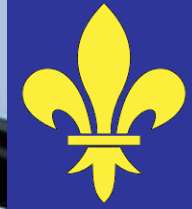


15.20-15.40



ESER  
European Society of  
Emergency Radiology

# Post Partum Complications

Professor Elizabeth Dick, MRCP, FRCR, MD, EDER  
Consultant Radiologist & Professor of Practice, St  
Mary's Campus, Imperial College NHS Trust,  
London, UK

Past President European Society of Radiology

[pollEv.com/edick900](https://pollEv.com/edick900)

Nordter, Aarhus, DK May 2023

All patients anonymised and pseudoanonymised  
Thank you to Dr Nishat Bharwani, Dr Mary Crofton



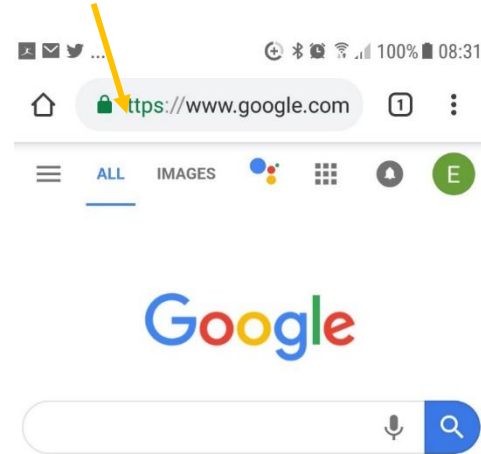


We will be doing anonymous voting,  
please enter this address on your phone



Enter `pollEv.com/edick900` on your browser

- `pollEv.com/edick900`



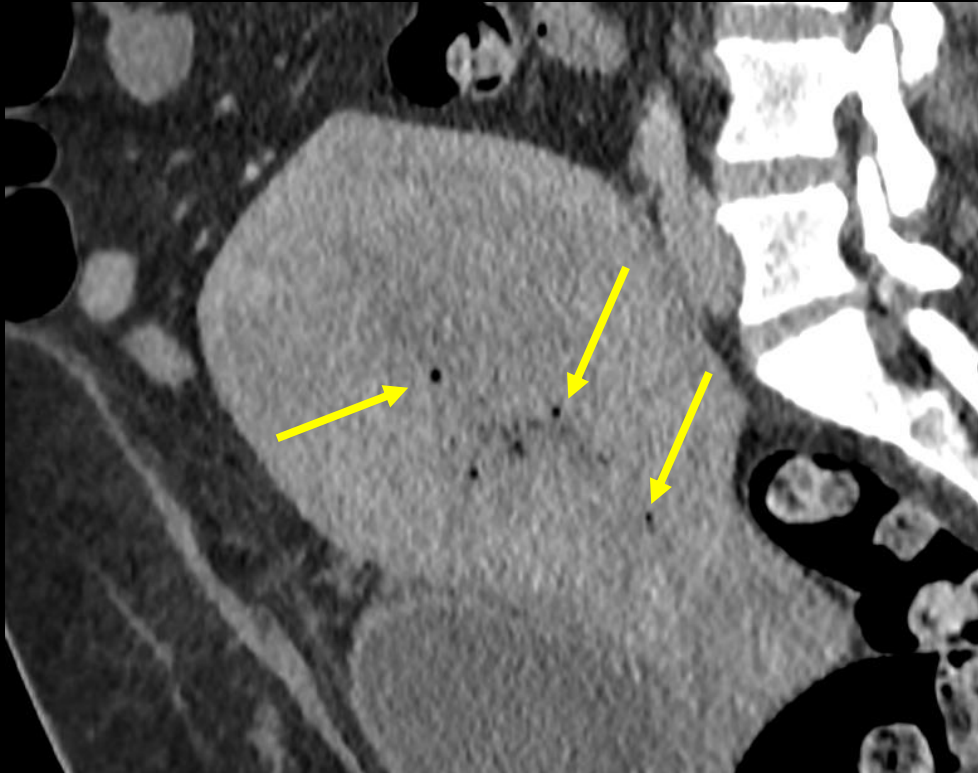
# Learning Objectives

- Build your internal memory bank of normal post partum appearances
- Improve your confidence about identifying abnormal features
- Develop a checklist for postpartum CT

[pollEv.com/edick900](https://pollEv.com/edick900)



D7 post elective Caesarean section.  
Fever, pain. Normal appearances?



[pollEv.com/edick900](https://pollEv.com/edick900)

When poll is active, respond at [pollev.com/edick900](https://pollev.com/edick900)

Text **EDICK900** to **07480 781235** once to join



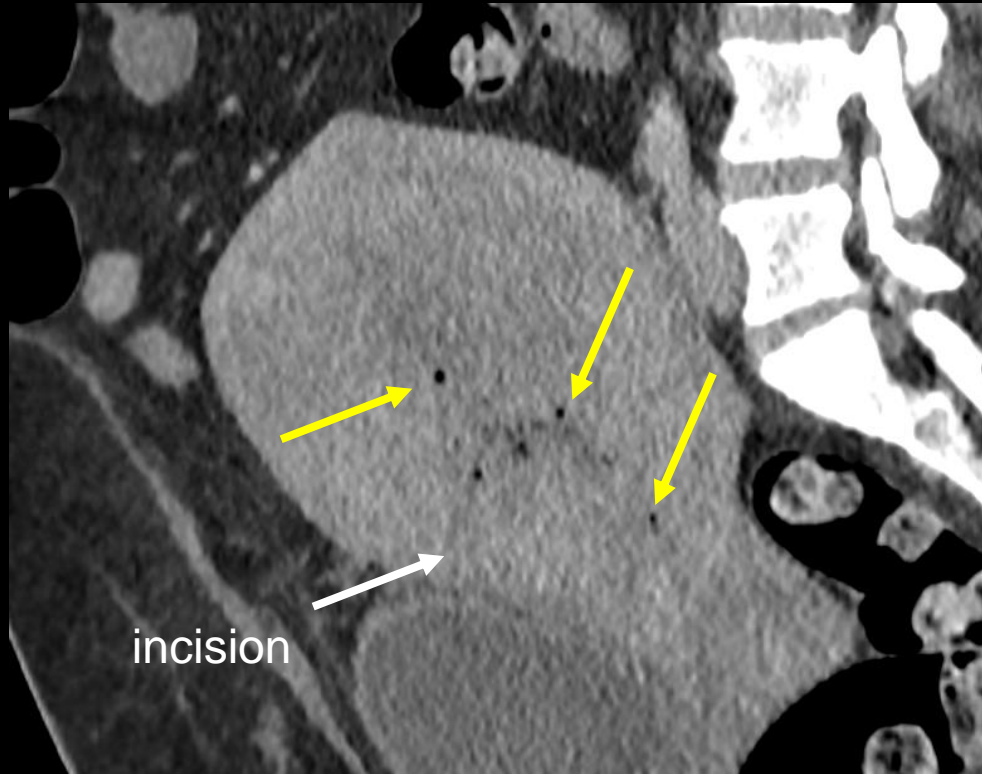
## Day 7 post partum, what do you think?

There is too much intrauterine  
air - suspect endometritis

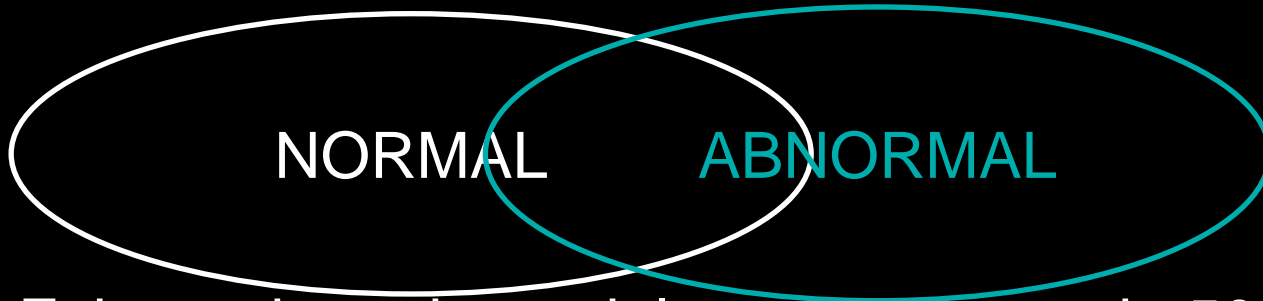
It would depend on the clinical  
picture

Intrauterine air is normal up  
to 3 weeks post birth

# D7 post elective CS

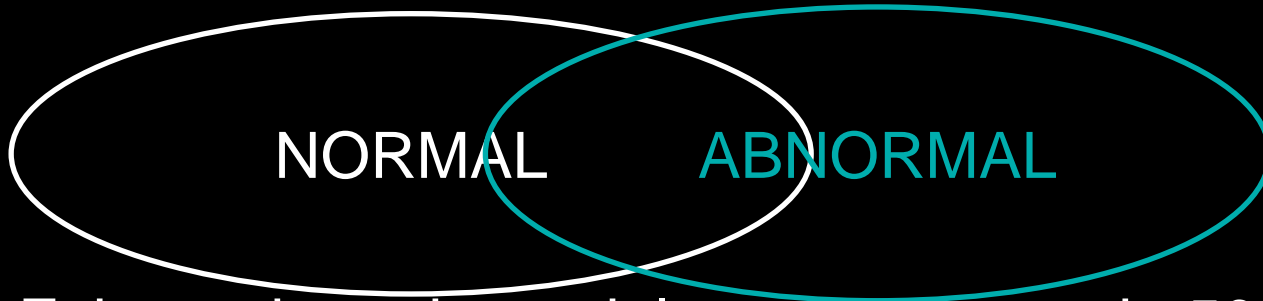


# Post-partum imaging



- Echogenic endometrial mass – occurs in 50% normal women 7/7 postpartum
- Range of vascularity of post partum uterus
- Gas within endometrial cavity normal for up to 3/52

