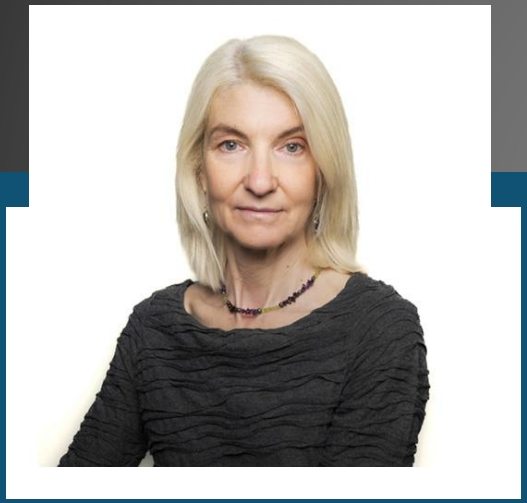
BMUS

Role of Ultrasound in Acute Pelvic Pain

Dr Anne Marie Coady



Dr Anne Marie Coady



Consultant Radiologist

Bch, BAO, BA, MRCP UK, FRCR UK

Diploma of Advanced Training in Obstetric Ultrasound June 2000

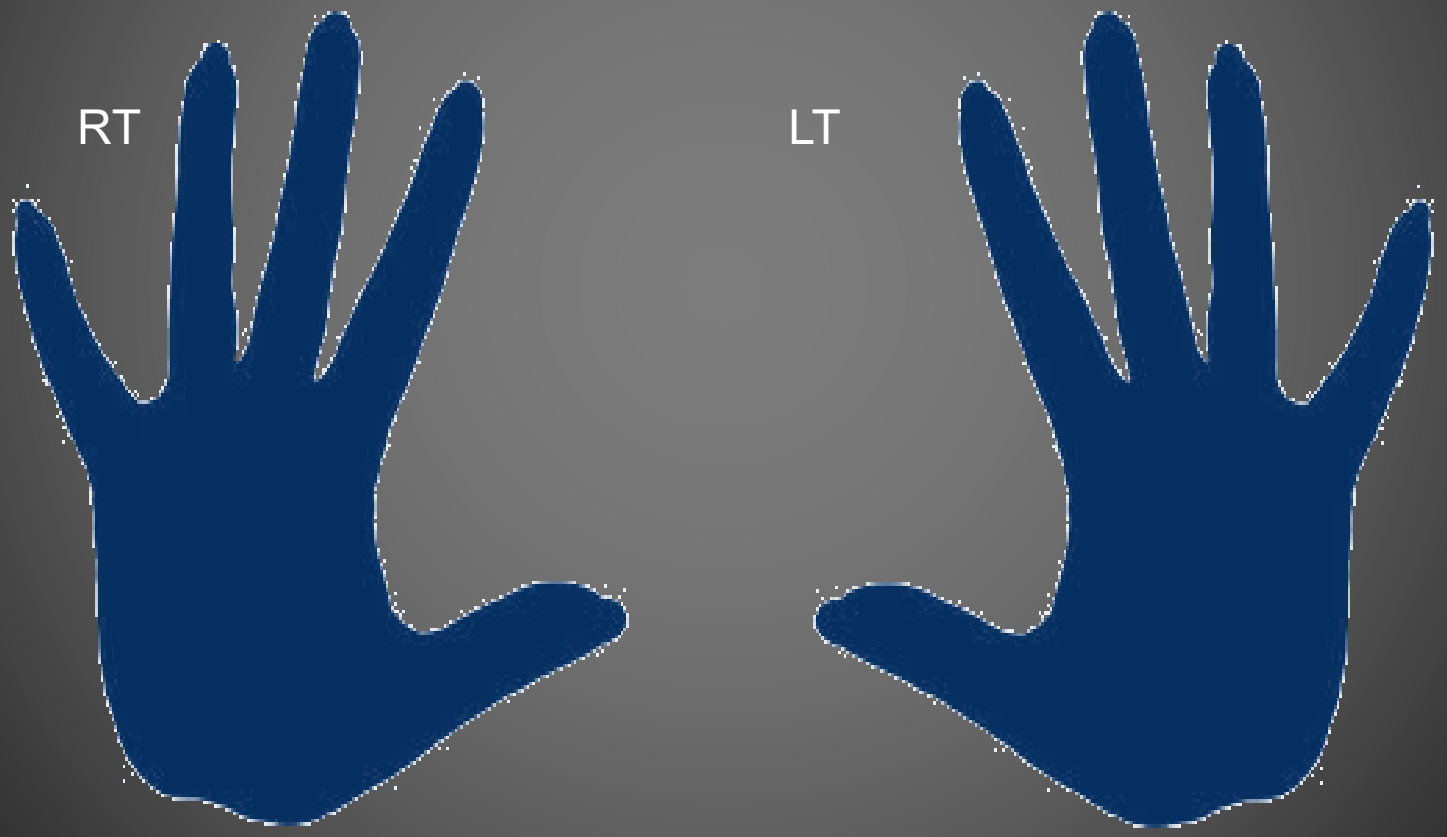
I am the Chief Editor of the 3rd Edition of Twining's Textbook of Fetal Abnormalities

BMUS

Disclaimer

This presentation is based on research conducted to the best of the presenter's abilities, acknowledging inherent uncertainties and limitations. The findings may be influenced by factors such as data quality, methodology, and interpretation, and do not guarantee real-world accuracy.

The content is intended for informational purposes only and does not necessarily reflect the views of the British Medical Ultrasound Society (BMUS) or its affiliates. The presenter is responsible for ensuring objectivity and disclosing any relevant financial/industry interests. BMUS and its affiliates disclaim liability for any claims arising from this educational activity.


RT
LT

THINK LIKE A GYNAECOLOGIST !!!!!!!!

Acute gynaecology: pain and bleeding

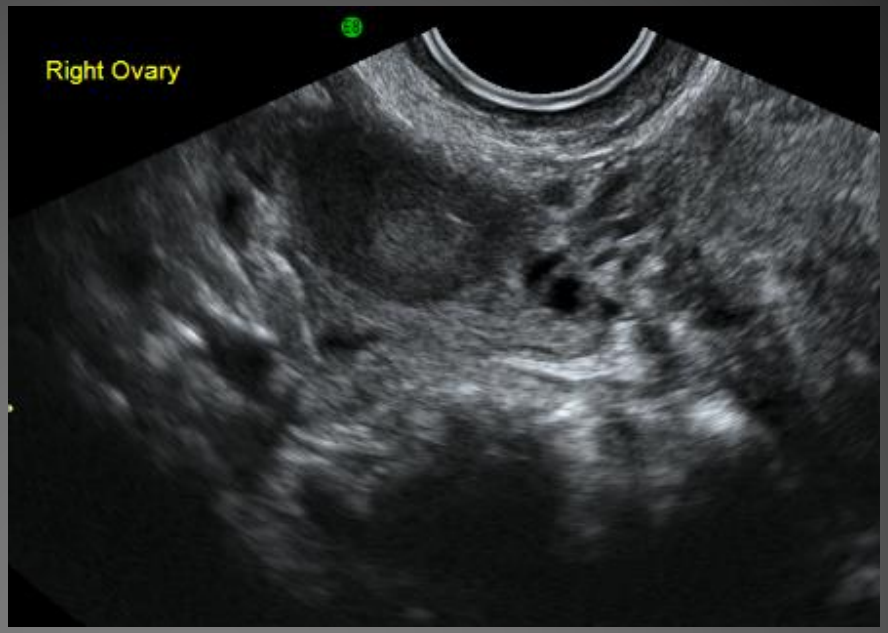
It is inconceivable to consider the initial assessment of the patient presenting acutely with suspected gynaecological pathology without an ultrasound examination

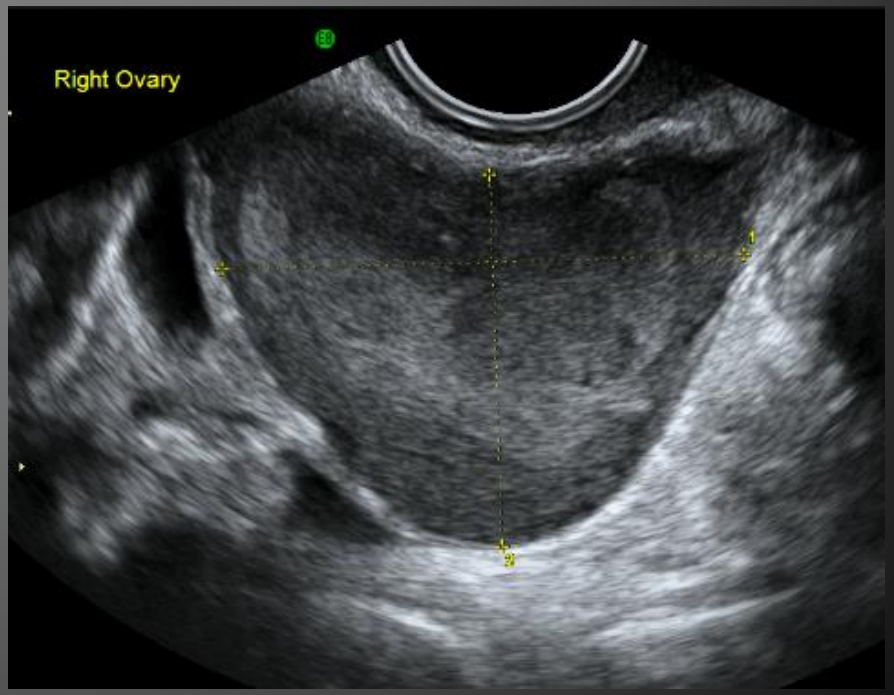
A well performed scan provides an effective and rapid means of diagnosis

Incidentaloma during scanning

Pain provocation S.S.T

The presence of pathology particularly adnexal pathology may be coincidental but pain mapping, using the transvaginal probe, will help confirm this.





Causes of acute pelvic pain

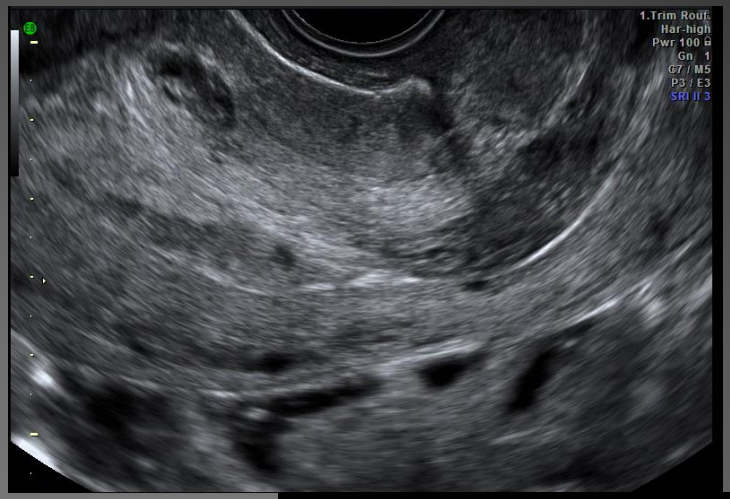
Gynaecological

1. Ectopic and failing pregnancy
2. Cyst accidents
3. Tubal torsion
4. Pelvic Inflammatory Disease
5. Fibroid complication

1. Lower genital tract infection
    1. Cervicitis
    2. Cystitis/urethritis
    3. Cyst infections

2. Appendicitis
3. Renal stones
4. Inflammatory bowel

5. Vascular issues







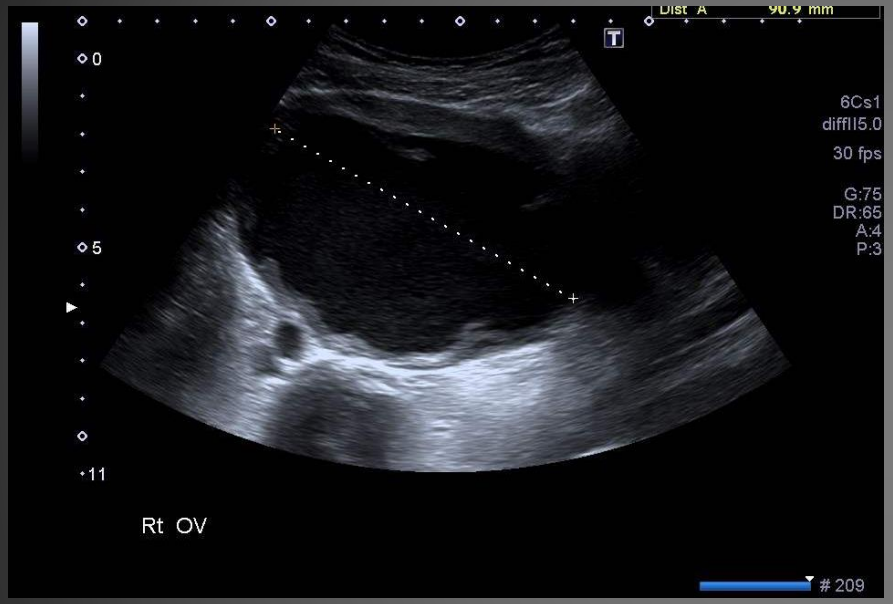
The Preamble

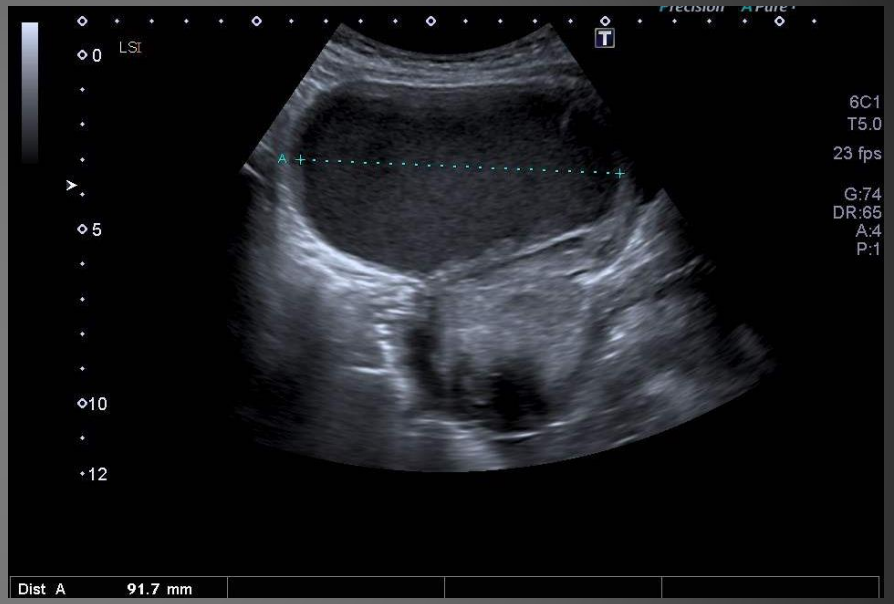
2 absolute bete noirs…

1. Gynaecological scan is a TV scan no ifs ands or buts !!!

2. Colour Doppler is misunderstood misused and capable of great harm and should only be used when you know what the diagnosis is

Bottom line 1
TV scan TV scan TV scan or just do not do it at all !!!!





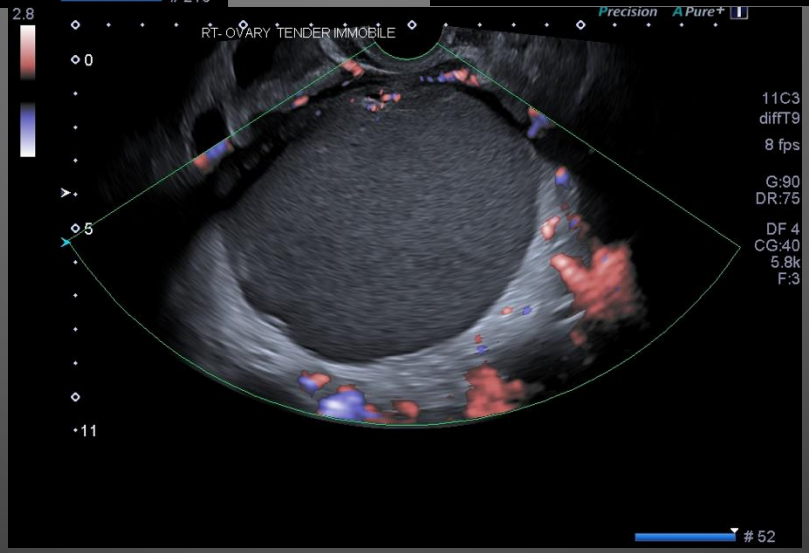
4 images all TA
Diagnosed as tuboovarian complex
due to pain and raised white cell count

1 week later due to continuing pain
TA scan “TOC confirmed” !!!!

Bottom line 1
TV scan TV scan TV scan or just do not do it at all !!!!

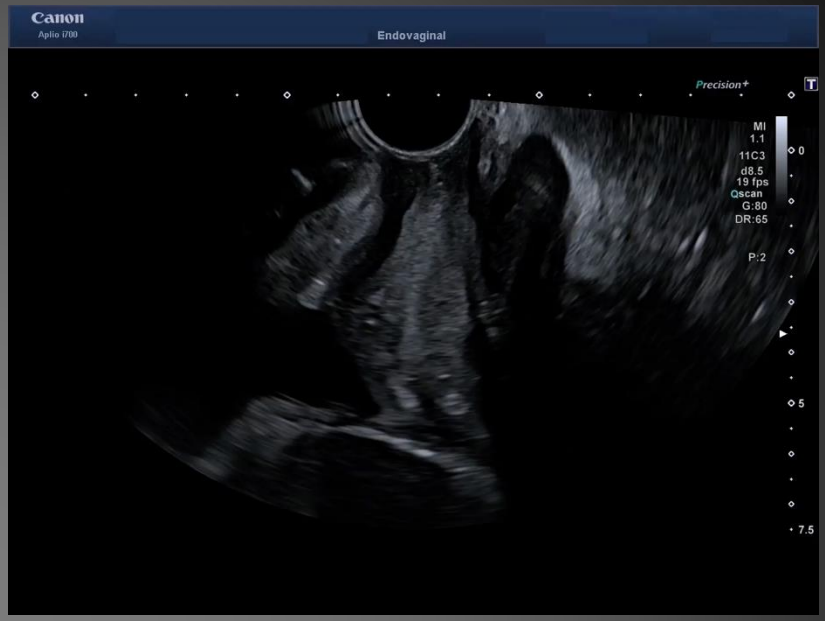






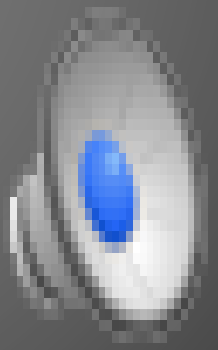
Acute gynaecology: the basic scan

1. Vagina
2. Cervix
3. Uterus
4. Ovaries
5. Adnexal regions



Mobility

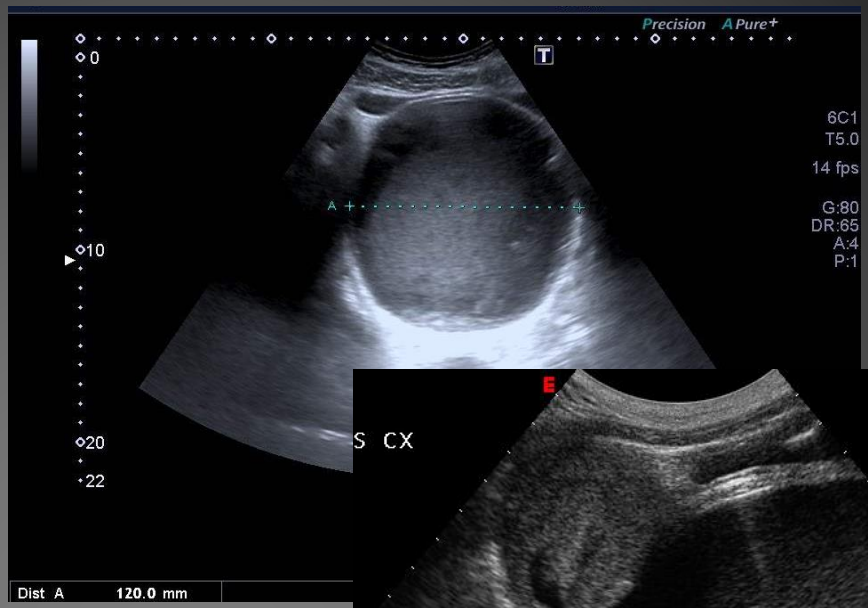
Tenderness and symptom provocation



Acute gynaecology: vagina

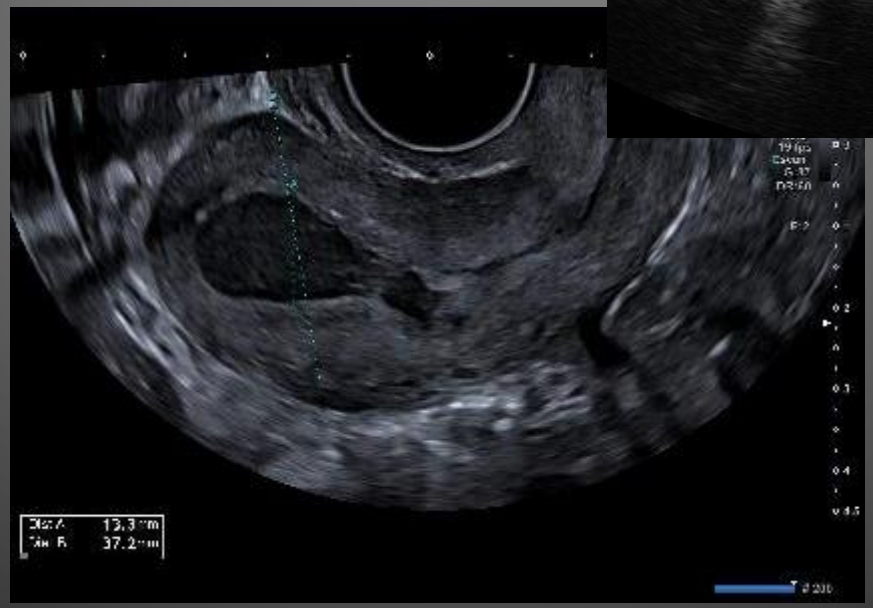
Obstruction

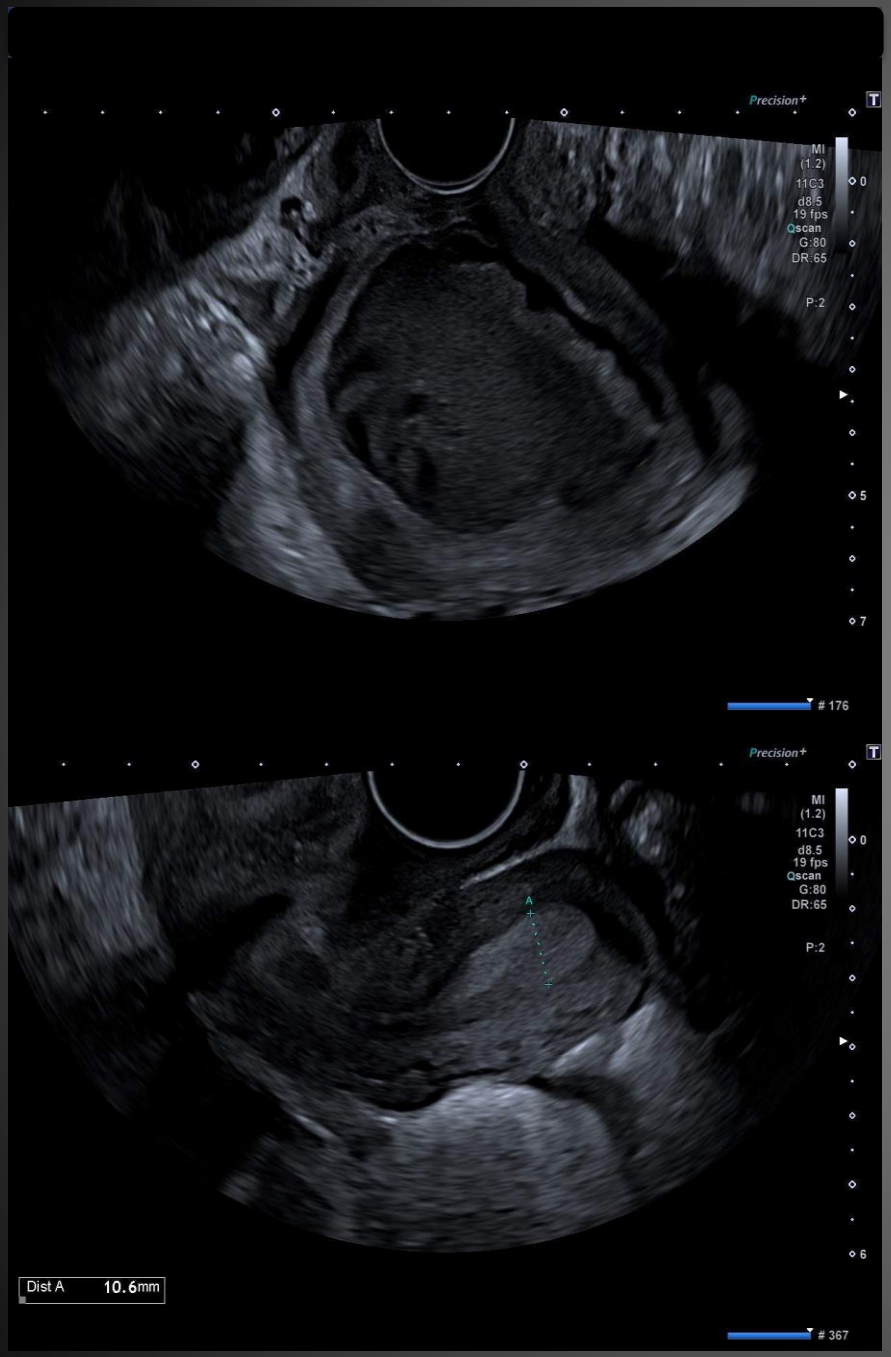
- Not just in a paediatric population
- Not just amenorrhoea or chronic discomfort

