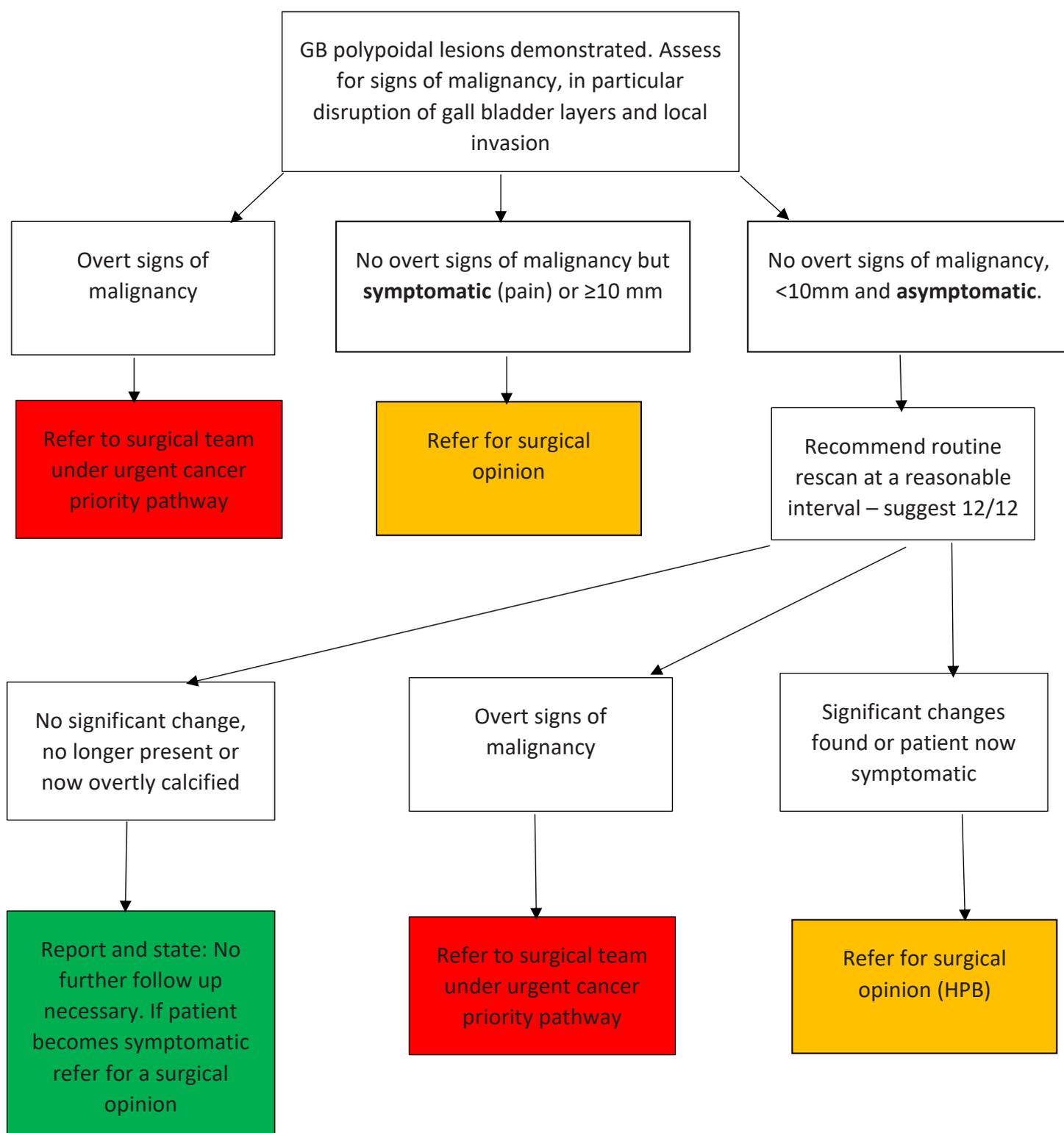
Association of Upper Gastrointestinal Surgery of Great Britain and Ireland : Pathway for the Management of Acute Gallstone Diseases. 2015. <https://www.augis.org/wp-content/uploads/2014/05/Acute-Gallstones-Pathway-Final-Sept-2015.pdf>

NICE. Gallstone disease: diagnosis and management: Clinical guideline [CG188], 2014. <https://www.nice.org.uk/guidance/cg188/chapter/1-Recommendations#diagnosing-gallstone-disease>

Gurusamy KS, Giljaca V, Takwoingi Y et al. Ultrasound versus liver function tests for diagnosis of common bile duct stones. Cochrane Database of Systematic Reviews 2015, Issue 2. Art. No.CD011548 doi: 10.1002/14651858.CD011548.

Gallbladder Polyps

- “Polypoid lesions of the gallbladder” refers to *any* elevated lesion of the mucosal surface of the gallbladder wall
- Cholesterol polyps account for the vast majority of all polyps (approximately 62%)
- Adenomas, which account for approximately 6%, have malignant *potential*.



References

Metman M, Olthof P, Van der Wal J, Van Gulik T, Roos D, Dekker J. Clinical relevance of gallbladder polyps; is cholecystectomy always necessary? *HPB*, 2020;22 (4): 506-510
<https://doi.org/10.1016/j.hpb.2019.08.006>

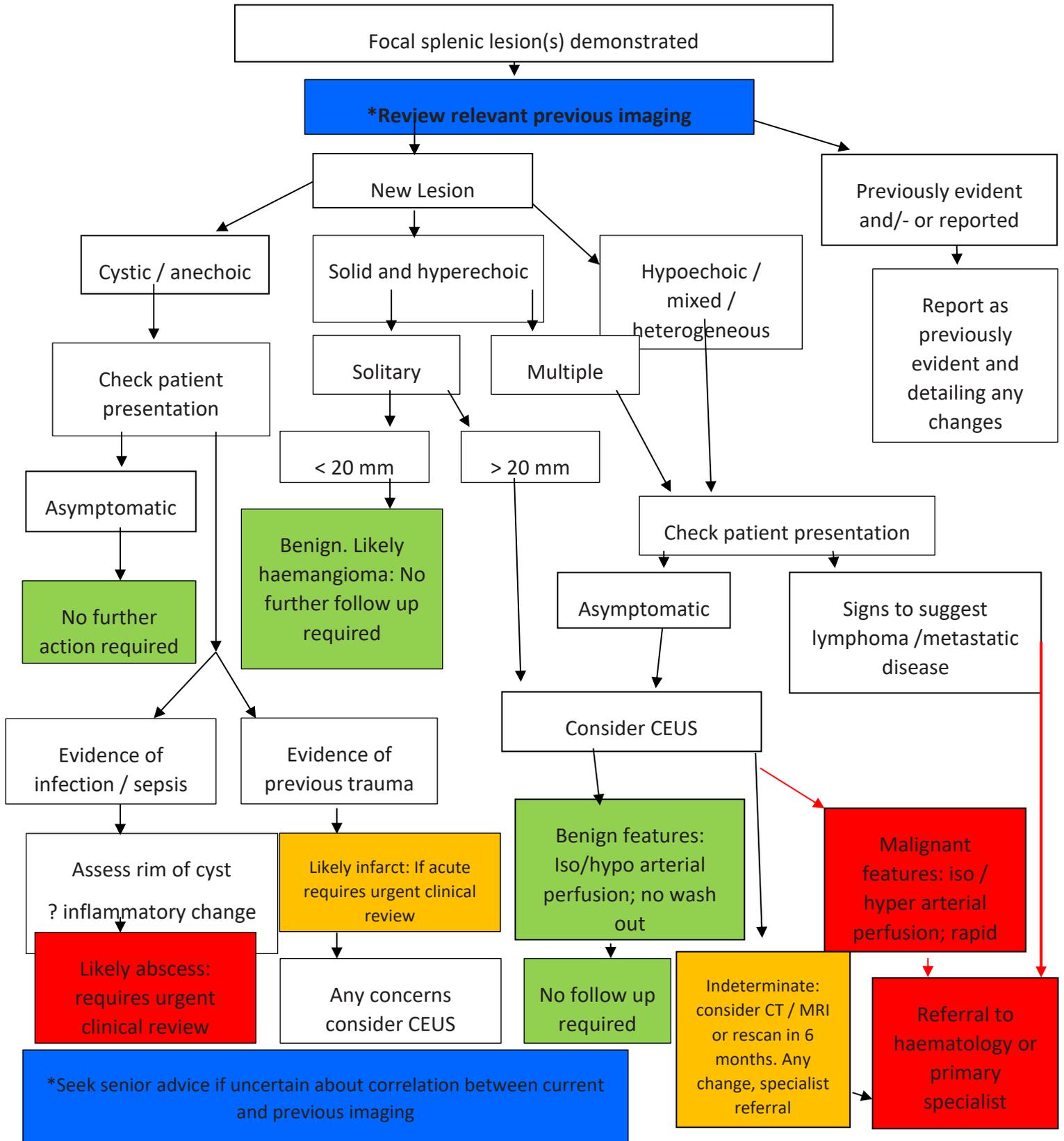
Patel K, Dajani K, Vickramarajah S, Huguet E. Five-year experience of gallbladder polyp surveillance and cost effective analysis against new European consensus guidelines. *HPB*, 2019;21 (5) : 636-642 <https://doi.org/10.1016/j.hpb.2018.10.008>