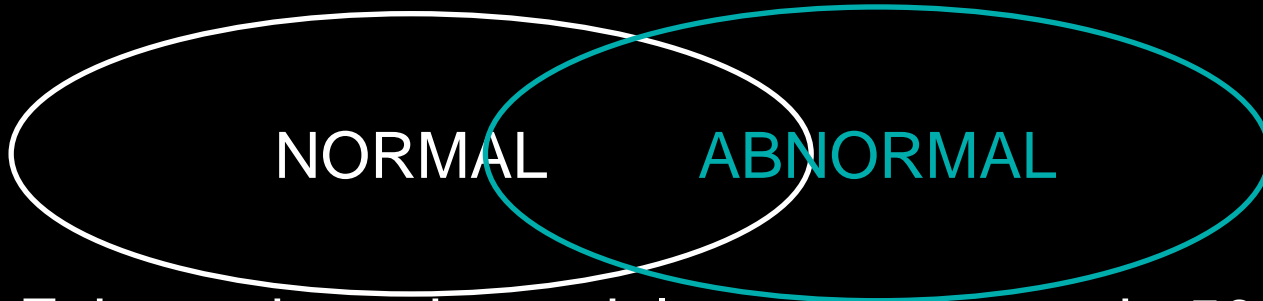
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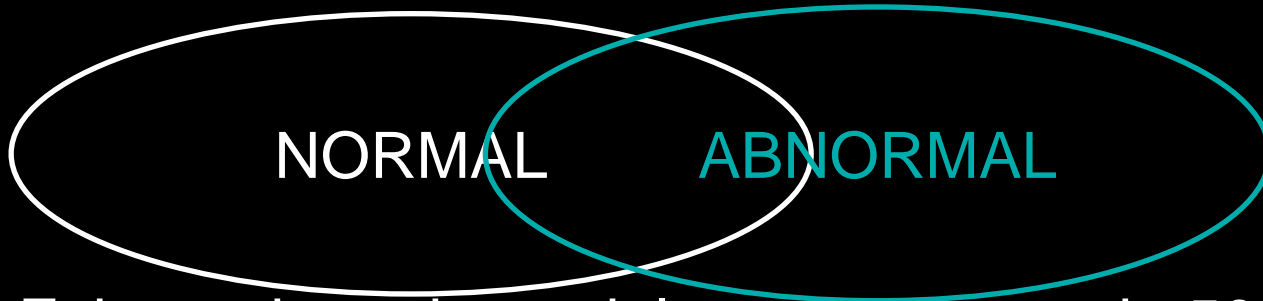


# Post-partum imaging



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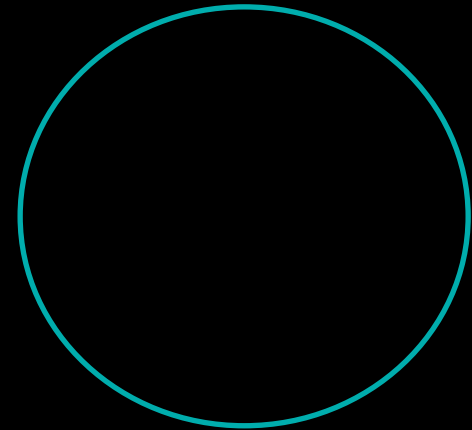
# Post-partum imaging



- Echogenic endometrial mass – occurs in 50% normal women 7/7 postpartum **ALSO sign of Retained Products of Conception (RPOC)**
- Range of vascularity of post partum uterus **↑ in RPOC**
- Gas within endometrial cavity normal for up to 3/52 **ALSO sign of endometritis**

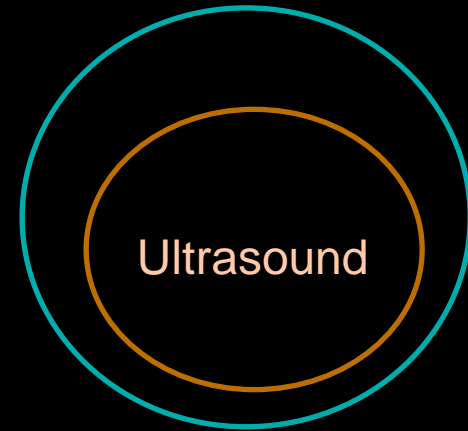
# Post-partum imaging - Challenges

- Clinical Findings non specific  
(fever/↑WCC,abdo pain, vaginal bleeding)
- Most patients seen by Obstetric/Gynae  
Dept
- Ultrasound – done by Obs/Gynae
- CT – Radiology gets involved



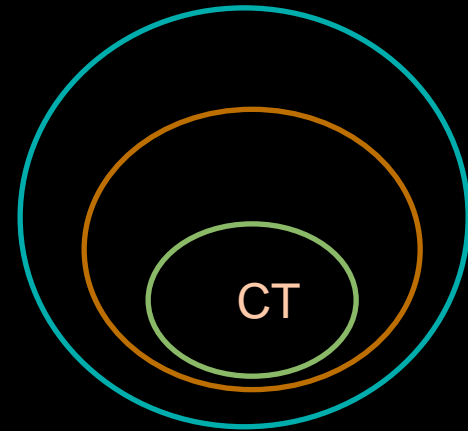
# Post-partum imaging - Challenges

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# Post-partum imaging - Challenges

- Clinical Findings non specific (fever/↑WCC, abdo pain, vaginal bleeding)
- Most patients seen by Obstetric/Gynae Dept
- Ultrasound – done by Obs/Gynae
- CT – Radiology gets involved



# Post-partum period

- From delivery of fetus and placenta to 6 weeks

OR

- Post spontaneous or elective abortion
- 75% of perinatal maternal deaths occur in this time

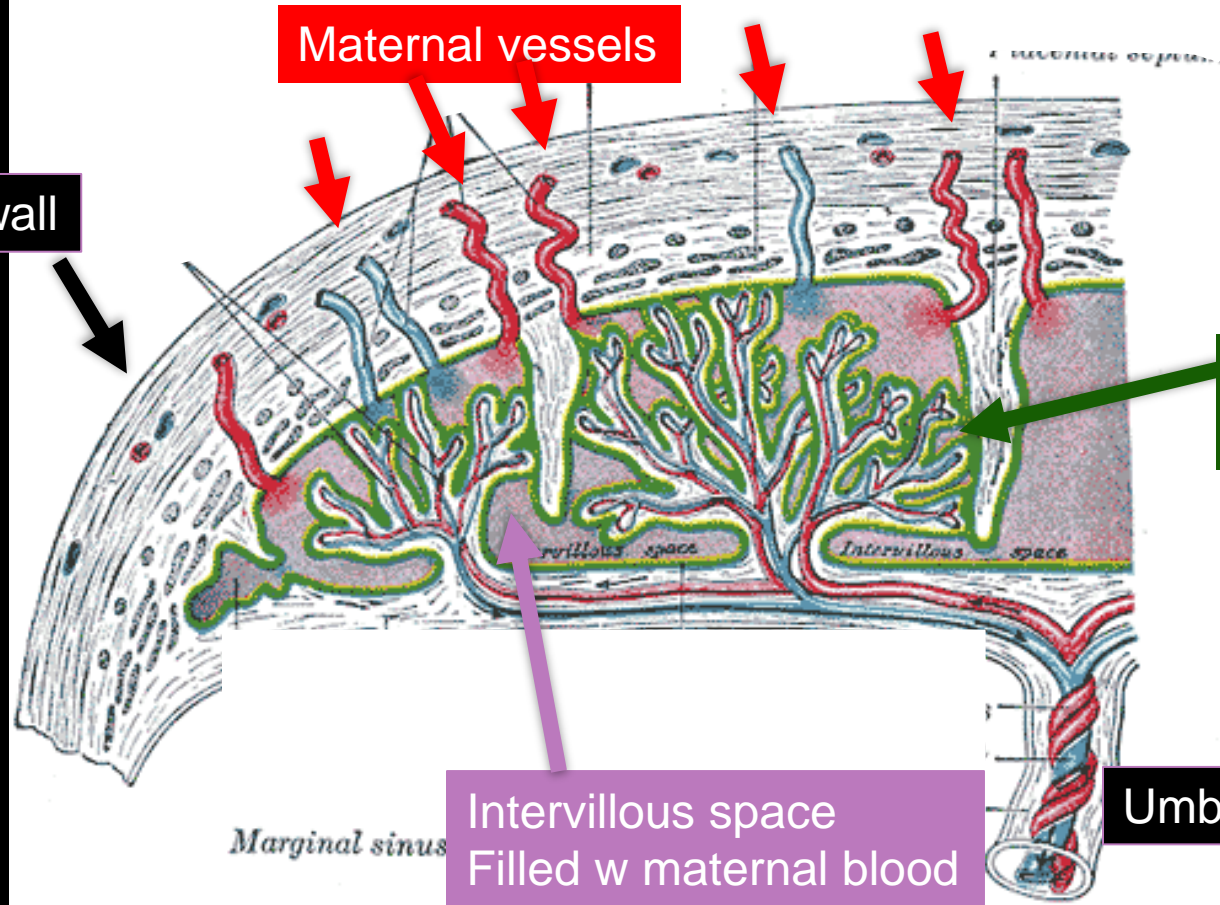
# Quick Revision – Normal Physiology and Placenta formation





# Placenta

fetal and maternal components



Uterine wall

Maternal vessels

Chorionic villi  
(from fetus)

Intervillous space  
Filled w maternal blood

Umbilical Vein/Artery

# Post Delivery

- Placenta detaches and is delivered
- Sub placental haematoma forms
- Strong myometrial contractions +++
- Prominent vessels contract
- Endometrial cavity can contain fluid, blood clots, gas
- 6/52 Lochia discharged per vaginum
- Lochia: contains blood, mucus, decidua, membranes