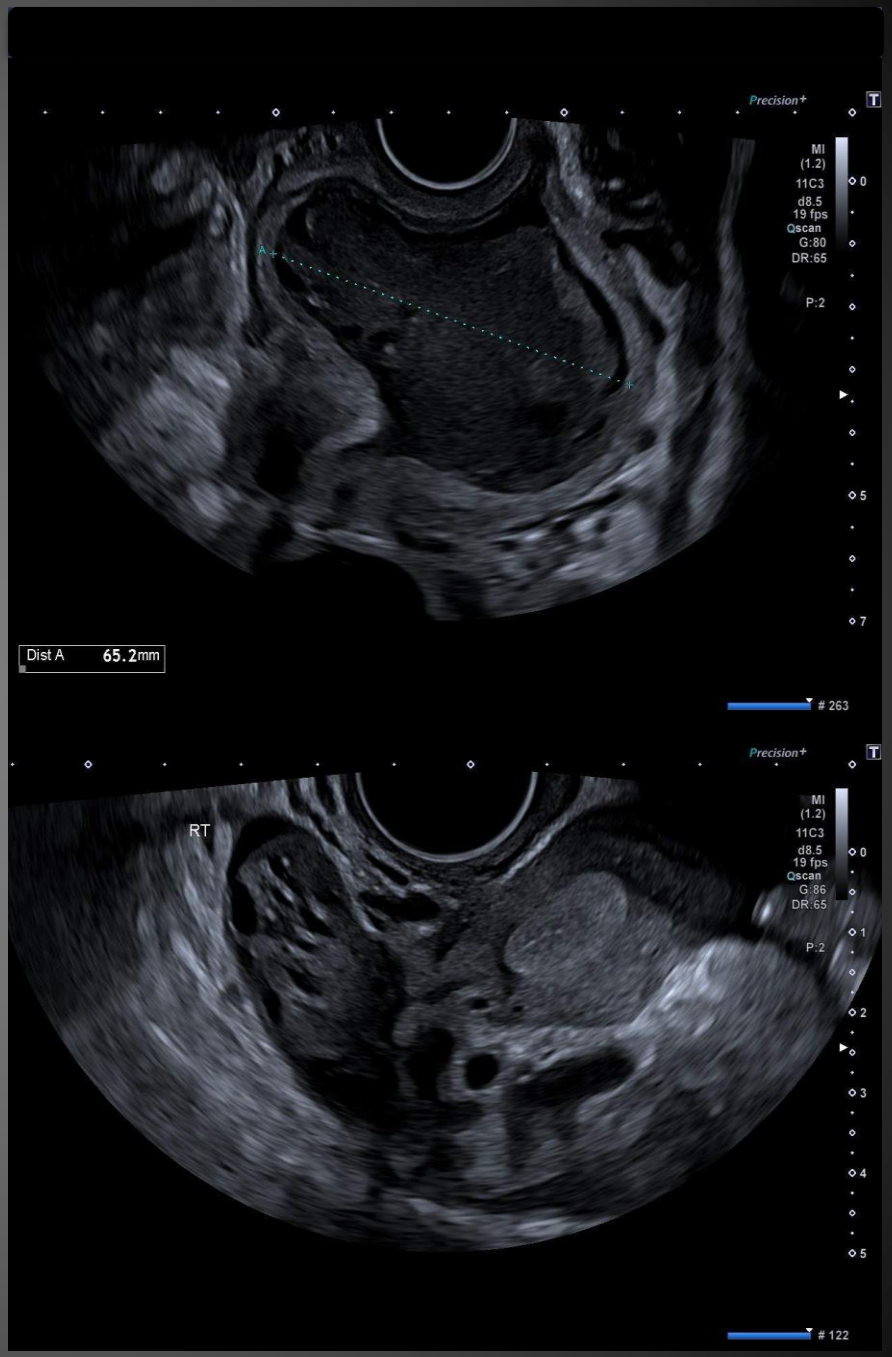


Cyst complications

- Local vaginal cysts

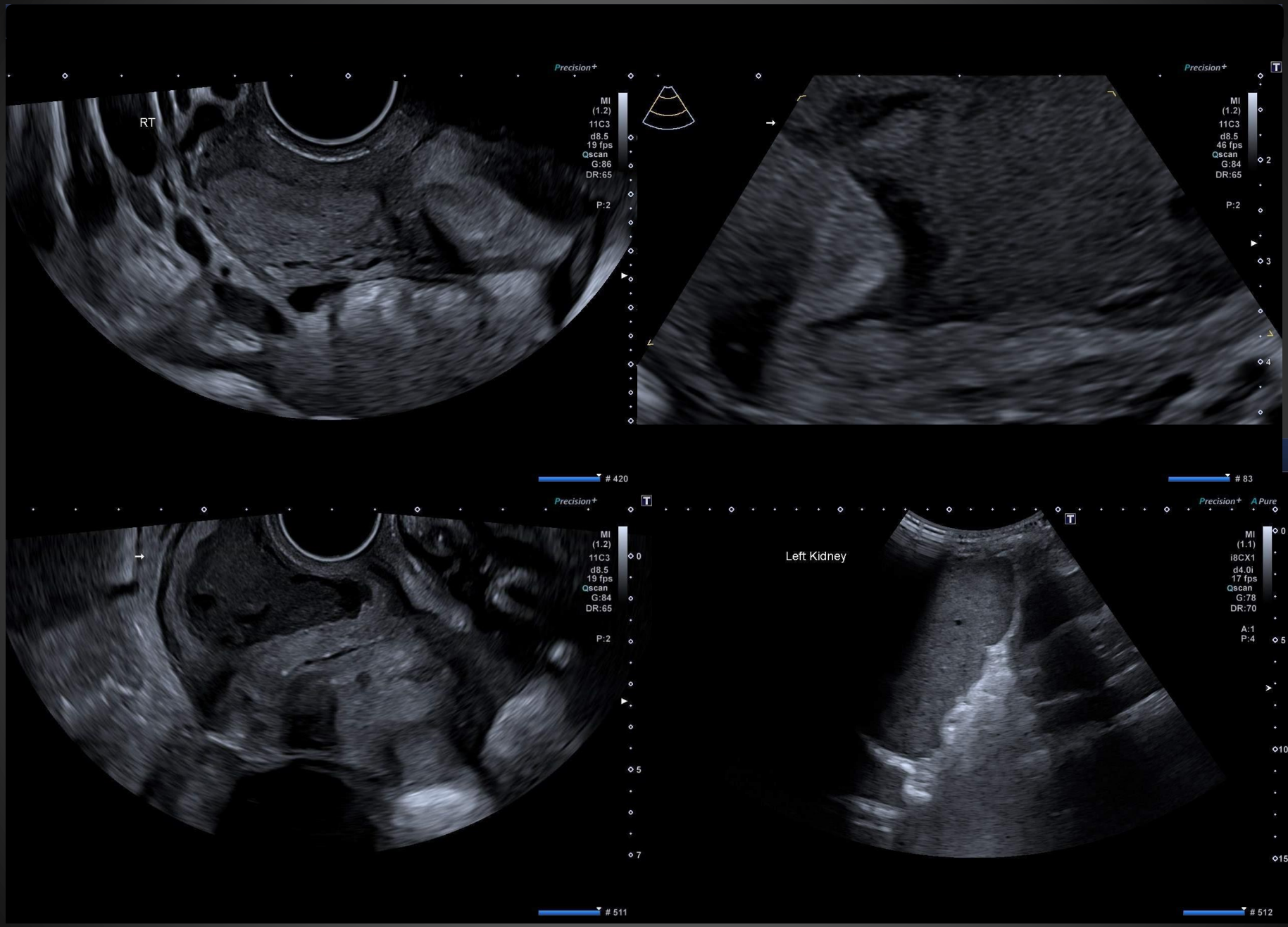



Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:80
DR:65
P:2
176


Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:80
DR:65
P:2
A
Dist A 65.2mm
263

Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:80
DR:65
P:2
A
Dist A 10.6mm
367

Precision+
RT
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:86
DR:65
P:2
122


Precision+
RT
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:86
DR:65
P:2
420
Precision+
MI
(1.2)
11C3
d8.5
46 fps
Qscan
G:84
DR:65
P:2
83
Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:84
DR:65
P:2
511
Left Kidney
Precision+
A Pure
MI
(1.1)
i8CX1
d4.0i
17 fps
Qscan
G:78
DR:70
A:1
P:4
512

OVIHRA Syndrome

OVIRA syndrome, is a rare congenital anomaly

It represents a diagnostic dilemma because of the regular menstruation and nonspecific lower abdominal pain.

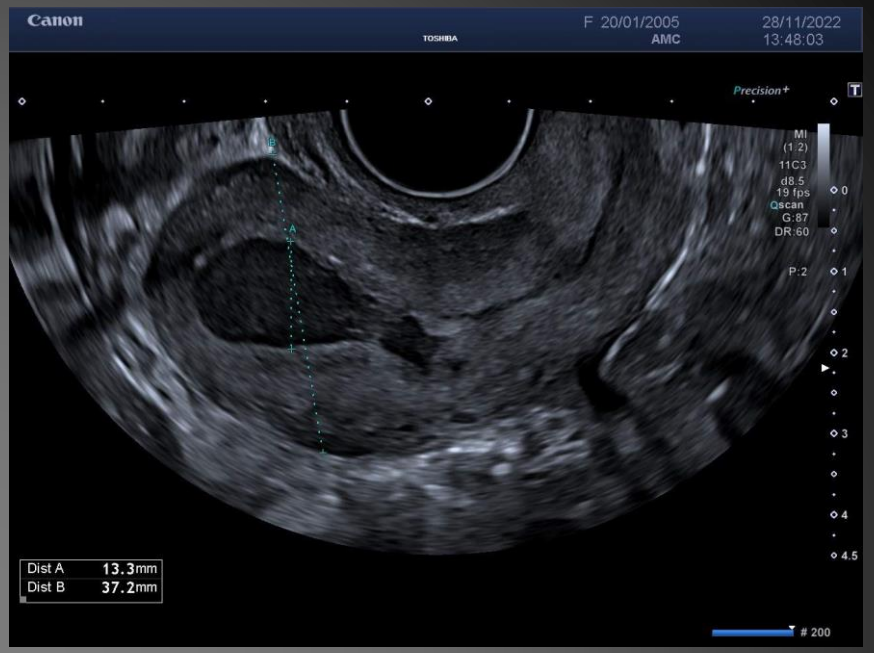
Obstructed hemivagina and ipsilateral renal anomaly (OHVIRA) or Herlyn-Werner-Wunderlich syndrome, is a rare Mullerian duct anomaly with uterus didelphys, unilateral obstructed hemivagina, and ipsilateral renal agenesis.

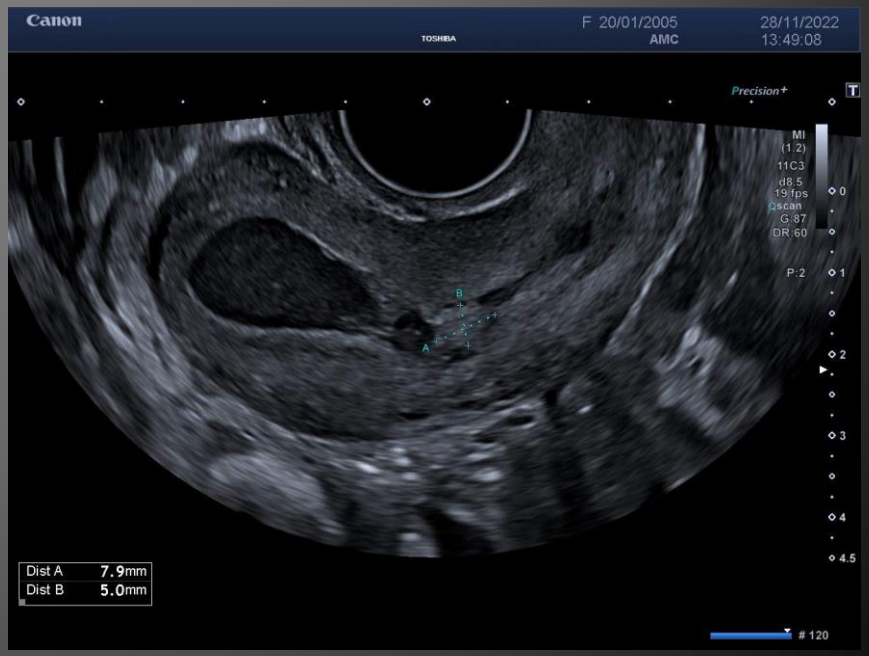
Acquired Haematometra

The clue is in the history



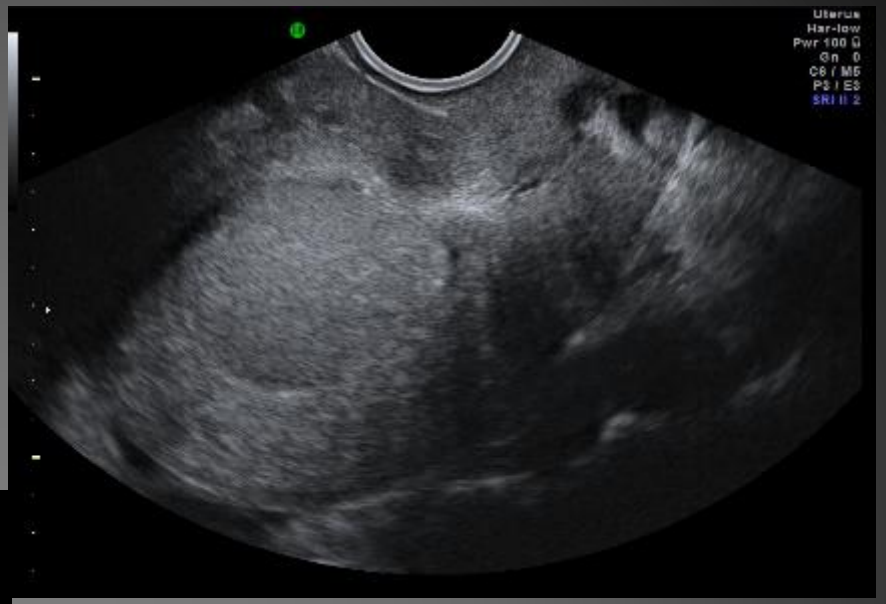


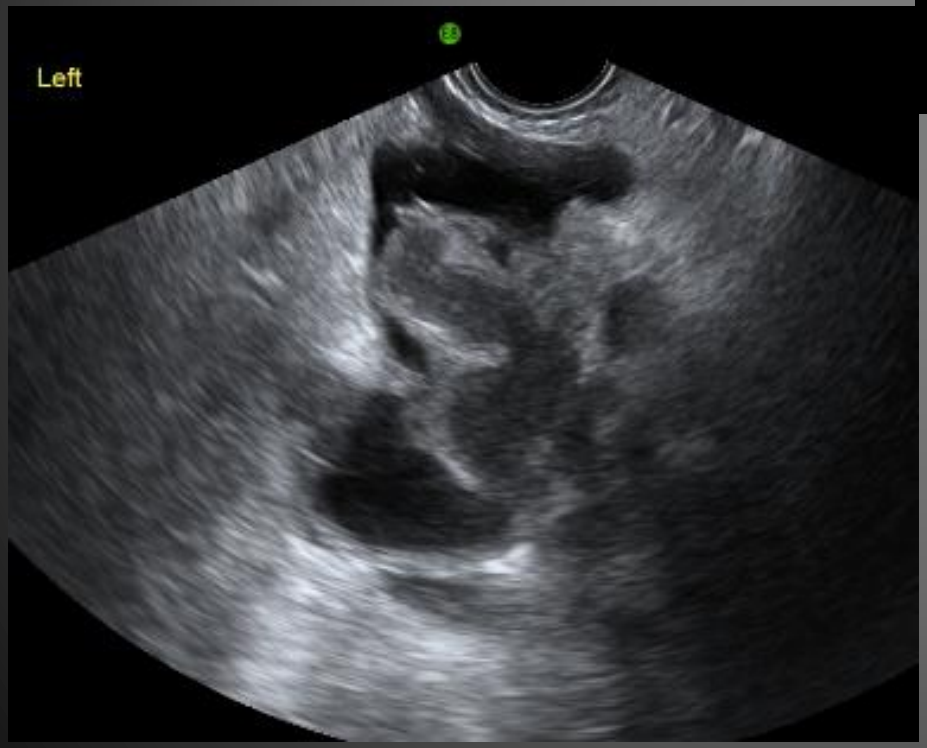


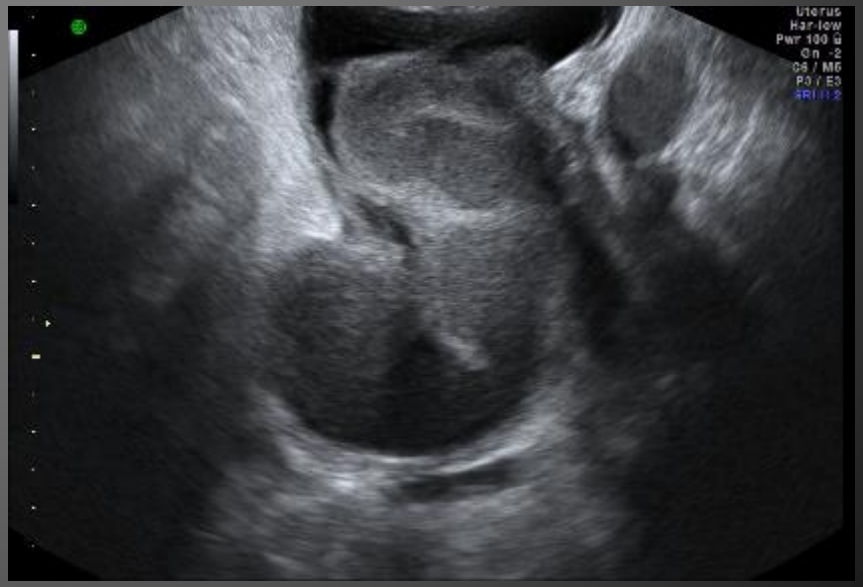


Acquired haematometra

The clue is in the history







Vaginal cysts

The vagina
can
IS
easily
ALWAYS
overlooked

A routine US protocol for the examination of the vagina includes

- transabdominal
- translabial
- transvaginal

Translabial imaging

- not part of a routine examination
- transvaginal US cannot be performed (e.g. due to obstruction or pain)
- specific request for directed vaginal imaging.

Examination of the Vagina

Normal appearances

Pre and post menopausal differences



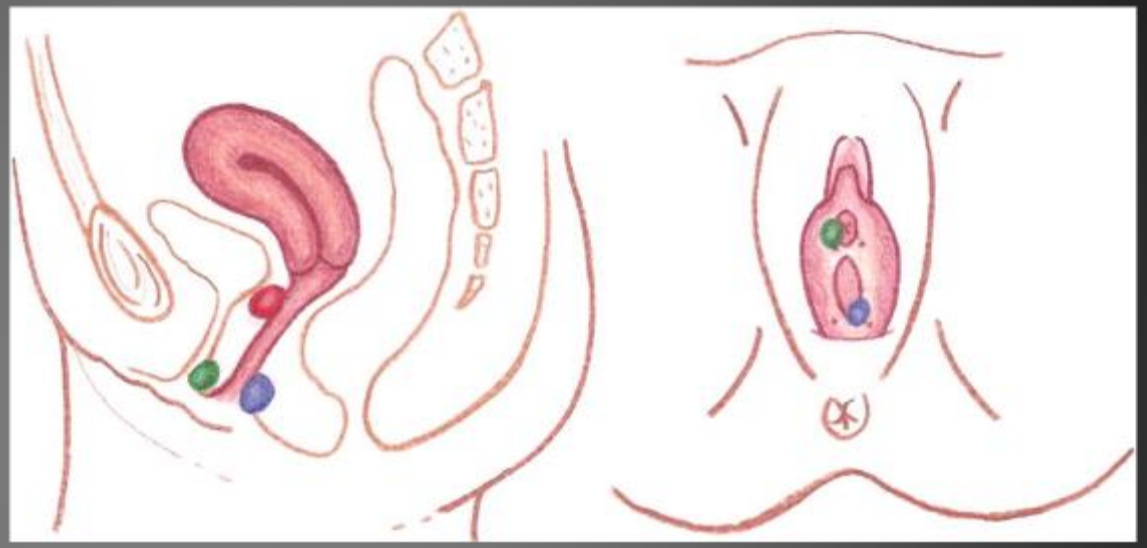


Vaginal cysts
Location location location

Gartner duct cysts
Red

Bartholin glands
Blue

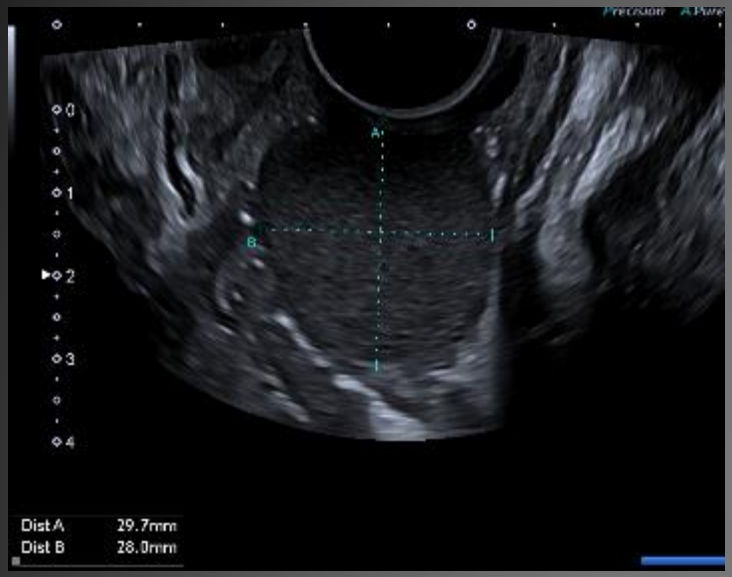
Skene glands
Green

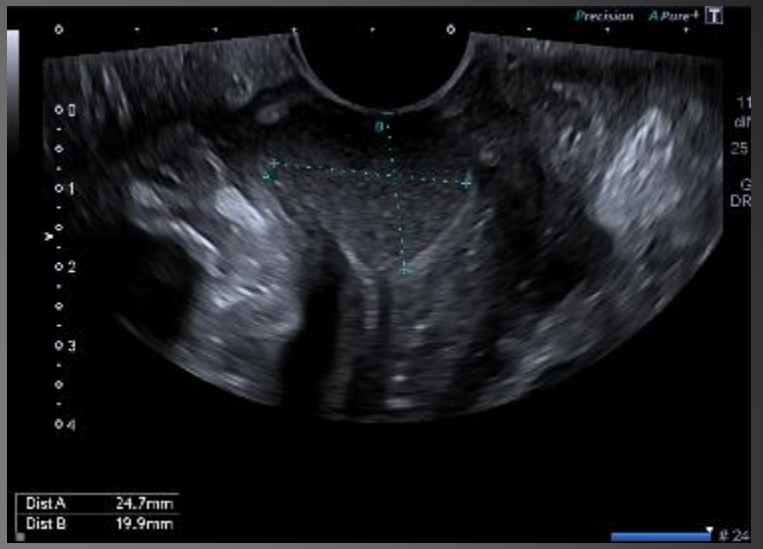


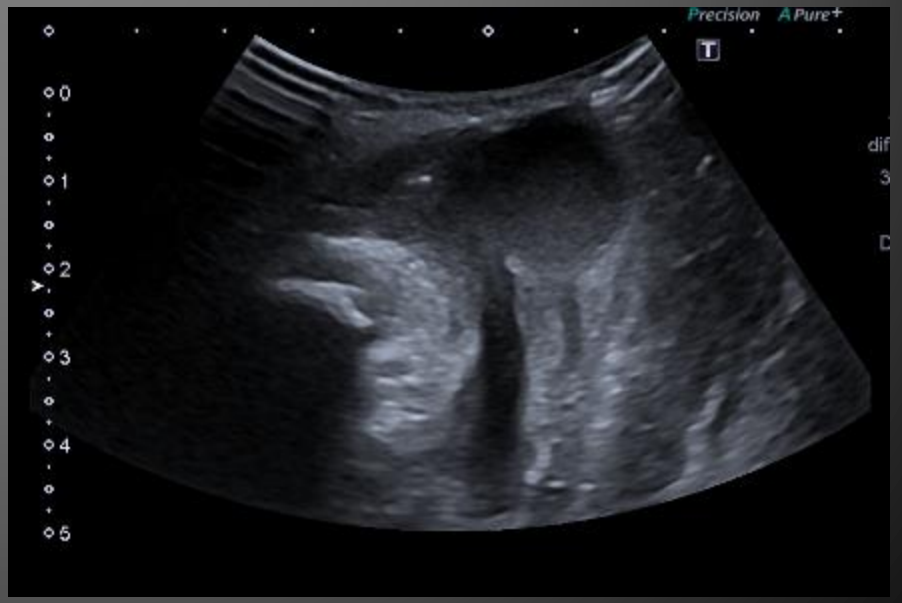
RSNA Radiographics

The vagina is “always” overlooked

Vaginal lesions: location location location





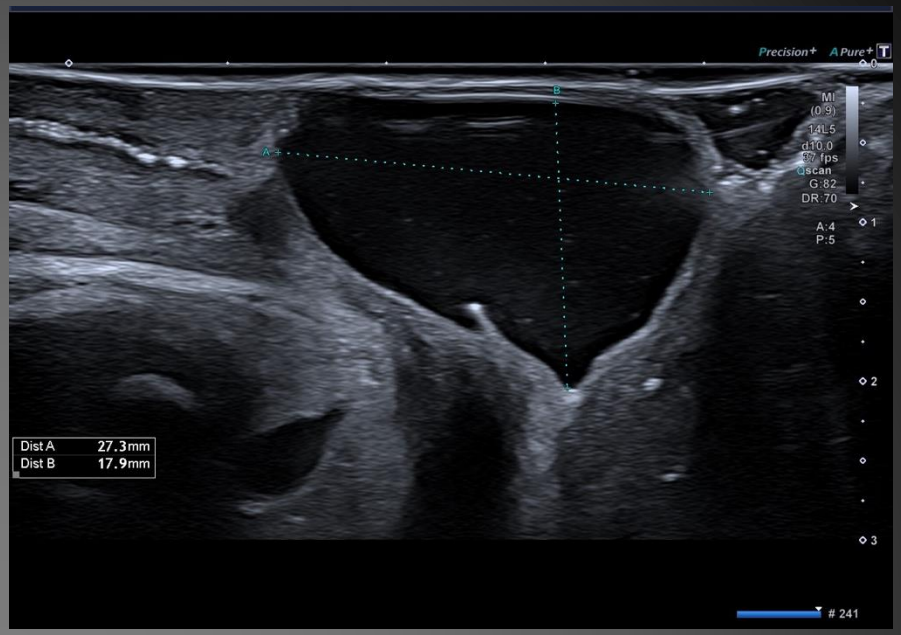


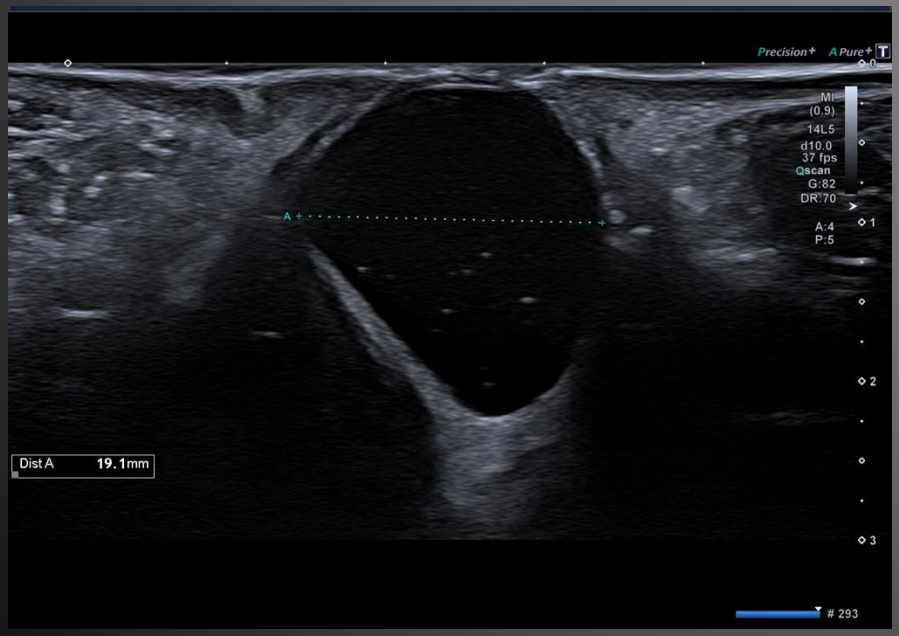
Skene duct cyst…

Acute urethritis

Acute urinary tract obstruction


Precision+
A Pure+
MI
(1.1)
14L5
d14.0
37 fps
Qscan
G:82
DR:70
A:3
P:5
490

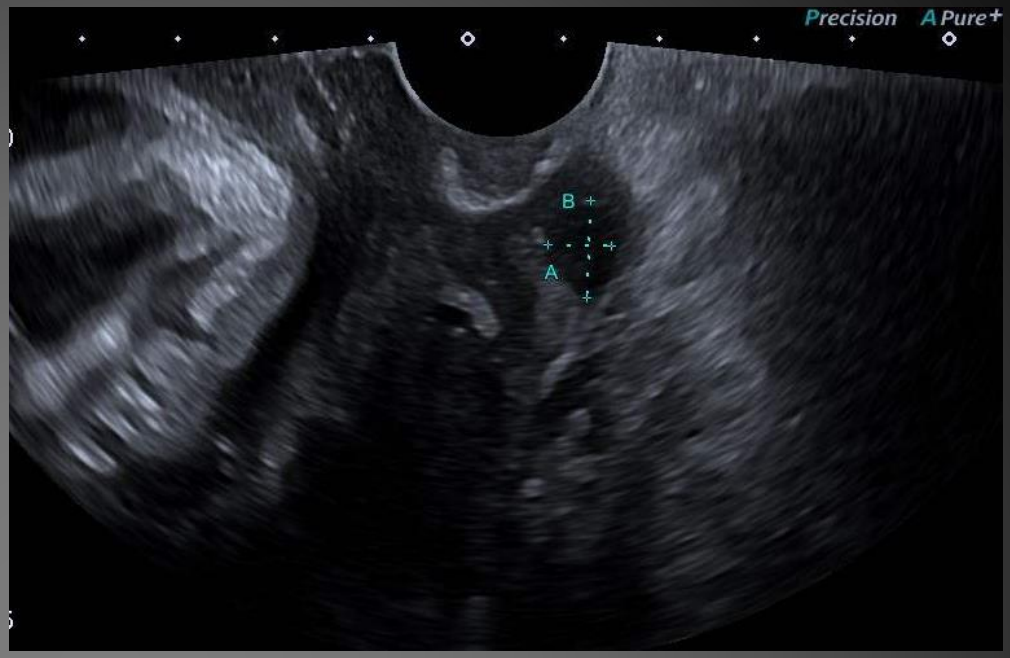

Precision+
A Pure+
MI
(0.9)
14L5
d10.0
37 fps
Qscan
G:82
DR:70
A:4
P:5
Dist A 27.3mm
Dist B 17.9mm
241


Precision+
A Pure+
MI
(0.9)
14L5
d10.0
37 fps
Qscan
G:82
DR:70
A:4
P:5
Dist A 19.1mm
293