Szpakowski JL, Tucker LY. Outcomes of Gallbladder Polyps and Their Association with Gallbladder Cancer in a 20 year Cohort. *JAMA Network Open. Gastroenterology and Hepatology*. 2020;3(5):e205143. doi:10.1001/jamanetworkopen.2020.5143.
<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2765996>

Wiles, R., Thoeni, R.F., Barbu, S.T. et al. Management and follow-up of gallbladder polyps. *Eur Radiol* 2017;27, 3856–3866. <https://doi.org/10.1007/s00330-017-4742-y>

Indeterminate Splenic Lesions

- The spleen is rarely the primary site of a malignancy
- Ratio of benign versus malignant lesions is 1:3
- Benign splenic lesions are often solitary, malignant lesions are more frequently multiple and fast growing; solitary metastases are very rare
- CEUS improves diagnostic confidence due to the characteristic perfusion patterns of benign and malignant lesions



References

Gore R, Ecanow J. Management of splenic “incidentalomas” found on ultrasound and computed tomography. *Cancer Imaging*. 2015;15(Suppl 1):O11.

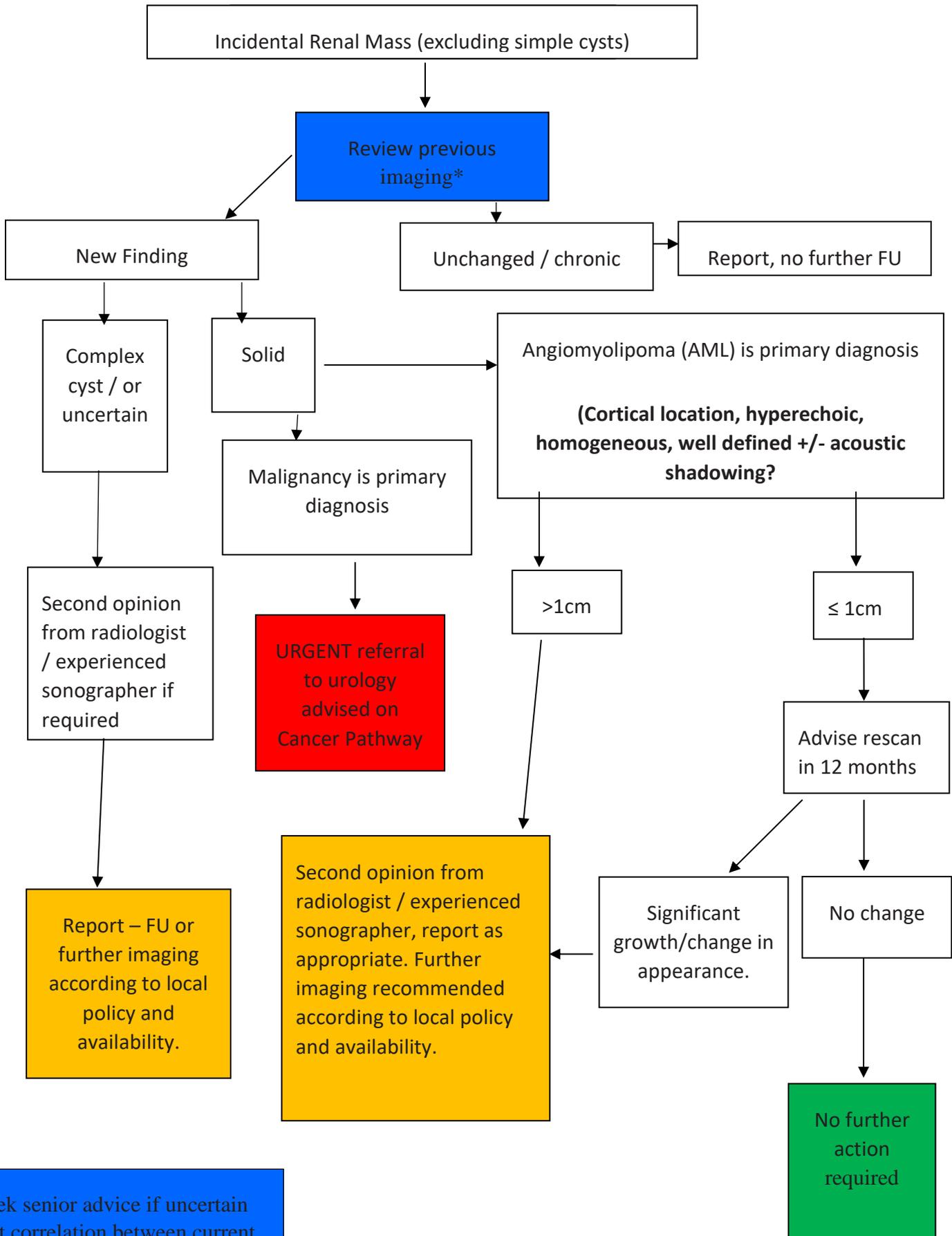
Caremani M, Occhini U, Caremani A, et al. Focal splenic lesions: US findings. *Journal of Ultrasound*. 2013;16(2):65-74.

Omar A, Freeman S. Contrast-enhanced ultrasound of the spleen. *Ultrasound*. 2016;24(1):41-49.

Lee H, Kim J, Hong J, et al. Cross-sectional Imaging of Splenic Lesions: RadioGraphics Fundamentals | Online Presentation. *RadioGraphics*. 2018;38(2):435-436.

Piscaglia F, Nolsøe C, Dietrich CF et al. The EFSUMB and WFUMB Guidelines and Recommendations on the Clinical Practice of Contrast Enhanced Ultrasound (CEUS). Update 2011 on Hepatic (EFSUMB and WFUMB) and Non-hepatic Applications (EFSUMB). *Ultraschall in der Medizin - European Journal of Ultrasound*. 2011;32(05):524-524.