# CHECKLIST



# CHECKLIST

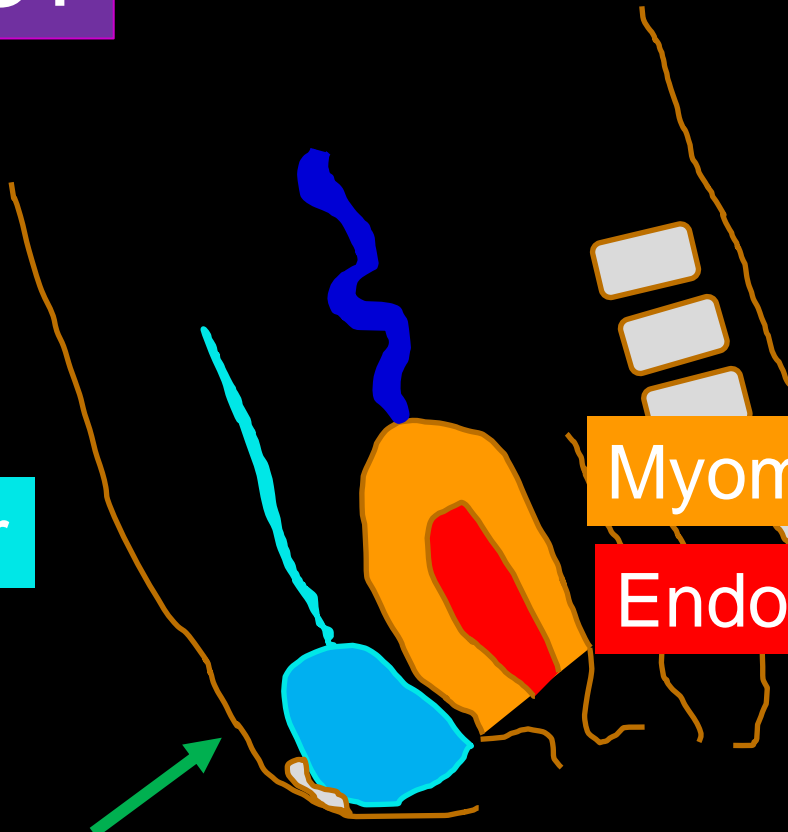
Ovarian vein

Bladder/Ureter

Myometrium

Endometrial cavity

Post Caesarian complications



# CHECKLIST

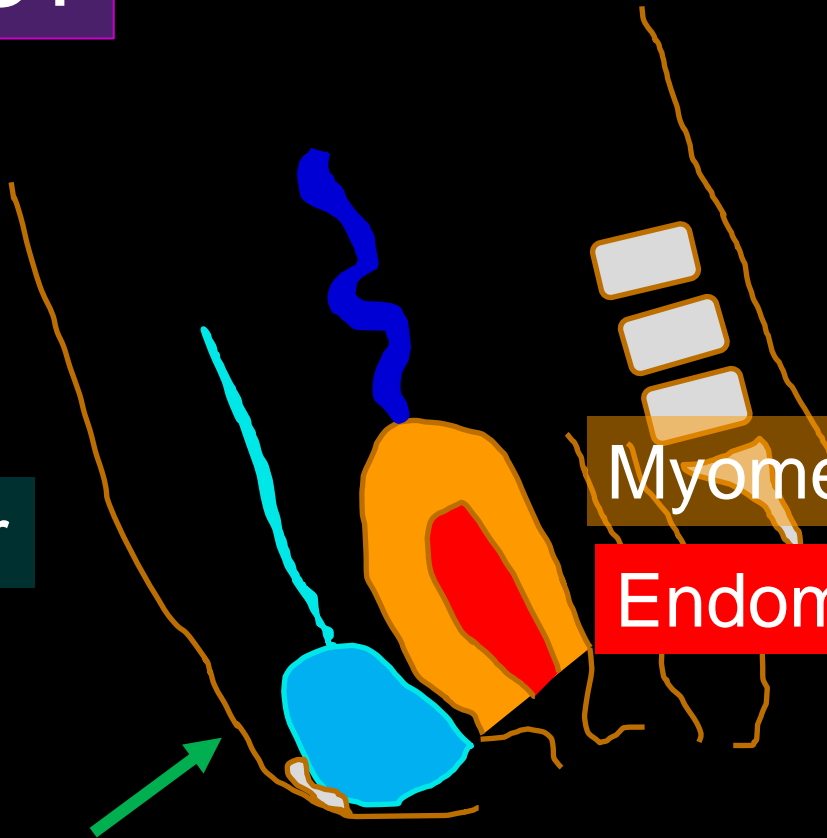
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Myometrium

Endometrial cavity

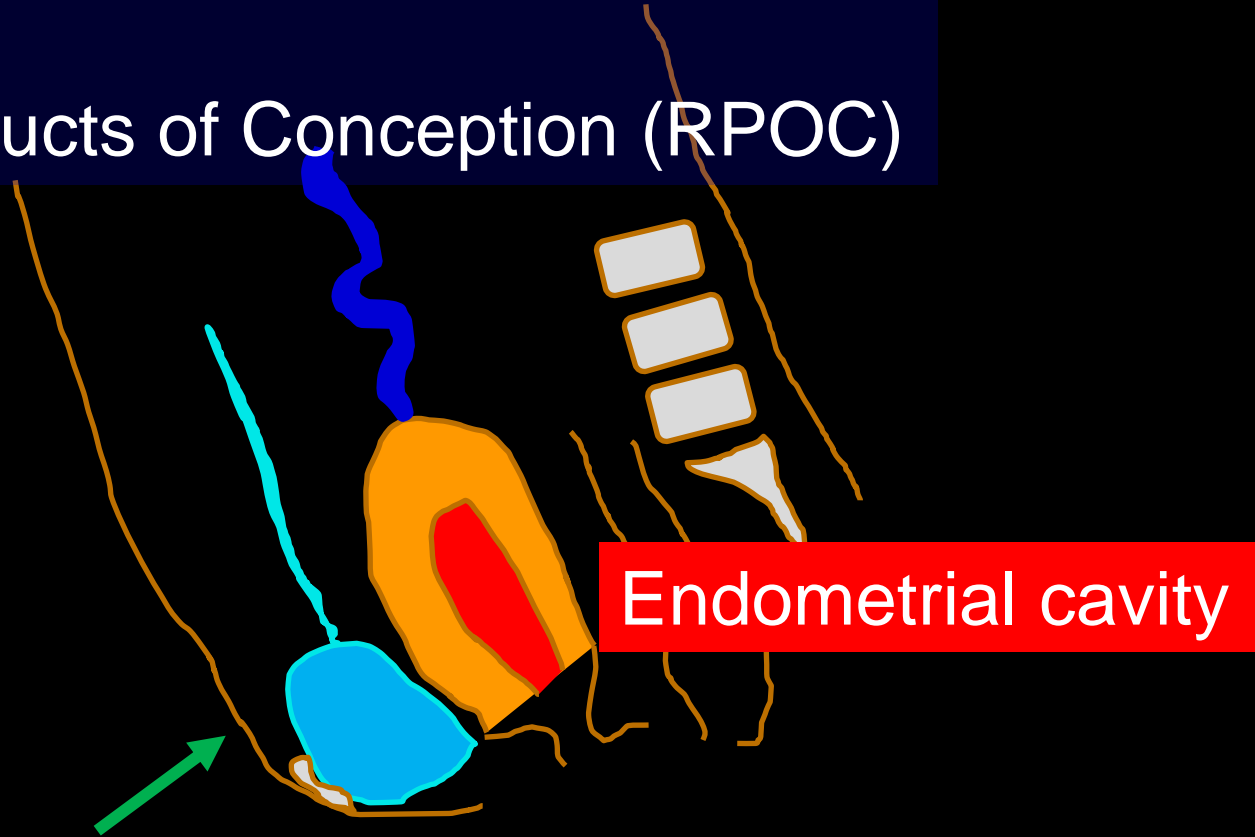
Post Caesarian complications



Post Partum Haemorrhage

Endometritis

Retained Products of Conception (RPOC)



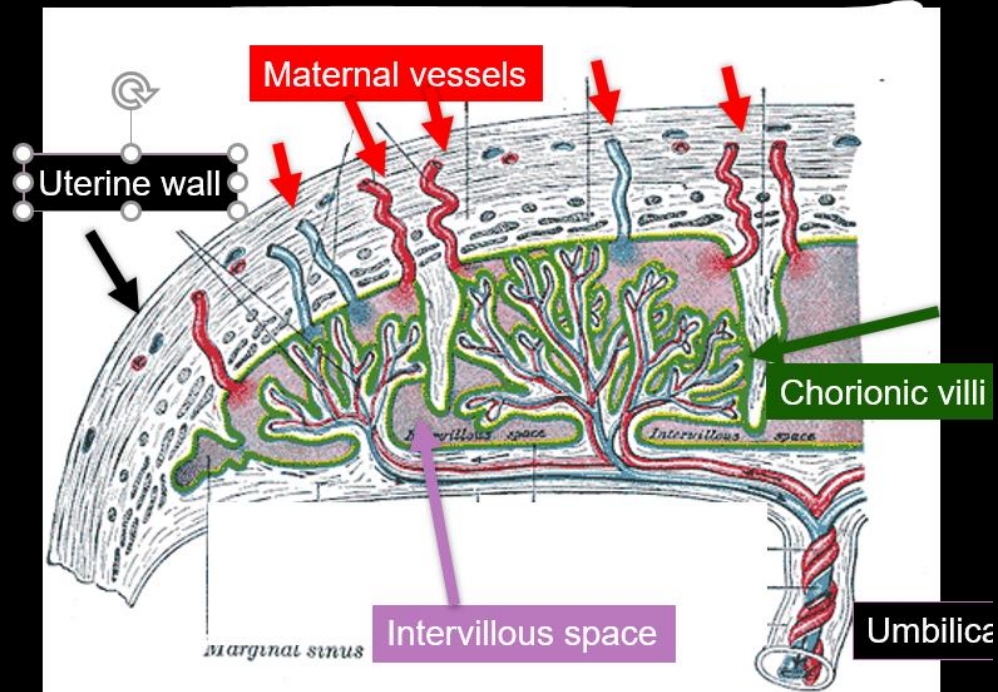
# Post-partum haemorrhage

- Primary (First 24 hrs)
- >500ml vaginal delivery
- >1000ml CS
  
- Secondary (24 hrs to 8 weeks post partum)
- RPOC most common cause

# Post partum Haemorrhage – RISKS

## 4 Ts

- Tone (eg multiple pregnancy, slow labour)
- Trauma/tear (episiotomy)
- Thrombin (pre-eclampsia)
- Tissue (retained placenta)





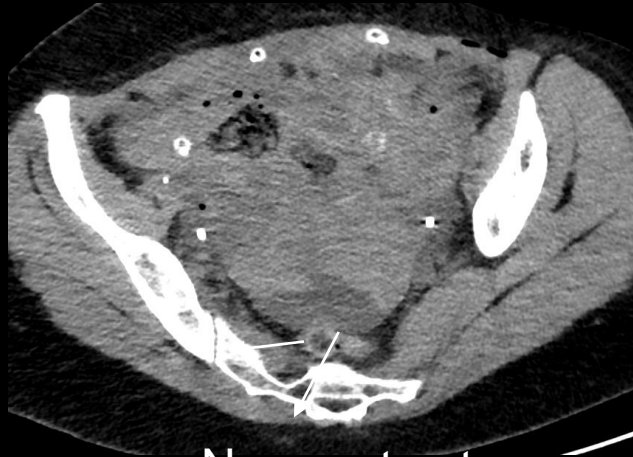
# Post partum Haemorrhage – Role of Interventional Radiology

- Arterial embolization effective in 86% of patients with PPH
- Preserves fertility