Precision+
MI
(0.9)
11C3
d8.5
26 fps
Qscan
G:76
DR:65
P:2
113

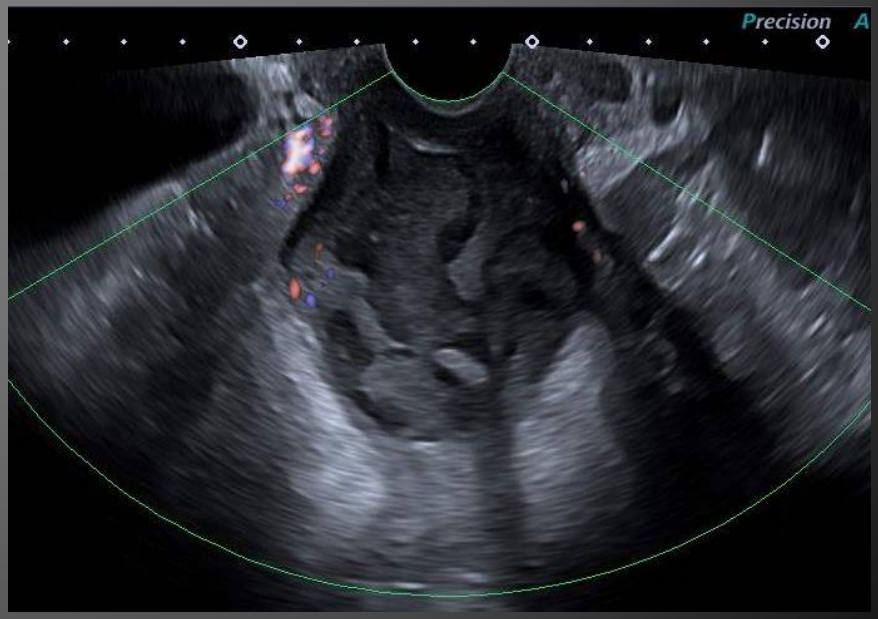
Bartholin's cyst

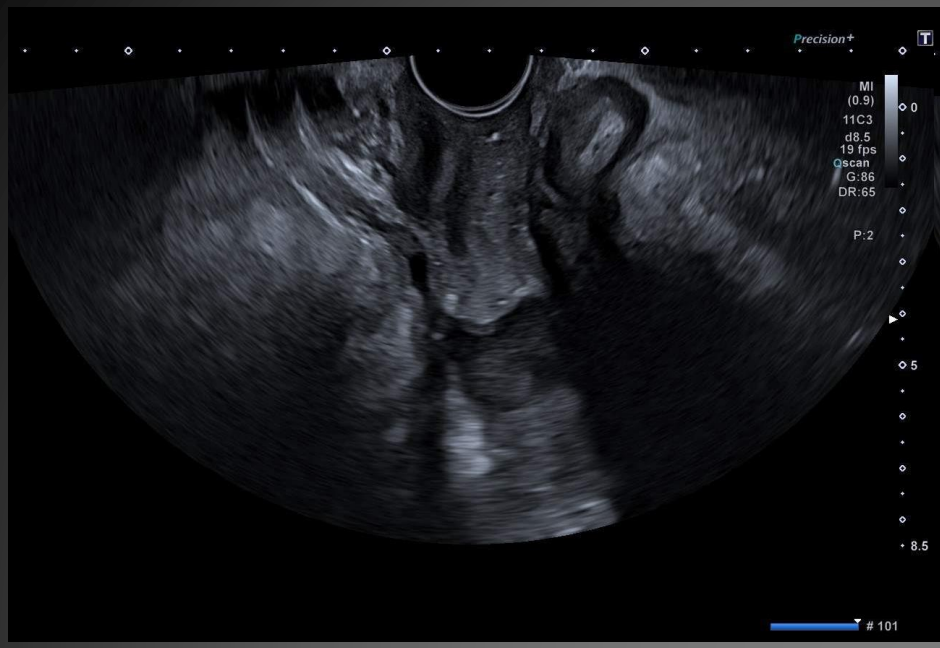
Asymptomatic



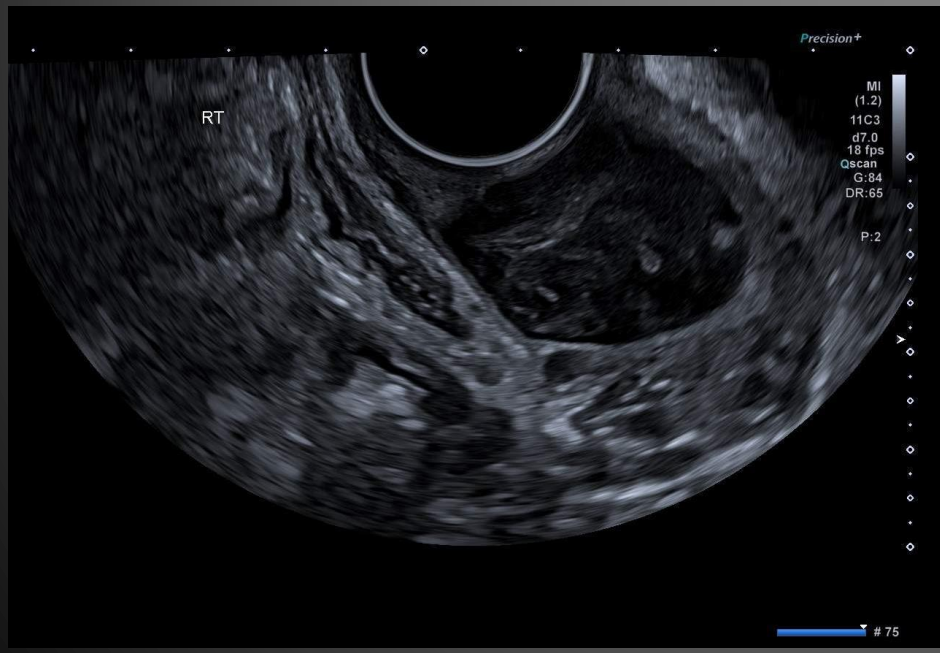
Severe pain when infected

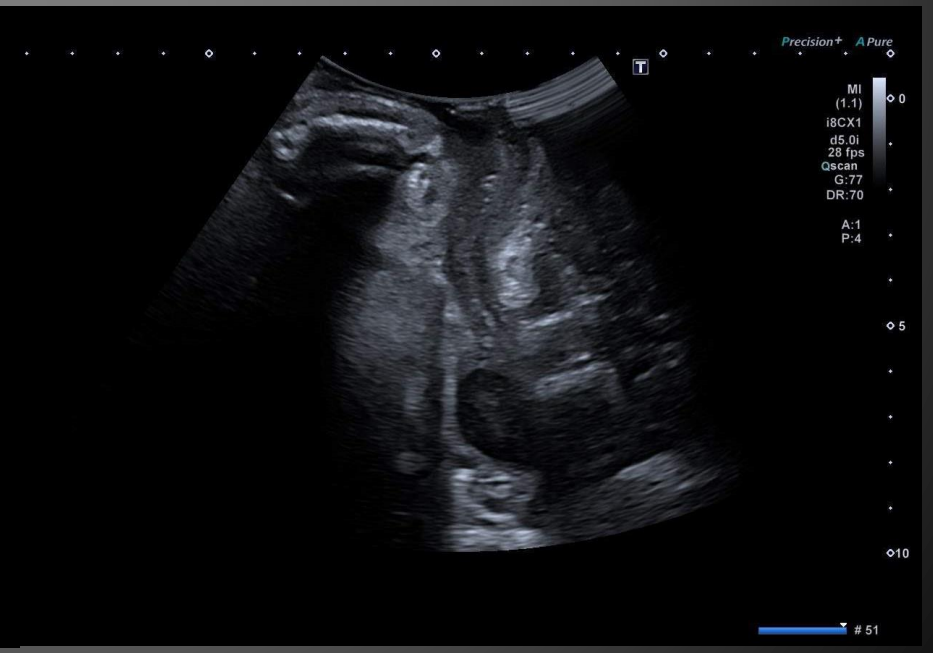





Precision+
MI
(0.9)
11C3
d8.5
19 fps
Qscan
G:86
DR:65
P:2
0
5
8.5
101


Precision+
12.7
MI
(1.2)
11C3
d8.5
11 fps
Qscan
G:86
DR:65
DF 4.8
CG:38
F:3
0
1
2
3
4
5
46


Precision+
RT
MI
(1.2)
11C3
d7.0
18 fps
Qscan
G:84
DR:65
P:2
75


Precision+
A Pure
MI
(1.1)
i8CX1
d5.0i
28 fps
Qscan
G:77
DR:70
A:1
P:4
0
5
10
51

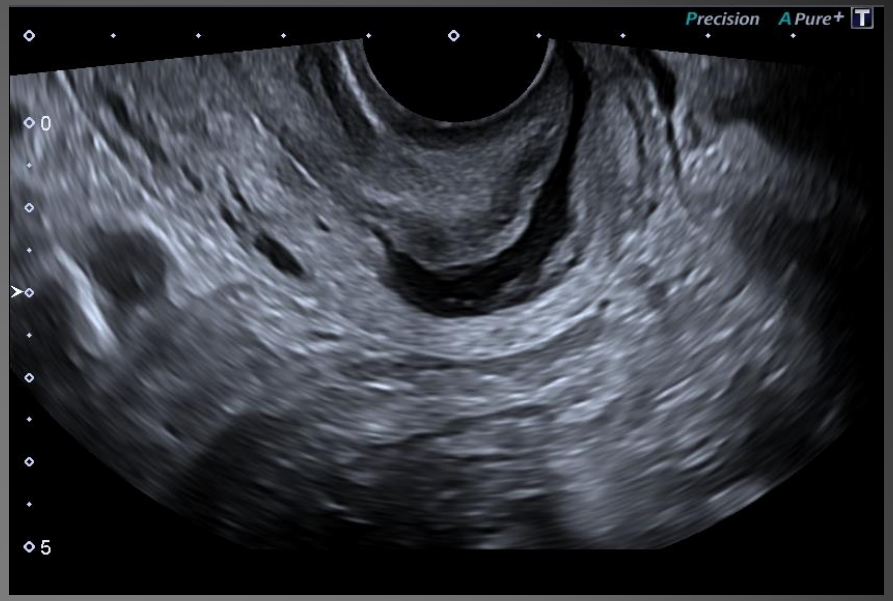
Cervical pathologies

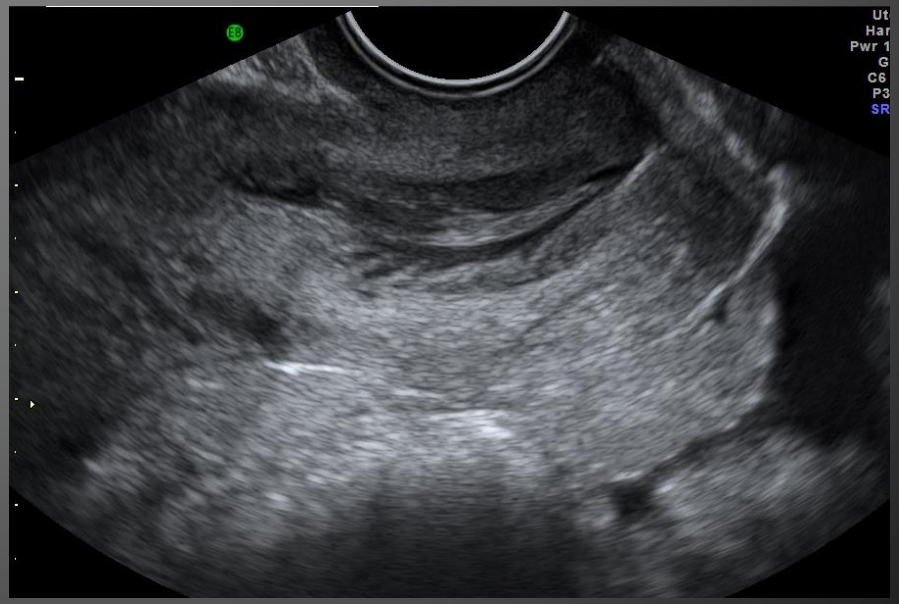
Well appreciated as a source of abnormal PV loss

- Polyps
- Cervical fibroids
- Cervical carcinoma

Less well recognised as a source of pain

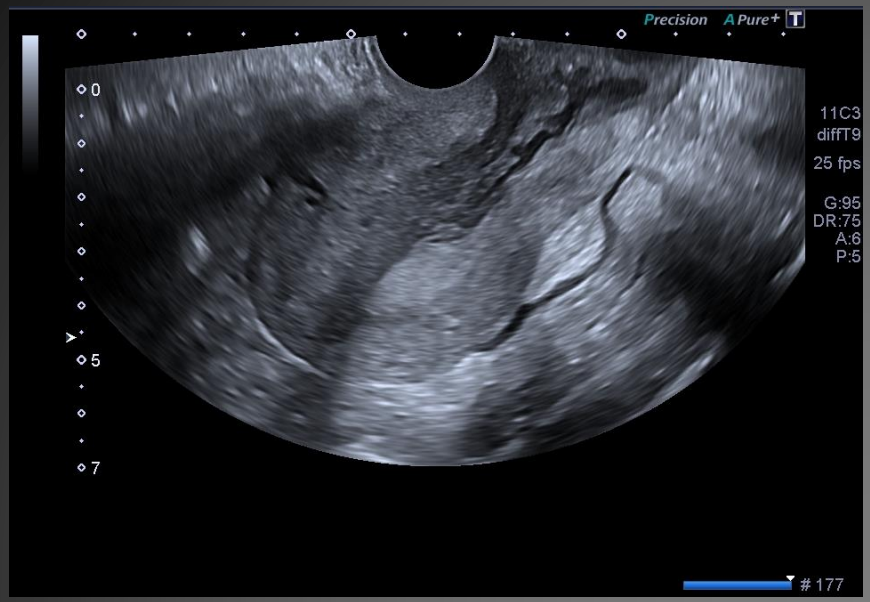
- Cervical stenosis
  - haematometra
- Fibroids
- Early PID ??

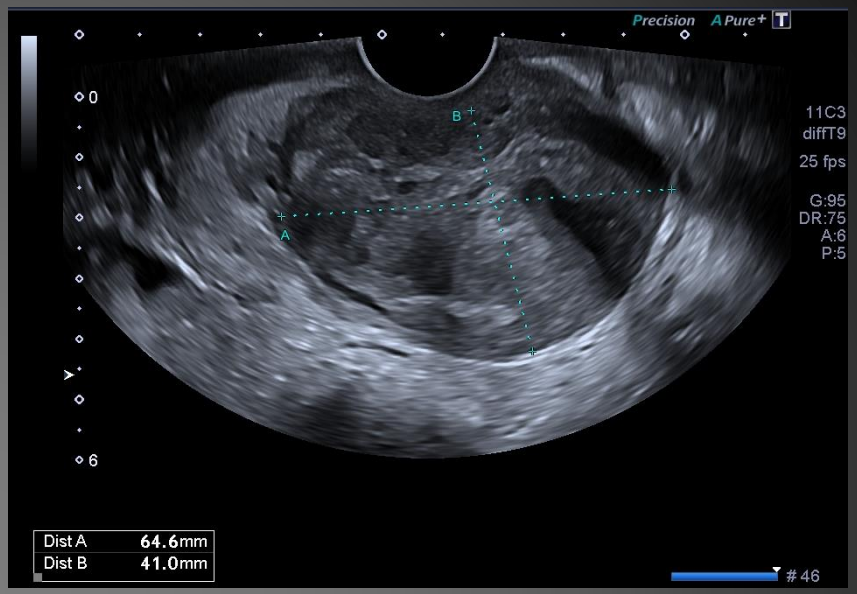




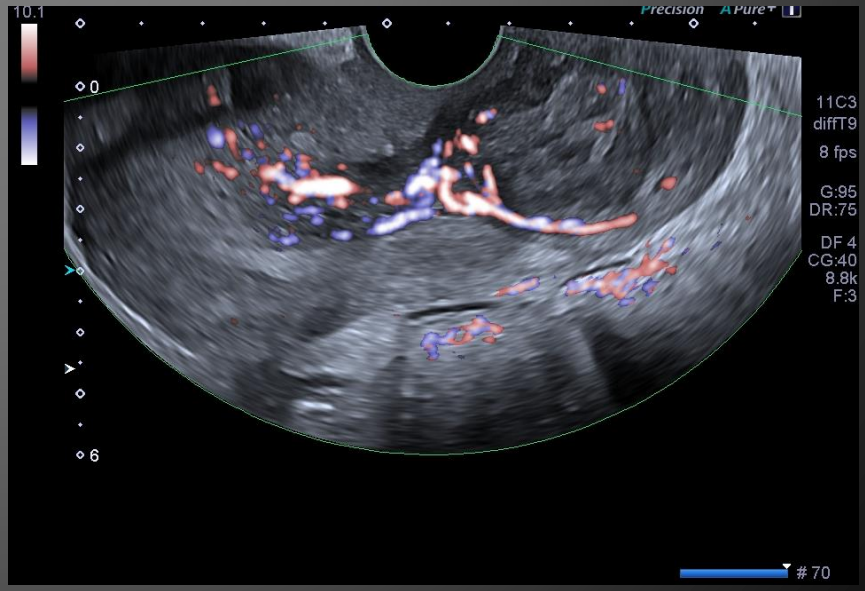
Acute cramping pain




Precision A Pure+
0
5
7
11C3
diffT9
25 fps
G:95
DR:75
A:6
P:5
177


Precision A Pure+
0
6
B
A
11C3
diffT9
25 fps
G:95
DR:75
A:6
P:5
Dist A 64.6mm
Dist B 41.0mm
46


LT
0
5
7.5
11C3
diffT9
25 fps
G:95
DR:75
A:6
P:5
124


10.1
0
6
11C3
diffT9
8 fps
G:95
DR:75
DF 4
CG:40
8.8k
F:3
70

Acute pelvic pain

Gynaecological

1. Ectopic pregnancy
2. Cyst accidents
3. Tubal torsion
4. Acute inflammatory disease
5. Fibroid complication



Ovaries

Ovarian cyst

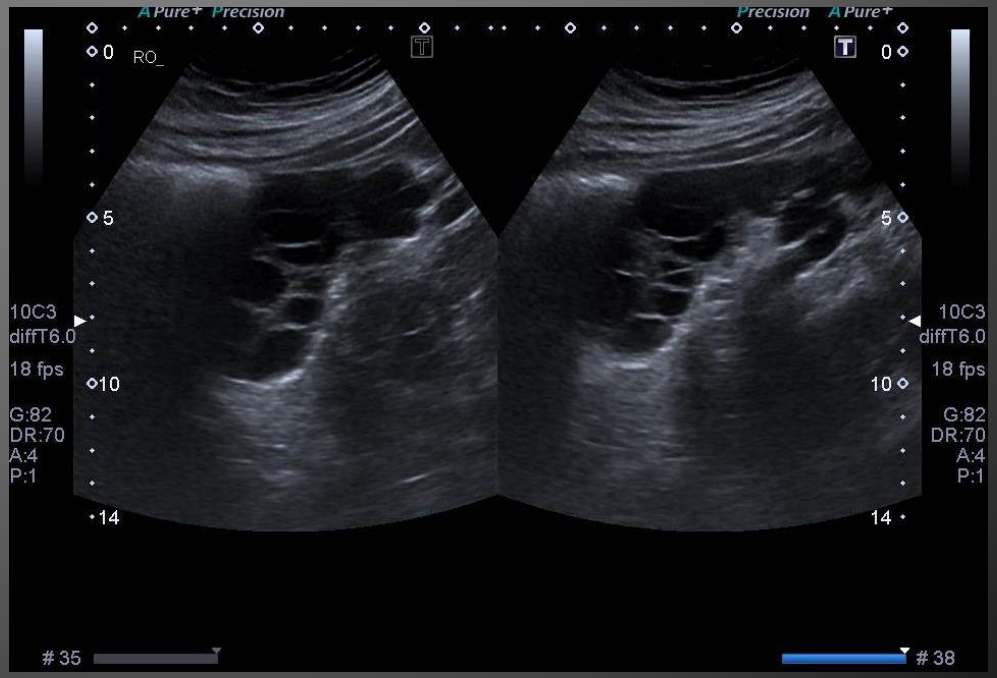
Acute setting questions that need to be asked:

Is the cyst the cause of the pain?

If so why and how?

- Has the cyst caused the ovary to twist?
- Has the cyst ruptured?
- Capsular stretch?





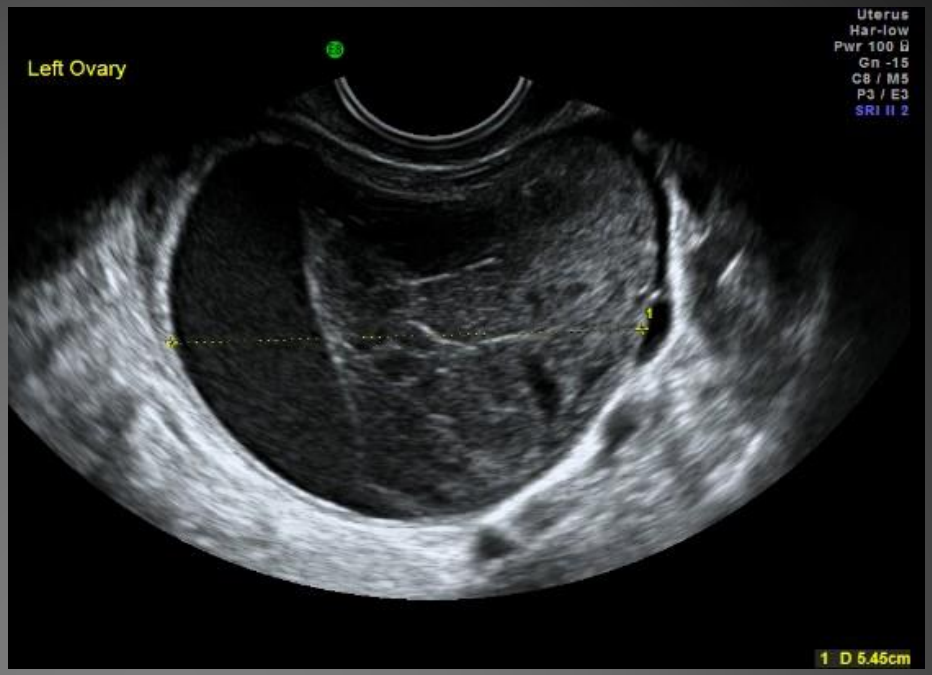
Adnexal cysts

Cyst > 30cm seen in 7% of ASYMPTOMATIC premenopausal women

Majority are physiological so why pain?

Rapid enlargement

- Haemorrhage within
- Leak
- Rupture





Haemorrhagic cysts

Thin walled, no internal vascularity

Variable patterns of internal echoes

- Change with time
- Ultimately resolve

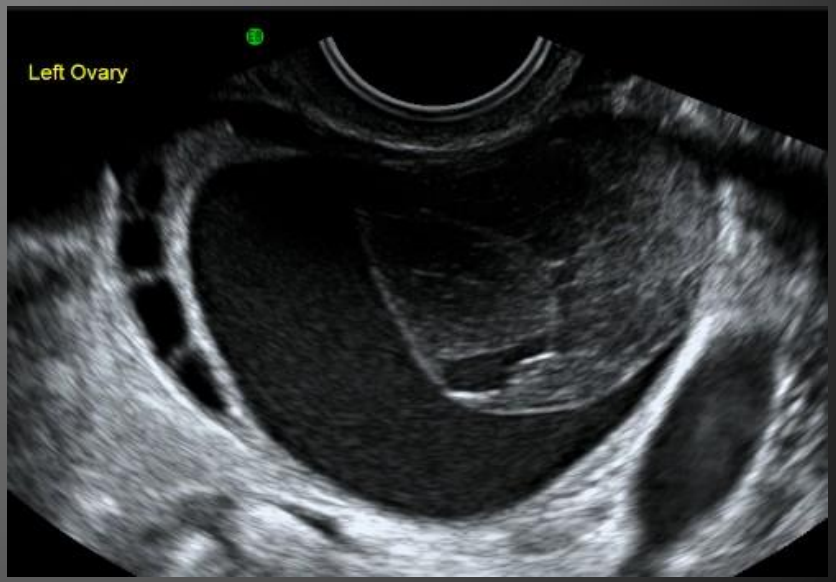
Lacelike or spiderweb avascular septations

Retractile clot with straight or concave margins

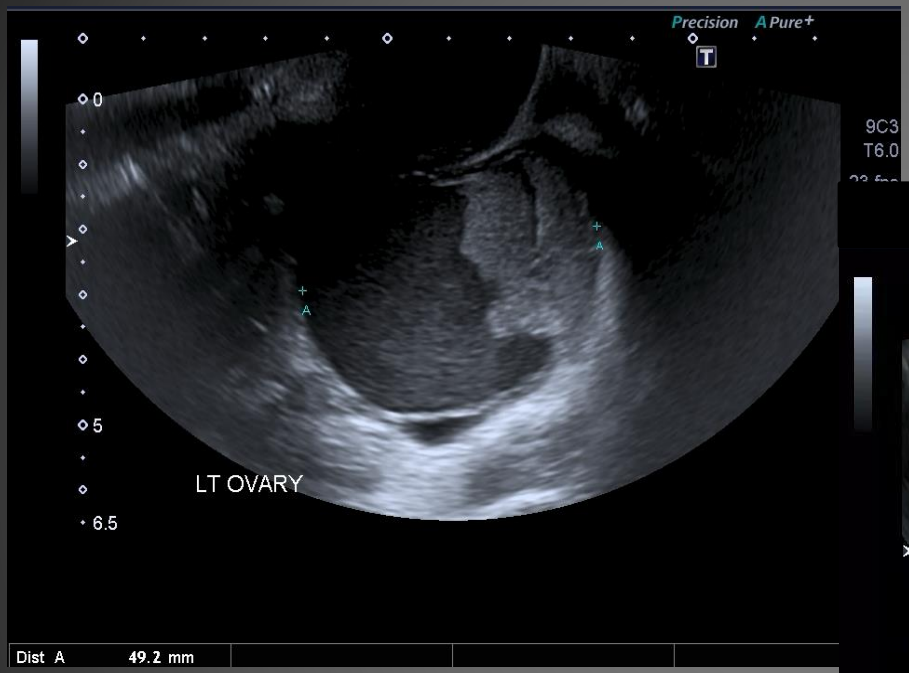
Layering of echoes

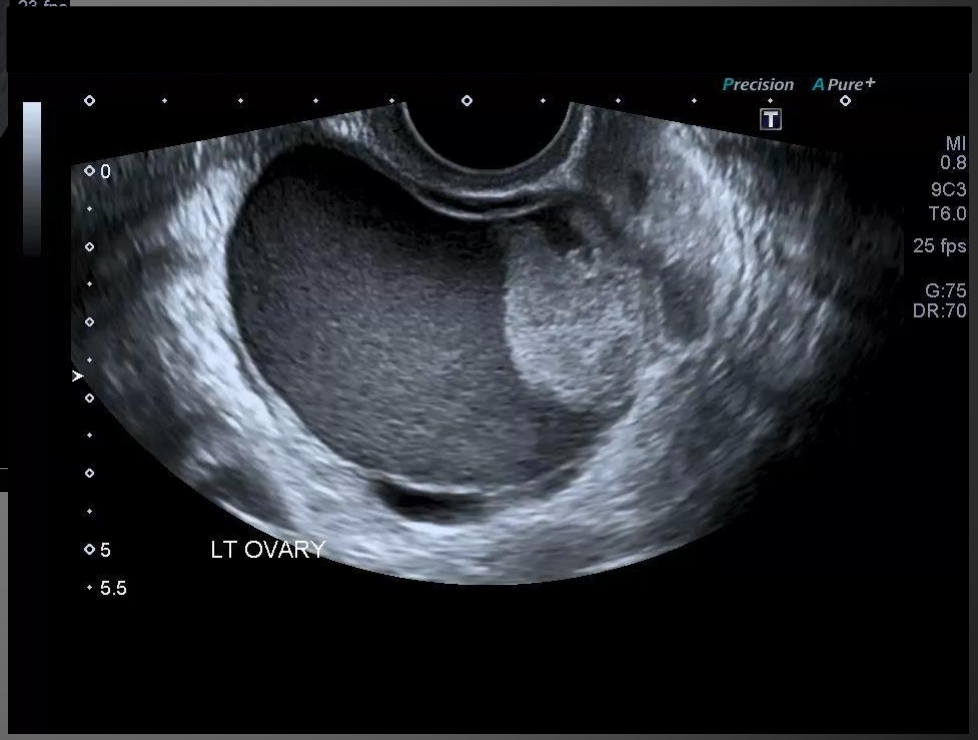
Diffuse low level echoes



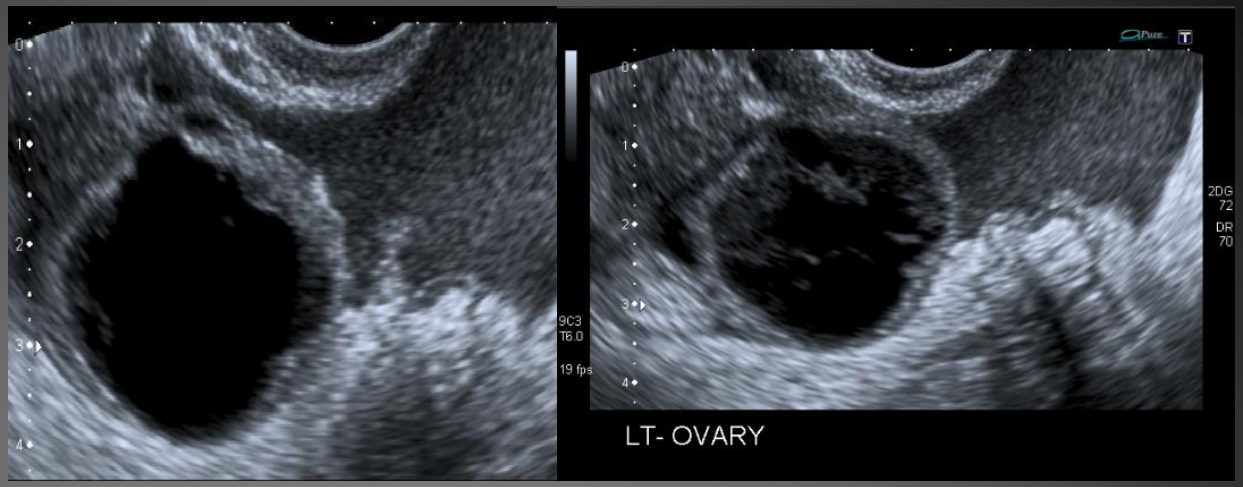


Haemorrhagic cysts





Haemorrhagic Corpus Luteum

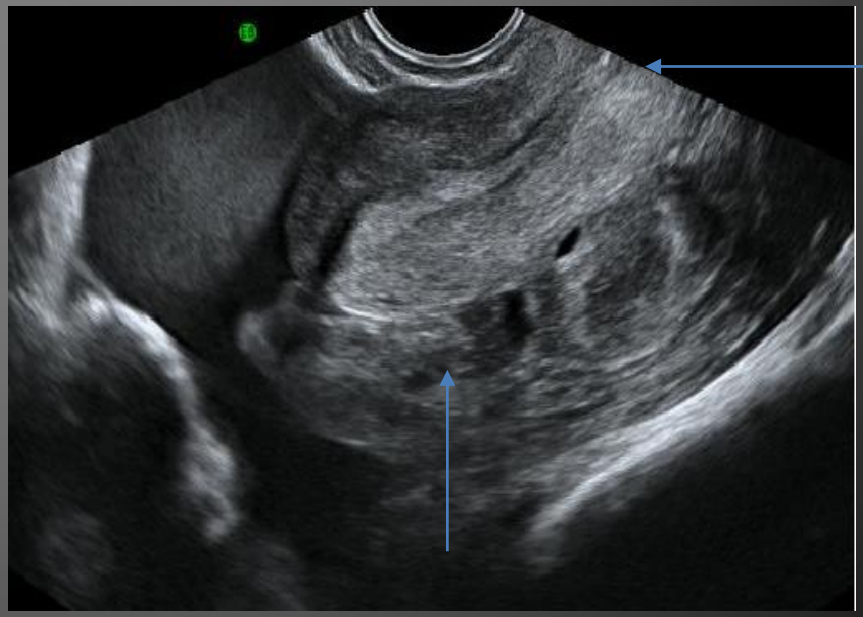


Quite a significant haemoperitoneum

Think !!!