Imaging Management of Renal Masses



*Seek senior advice if uncertain about correlation between current and previous imaging

References

Halpenny D, Snow A, McNeill G, Torreggiani W. The Radiological Diagnosis and Treatment of Renal Angiomyolipoma-current status. *Clin Radiol*.2010; 65(2):99-10

Rini B, Campbell S, Escudier B. Renal Cell Carcinoma. *The Lancet*. 2009;373:1119-32

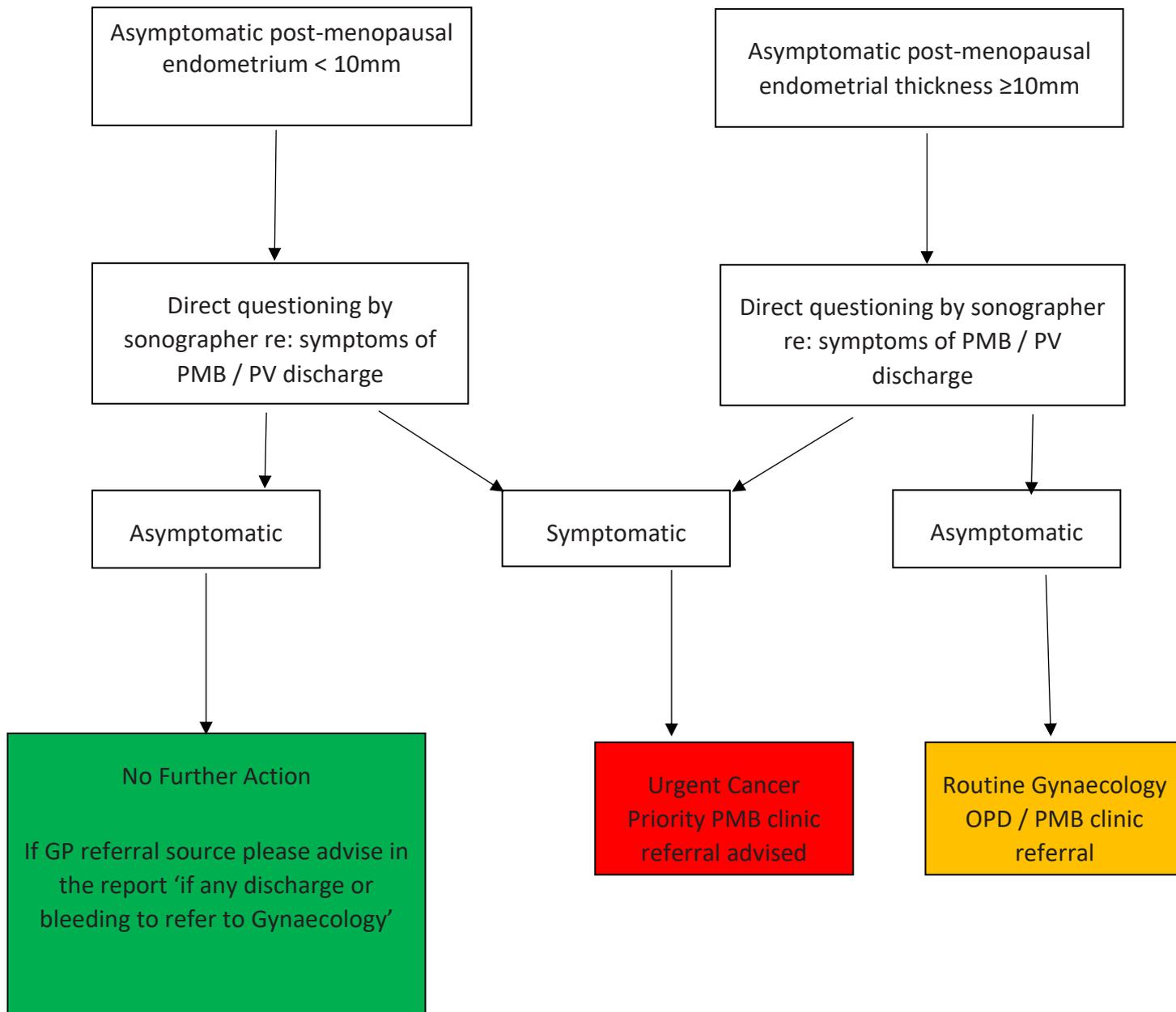
Tublin M, Thurston W, Wilson S. The Kidney and Urinary Tract, in *Diagnostic Ultrasound (vol.1)*. Rumack C, Wilson S, Charboneau J, Levine D (eds). 2011. Elsevier, Philadelphia

Farrelly C, Delaney H, McDermott R. et al. Do all non-calcified renal lesions found on ultrasound need further evaluation with CT? *Abdom Imaging* (2008) 33: 44

Hussein T et al, Can subcentimetre ultrasound detected angiomyolipomas be safely disregarded? *Clinical Radiology*. 2020 Apr;75(4):287-292. doi: 10.1016/j.crad.2019.12.006

Sidhar K, McGahan JP, Early HM, Corwin M, Fananapazir G, Gerscovich EO. Renal Cell Carcinomas: Sonographic Appearance Depending on Size and Histologic Type. *J Ultrasound Med*. 2016;35(2):311–320. doi:10.7863/ultra.15.03051

Incidental finding of thickened endometrium



- If on direct questioning at the time of the scan there are symptoms of post-menopausal bleeding or vaginal discharge (irrespective of endometrial thickness), patients should be referred to fast track PMB clinic (make explicit in report who is to refer). Clinical review by GP is advised to review the history in patients who are asymptomatic and the thickness is less than 10mm to ensure no relevant history.
- The same criteria are used for patients receiving HRT or Tamoxifen.