Prevention and Management of Postpartum Haemorrhage

Green-top Guideline No. 52  
December 2016



Non contrast

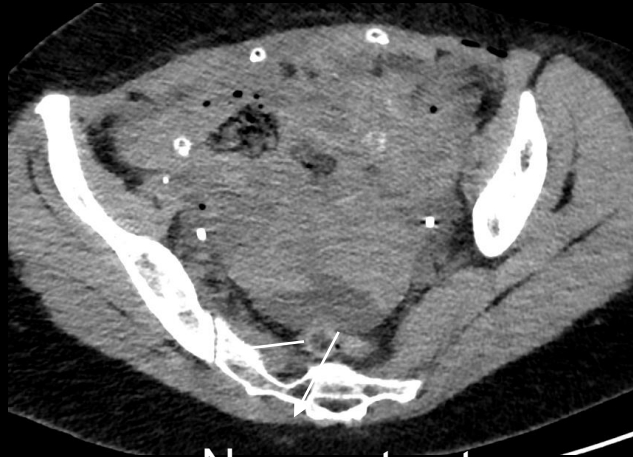


arterial



venous

Post hysterectomy, lost 40 units blood, hypotensive



Non contrast

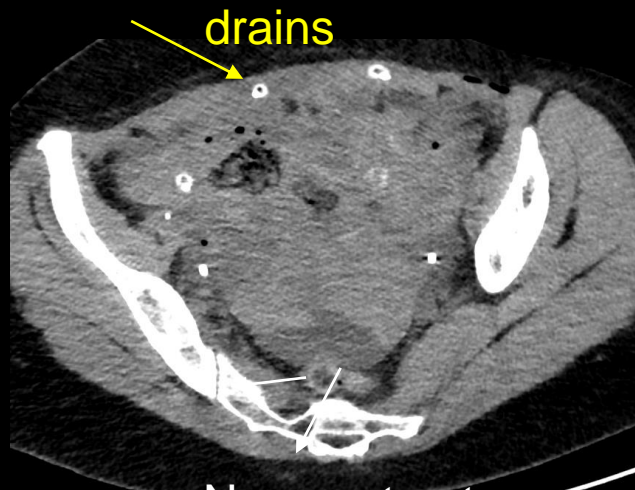


arterial



venous

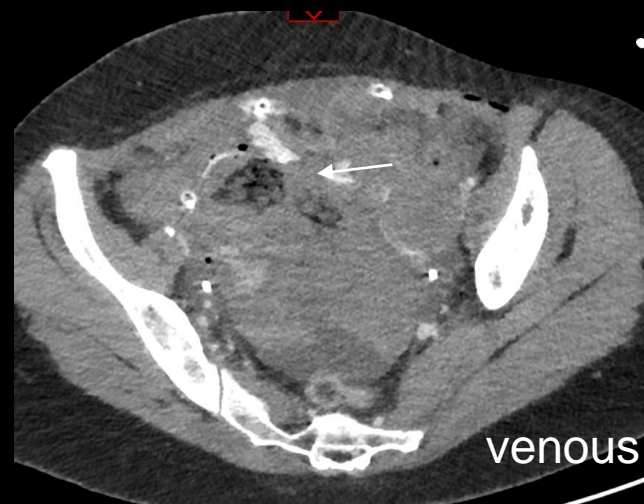
Post  
hysterectomy,  
lost 40 units  
blood,  
hypotensive



Non contrast

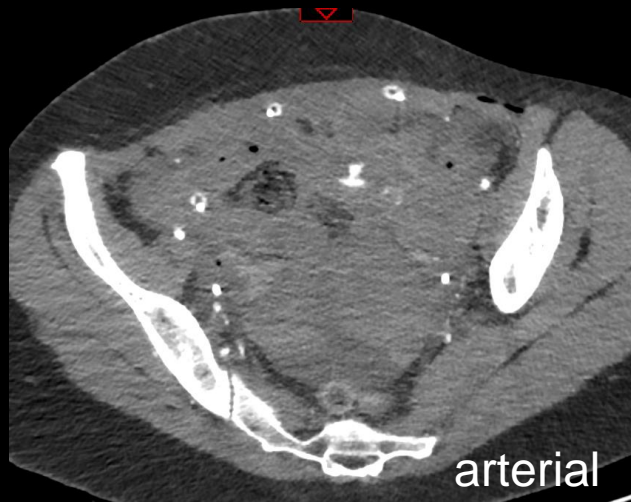
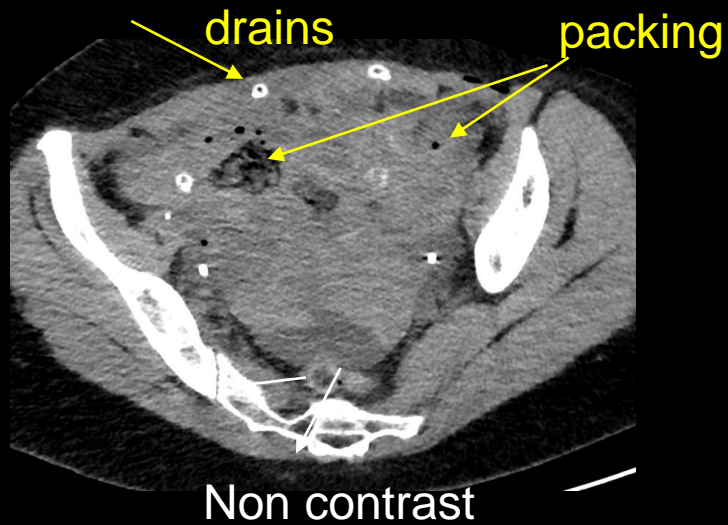


arterial



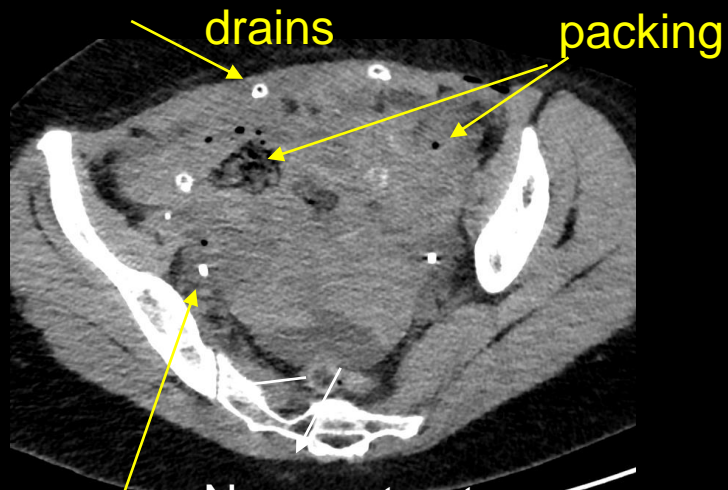
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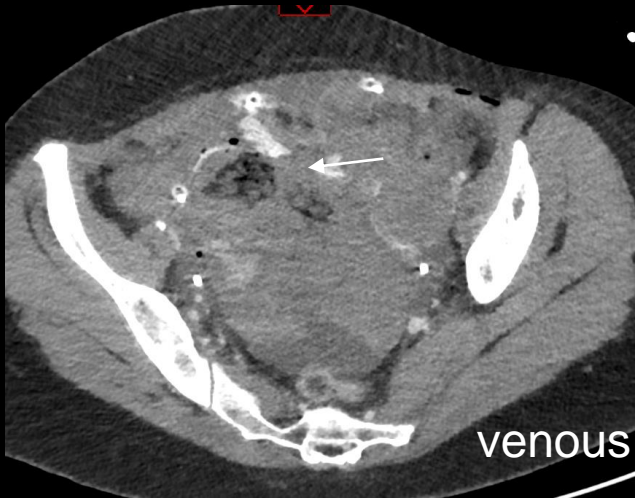
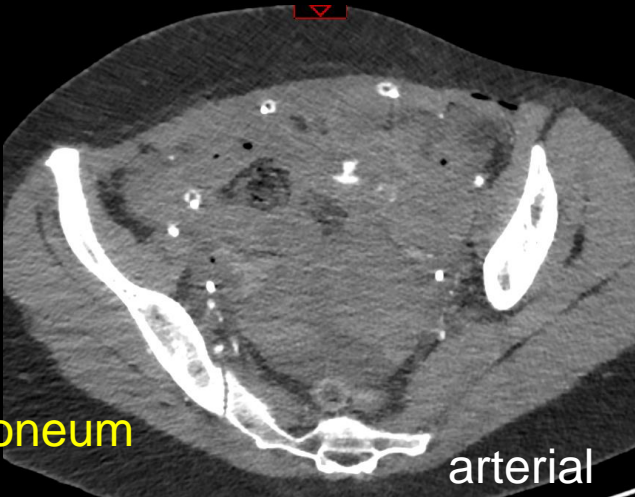
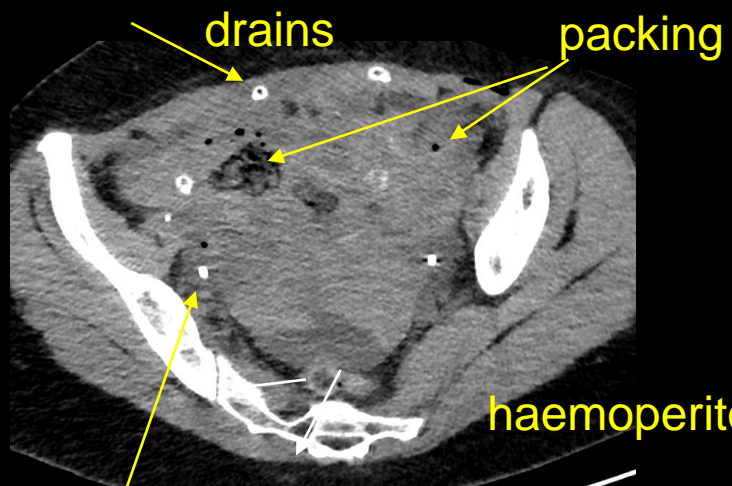


Post  
hysterectomy,  
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hypotensive