Rupture of a corpus luteal cyst





RUPTURE CORPUS LUTEUM









Pelvic Inflammatory Disease

Common

Can be fatal..sequelae significant

May go unrecognised



Aetiology

90 to 95% STD

5 to 10% post procedural

- NVD
- TOP
- Biopsy
- IUD
- POST MENSES

Clinical and laboratory diagnoses

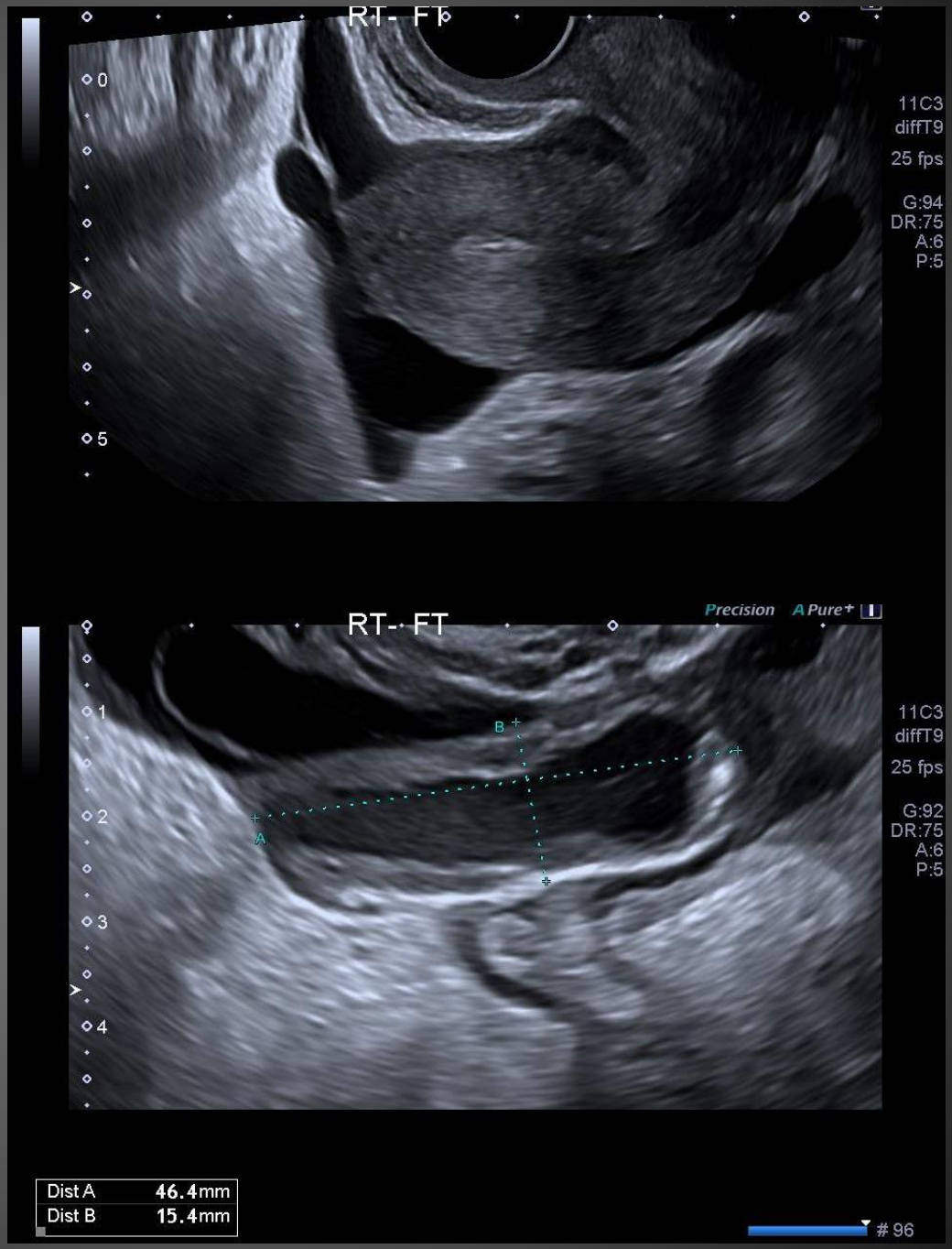
Imaging

Clinically suspected

+ palpable mass

+ severe illness

+ no response to oral AB after 48 to 72 hours



PID phases evolution of disease

Endometritis myometritis

Salpingitis

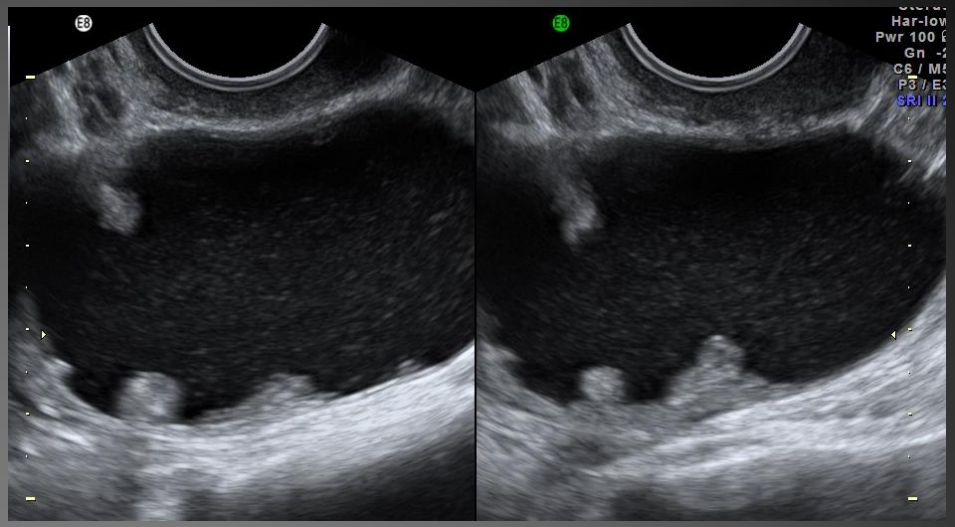
Pyosaplinx

Tubo ovarian complex

Tubo ovarian abscess

Even EARLIER…

Cervicitis ?





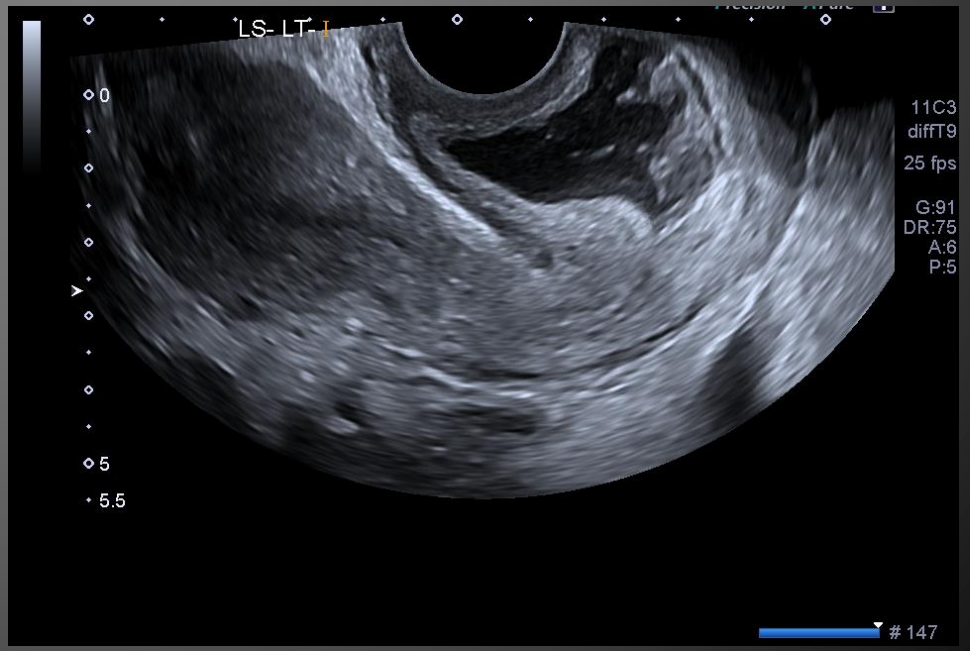
Cervicitis …role of ultrasound

Bete noir

Colour Doppler







Endometritis Myometritis

Normal

Out of phase endometrium: thickened and heterogenous

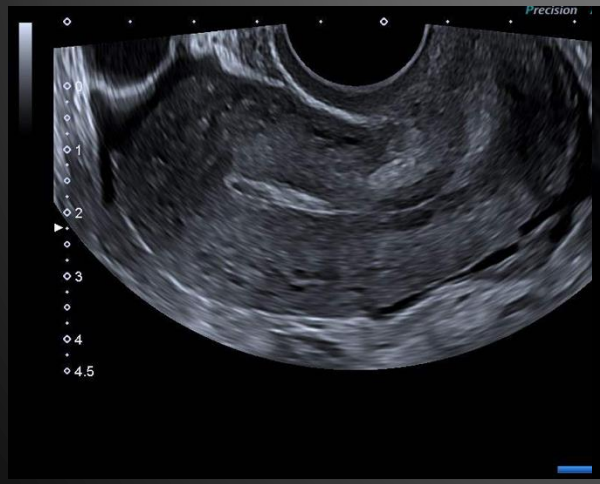
Increased myometrial vascularity

Intracavitary fluid with echoes

Gas











Salpinigitis

Thickened tube

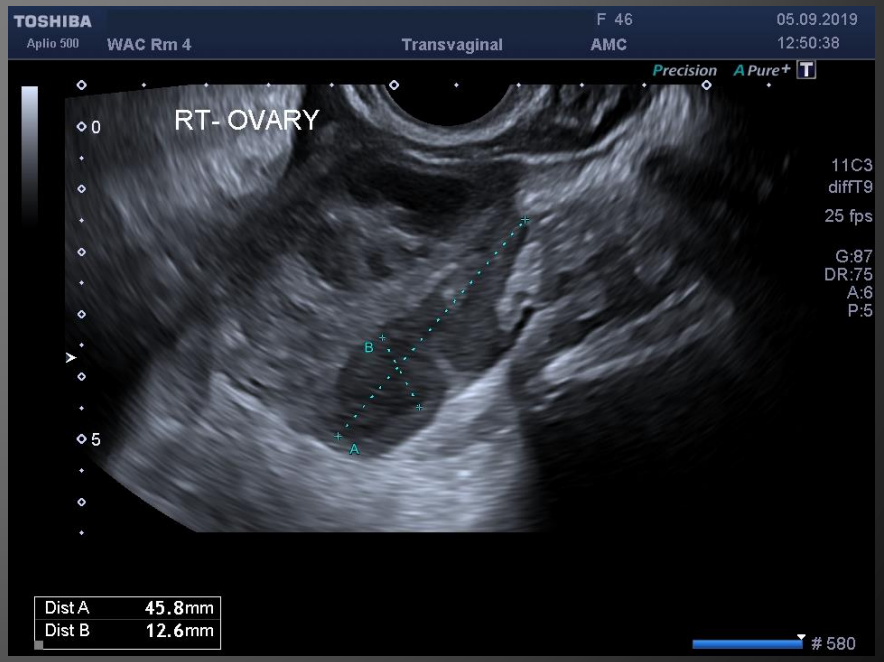
Too much tissue around the ovary which may be vascular

Indistinct ovary

Dilated tubular structure which appears multi loculated with thickened endosalpingeal folds







Salpinigitis

Progression

Thickened echogenic walls > 5mm

Internal echoes

Fluid debris levels

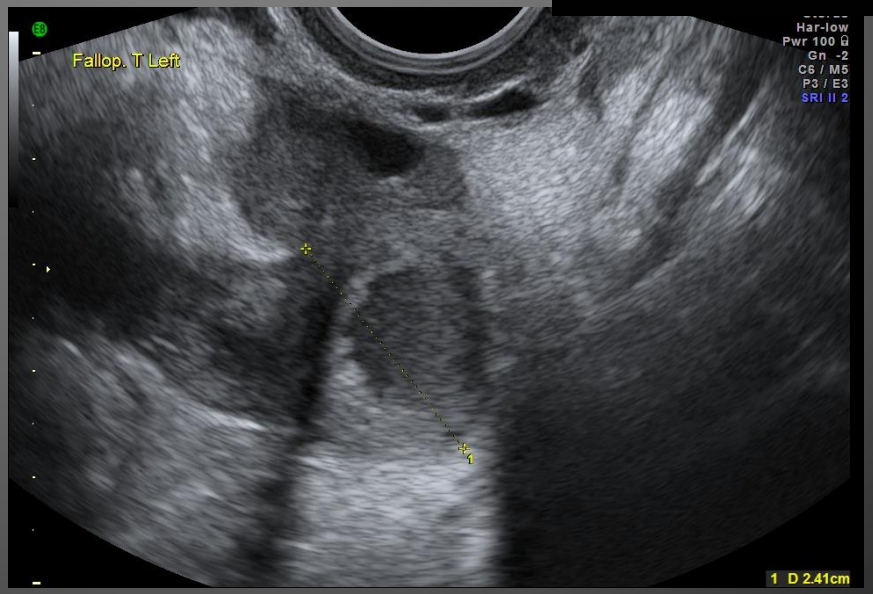
Beaded cogwheel appearance

Vascularity











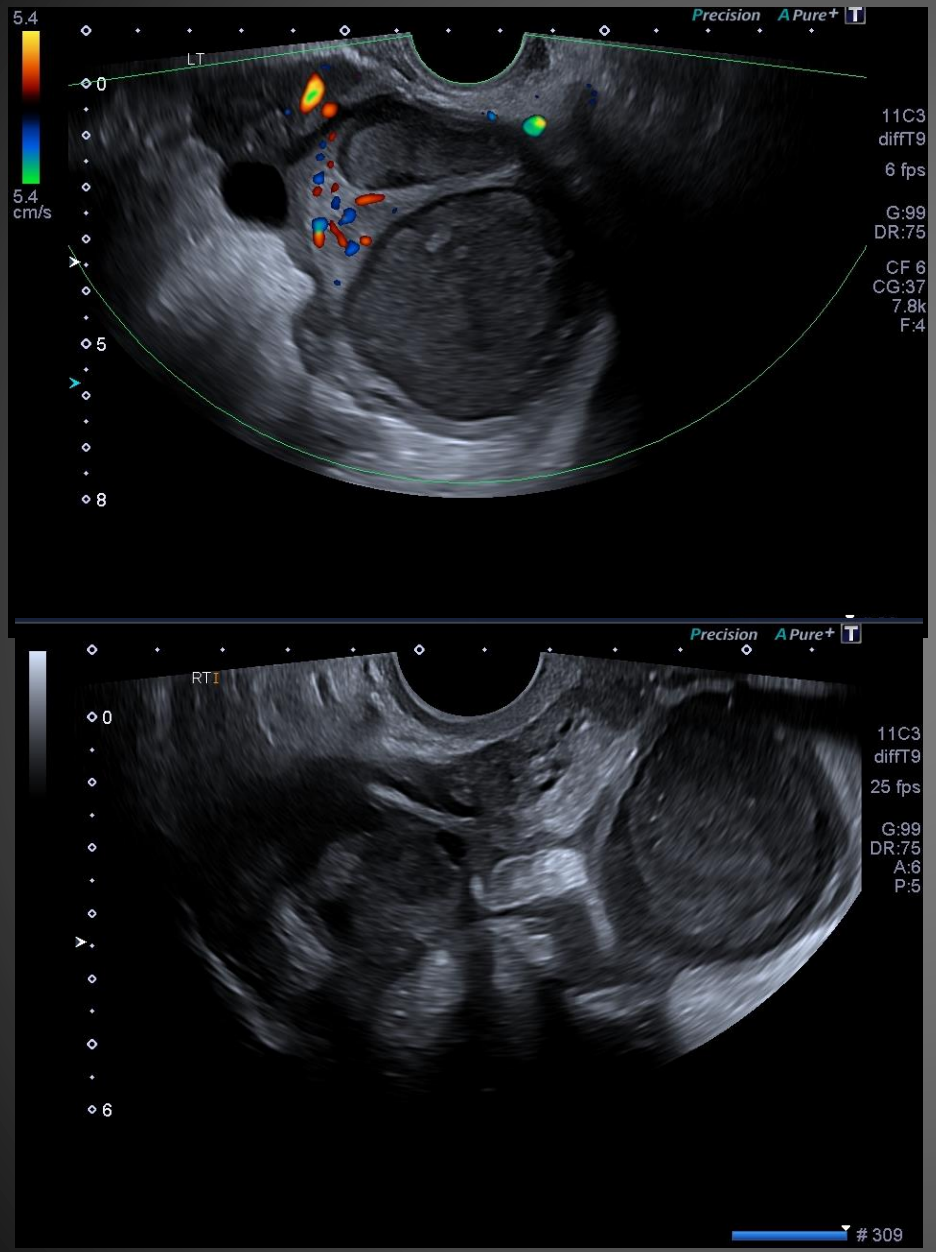
Scan the entire pelvis

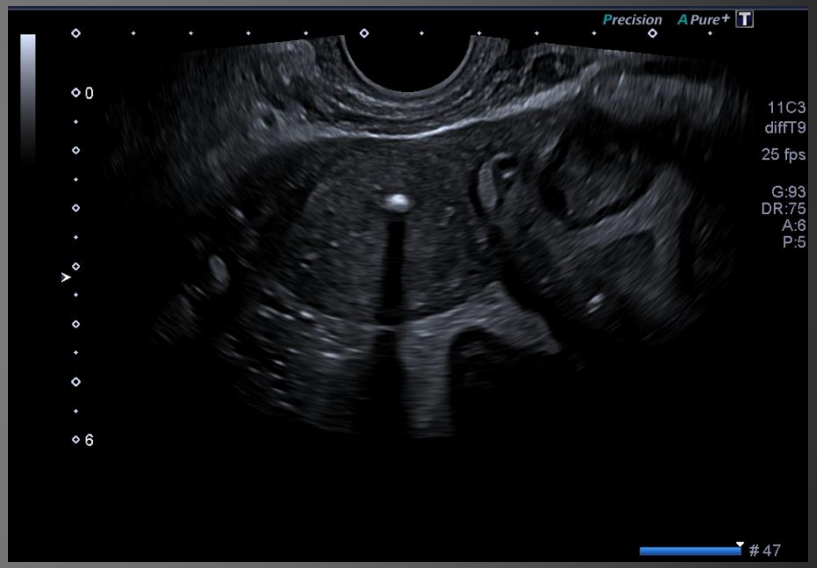
Move the pelvic structures





Bilateral but not necessarily symmetrical





Tubo ovarian complex TOC

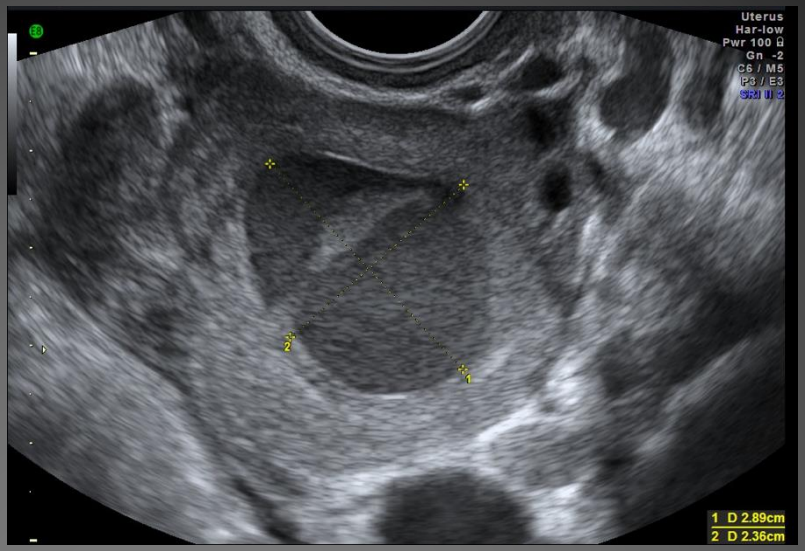
TOC

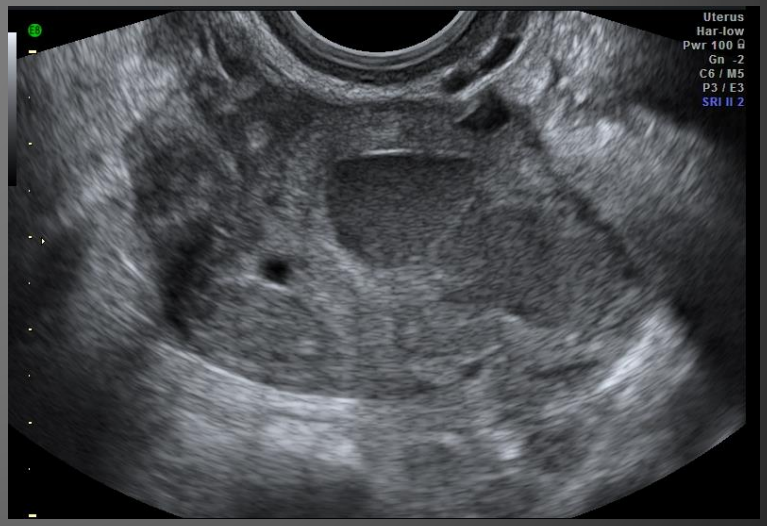
Complex ovarian mass

Inseparable from the ovary

Ovary itself will be oedematous, indistinct and hyperaemic

Preserved NORMAL ovarian parenchyma







Tubo ovarian abscess TOA

7 to 16% PID cases

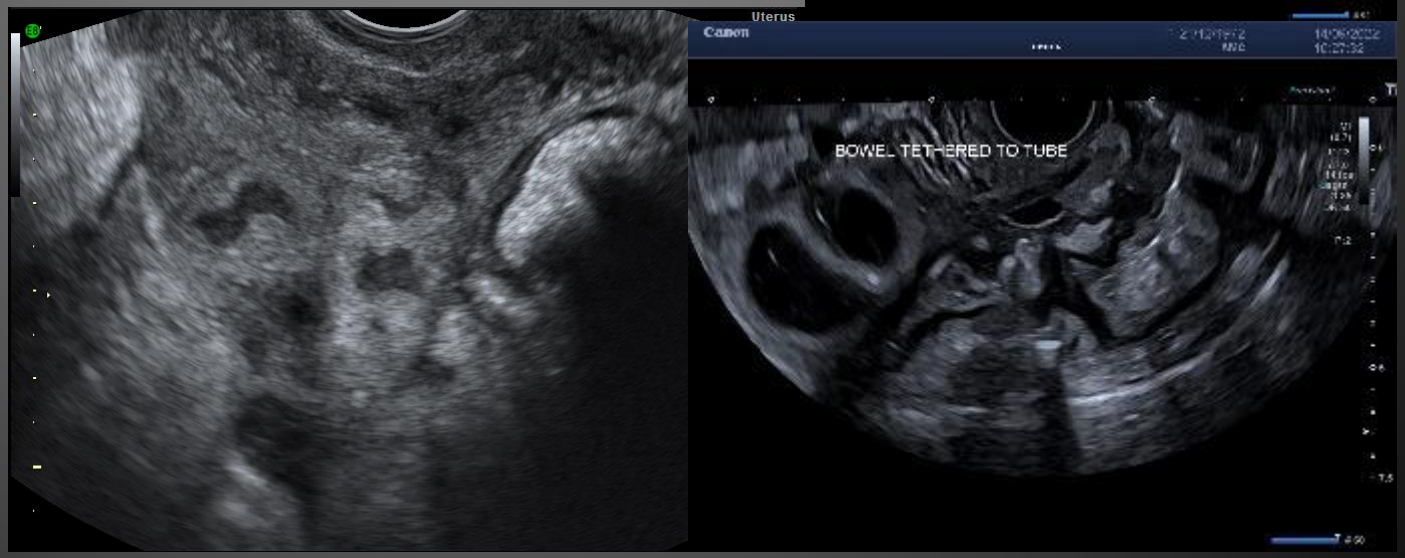
Breakdown of the tubal walls and the normal ovarian architecture

- Non specific complex mass NB BOWEL
- Heterogenous
- Fluid levels
- GAS

+/_ PYOPERITONEUM







Listen to the patient

PV bleeding ….

Air per vaginum





Calcified fibroid ???

Unsure


Canon


Canon


Canon


Canon

Torsion

Anything in the pelvis can twist

Adnexa

- Ovary +/_ tube
- Fallopian tube isolated

Uterus

- Exophytic fibroid
- Proper gravid
- Myomatous



Ovaries

1.Ovarian cysts less than 5cm in average diameter rarely twist ANY SIZE

2.Dermoid cysts are the most common type of cyst to twist due to their weight.

DERMOID WITH PAIN = TORSION

1.Endometriomas are less likely to twist because of associated inflammation and potential adhesions.

2.Superovulation significantly increases the risk of torsion

83% pre menopusal

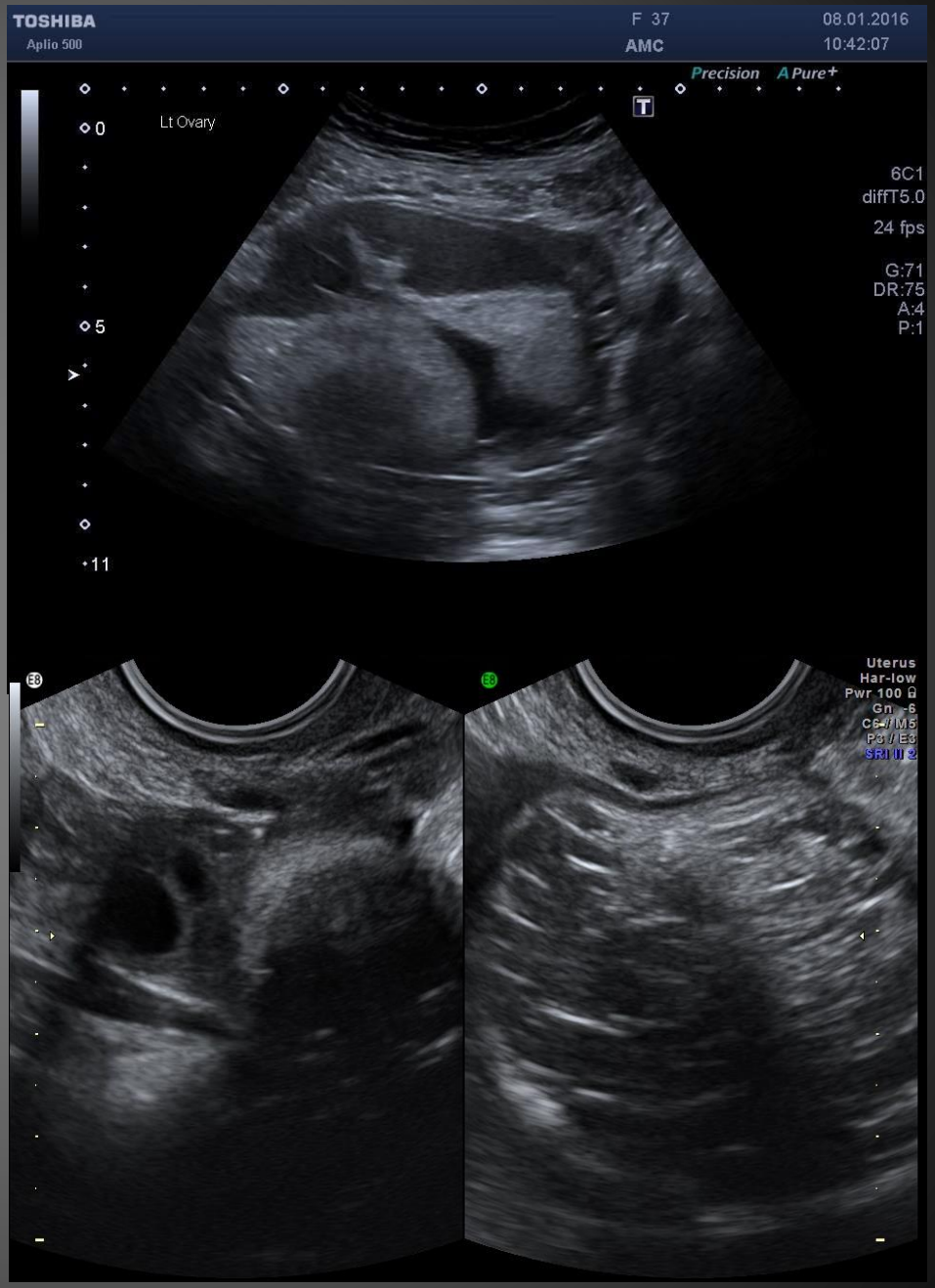
40 to 47 % previous surgery

Previous ovarian cyst

Pregnancy

Ovulation induction

47% no risk factors



Gray scale Ultrasound

Normal ovary 2 x 3 x 4cm

Asymmetric ovarian enlargement

90% > 5cm

WRONG PLACE

Massive ovarian oedema with intermittent torsion

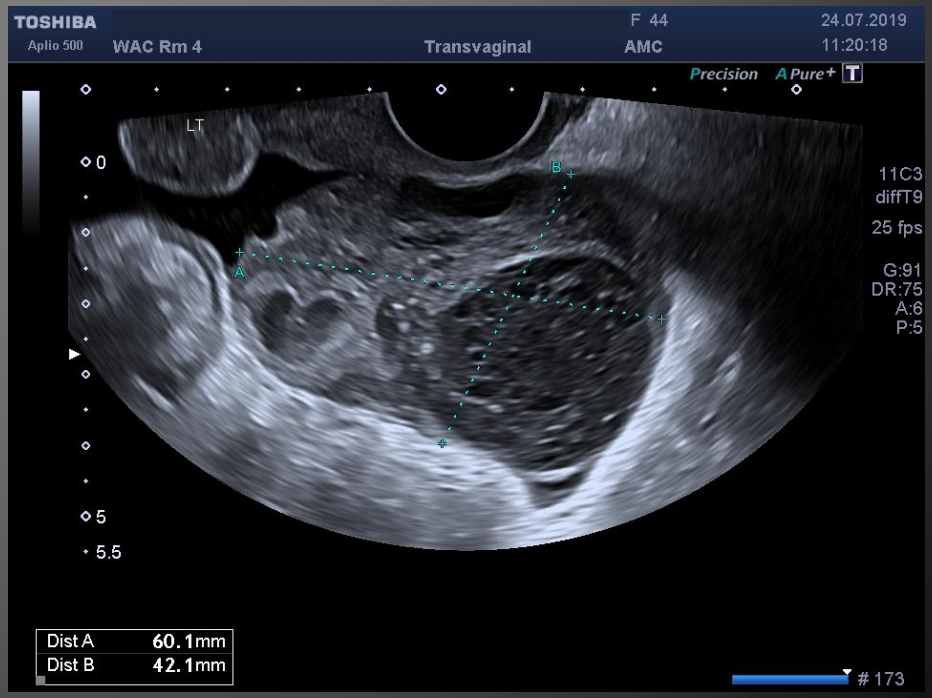
Ovary may be 28 x the normal size !!!!