References

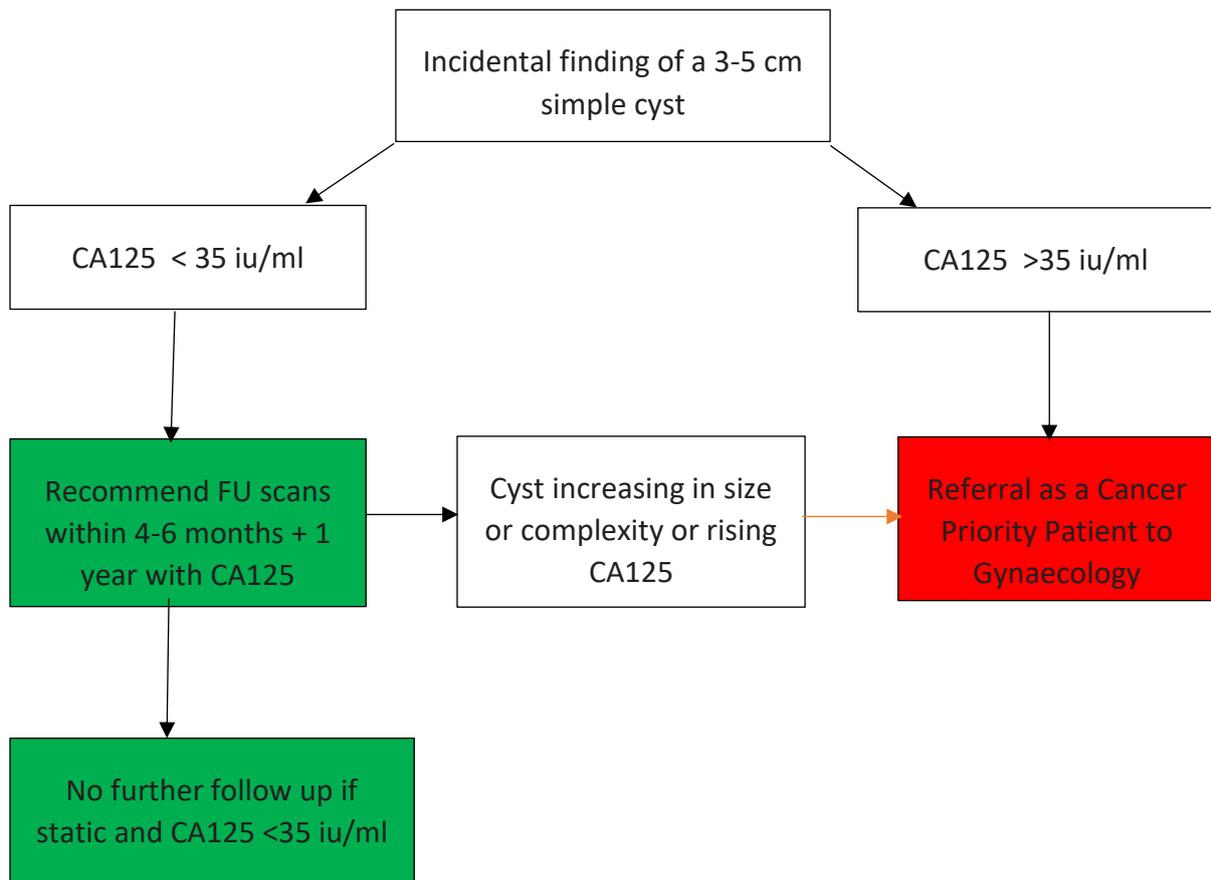
Jacobs I, Gentry-Maharaj A, Burnell M, Manchanda R, Singh N et al. Sensitivity of transvaginal ultrasound screening for endometrial cancer in postmenopausal women: a case-control study within the UKCTOCS cohort. *Lancet Oncol.* 2011;12(1):38-48. doi: 10.1016/S1470-2045(10)70268-0. Epub 2010 Dec 10. PMID: 21147030.

Smith-Bindman R, Weiss E, Feldstein V. How thick is too thick? *Ultrasound Obs Gynecol* 2004; 24: 558-65 doi: 10.1002/uog.1704. PMID: 15386607.

Macdonald R. Ultrasound and gynaecological cancer : current and potential future uses. *Ultrasound* 2010; 18: 170-175

Incidental Post-Menopausal Simple Ovarian Cysts

The definition of a simple cyst includes completely anechoic cysts or cysts with one thin septation (<3mm). Simple cysts should be anechoic, with smooth thin walls, posterior acoustic enhancement, no solid component and no internal flow at colour Doppler ultrasound. BMUS advocates the use of IOTA guidance for all other ovarian mass ultrasound pathways. [IOTA Simple Rules and risk calculator to diagnose ovarian cancer | Iota Group](#)



- Simple cysts < 3 cm need no follow up
- One thin septation (<3mm) or small calcification in wall is almost always benign
Treat as simple and follow up according to size of cyst
- **Symptomatic** cysts of any size may need gynaecological referral
- In cases suspicious for metastatic malignancy urgent further imaging would be warranted

References

Royal College of Obstetricians and Gynaecologists. The management of ovarian cysts in postmenopausal women. London, 2016.

https://www.rcog.org.uk/globalassets/documents/guidelines/green-top-guidelines/gtg_34.pdf

Levine D et al. Management of Asymptomatic Ovarian and other Adnexal Cysts Imaged at US: Society of Radiologist in Ultrasound Consensus Conference Statement. *Radiology* 2010;256:943-954

Sauders B, Podzielinski I, Ware R et al. Risk of malignancy in sonographically confirmed septated cystic ovarian tumors. *Gynecologic Oncology* 2010;118:278-282

Greenlee R, Kessel B, Williams C et al. Prevalence, incidence, and natural history of simple ovarian cysts among women over age 55yrs in a large cancer screen trial. *American Journal of Obstetrics and Gynecology*. 2010;202:373.e1-9

BMUS.

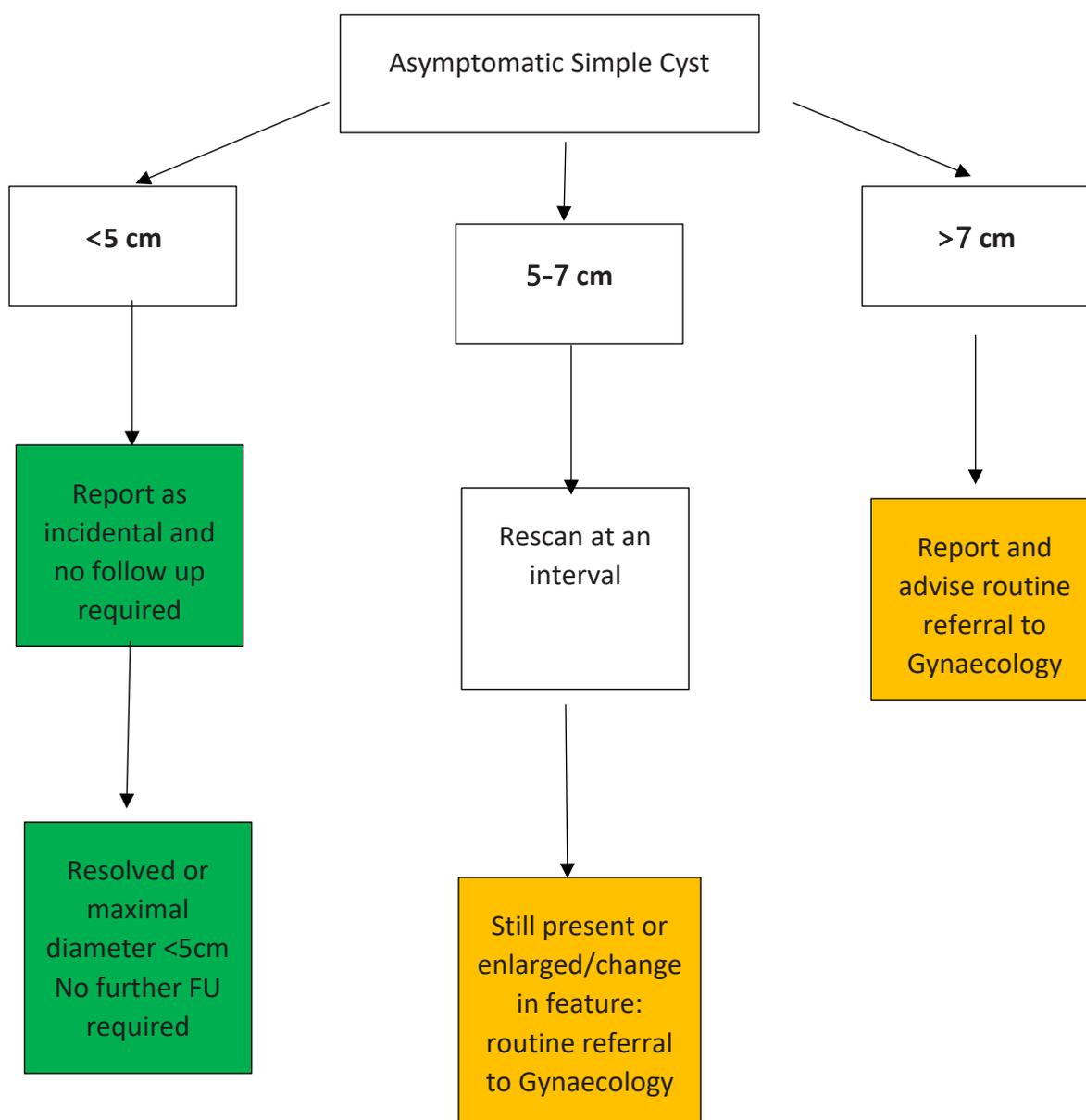
https://www.bmus.org/static/uploads/resources/Guidelines_for_Professional_Ultrasound_Practice.pdf December 2019