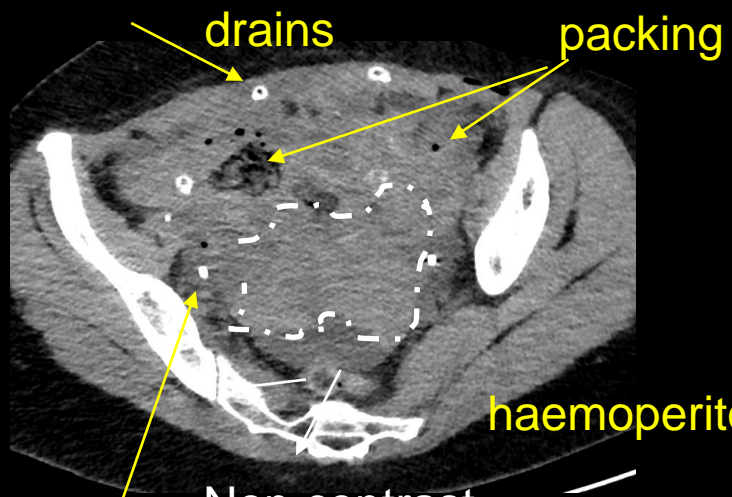




Post hysterectomy, lost 40 units blood, hypotensive



Post hysterectomy, lost 40 units blood, hypotensive



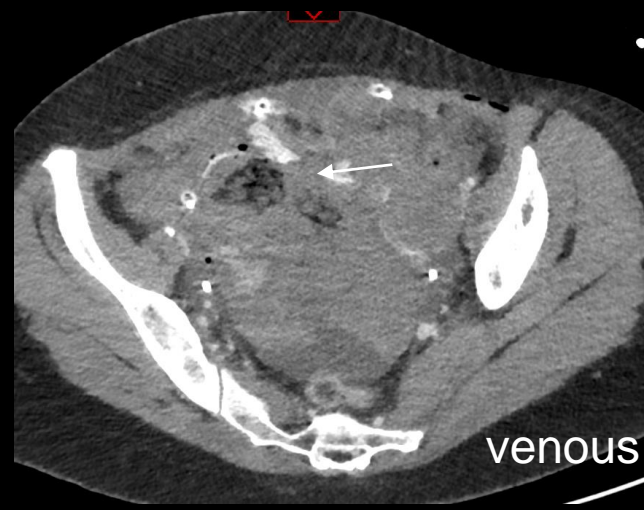
Non contrast

Ureteric stents

haemoperitoneum



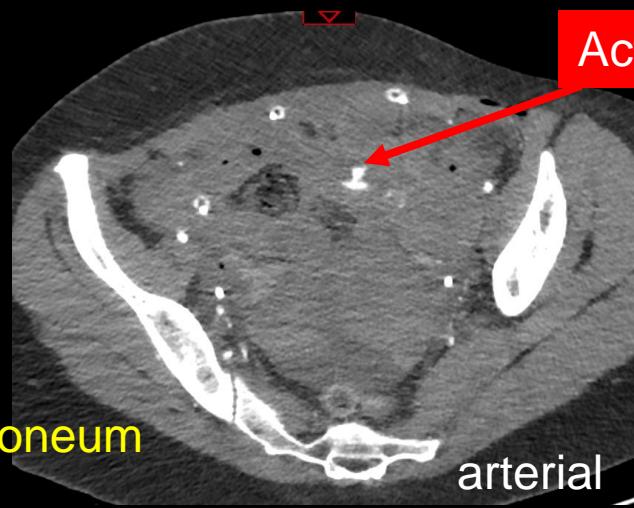
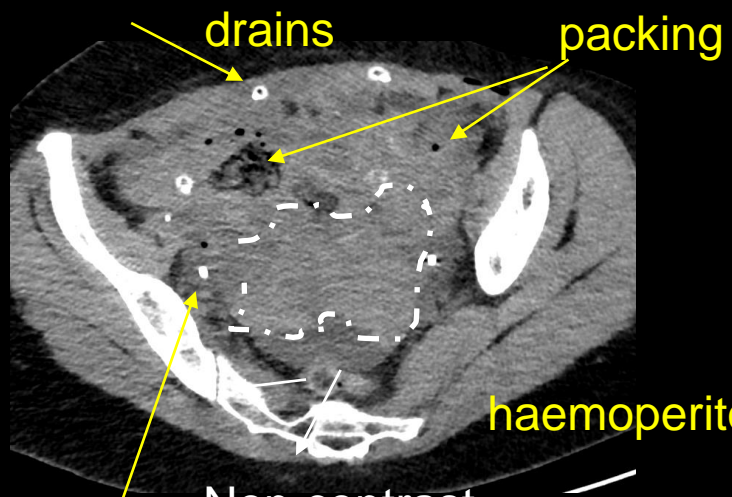
arterial



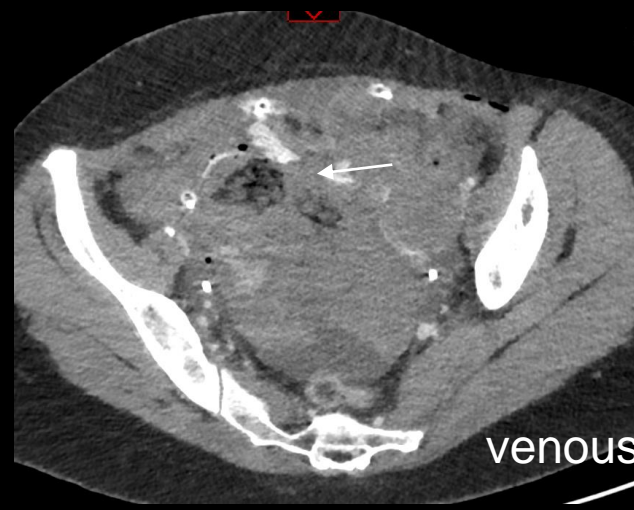
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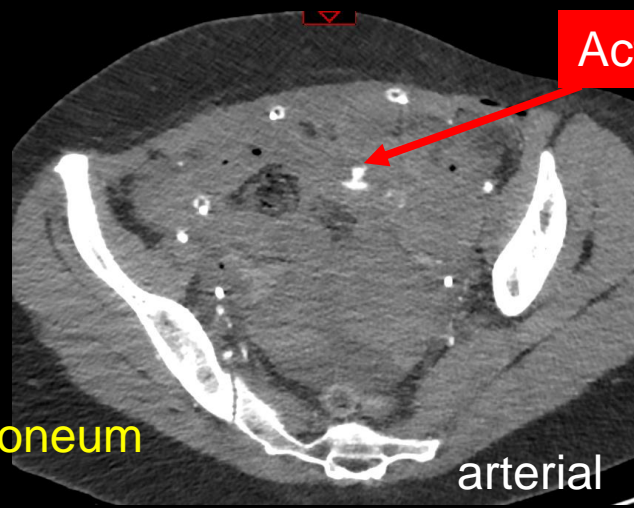
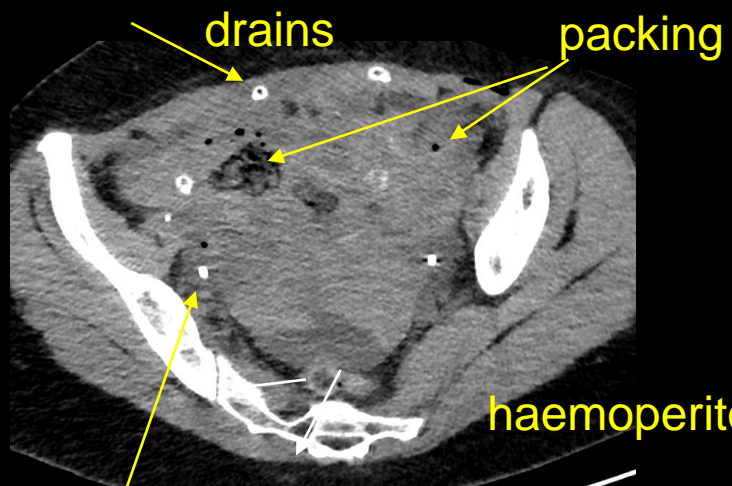
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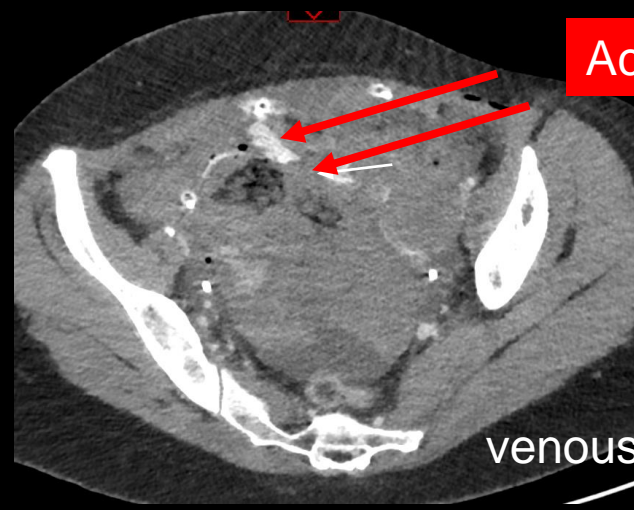


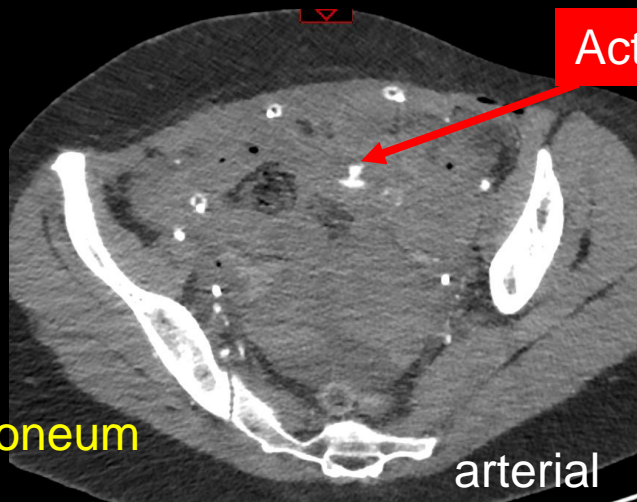
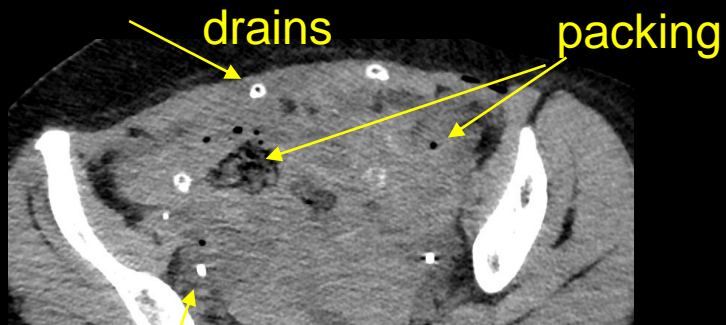
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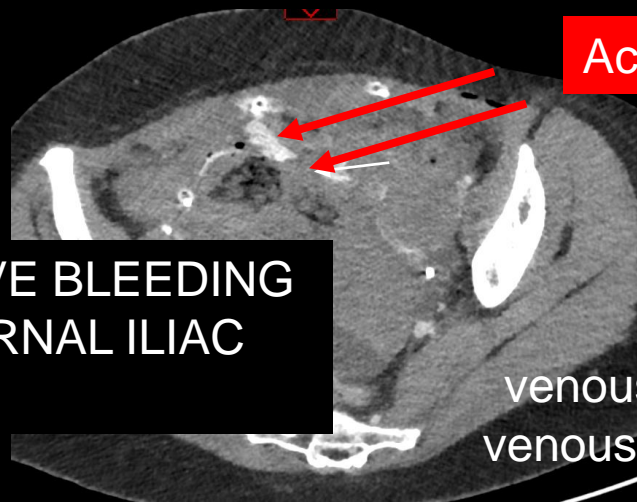
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Post hysterectomy, lost 40 units blood, hypotensive