Free fluid 80%

Peripherally located follicles

Echogenic follicular rim sign



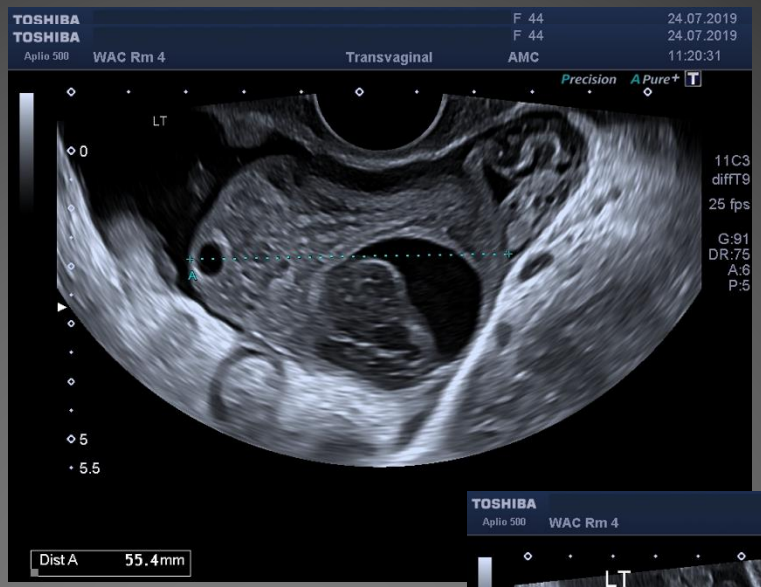


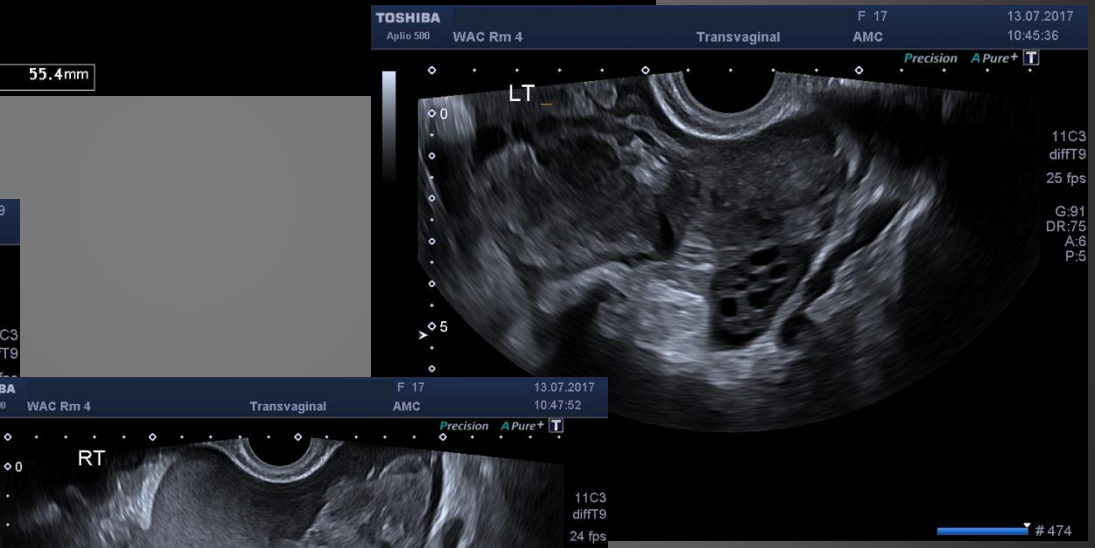
Gray scale Ultrasound

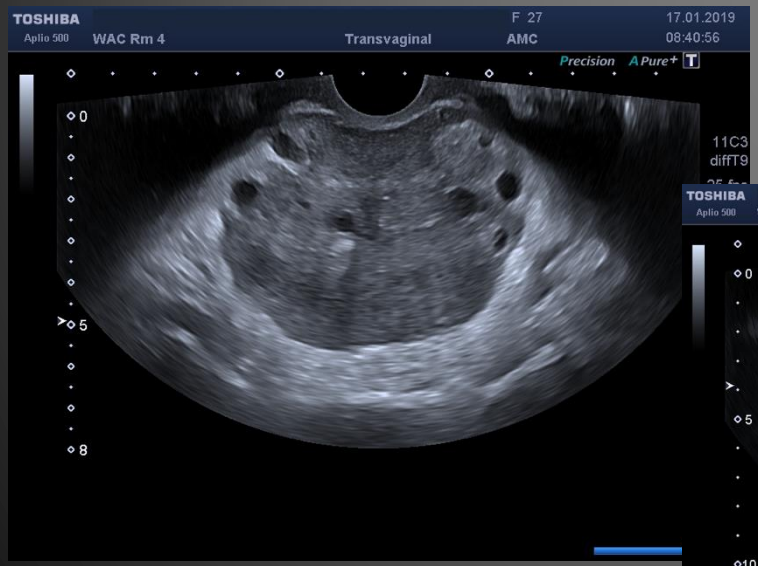
Asymmetric ovarian enlargement

Echogenic follicular rim sign +++

Free fluid 80%





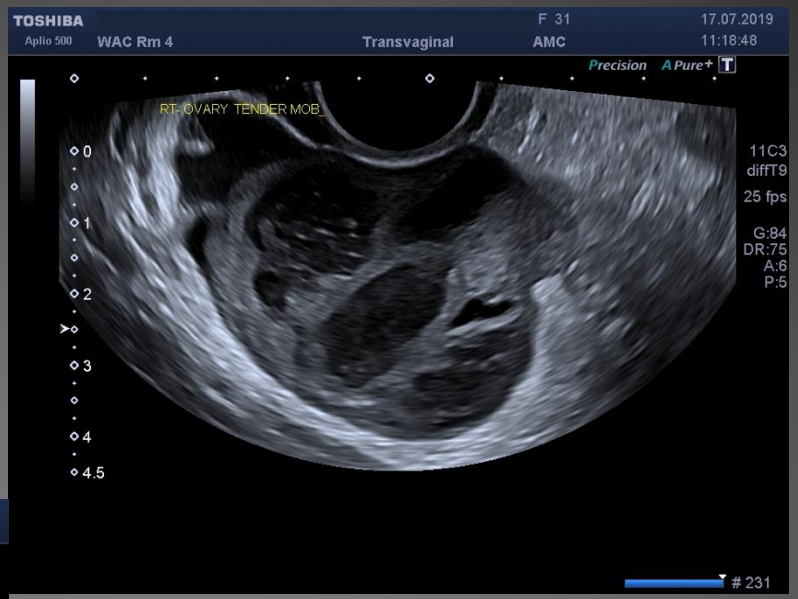


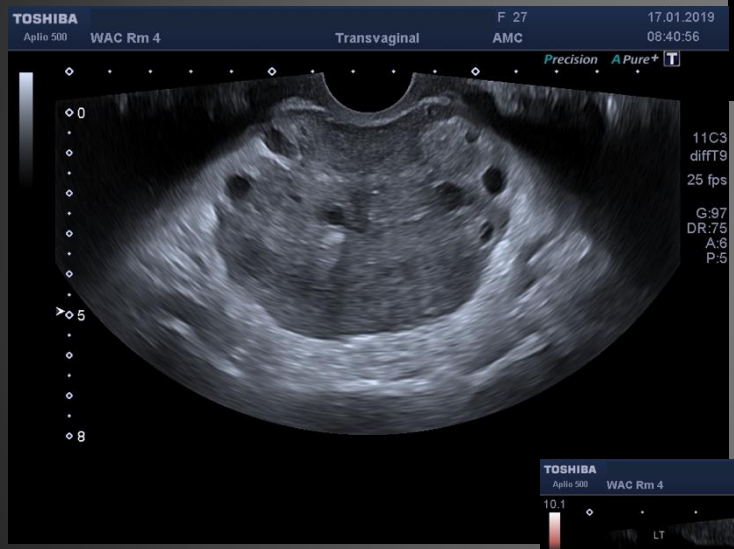


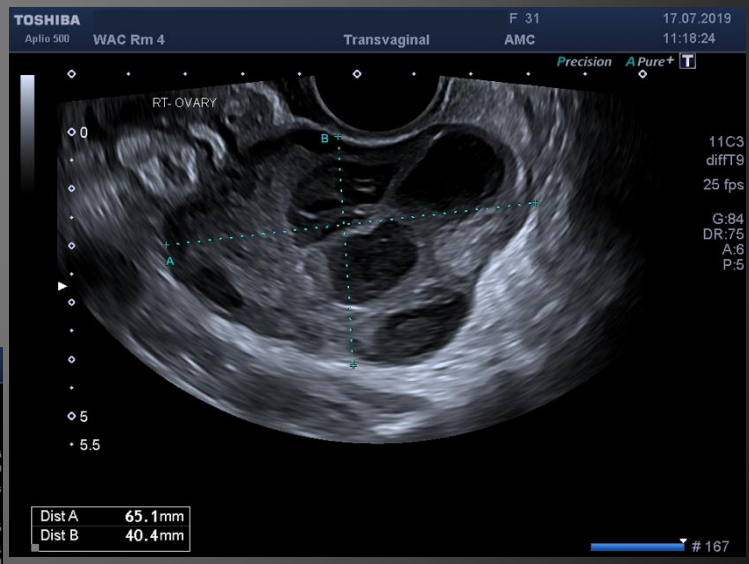
Gray scale Ultrasound

Oedematous stroma

Haemorrhagic locules

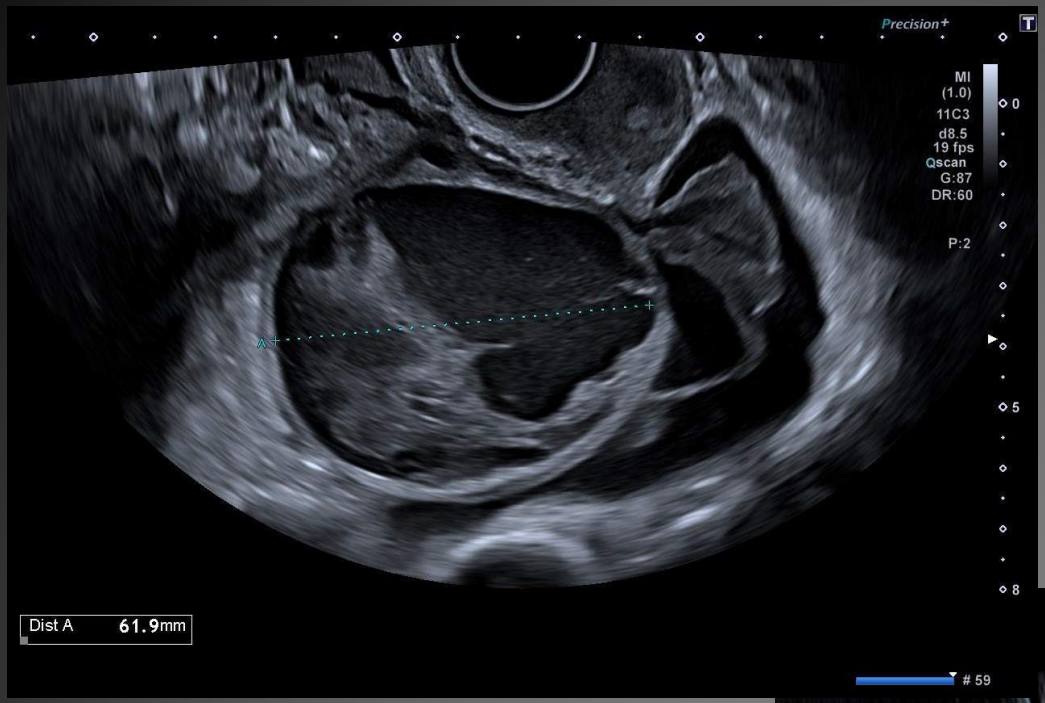




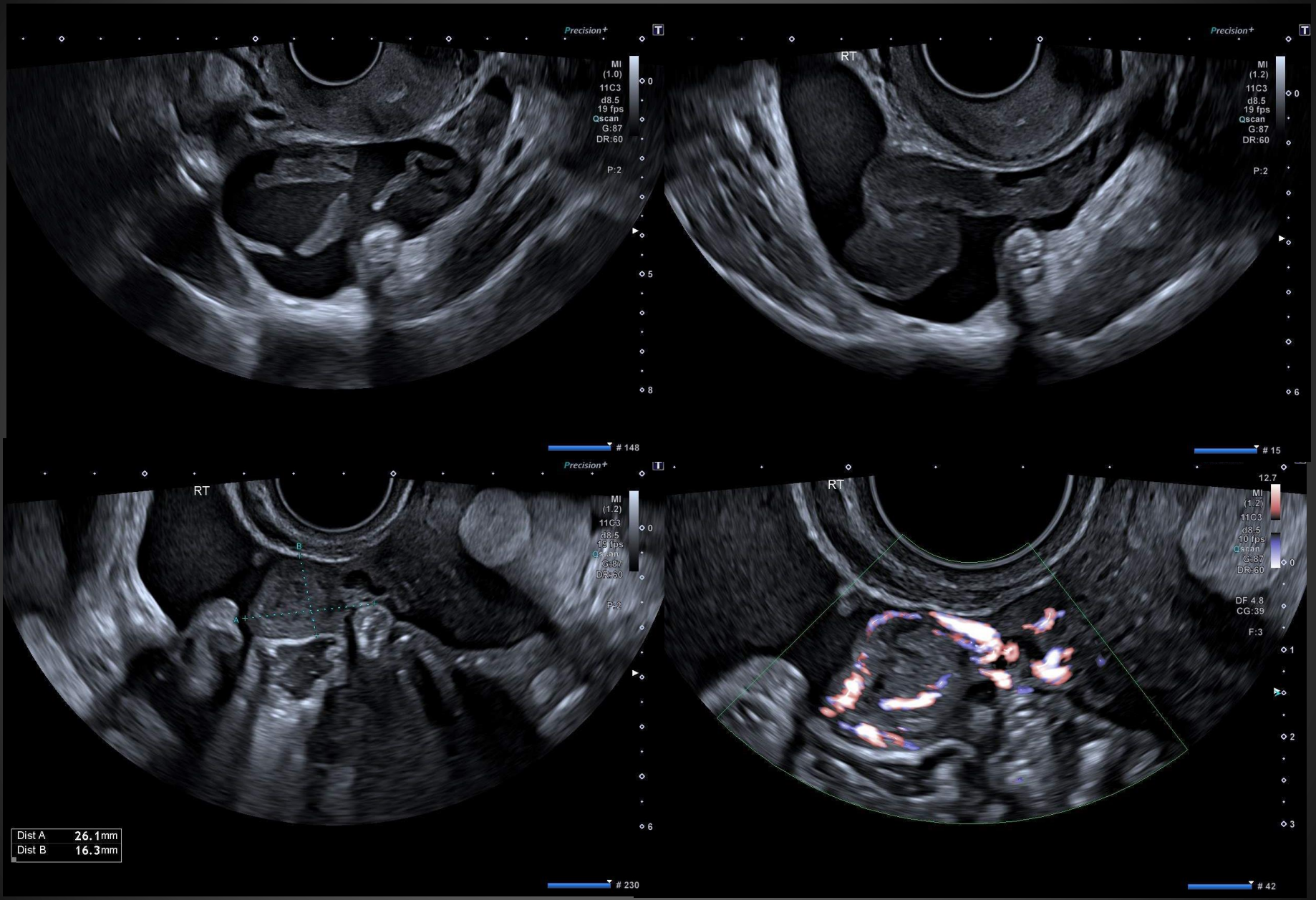




Blood flow assessment..
Not necessary
Salvageable


Precision+
MI
(1.0)
11C3
d8.5
19 fps
Qscan
G:87
DR:60
P:2
0
5
8
A
Dist A 61.9mm


Precision+
59
MI
(1.0)
11C3
d8.5
19 fps
Qscan
G:87
DR:60
P:2
0
5
8
156


Precision+
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(1.0)
11C3
d8.5
19 fps
Qscan
G:87
DR:60
P:2
148
Precision+
RT
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:87
DR:60
P:2
15
Precision+
RT
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:87
DR:60
P:2
Dist A 26.1mm
Dist B 16.3mm
230
RT
12.7
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DF 4.8
CG:39
F:3
42