Levine D, Patel DM et al. Simple Adnexal Cysts: SRU Consensus Conference Update on Follow-up and Reporting. *Radiology* 2019;293:2

<https://pubs.rsna.org/doi/10.1148/radiol.2019191354>

Incidental Pre-Menopausal Ovarian Cysts

- BMUS and the RCOG advocate the use of IOTA guidelines in determining the significance of ovarian masses
- CA125 assessment is not required if a simple ovarian cyst is seen at ultrasound scan
- The following cysts should also be treated as simple and the same size thresholds used:
 - paraovarian cysts where the ovary can be seen separately
 - cysts containing daughter cysts
 - cysts with one thin septation (<3mm) or small calcification in wall.
- Always refer to previous imaging if available CT/MRI/US
- Make explicit in the report who is to arrange follow up
- Symptomatic cysts may need referral



References

Garg S, Kaur A, Mohi J et al. Evaluation of IOTA Simple Ultrasound Rules to Distinguish Benign and Malignant Ovarian Tumours. *J Clin Diagn Res.* 2017 Aug; 11(8): TC06–TC09.

Glanc P, Brofman N, Salem S et al. The prevalence of incidental simple ovarian cysts ≥ 3 cm detected by transvaginal sonography in early pregnancy. *J Obstet Gynaeco* 2007;29,(6)502-506.

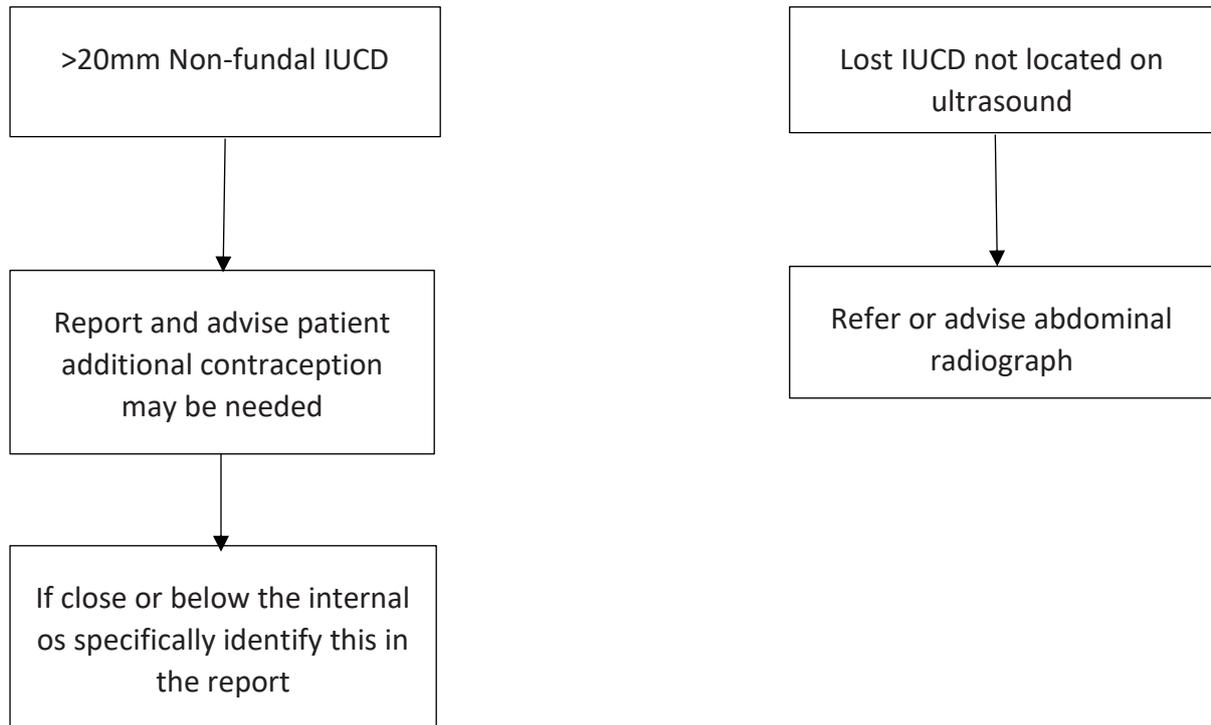
Levine D, Brown DL, Andreotti R et al. Management of Asymptomatic Ovarian and Other Adnexal Cysts Imaged at US: Society of Radiologists in Ultrasound Consensus Conference Statement. *Radiology*,2010;26:3:121-131. <https://doi.org/10.1148/radiol.10100213>

Timmerman D, Testa AC, Bourne Tet al. Simple ultrasound-based rules for the diagnosis of ovarian cancer. *Ultrasound Obstet Gynecol.* 2008;31(6):681-90.

Timmerman D, Van Calster B, Jurkovic D et al Inclusion of CA-125 does not improve mathematical models developed to distinguish between benign and malignant adnexal tumours. *J Clin Onco*2007;25(27)4194-4200

Management of Malpositioned Intrauterine Contraceptive Devices (IUCDs)

- Non-fundal IUCDs (>3mm from top of the endometrial cavity) can cause symptoms such as bleeding or cramping; the vast majority remain asymptomatic
- The contraceptive function of the malpositioned IUCD, especially those 20mm from the fundus, cannot be guaranteed. The decision to remove or replace is clinical and multifactorial



References

American College of Obstetricians and Gynecologists. Clinical Challenges of Long-Acting Reversible Contraceptive Methods. 2016 (reaffirmed 2018) Number 672.

<https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2016/09/clinical-challenges-of-long-acting-reversible-contraceptive-methods>