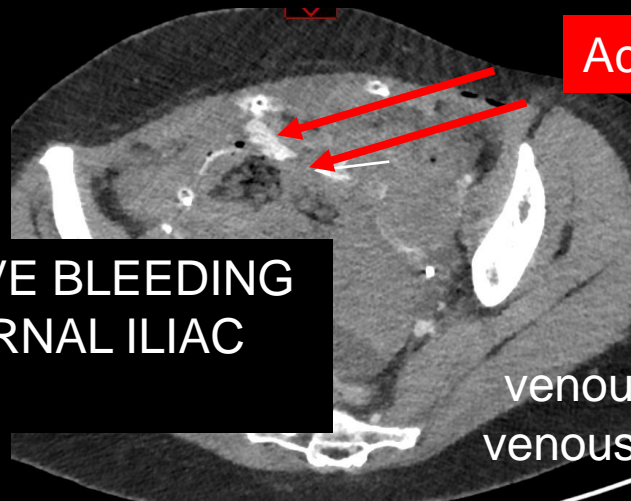
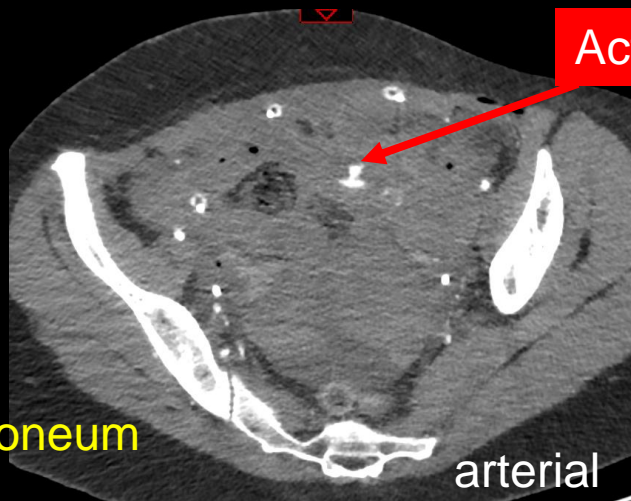
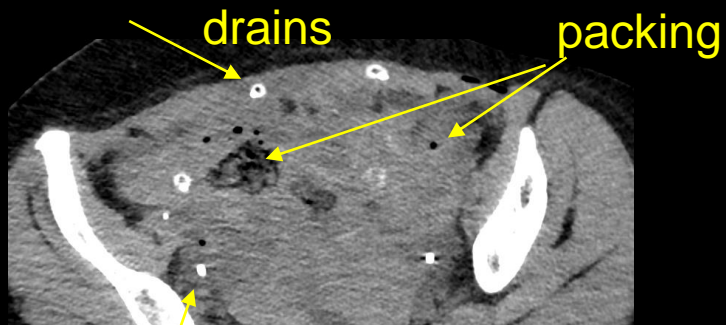
haemoperitoneum



ANGIO – ACTIVE BLEEDING  
BRANCH INTERNAL ILIAC  
(EMBOLISED)

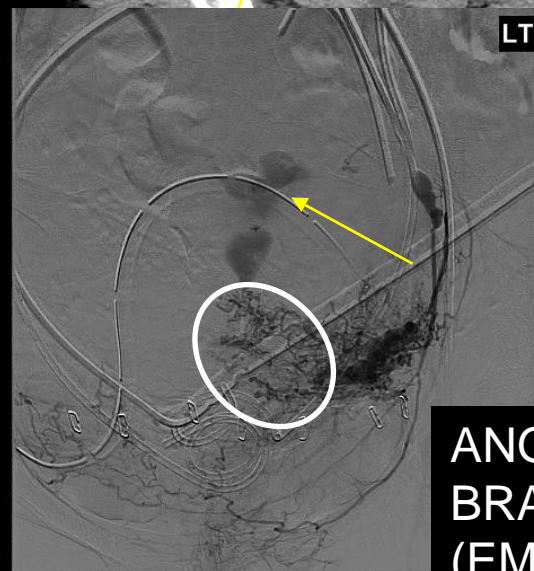




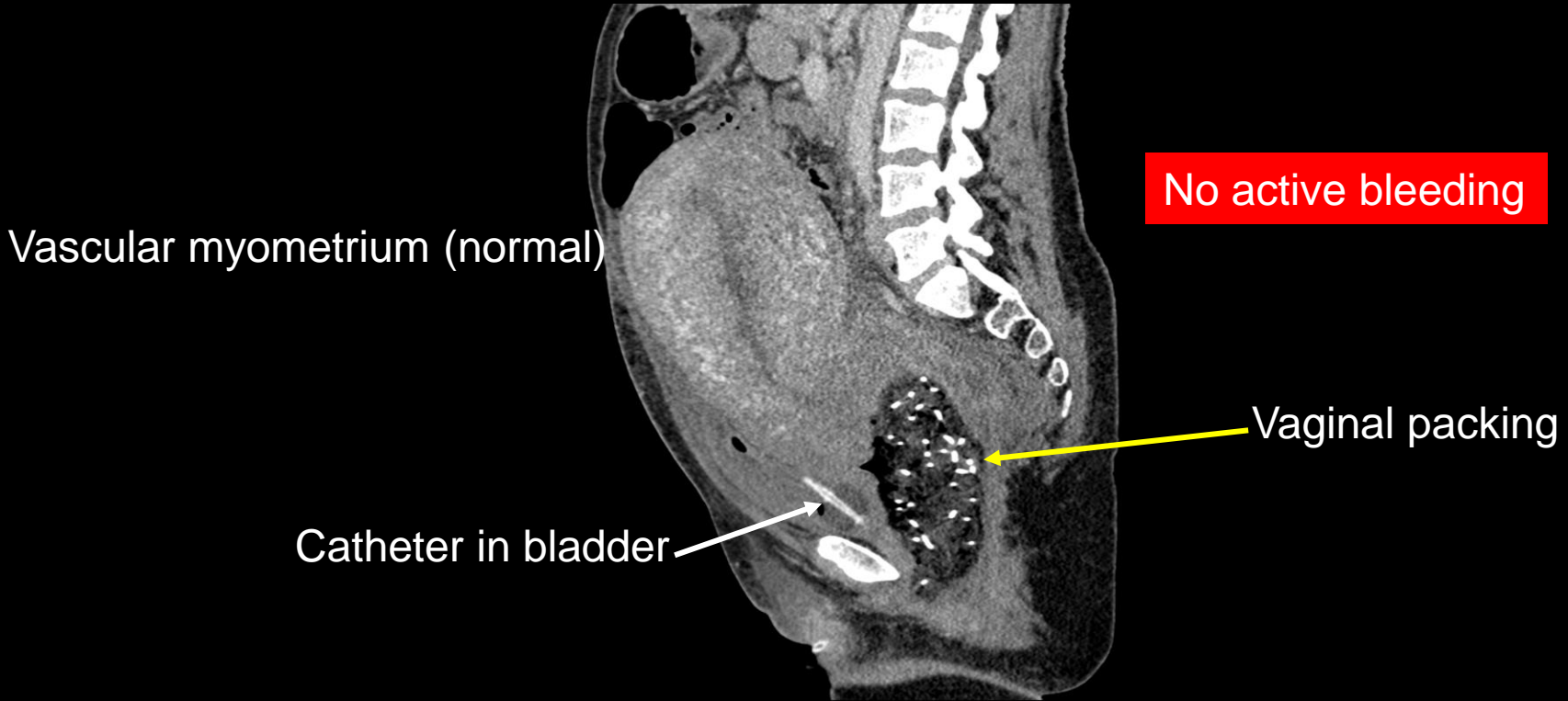


haemoperitoneum

ANGIO – ACTIVE BLEEDING  
BRANCH INTERNAL ILIAC  
(EMBOLISED)



# Day 0. Vaginal laceration (vaginal delivery), Massive bleeding/post partum haemorrhage



# Retained products of conception RPOC

- Overall incidence 3-5% (for all pregnancies)
- Can occur after termination of pregnancy, miscarriage and fetal delivery
- Any trimester (2<sup>nd</sup> most common)

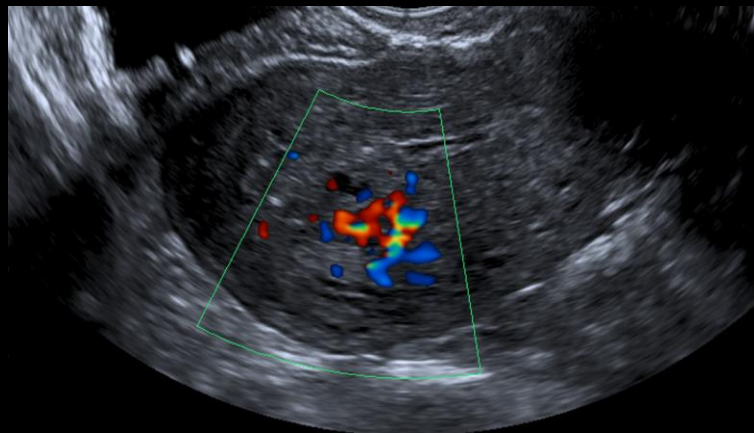
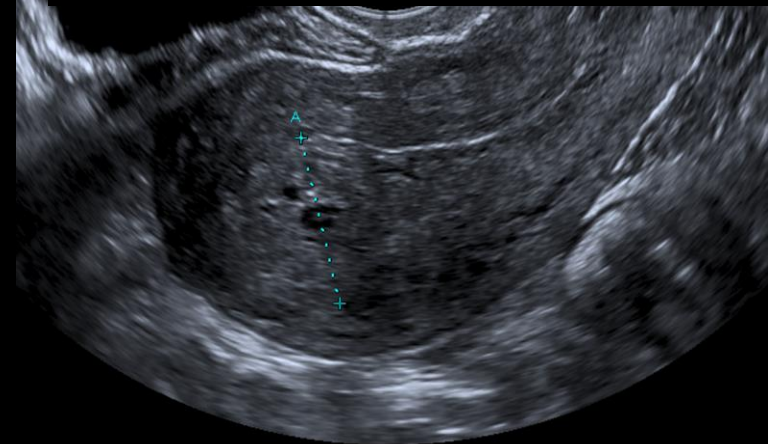
# Retained Products of Conception (RPOC)

## ULTRASOUND:

1. Endometrial echo complex (EEC) thickening >10mm
2. Echogenic mass
3. Hypervascularity (of mass) on doppler (v sensitive) (Grade 1 to 4)

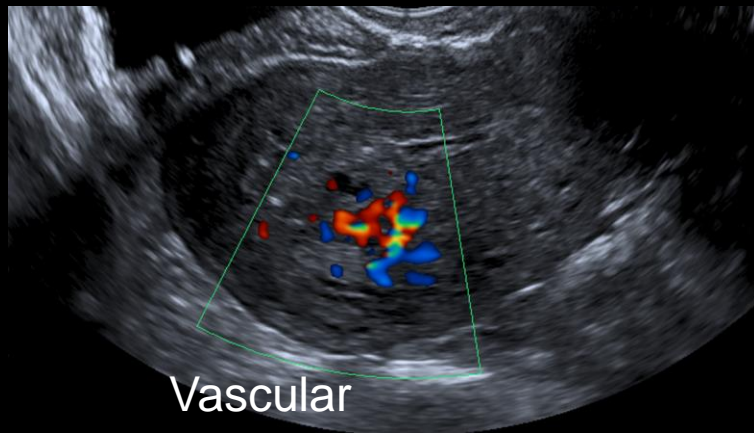
Plunk, Lee, Kani et al *Imaging of Postpartum Complications, a multimodality review* AJR 2013  
Gonzalo-Carbelles et al, *Radiographics* 2020 A pictorial review of postpartum complications