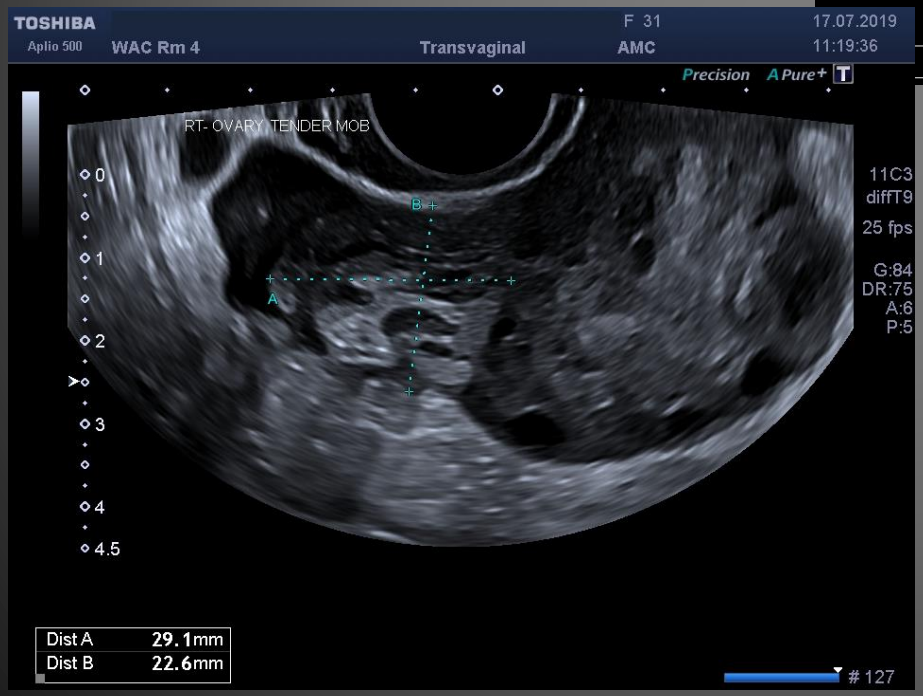
Torsion Twisted Pedicle Sign

Target sign

Mass adjacent to the ovary

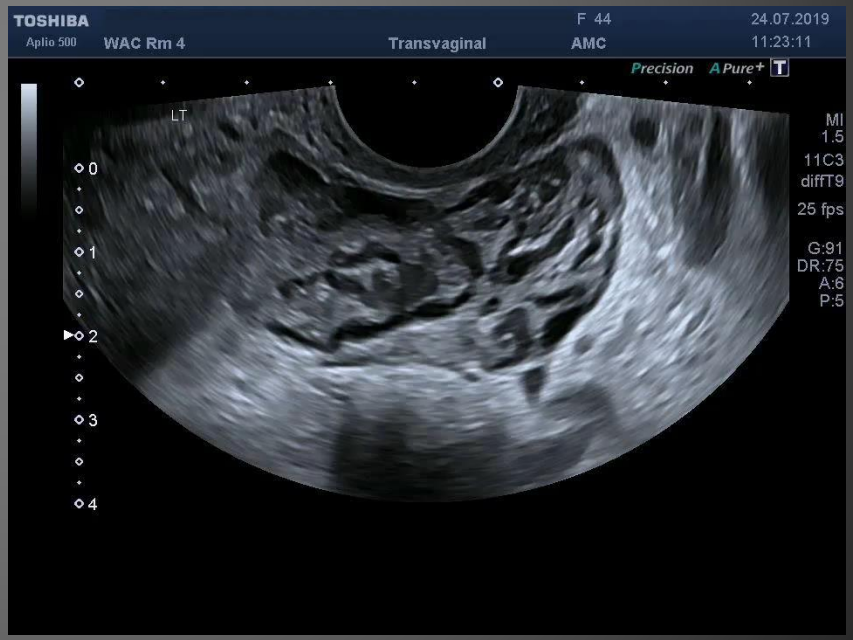
Concentric rings

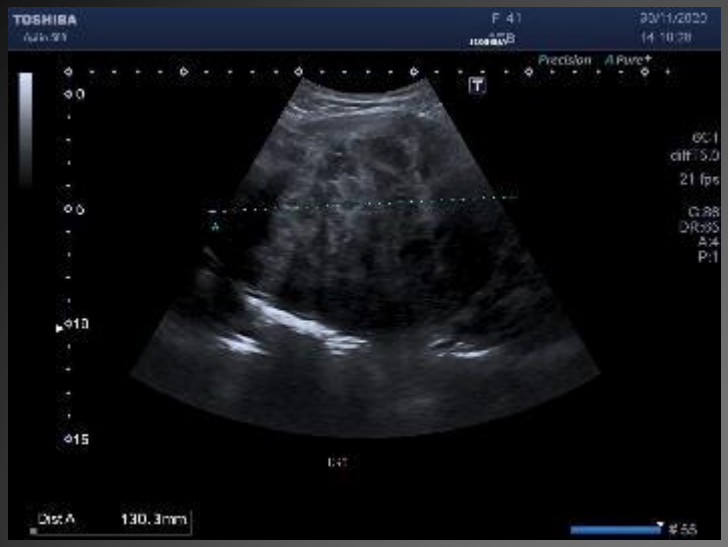




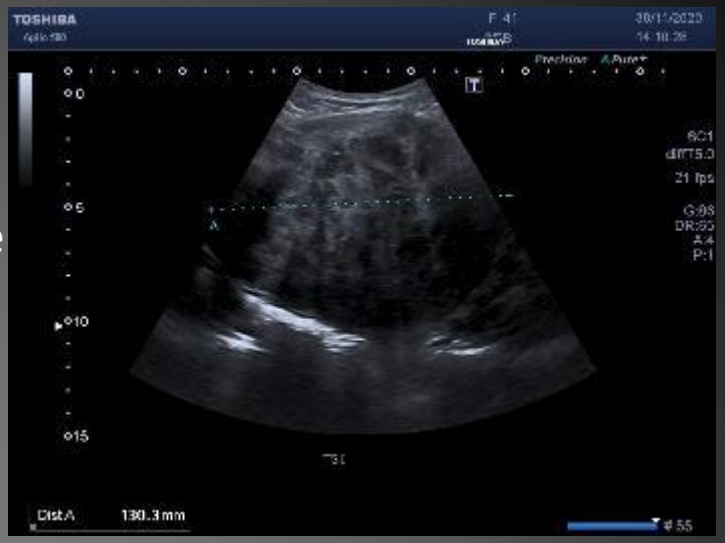
Twisted Pedicle Sign







Look beyond pathology or the actual site of pain for clues



Fibroid TORSION





Endometriosis

1. Rupture

Free fluid echogenic

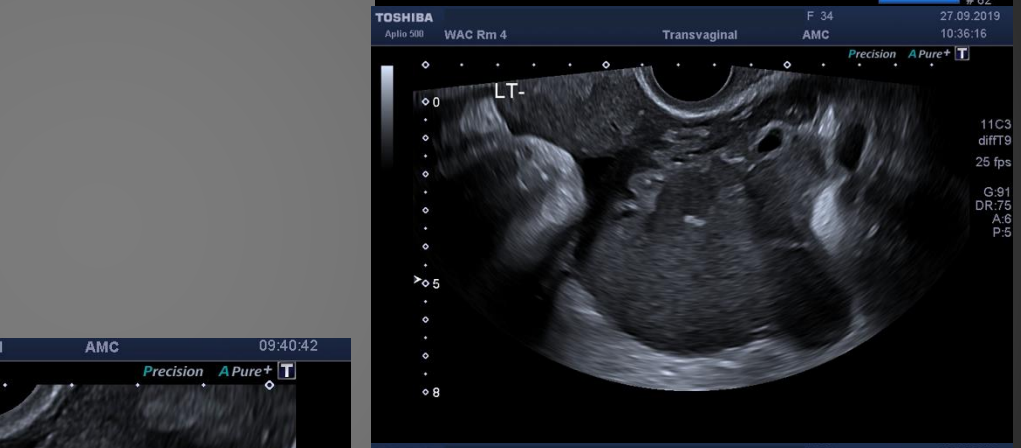
2. Acute haematosalpinx

3. Acute haemorrhage into a pre existing endometrioma

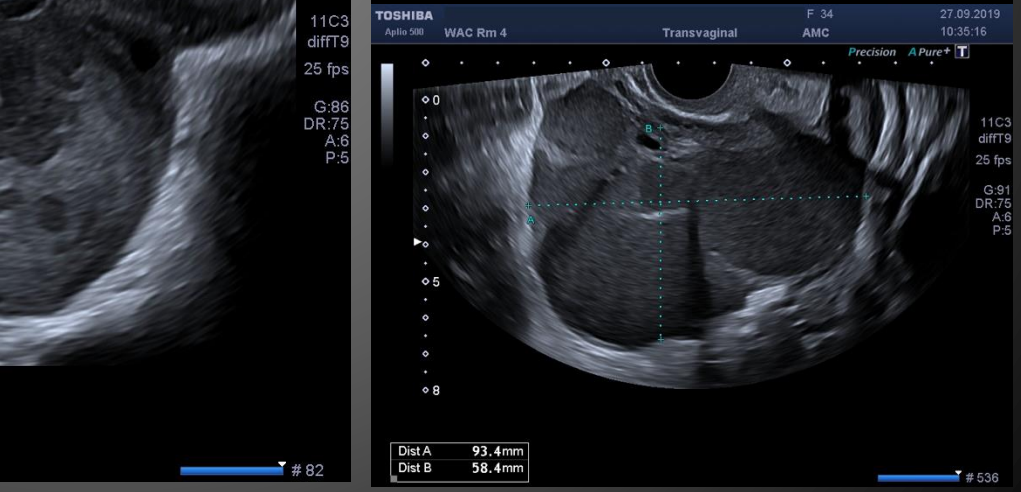
Eccentric linear or mass like echoes









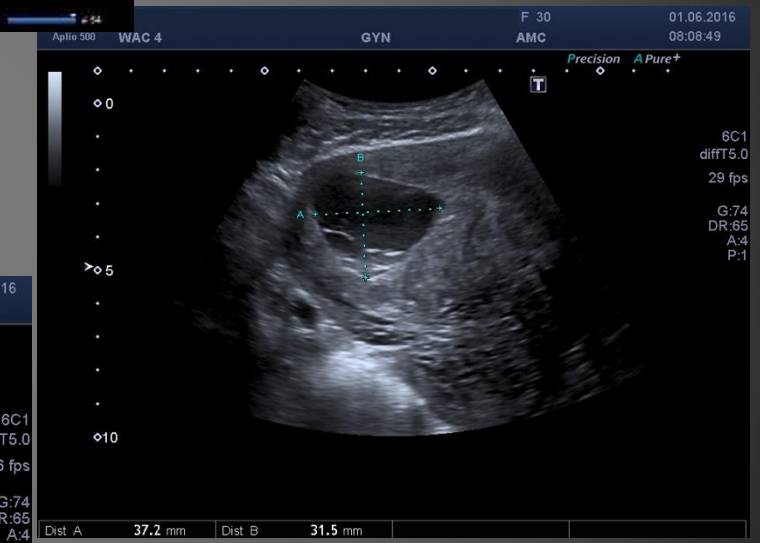


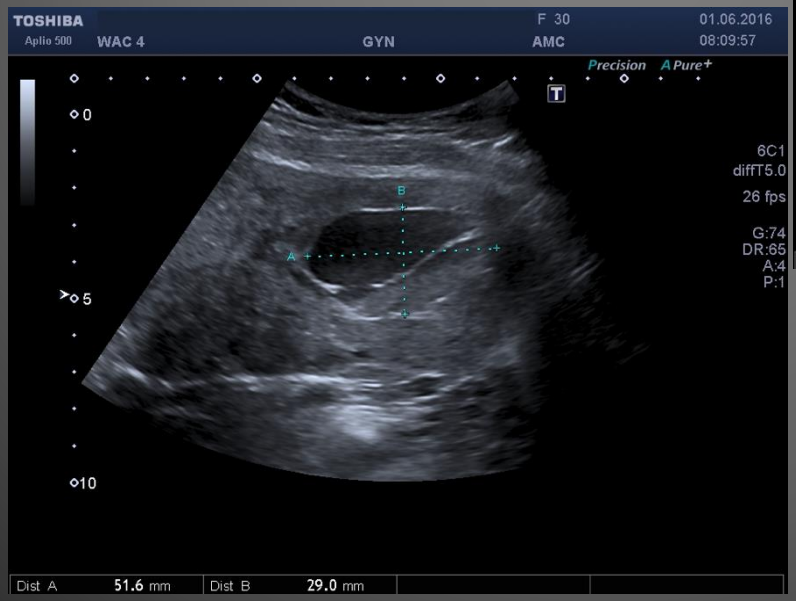
Fibroids

Acute pain due to

- Infarction
- Prolapse
- Torsion
- Other







Fibroids

Acute pain due to

- Infarction
- Prolapse
- Torsion
- Other





Fibroids

Acute pain due to

- Infarction
- Prolapse
- Torsion
- Other

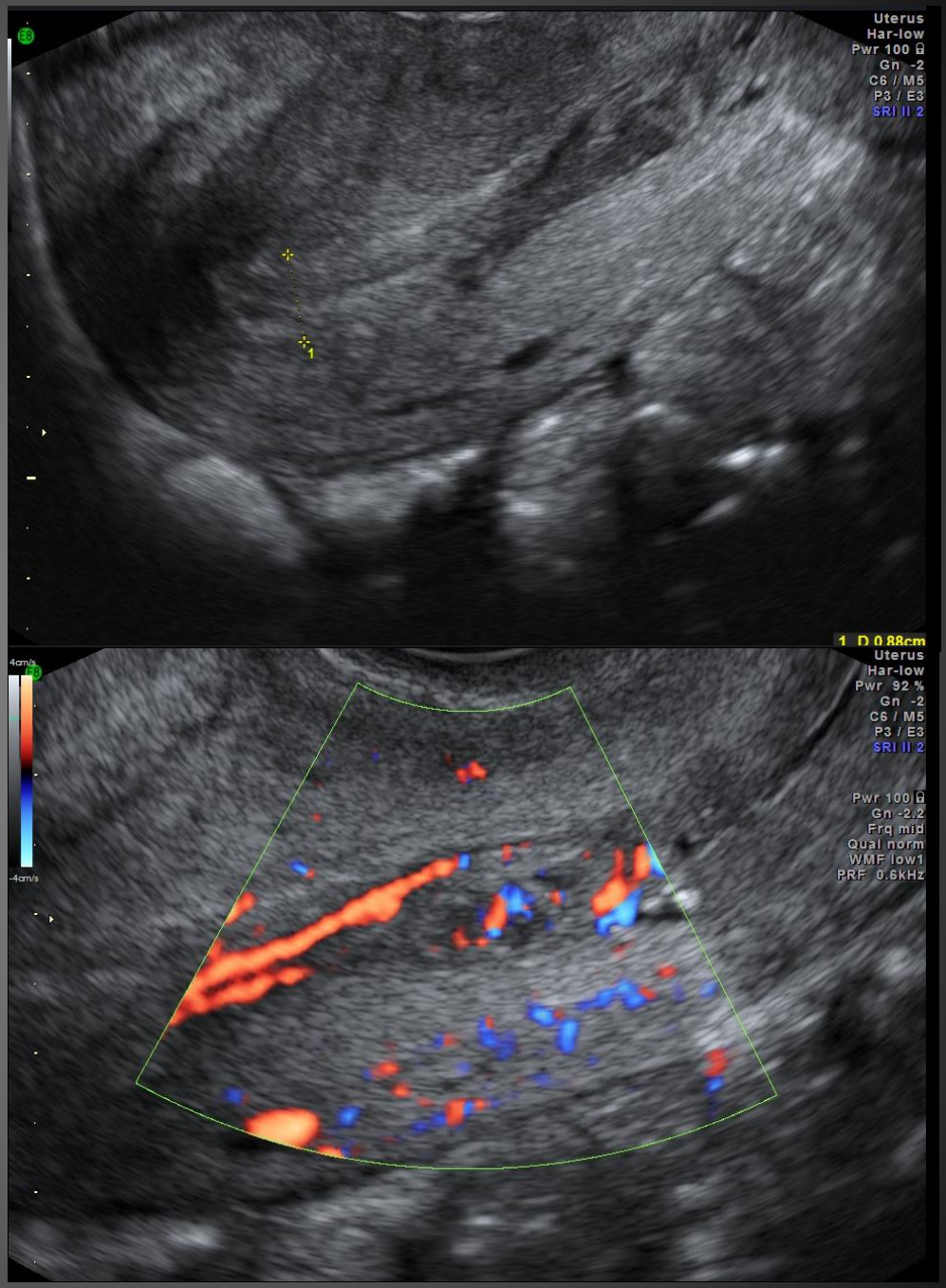




Fibroids

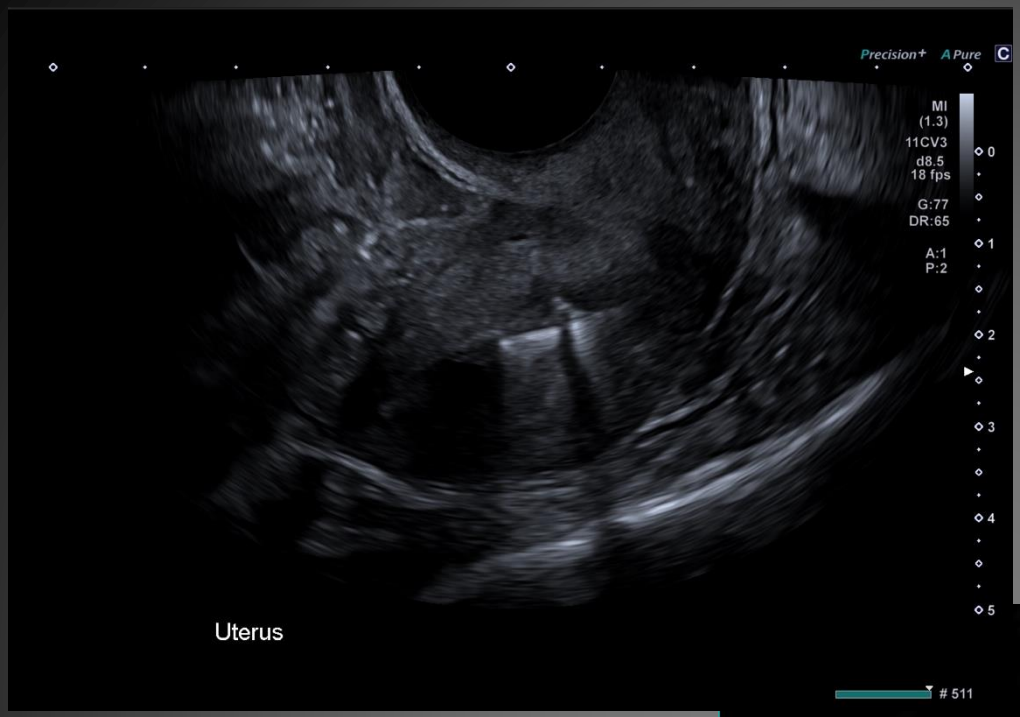
Acute pain due to

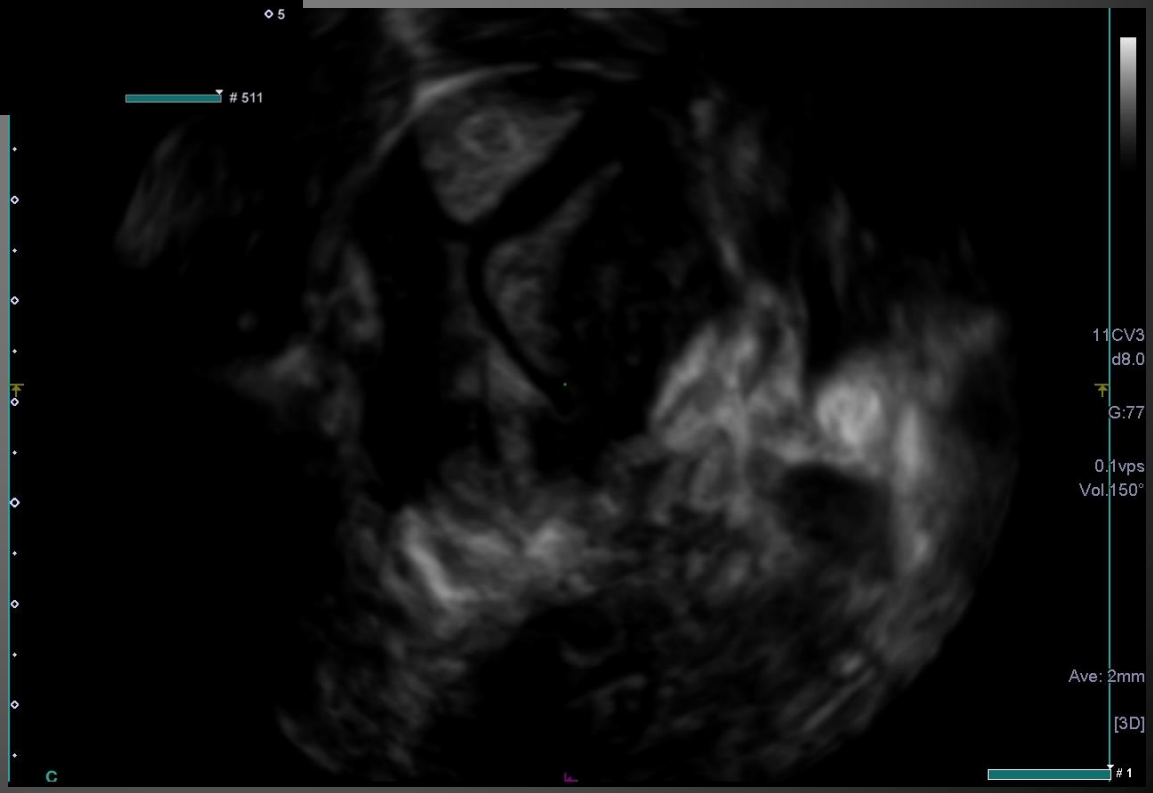
- Infarction
- Prolapse
- Torsion
- Other

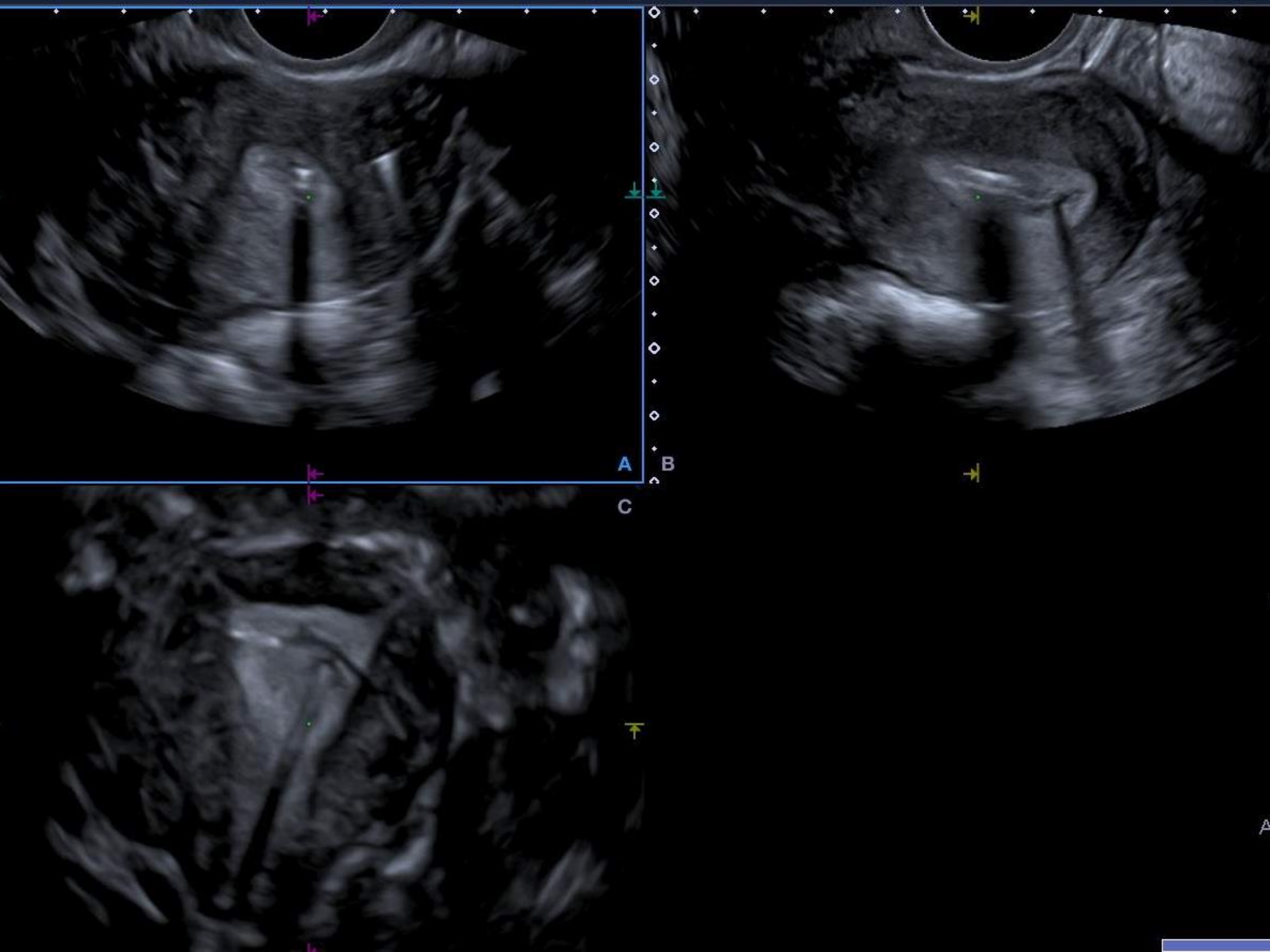


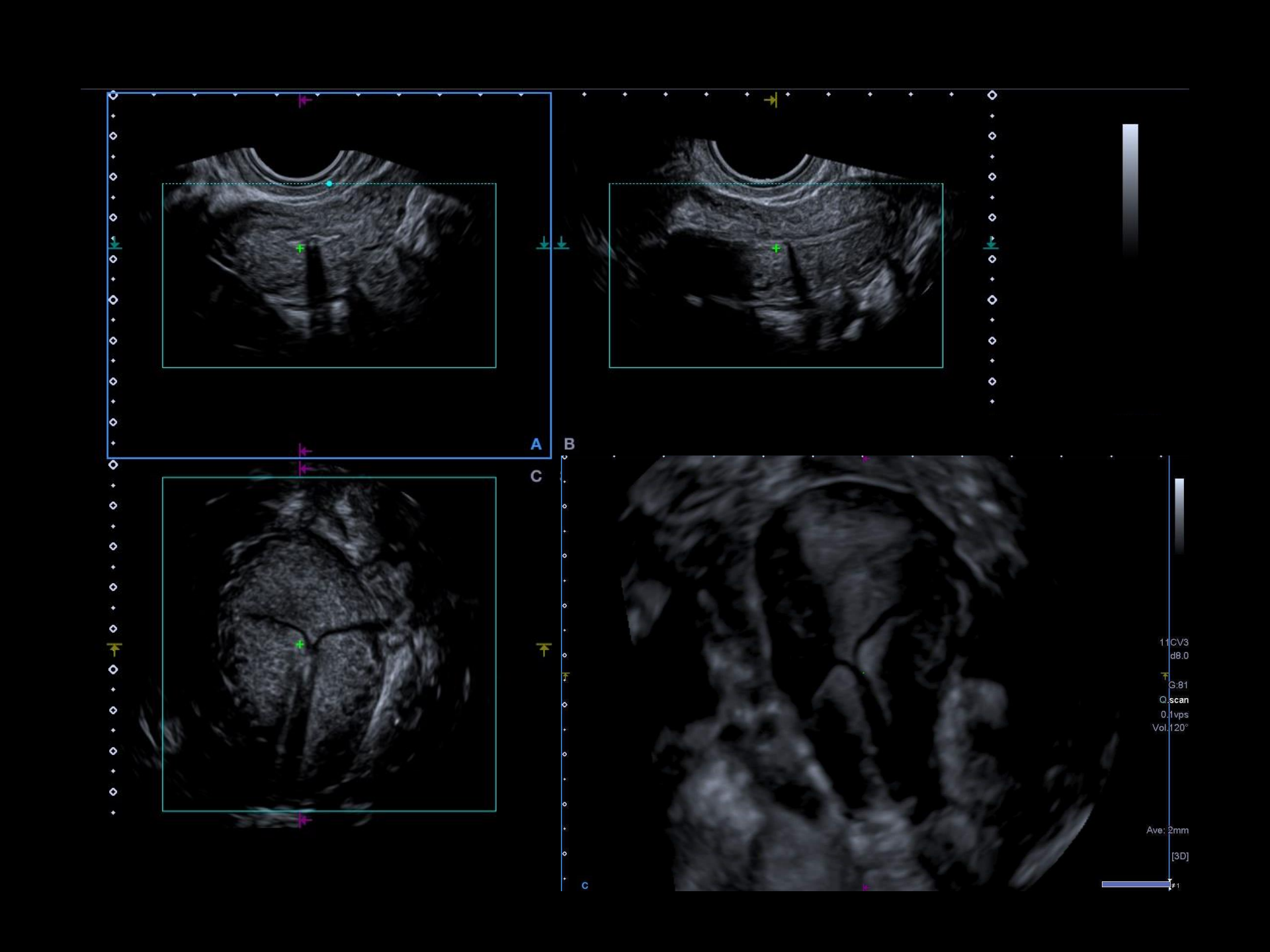
Misplaced Coils

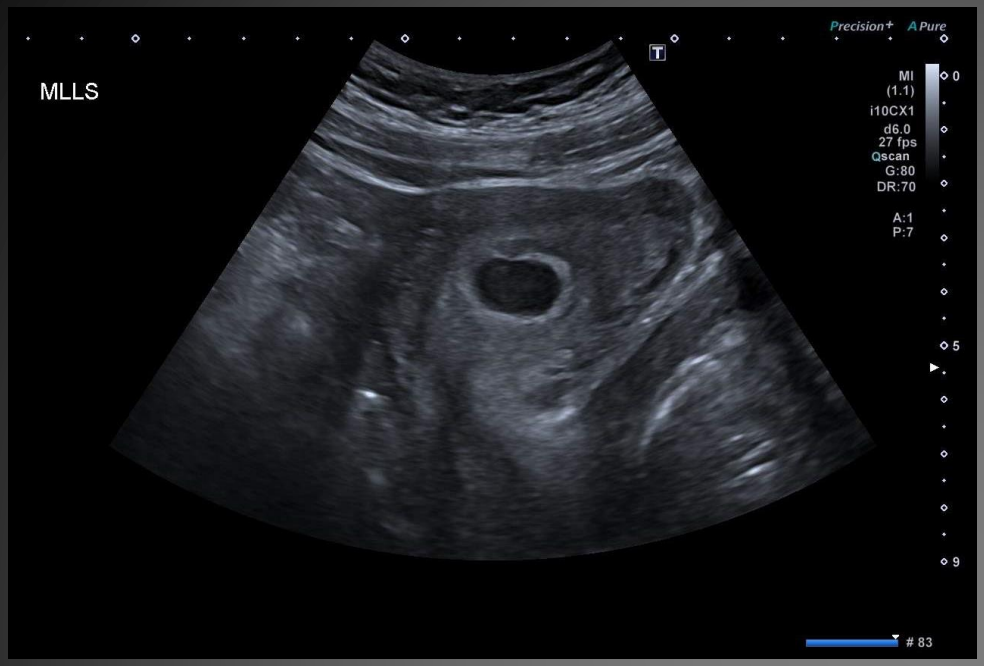
Malpositioned Coils

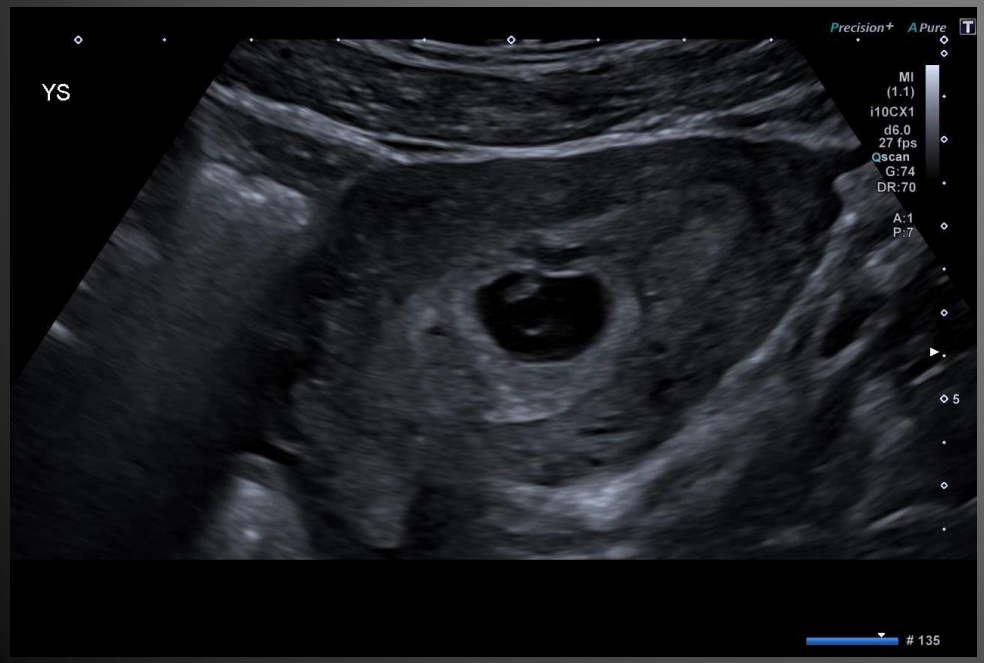


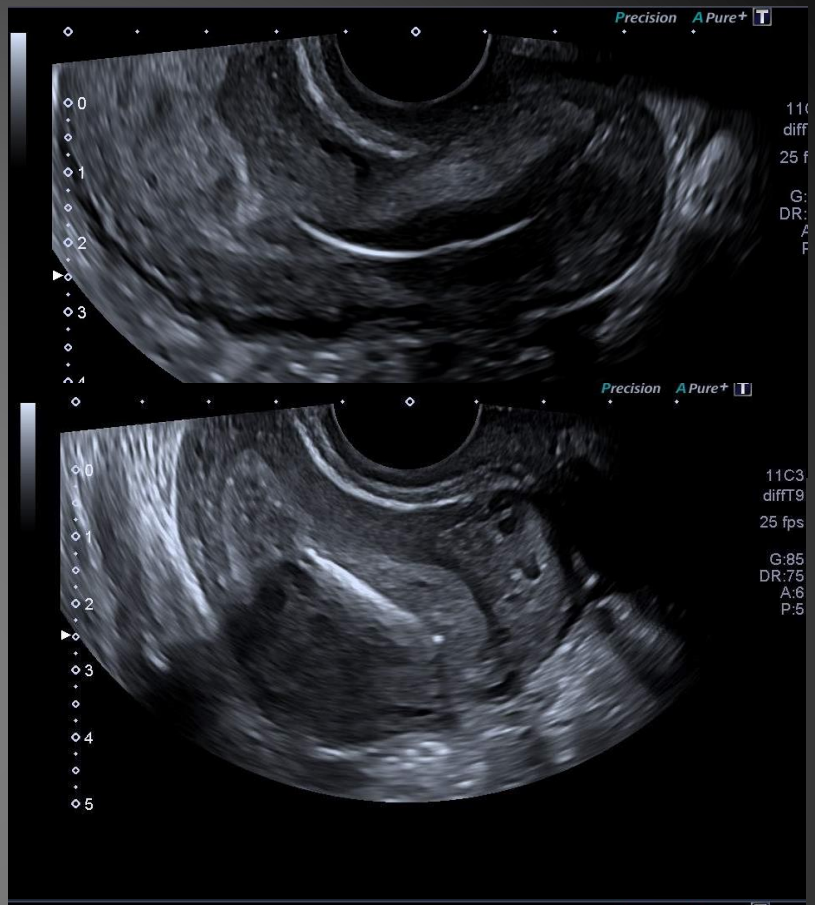


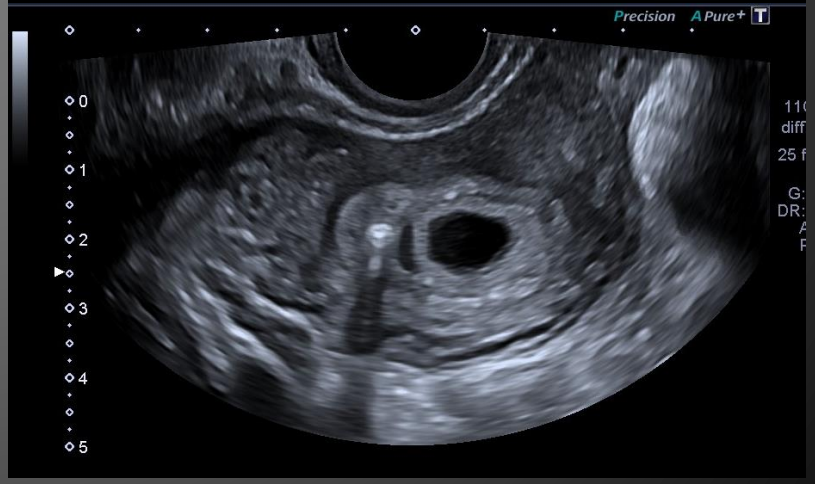

A
B
C


A
B
C
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G:81
Q.scan
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Vol.120°
Ave: 2mm
[3D]

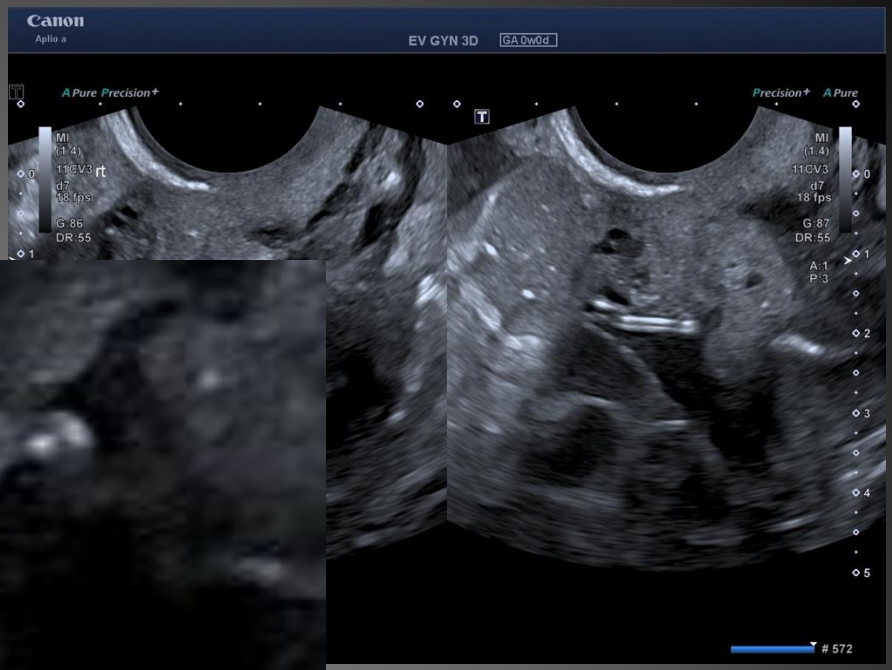

Precision+ A Pure
MLLS
MI
(1.1)
i10CX1
d6.0
27 fps
Qscan
G:80
DR:70
A:1
P:7
83


Precision+ A Pure
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d6.0
27 fps
Qscan
G:74
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A:1
P:7
135