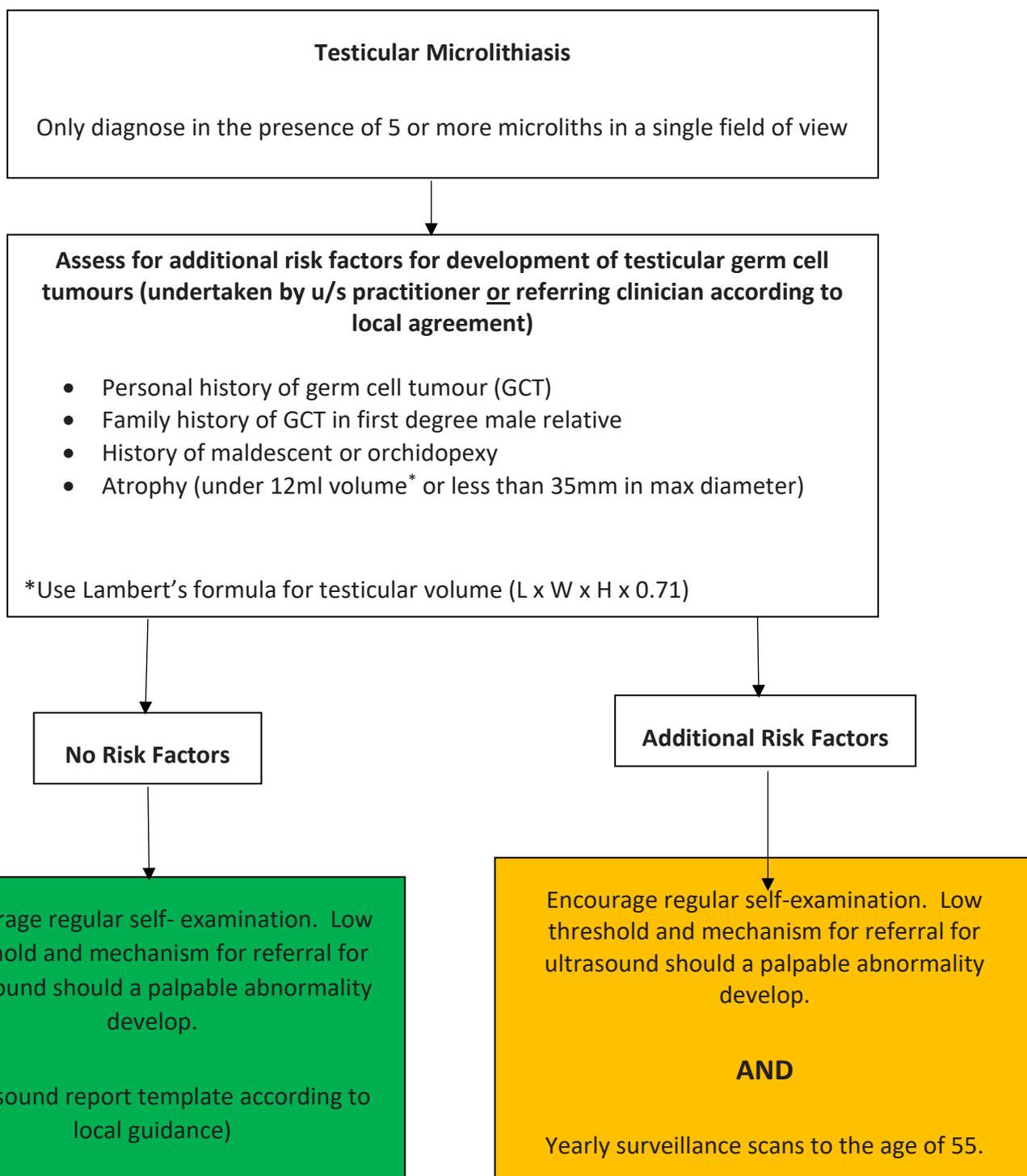
NICE Guidelines. Contraception IUS/IUD. Revised May 2019

<https://cks.nice.org.uk/contraception-iusiud#!scenarioClarification:7>

Faculty of Sexual and Reproductive Healthcare of the Royal College of Obstetricians & Gynaecologists. Published 2005 (revised 2019) <https://www.guidelines.co.uk/womens-health/fsrh-intrauterine-contraception-guideline/252622.article>

Testicular Microlithiasis

- Testicular microlithiasis is a common finding on scrotal ultrasound
- Follow-up scrotal ultrasound and serum tumour marker testing are no longer recommended
- The patient should be educated regarding regular self-examination and to seek immediate medical attention if there are any palpable changes or masses detected
- While there has been concern that testicular microlithiasis may be a risk factor for development of a subsequent testicular germ cell tumour, its significance remains uncertain
- This algorithm aims to standardise management where testicular microlithiasis has been discovered incidentally on scrotal ultrasound



References

Goede J, Hack WW, van der Voort-Doedens LM, Sijstermans K, Pierik FH. Prevalence of testicular microlithiasis in asymptomatic males 0 to 19 years old. *J Urol* 2009; 182:1516–1520 <https://www.ajronline.org/doi/ref/10.2214/AJR.15.15226>

Gorman and Carroll. The scrotum. In: Rumack C, Wilson S, Charboneau J (eds). *Diagnostic Ultrasound*. Vol. 1. Philadelphia. Mosby; 2005, 866-867

Hsieh ML, Huang ST, Huang HC, Chen Y, Hsu YC. The reliability of ultrasonographic measurements for testicular volume assessment: comparison of three common formulas with true testicular volume. *Asian J Androl*. 2009;11(2):261–265. doi:10.1038/aja.2008.48

Lam D, Gersovich E, Kuo M et al. Testicular Microlithiasis: Our experience of 10 years. *J Ultrasound Med* 2007; 26:867-873

Leblanc L, Lagrange F, Lecoanet P et al. Testicular microlithiasis and testicular tumor: a review of the literature. *Basic Clin Androl*. 2018; 28:8

Miller F, Rosairo S, Clarke J et al. Testicular calcification and microlithiasis: Association with primary intra-testicular malignancy in 3,477 patients. *Eur Radiol* 2007; 17:363-369.

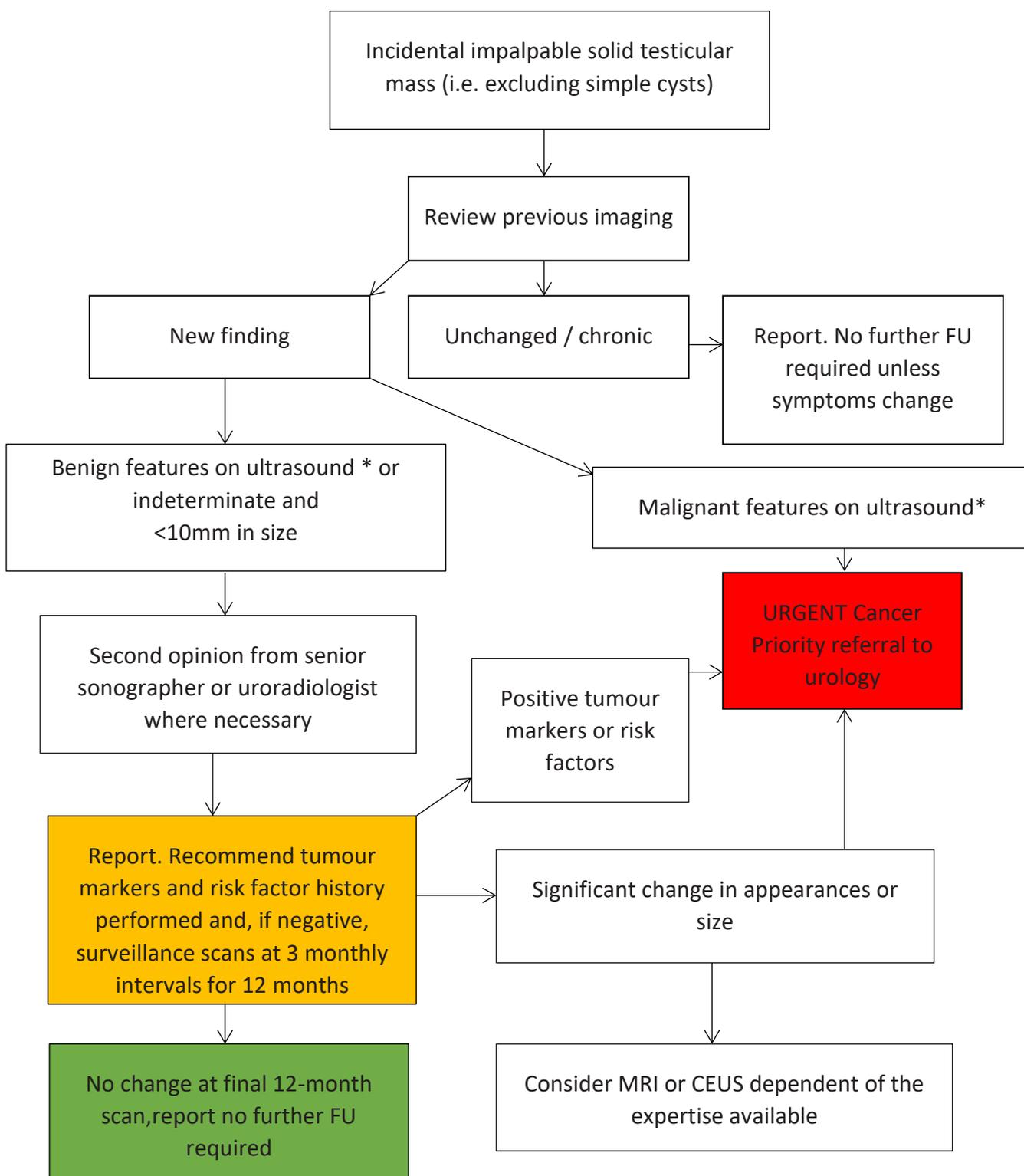
Richenberg J, Belfied J, Ramchandani P et al. Testicular microlithiasis imaging and follow-up: guidelines of the ESUR scrotal imaging subcommittee. *Eur Radio*, 2015;25(2):323-330 http://www.esur.org/fileadmin/content/user_upload/Testicular_microlithiasis_imaging_and_follow-up.pdf