# 6/52 post medical termination of pregnancy, persistent bleeding

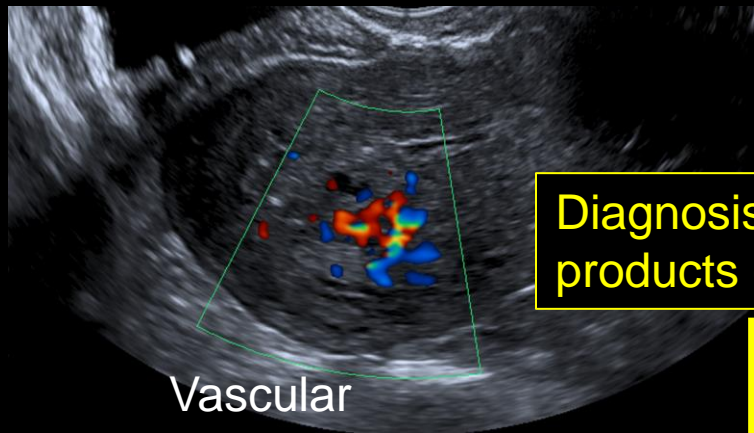
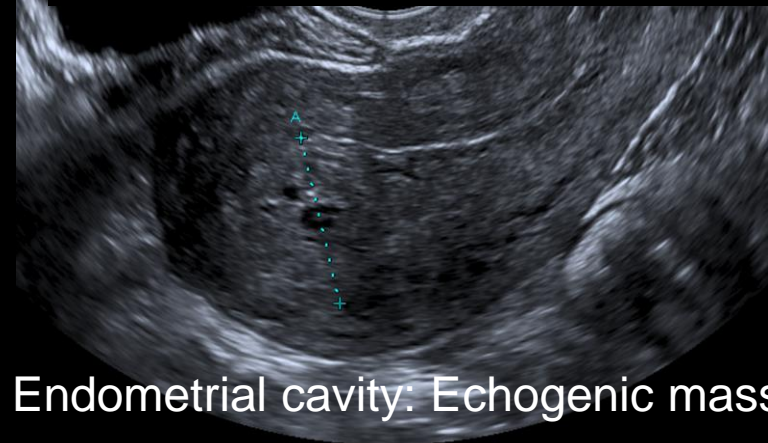




# 6/52 post medical termination of pregnancy, persistent bleeding



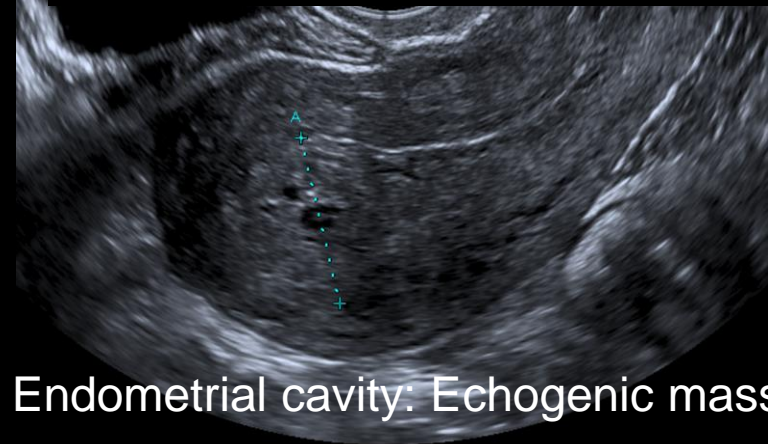
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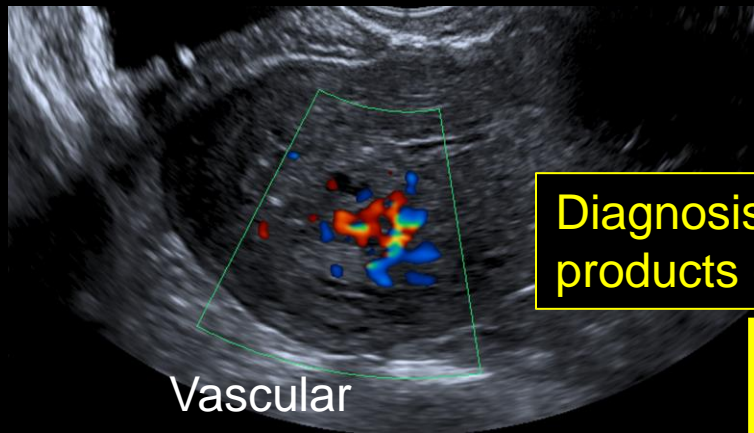
Diagnosis: Retained products of conception



# 6/52 post medical termination of pregnancy, persistent bleeding



Endometrial cavity: Echogenic mass



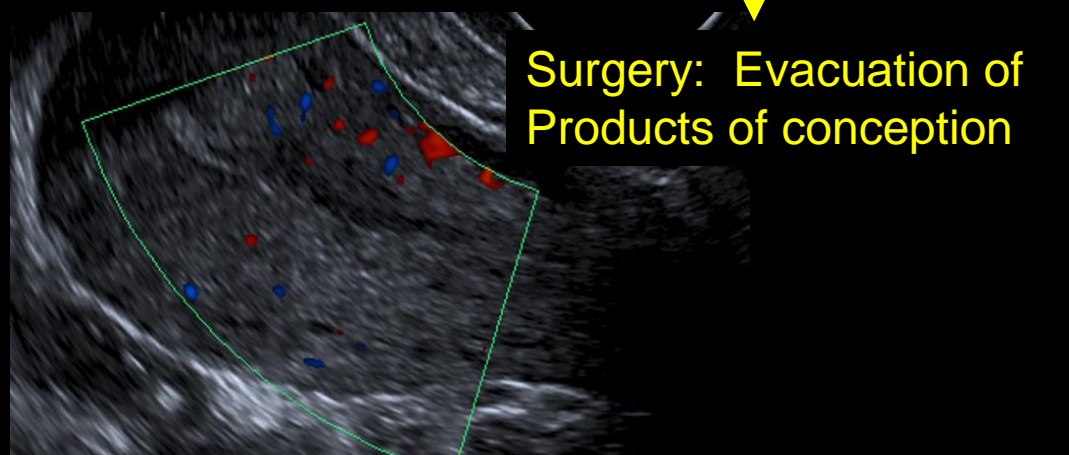
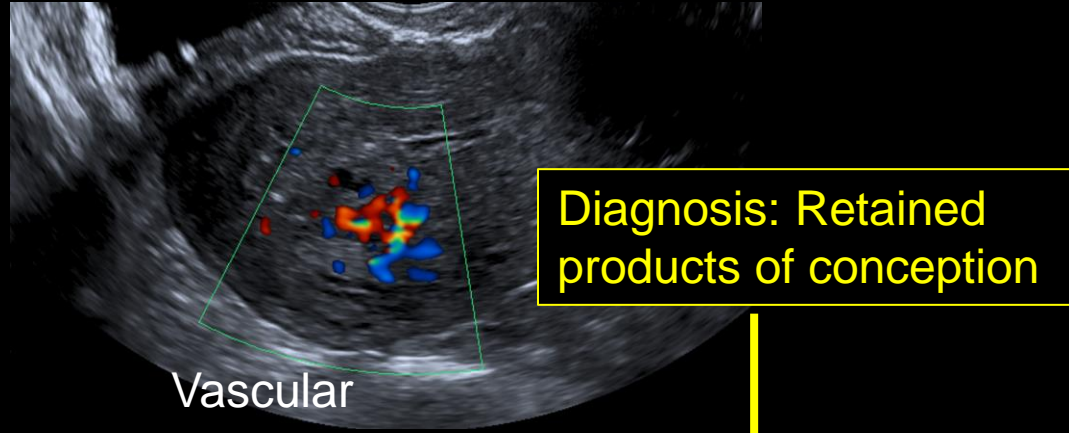
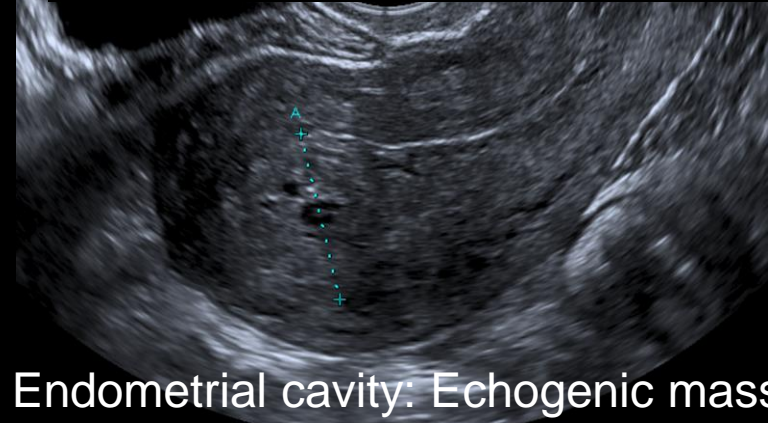
Vascular

Diagnosis: Retained products of conception



Surgery: Evacuation of Products of conception

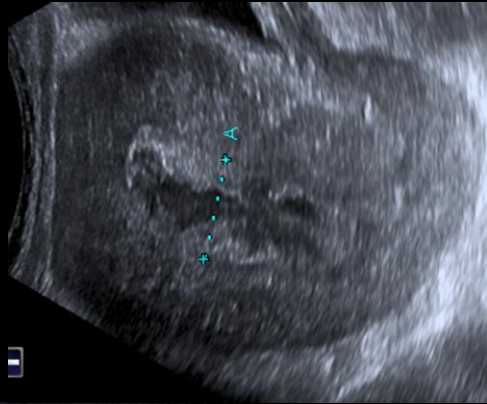
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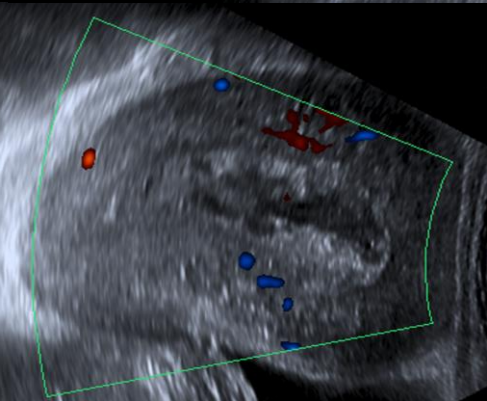


# Endometrium

DAY 9



Endometrium thick,  
echogenic, fluid  
contents



not vascular

?? RPOC  
?? normal

# How should this patient be managed?

Echogenic thick endometrium  
= RPOC, needs surgery

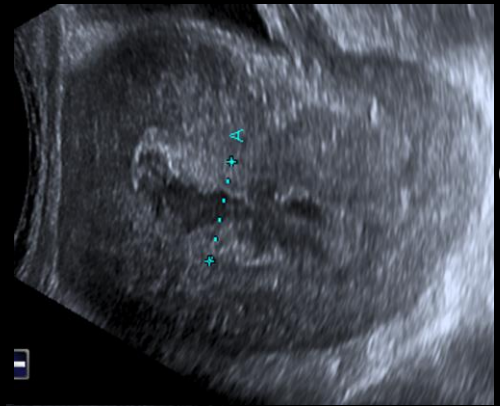
Lack of vascularity = not  
RPOC, does not need surgery