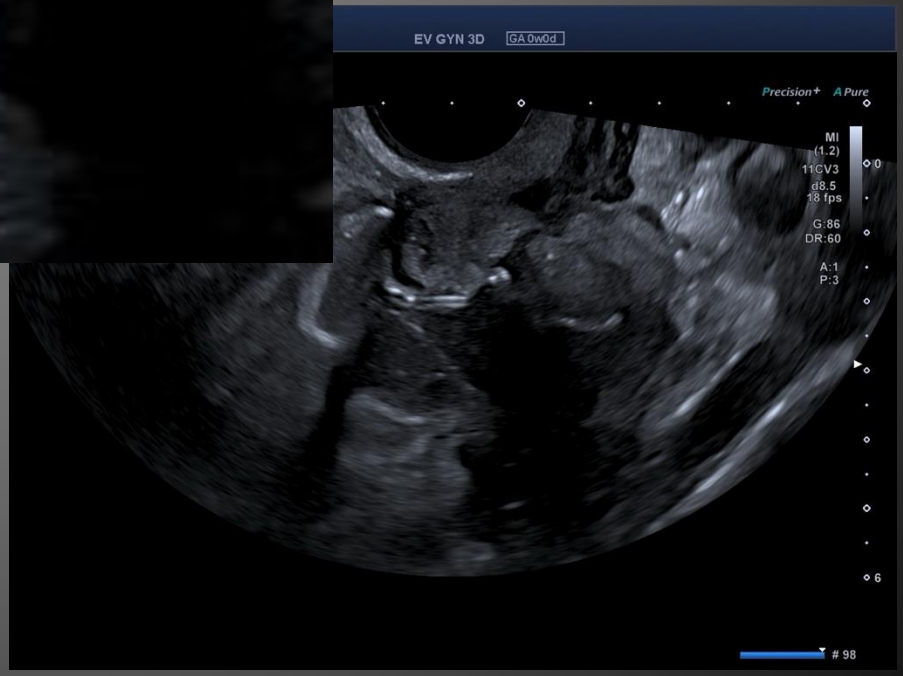

Precision A Pure+
Precision A Pure+

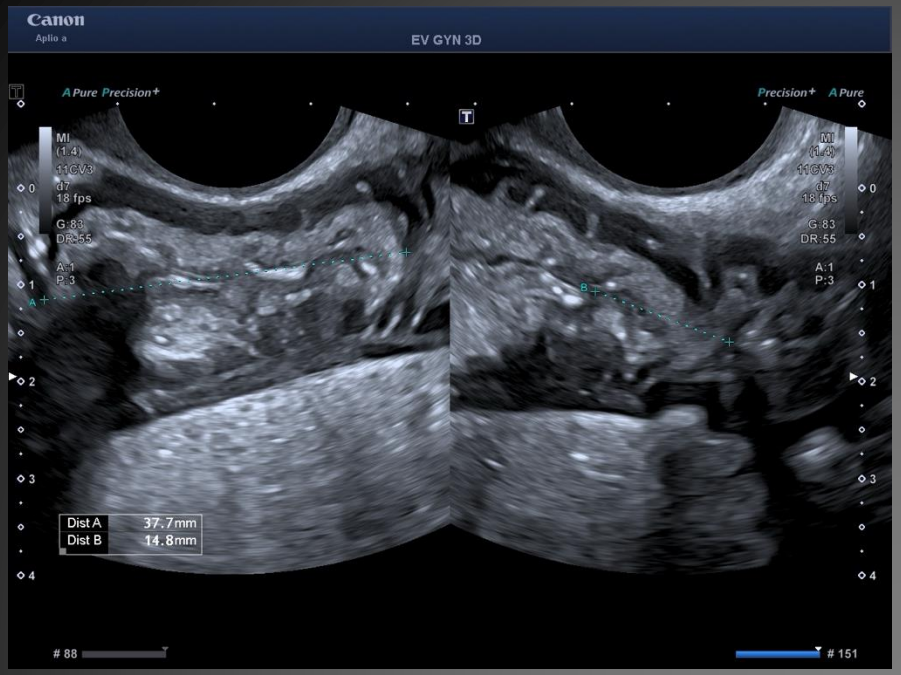

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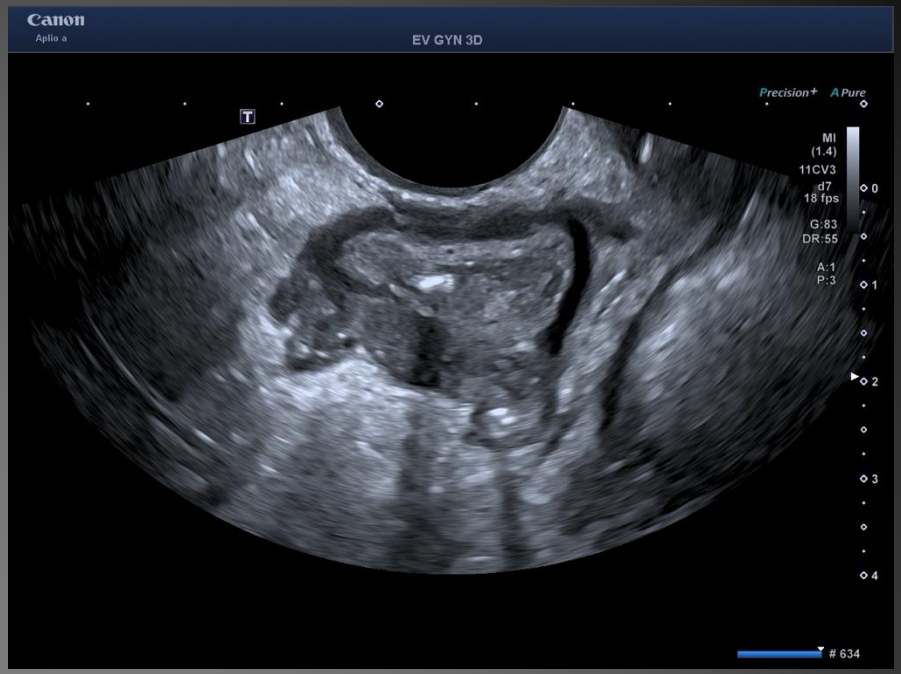

Canon
Aplio a
EV GYN 3D
GA 0w0d
A Pure Precision+
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11CV3
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G:86
DR:55
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P:3
53

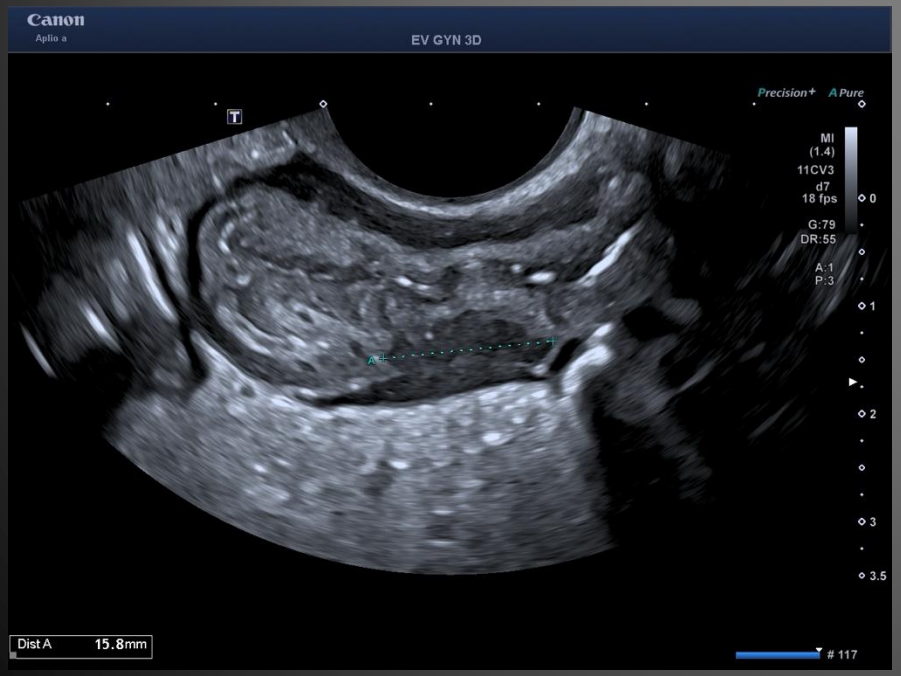

Canon
Aplio a
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GA 0w0d
A Pure Precision+
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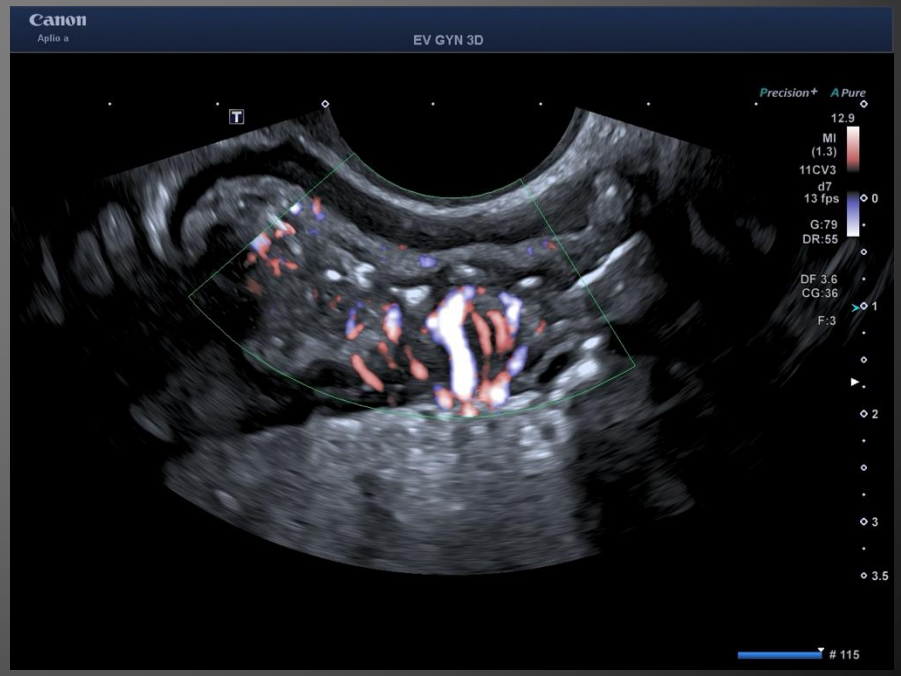

Canon
Aplio a
rt
60


EV GYN 3D
GA 0w0d
Precision+ A Pure
MI
(1.2)
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d8.5
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DR:60
A:1
P:3
98

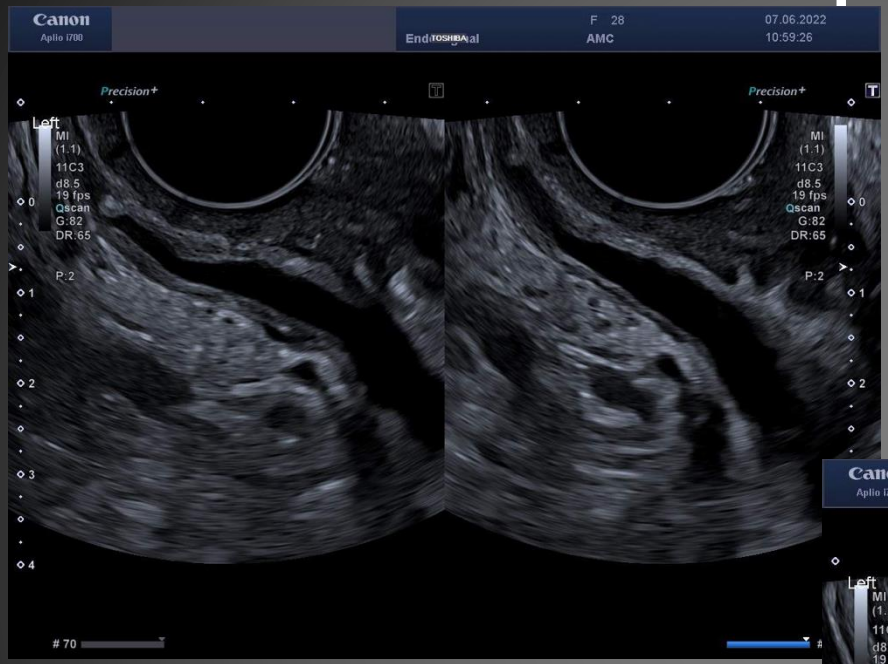

Canon
Aplio a
EV GYN 3D
A Pure Precision+
MI (1.4)
11CV3
d7
18 fps
G:83
DR:55
A:1
P:3
Dist A 37.7mm
Dist B 14.8mm
88
151

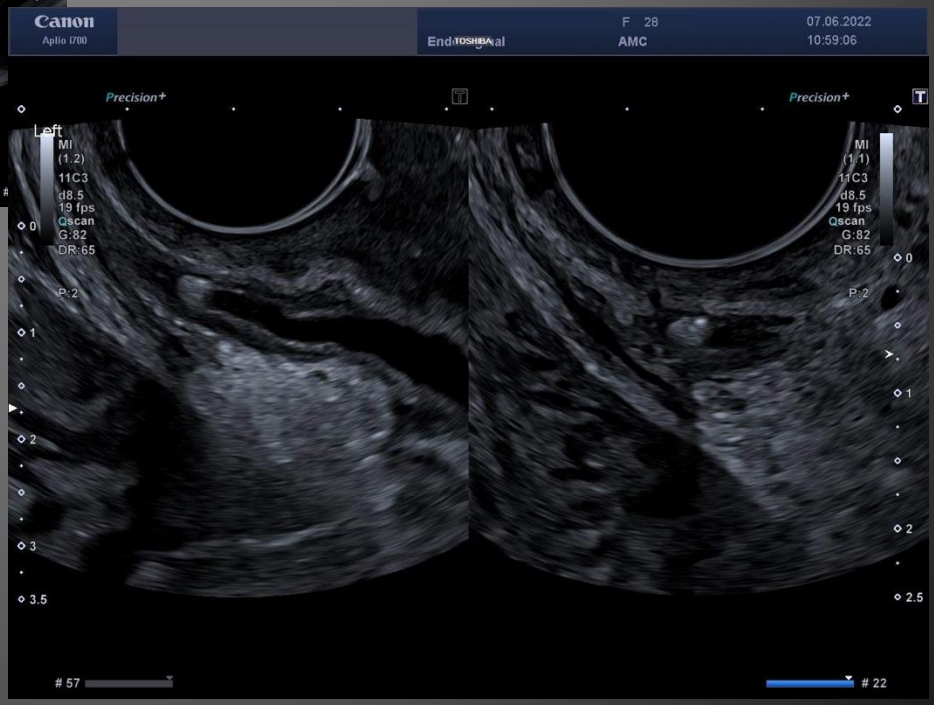

Canon
Aplio a
EV GYN 3D
Precision+ A Pure
MI (1.4)
11CV3
d7
18 fps
G:83
DR:55
A:1
P:3
634


Canon
Aplio a
EV GYN 3D
Precision+ A Pure
MI (1.4)
11CV3
d7
18 fps
G:79
DR:55
A:1
P:3
Dist A 15.8mm
117


Canon
Aplio a
EV GYN 3D
Precision+ A Pure
12.9
MI (1.3)
11CV3
d7
13 fps
G:79
DR:55
DF 3.6
CG:36
F:3
115

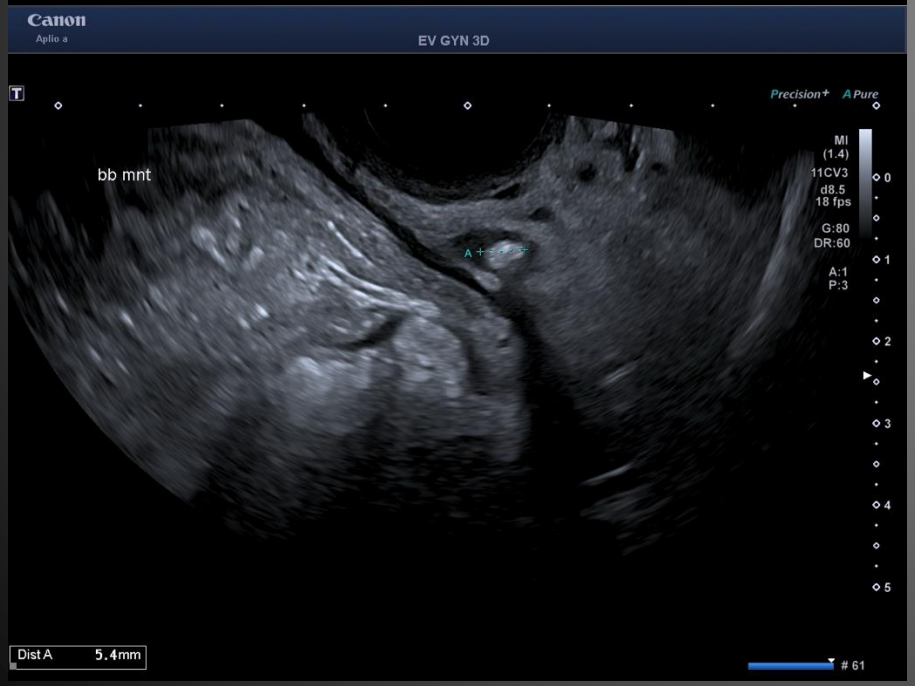
Left sided pain ? ectopic

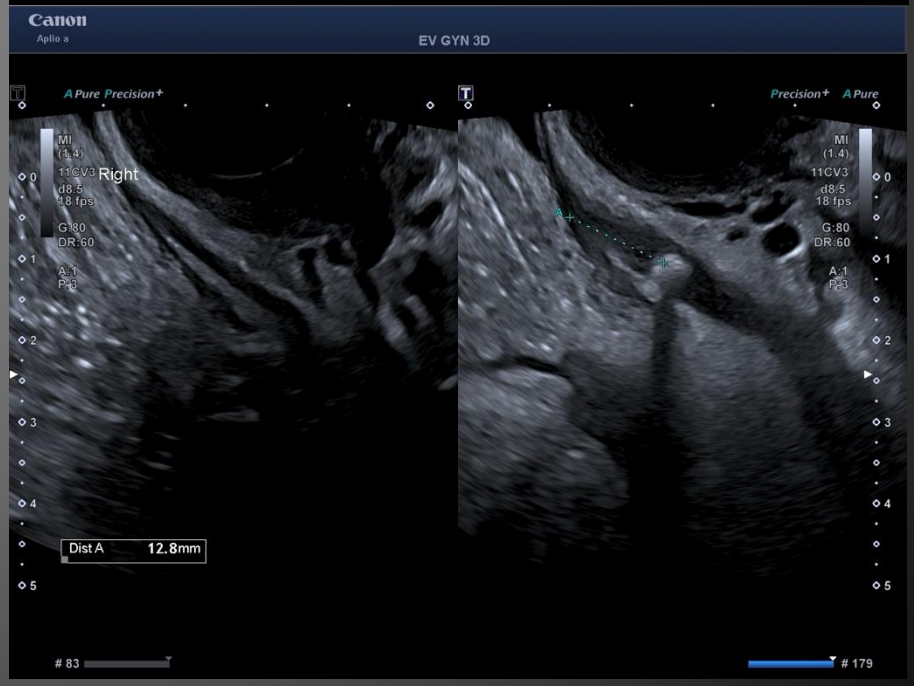


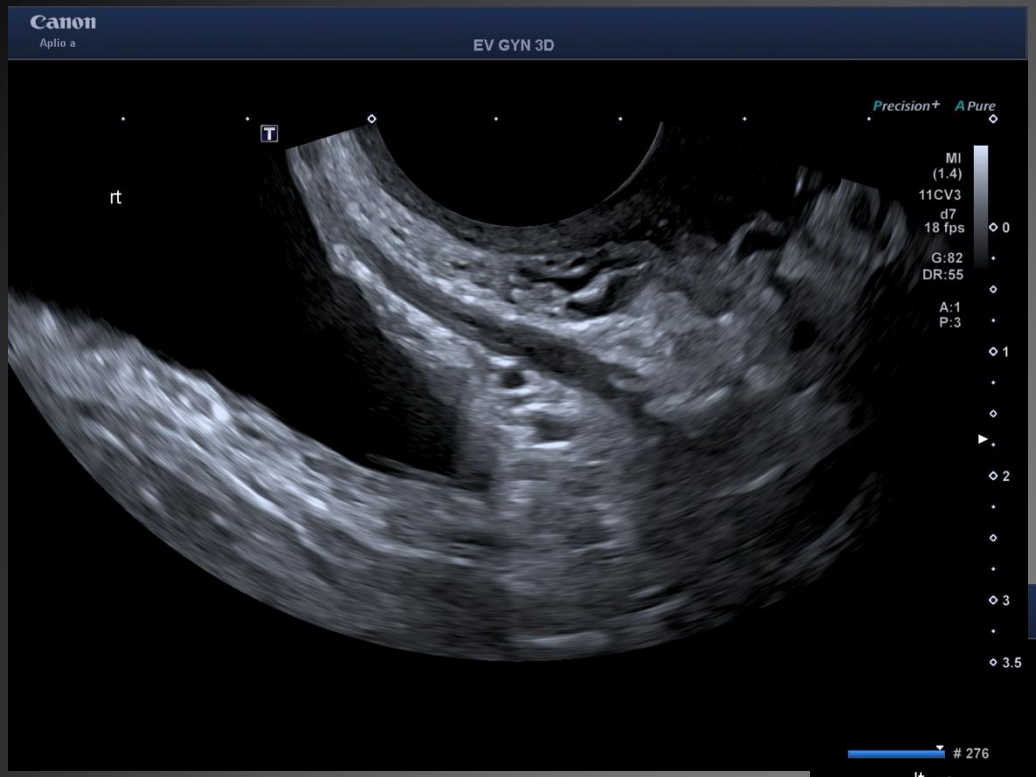


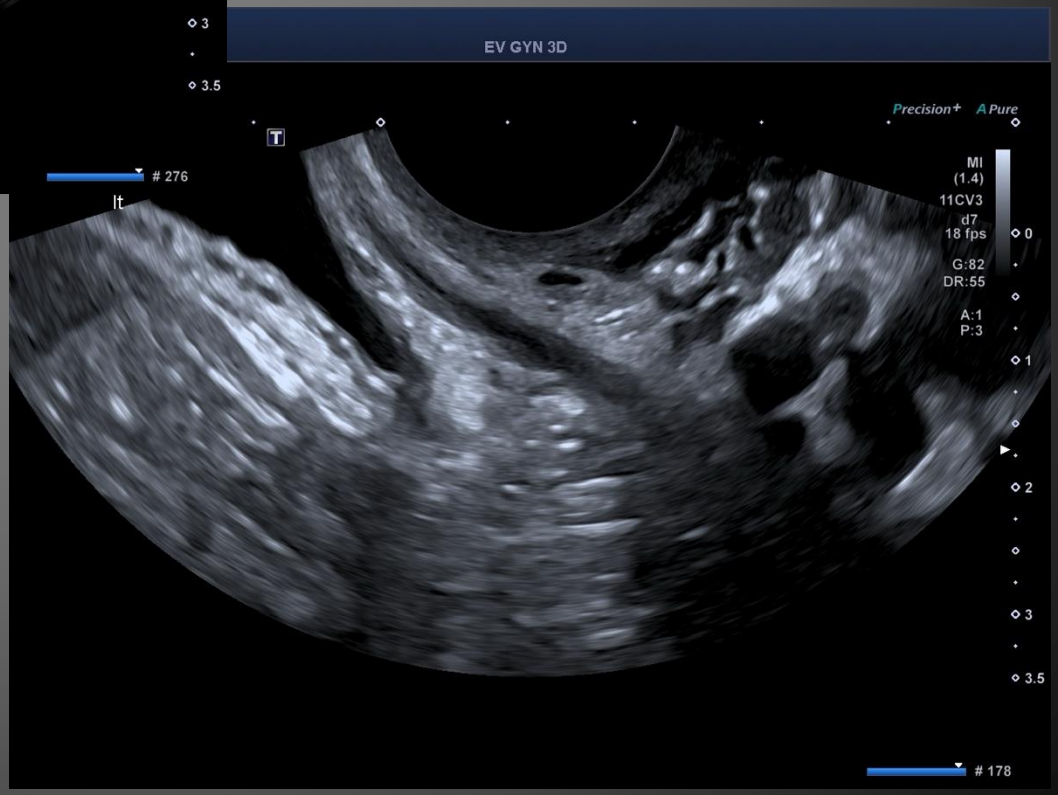

Canon
Aplio a
EV GYN 3D
Precision+ A Pure
Left
MI
(1.4)
11CV3
d8.5
18 fps
G:79
DR:60
A:1
P:3
Dist A 4.3mm
Dist B 3.3mm
99


Canon
Aplio a
EV GYN 3D
Precision+ A Pure
Left
MI
(1.4)
11CV3
d8.5
18 fps
G:79
DR:60
A:1
P:3
Dist A 2.8mm
94

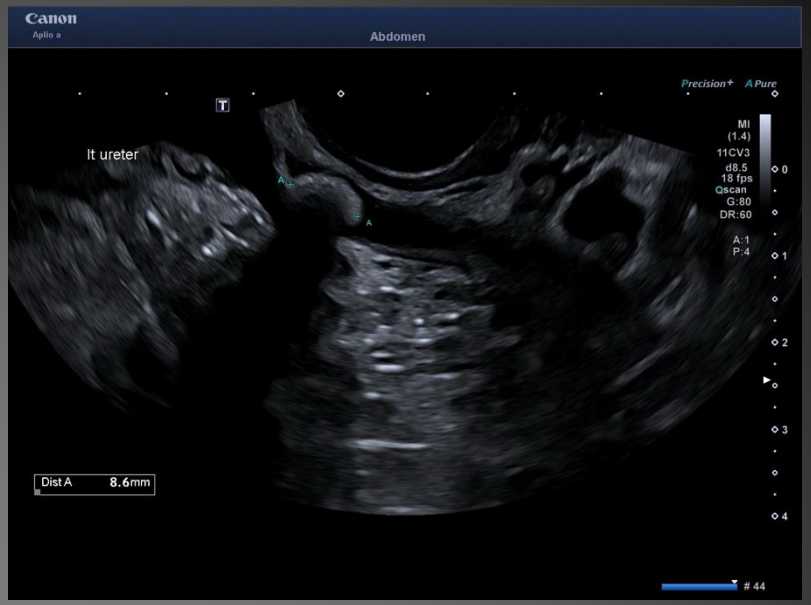

Canon
Aplio a
EV GYN 3D
Precision+ A Pure
bb mnt
MI
(1.4)
11CV3
d8.5
18 fps
G:80
DR:60
A:1
P:3
Dist A 5.4mm
61

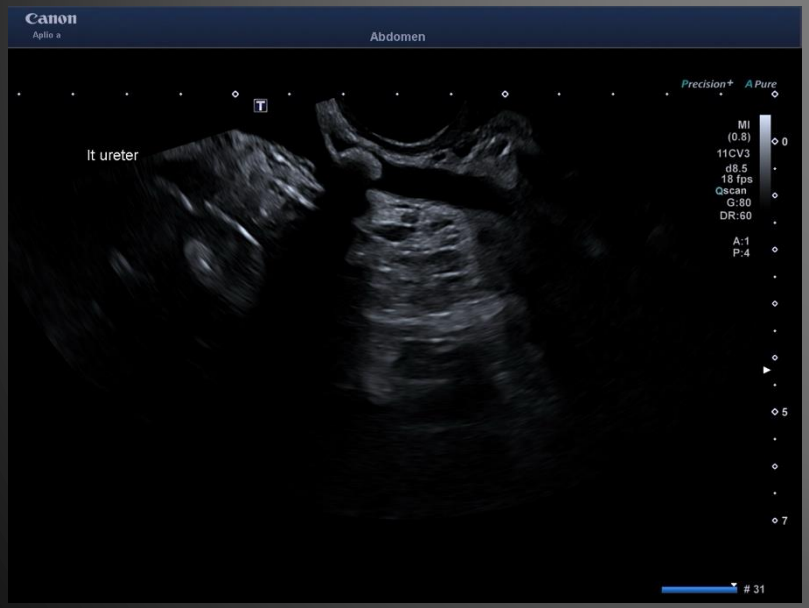

Canon
Aplio a
EV GYN 3D
A Pure Precision+
Right
MI
(1.4)
11CV3
d8.5
18 fps
G:80
DR:60
A:1
P:3
Dist A 12.8mm
83
Precision+ A Pure
MI
(1.4)
11CV3
d8.5
18 fps
G:80
DR:60
A:1
P:3
179

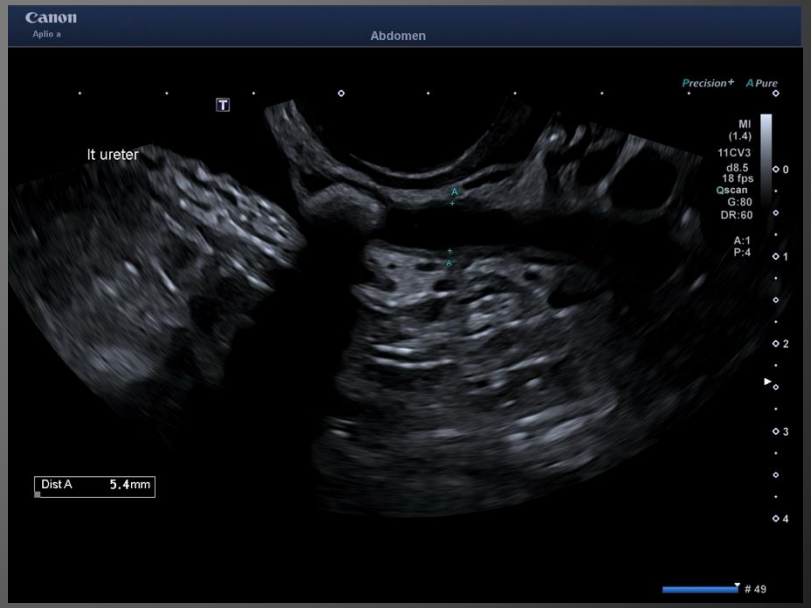

Canon
Aplio a
EV GYN 3D
Precision+
A Pure
rt
MI
(1.4)
11CV3
d7
18 fps
G:82
DR:55
A:1
P:3
0
1
2
3
3.5