Shanmugasundaram R, Singh JC, Kekre NS. Testicular microlithiasis: is there an agreed protocol? *Indian J Urol* 2007; 23:234–239 <https://www.ajronline.org/doi/ref/10.2214/AJR.15.15226>

Winter TC, Kim B, Lowrance W et al. Testicular Microlithiasis: What Should You Recommend? *American Journal of Roentgenology*. 2016;206: 1164-1169. <https://www.ajronline.org/doi/10.2214/AJR.15.15226>

Incidental Testicular Lesions

- Incidental, asymptomatic non-palpable, solid testicular masses are common and can be found in up to 7.4% of the population
- The majority of palpable solid testicular lumps are malignant
- The majority of incidentally discovered non-palpable masses are benign (73%). In the absence of risk factors, the report should avoid advice leading to orchidectomy.
- Many radical orchidectomies are performed for benign disease. Implications for fertility, endocrine function and body image are important to consider



*Grey scale & Doppler features of testicular tumours	
Benign Patterns	Malignant Patterns
Non palpable and absence of clinical risk factors	Palpable (>10 mm)
Well defined	Irregular margins/ill-defined
Simple cyst	Solid mixed
Uniformly hypoechoic	Hypoechoic
Normal parenchyma	Microlithiasis + focal lesion
'onion skin' pattern	Intralesion microcalcifications
Geographic wedged-shaped hypoechoic areas	Irregular hypoechoic areas
Avascularity increases the probability of benign aetiology – suggest the use of microvascular imaging technique as low flow difficult to detect in small lesions	Vascular

References

Isidori AM, Pozza C, Gianfrilli D et al. Differential Diagnosis of Nonpalpable Testicular Lesions: Qualitative and Quantitative Contrast-enhanced US of Benign and Malignant Testicular Tumors. *Radiology*. 2014;273, 606-618 <https://doi.org/10.1148/radiol.14132718>

Lewicki A, Freeman S et al . 2021. Incidental Findings and How to Manage Them: Testis— A WFUMB Position Paper. *Ultrasound in Medicine & Biology*. Volume 47, Issue 10, October 2021, Pages 2787 -2802
<https://www.sciencedirect.com/science/article/pii/S0301562921002520>

Milose JC, Filson CP, Weizer A et al. Role of biochemical markers in testicular cancer: diagnosis, staging, and surveillance. *Open Access Journal of Urology*. 2012; 4:1-8
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818947/>

Richenberg J, Belfied J, Ramchandani P et al et al. Testicular microlithiasis imaging and follow-up: guidelines of the ESUR scrotal imaging subcommittee. *Eur Radio*, 2015;25(2):323-330
http://www.esur.org/fileadmin/content/user_upload/Testicular_microlithiasis_imaging_and_follow-up.pdf

Rocher L, Ramchandani P, Belfield J et al. *European Radiology*, 2016;26,2268–2278.
<https://link.springer.com/article/10.1007/s00330-015-4059-7>

Schröder C, Lock G, Schmidt C et al. Real-Time Elastography and Contrast-Enhanced Ultrasonography in the Evaluation of Testicular Masses: A Comparative Prospective Study. *Ultrasound in Medicine and Biology*. 2016;42: 1807-1815
<https://www.sciencedirect.com/science/article/abs/pii/S0301562916300023>

Wotton F, Freeman S. New ultrasound techniques in the assessment of incidental, impalpable, testicular lesions: Can radical orchidectomy be avoided? *Imaging and Oncology*. 2015. https://www.sor.org/system/files/article/201504/io_2015_lr.pdf

Qian L, Abhinav V, Hahn P et al. The Value of Active Ultrasound Surveillance for Patients With Small Testicular Lesions, *Ultrasound Quarterly*, 2017;33(1)23-27 doi: 10.1097/RUQ.0000000000000245

Incidental Thyroid Nodules

Since the frequency of incidentally detected thyroid nodules can be up to 70%, depending on the patient population age, The British Thyroid Association recommends:

US detected incidental nodules – a benign (i.e. U2) appearance should result in no further action other than reassurance. (Any incidental nodule detected on US should be assessed using BTA criteria (i.e. U1 – U5)).

Incidentally detected nodules on CT or MRI should undergo clinical assessment. In the majority of cases no further assessment/investigation is required. However, if suspicious findings on CT (extracapsular extension, tracheal invasion, associated suspicious lymphadenopathy) or the patient belongs to a high risk group/significant clinical concern, US assessment is recommended.

Nodules detected on PET CT with focal FDG activity – should be investigated with US +/- FNAC, unless disseminated disease is identified and the prognosis from an alternative malignancy would preclude further investigation.

References

Brito JP1, Morris JC, Montori VM. Thyroid cancer: zealous imaging has increased detection and treatment of low risk tumours. *BMJ*. 2013;27,347:f4706. doi: 10.1136/bmj.f4706.

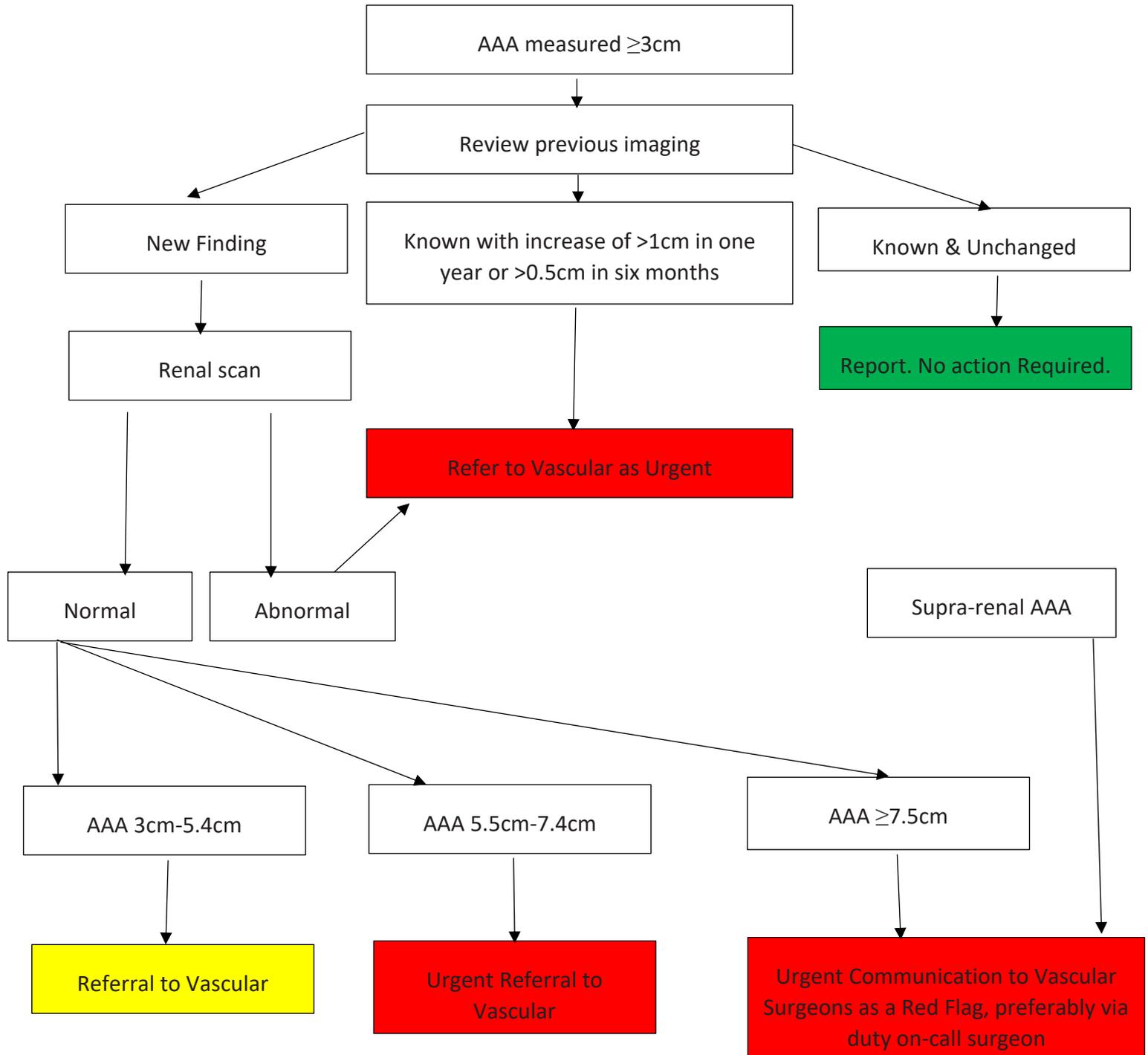
Hoang JK, Nguyen XV. Understanding the Risks and Harms of Management of Incidental Thyroid Nodules. *JAMA Otolaryngol Head Neck Surg*. 2017;143(7):718-724. doi:10.1001/jamaoto.2017.0003

Perros P, Colley S, Boelaert K et al. 2014. British Thyroid Association Guidelines for the Management of Thyroid Cancer. Third Ed.
<https://onlinelibrary.wiley.com/doi/pdf/10.1111/cen.12515>

Tufano RP, NoUreldene S, Angelos P Incidental Thyroid Nodules and Thyroid Cancer Considerations Before Determining Management. *JAMA Otolaryngol Head Neck Surg*. 2015;141(6):566-572. doi:10.1001/jamaoto.2015.0647

Incidental Abdominal Aortic Aneurysm (AAA)

- The NHS abdominal aortic screening programme defines an aneurysm of the abdominal aorta as $\geq 3\text{cm}$ measured from the inner to inner wall of the vessel.
- A 'small' AAA measures between 3 cm and 4.4 cm and up to 1% of men on the AAA screening programme will have a small AAA diagnosed.



Where the AAA is ≥ 5.5 cm or where the neck of the AAA cannot be visualised – CT scan is required.

References

NICE. <https://www.nice.org.uk/guidance/ng156/documents/short-version-of-draft-guideline>

BMUS.

[https://www.bmus.org/static/uploads/resources/Guidelines for Professional Ultrasound Practice v3 OHz76r.pdf](https://www.bmus.org/static/uploads/resources/Guidelines%20for%20Professional%20Ultrasound%20Practice%20v3%20OHz76r.pdf)

NHS. <https://www.nhs.uk/conditions/abdominal-aortic-aneurysm-screening/>

Communication of reports

The timeliness of the reporting of incidental findings when they are deemed to be significant is key. The onus is on the reporter to ensure that the report is communicated appropriately, be it a 'phone call to a clinician or urgent/routing electronic transfer to a practice, post etc.

Where actions have been taken, they should be recorded appropriately in the report e.g. "report finding telephoned through to on-call surgical registrar @00:00hrs". There are several recommended fail-safe mechanisms which are commonly used in UK practice to ensure patient safety and appropriate clinical follow up of abnormal findings.

A 'red flag' system, used in practice within the UK, can be modified to give a more streamlined and efficient communication system to allow referrers to be informed in an appropriate timescale and to ensure that there is a tailored fail-safe backup system in place to ensure patient safety. Where this can be directly linked to Radiology Information Systems with voice recognition reporting etc., cost efficiency and enhanced safety for patients will result. This aligns with the recommendations in the following RCR document: [Standards for the communication of radiological reports and fail-safe alert notification | The Royal College of Radiologists \(rcr.ac.uk\)](https://www.rcr.ac.uk/standards-for-the-communication-of-radiological-reports-and-fail-safe-alert-notification)

The following standards for report notification have been defined by the RCR:

Standard 1

All radiology reports should be produced, read and acted upon in a timely fashion

Standard 2

It is the reporting practitioners' responsibility to produce reports as quickly and efficiently as possible, and to flag the reports when they feel a fail-safe alert is required

Standard 3

It is the responsibility of the employing organisation to ensure appropriate reposting and fail-safe systems are in place.

This is an example of a 'fail-safe' reporting system which has been implemented (courtesy of Hull University Teaching Hospitals)

The 'fail-safe' alert system should be used when there are urgent, critical, significant or unexpected findings that require the referrer to action or to discuss with the patient. These findings may be unexpected or expected, but the examination has been performed to confirm the clinical diagnosis. The findings that should be flagged under this system would require the referrer to take further action.

The appropriate alert must be added to the end of the report. OPD/IP reports that contain this alert are emailed (or other electronic alert system) to the referrer with a requirement for the referrer to respond within a given time frame.

GP reports with alerts are currently required to be emailed to the surgery and this action recorded on the radiology system.

Colour	Report Phrase	Examples of use
Green	Routine – No action required	<ul style="list-style-type: none"> • Normal study • Normal variant • Insignificant abnormality for presenting symptoms (i.e. renal cyst, mural or subserosal fibroid, gallstones in asymptomatic patient)
Yellow	This report contains a serious, unexpected or urgent finding, requiring acknowledgement (CODE: YELLOW1)	<ul style="list-style-type: none"> • Any finding requiring action • Mass • Change in previous findings • Follow up imaging required • Biliary dilatation (GP/OP) • Acute cholecystitis • Unexpected free fluid • Asymptomatic AAA over 7.5 cm • Positive DVT
Orange	This report contains a serious, critical or urgent finding, requiring acknowledgement (CODE: ORANGE1). The clinical findings were discussed at the time of reporting with [...] at [...].	<ul style="list-style-type: none"> • Any finding requiring action within 4 to 6 hours • Hydronephrosis in septic patient • Appendicitis (positive evidence) • GB perforation in unwell patient • Biliary dilatation with jaundice • Symptomatic AAA • Pyloric stenosis / intussusception

Red	This report contains a serious, critical or urgent finding, requiring acknowledgement (CODE: RED1). The clinical findings were discussed at the time of reporting with [...] at [...].	<ul style="list-style-type: none">• Any finding requiring action within 30 mins / 1 hour• Obvious perforation (free air in peritoneum and echoes within ascites)• Signs of dissecting AAA (fluid around AAA)
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