EV GYN 3D
Precision+
A Pure
276
lt
MI
(1.4)
11CV3
d7
18 fps
G:82
DR:55
A:1
P:3
0
1
2
3
3.5
178


Canon
Aplio a
Abdomen
Precision+
A Pure
Left Kidney
MI
(1.6)
8C1
d5.0
15 fps
Qscan
G:77
DR:60
A:1
P:4
0
5
10
15
17
134


Canon
Aplio a
Abdomen
Precision+
A Pure
lt ureter
MI
(1.4)
11CV3
d8.5
18 fps
Qscan
G:80
DR:60
A:1
P:4
Dist A 8.6mm
0
1
2
3
4
44


Canon
Aplio a
Abdomen
Precision+
A Pure
lt ureter
MI
(0.8)
11CV3
d8.5
18 fps
Qscan
G:80
DR:60
A:1
P:4
0
5
7
31


Canon
Aplio a
Abdomen
Precision+
A Pure
lt ureter
MI
(1.4)
11CV3
d8.5
18 fps
Qscan
G:80
DR:60
A:1
P:4
Dist A 5.4mm
0
1
2
3
4
49

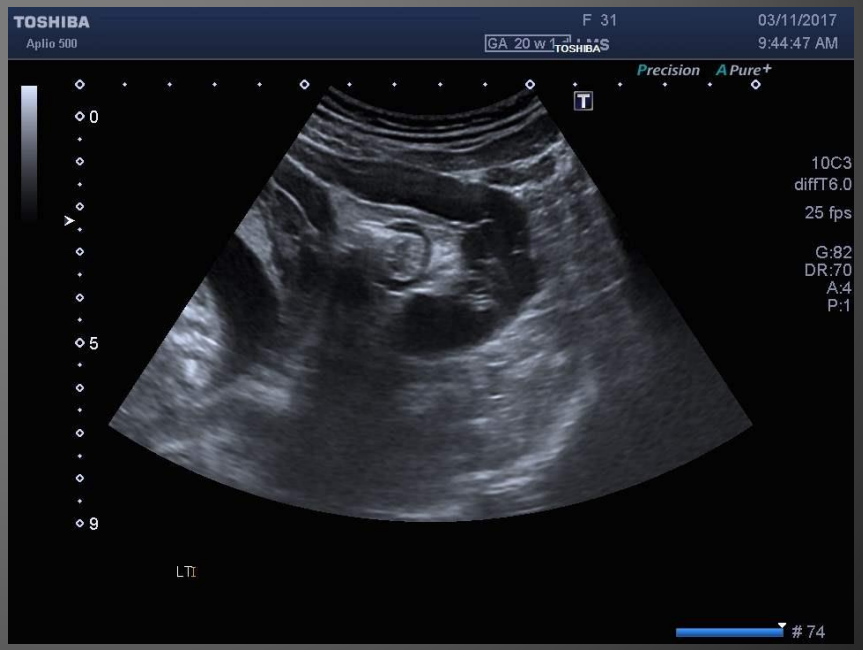
Unusual pathologies

Ovarian varices +/- thrombosis

OHSS

OHSS vs TORSION





Bimanual and SST

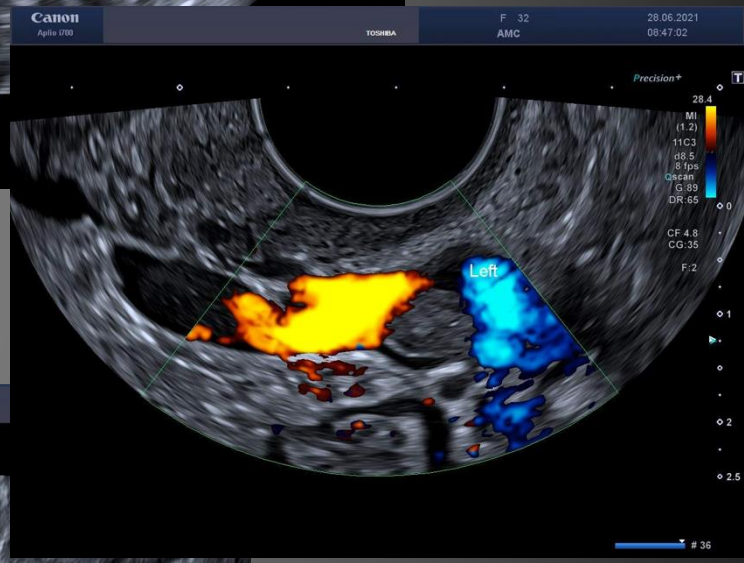
The ability to use the probe to assess pelvic structures for tenderness is an added advantage of TVS.

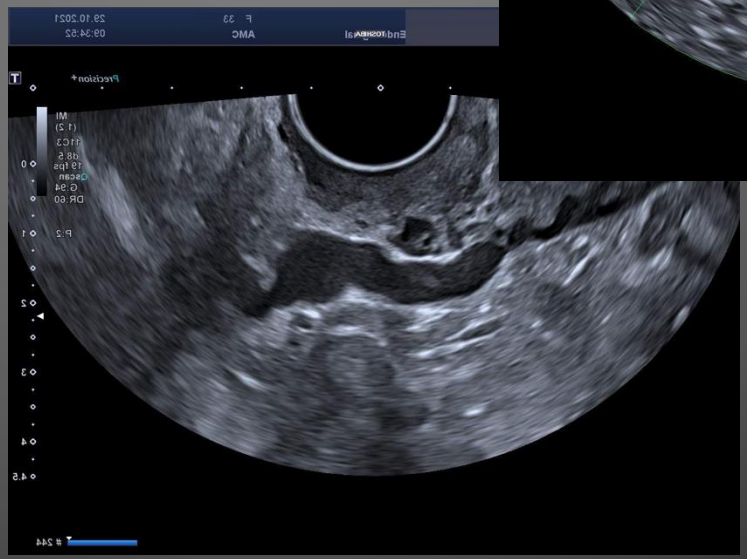
Site specific tenderness:

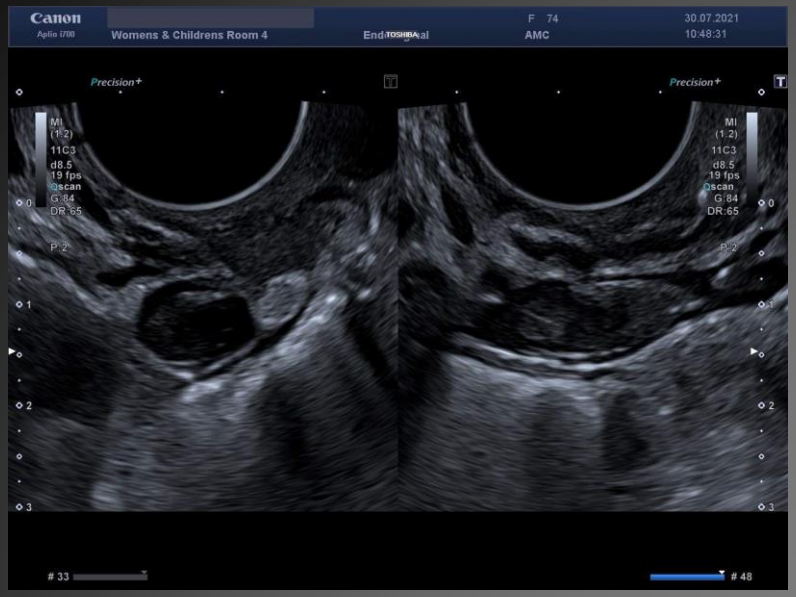
Not just for endometriosis!!!

Superior to bimanual and TA





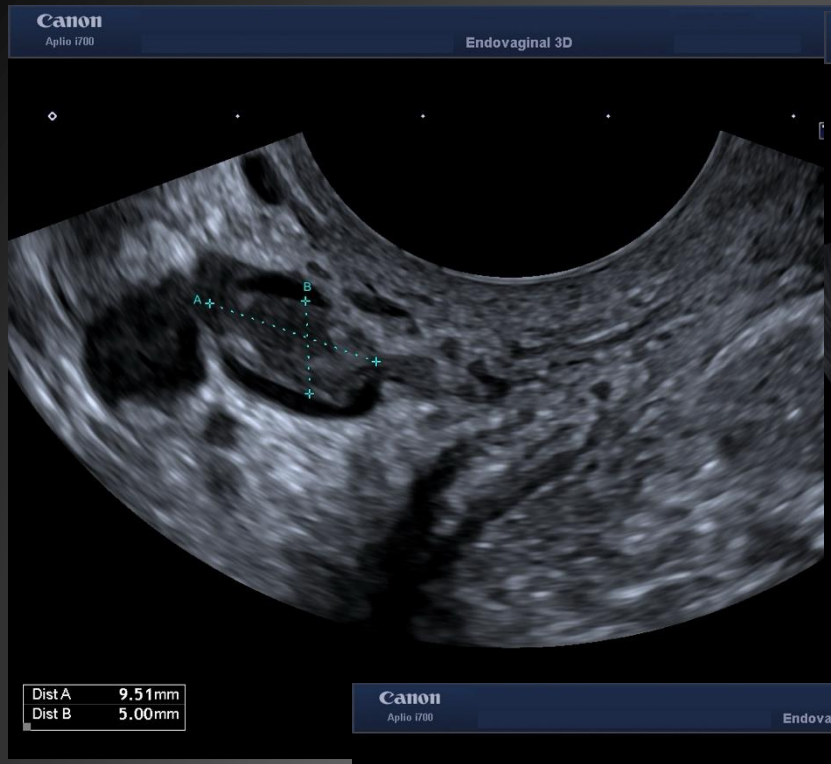



Canon
Aplio i700
Womens & Childrens Room 4
F 74
AMC
30.07.2021
10:48:31
Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:84
DR:65
P:2
33
48

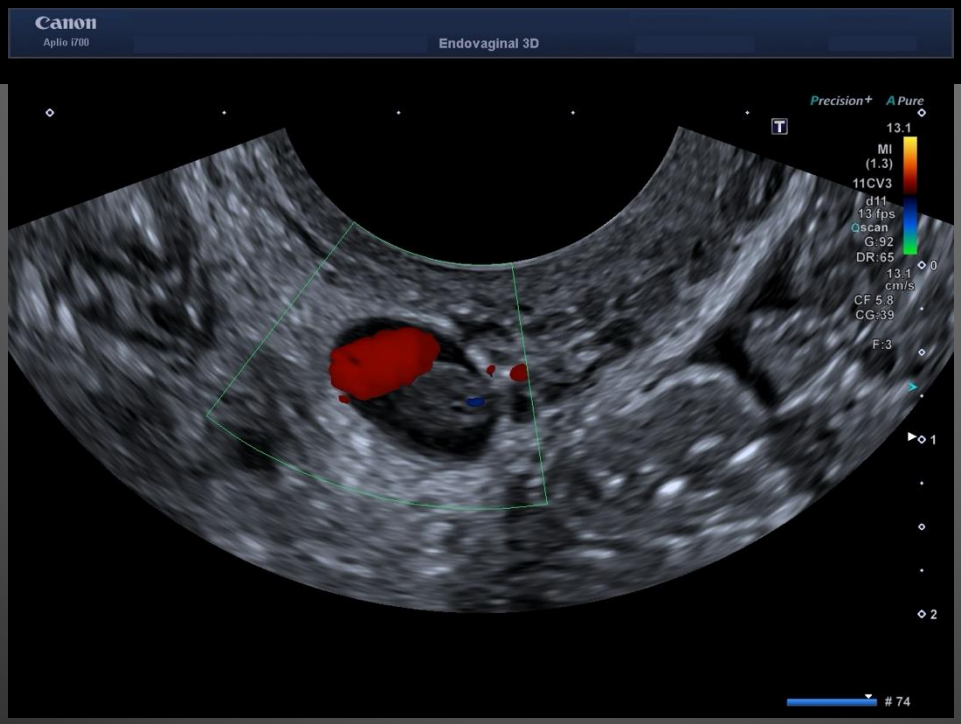

Canon
Aplio i700
Womens & Childrens Room 4
F 74
AMC
30.07.2021
10:43:28
Precision+
MI
(1.2)
11C3
d8.5
19 fps
Qscan
G:86
DR:65
P:2
167


Canon
Aplio i700
Womens & Childrens Room 4
F 74
AMC
30.07.2021
10:41:53
Precision+
2.6
MI
(1.2)
11C3
d8.5
9 fps
Qscan
G:86
DR:65
DF 5.8
CG:38
F:3
57


Canon
Aplio i700
Womens & Childrens Room 4
F 74
AMC
30.07.2021
10:38:07
Precision+
9.9
MI
(0.9)
11C3
d8.5
10 fps
Qscan
G:86
DR:65
CF 4.8
CG:35
F:2
34


Canon
Aplio i700
Endovaginal 3D
A
B
Dist A 9.51mm
Dist B 5.00mm

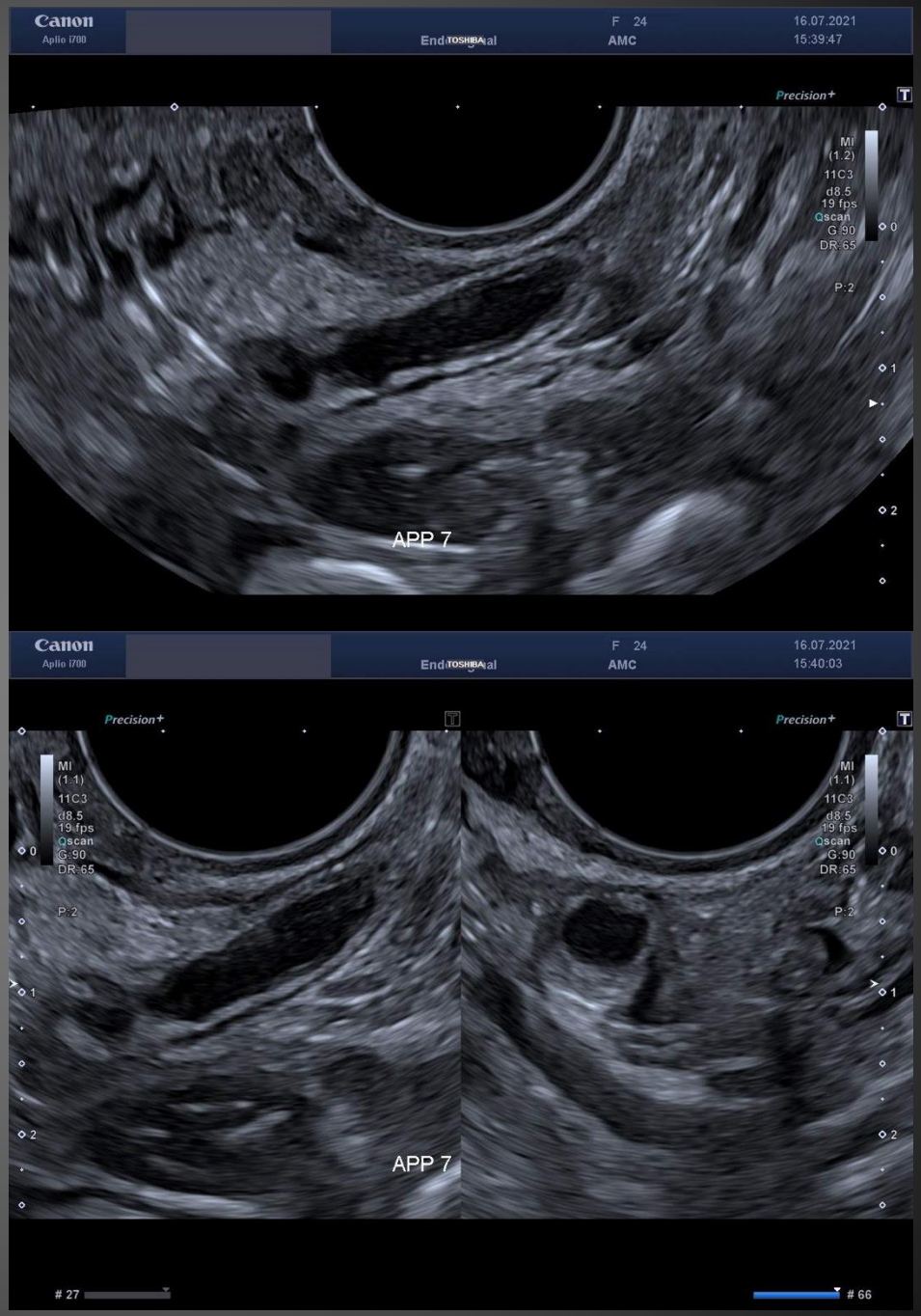

Canon
Aplio i700
Endovaginal 3D
Precision+ A Pure
MI
(0.9)
11CV3
d11
19 fps
Qscan
G:92
DR:65
A:1
P:2
A
106


Canon
Aplio i700
Endovaginal 3D
Precision+ A Pure
13.1
MI
(1.3)
11CV3
d11
13 fps
Qscan
G:92
DR:65
13.1
cm/s
CF 5.8
CG:39
F:3
74

Bimanual and SST

Appendicitis…usual aetiology not the only pathology

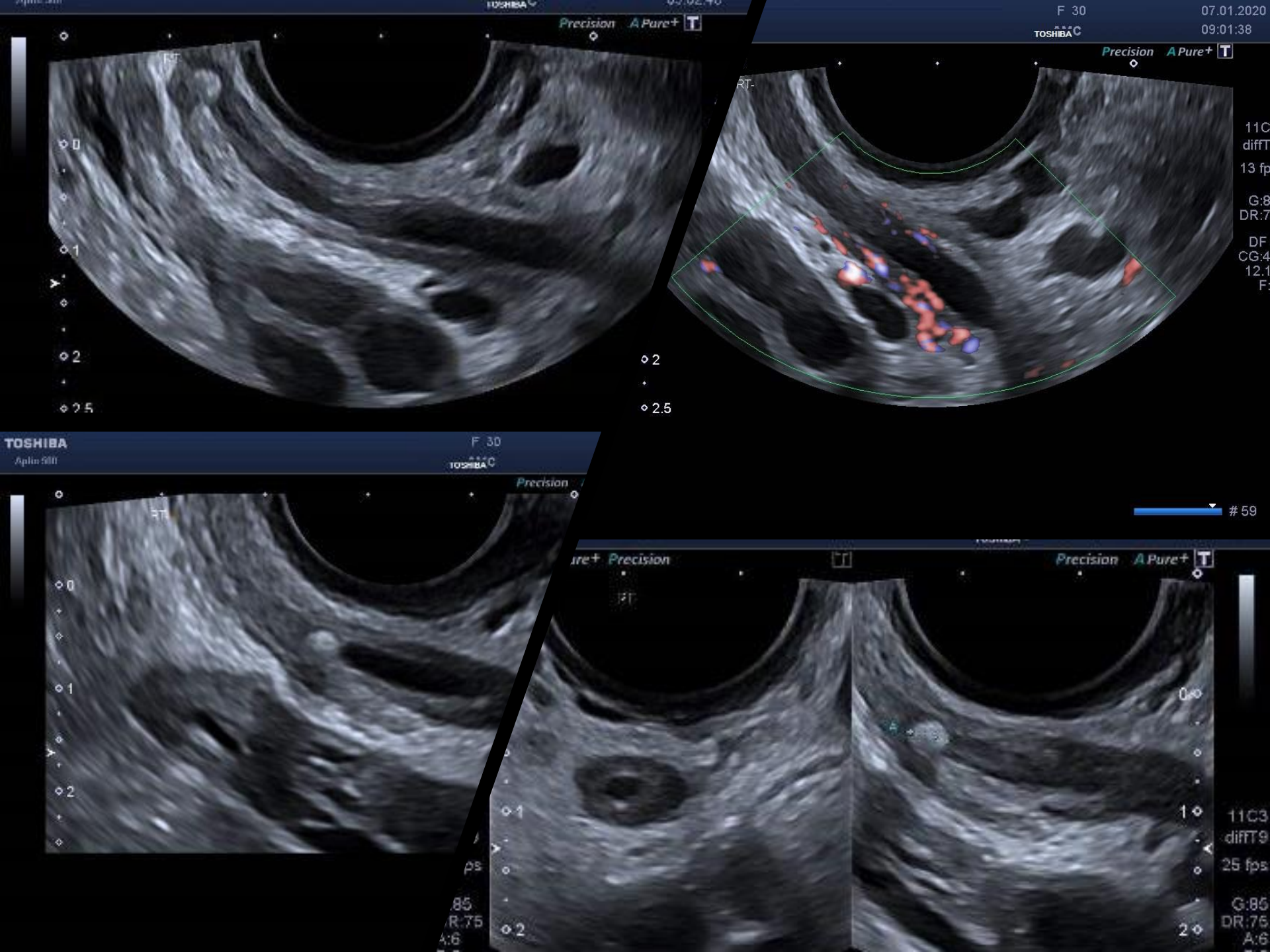
Endometriosis can affect the appendix also

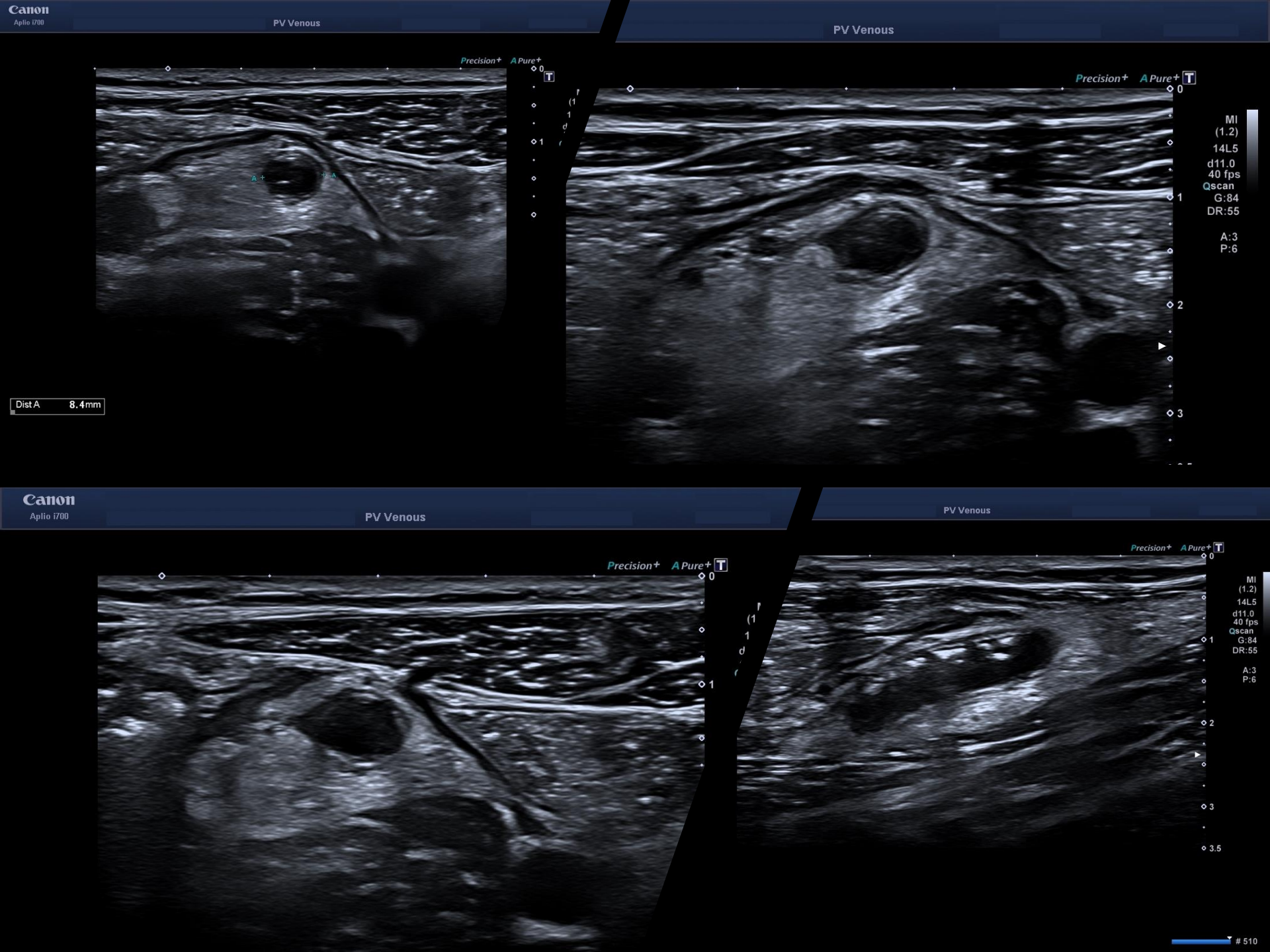



Canon
F 28/01/1975
AMC
09/05/2022
11:46:32
Precision+
LT


Canon
F 28/01/1975
AMC
Precision+
LT

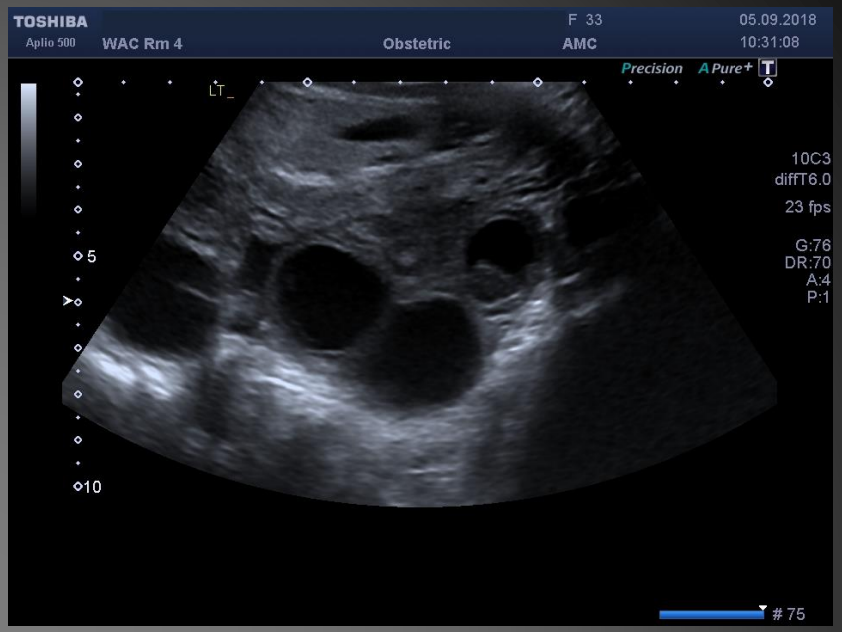

Canon
F 28/01/1975
AMC
09/05/2022
11:46:32
Precision+
Precision+
LT

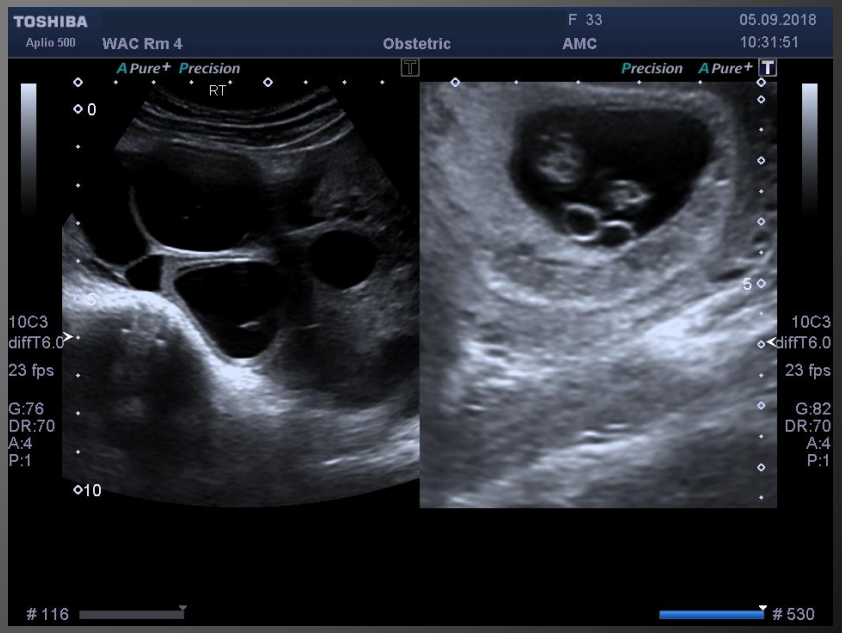

Precision
A Pure+
F 30
07.01.2020
09:01:38
TOSHIBA
Aplio 500
59


Canon
Aplio i700
PV Venous
Precision+
A Pure+
Dist A 8.4mm
MI
(1.2)
14L5
d11.0
40 fps
Qscan
G:84
DR:55
A:3
P:6
510

OHSS







Enlarged ovaries..usually symmetrical

? Torsion

Asymmetry

Learning points

- Clinical correlation is essential
  - PID
  - Torsion (symptoms out of proportion to the ultrasound features)
  - Endometriosis may be an acute pathology WCC CRP etc
- A thorough history is essential
  - Previous surgery
  - Previous pain
- The scan must be systematic and ordered, nothing should be missed: the best examination is a thorough well performed examination considering the clinical question and imaging every organ every time
- The cervix and the vagina are sources of pain and bleeding and must not be overlooked
- Torsion is extremely important to diagnose but remember it is not only the ovary that twists
- Torsion is not NO FLOW, flow suggests viability
  - Symmetric ovaries high NPV for torsion

Thank you for your attention

Any Questions