Ultrasound not definitive,  
depends on clinical findings

Ultrasound not definitive,  
repeat in 8 weeks

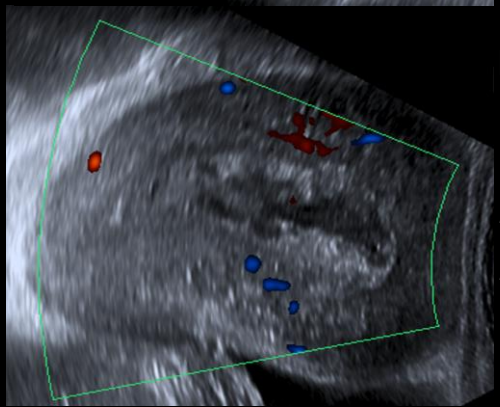
# Endometrium – variable appearance

DAY 9



Endometrium thick,  
echogenic,

Dx: Normal uterine contents: lochia, clot, fluid



not vascular

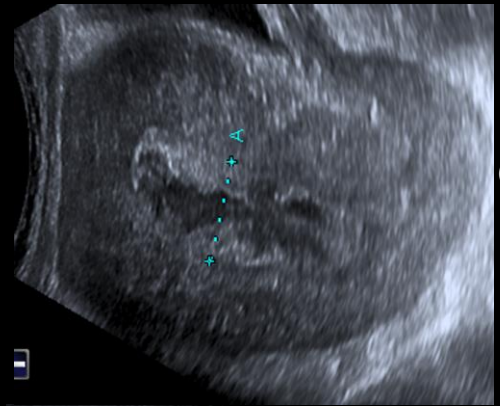
?? RPOC

?? normal

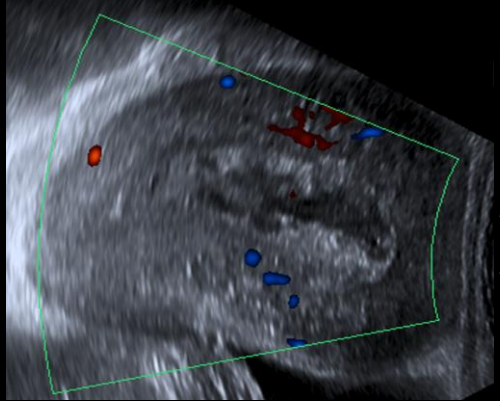
→ Conservative Management

# Endometrium – variable appearance

DAY 9



Endometrium thick,  
echogenic,



not vascular

?? RPOC

?? normal

→ Conservative Management

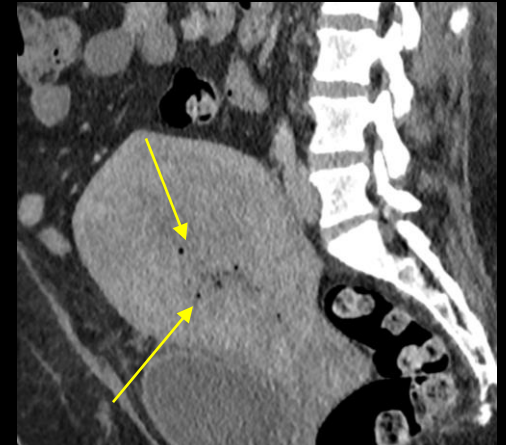
6 weeks - normal





# Endometritis = a clinical diagnosis

- Infection of uterine decidua
- ↑ risk post CS (occurs in up to 25% CS, 3% post SVD)
- Rx: Antibiotics
- Imaging non specific
- infection can track thru tissue planes



Day 4 Intrauterine gas  
- Non specific finding

Plunk, Lee, Kani et al Imaging of Postpartum Complications, a multimodality review AJR 2013 Gonzalo-Carbelles et al, Radiographics 2020 A pictorial review of postpartum complications

# CHECKLIST

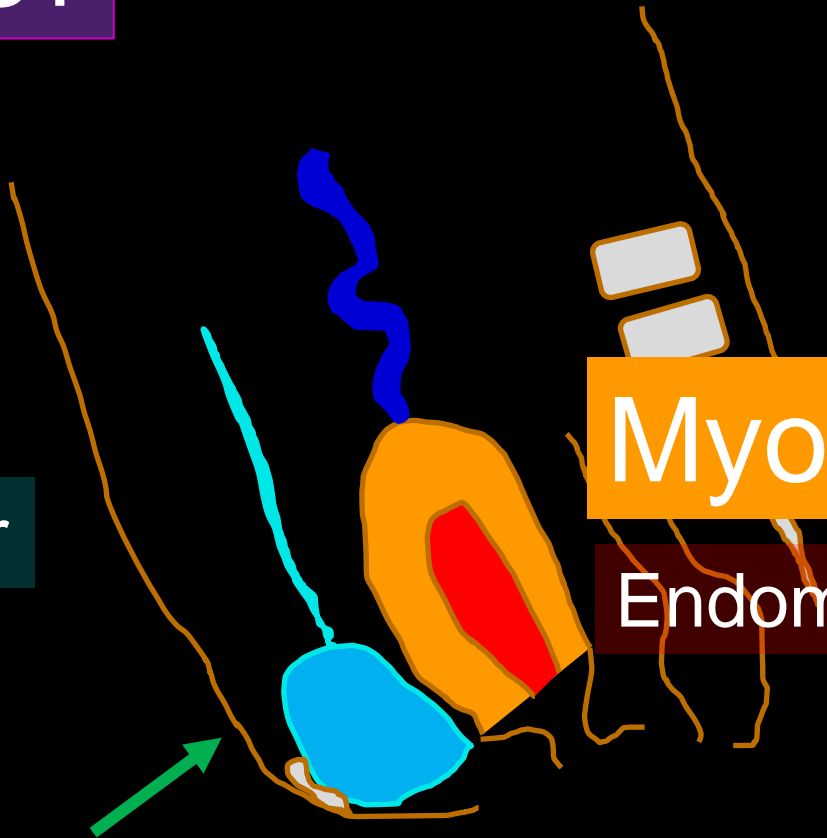
Ovarian vein

Bladder/Ureter

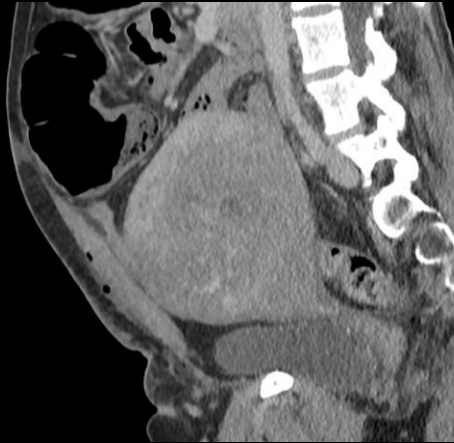
Myometrium

Endometrial cavity

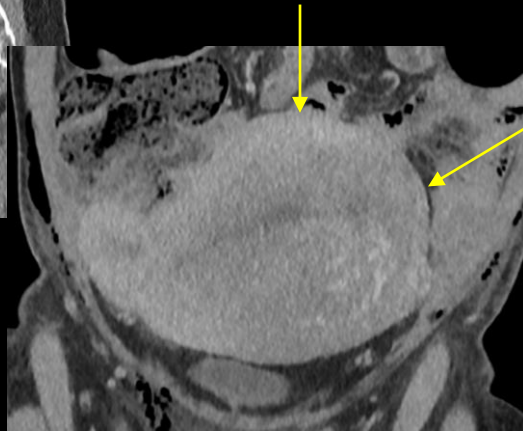
Post Caesarian complications



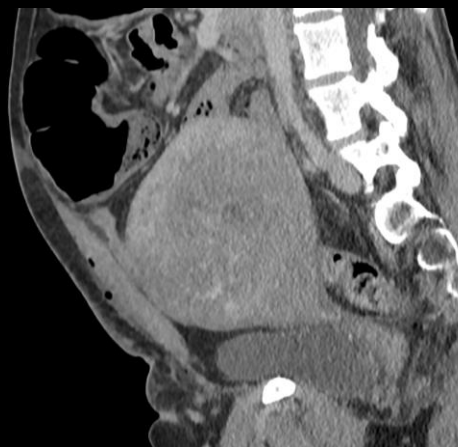
# Normal myometrium variable appearances



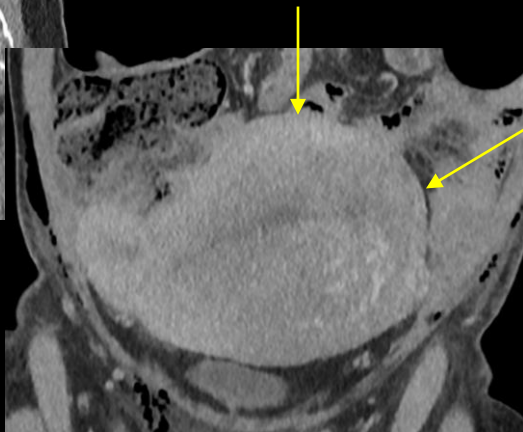
Pt #1 Bulky  
myometrium



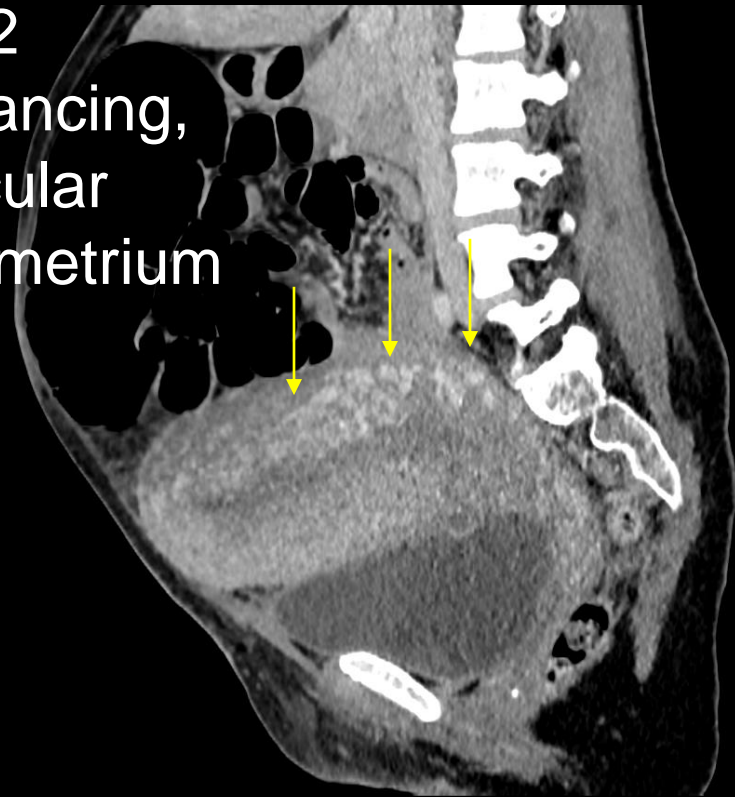
# Normal myometrium variable appearances



Pt #1 Bulky  
myometrium



Pt #2  
Enhancing,  
vascular  
myometrium



# CHECKLIST

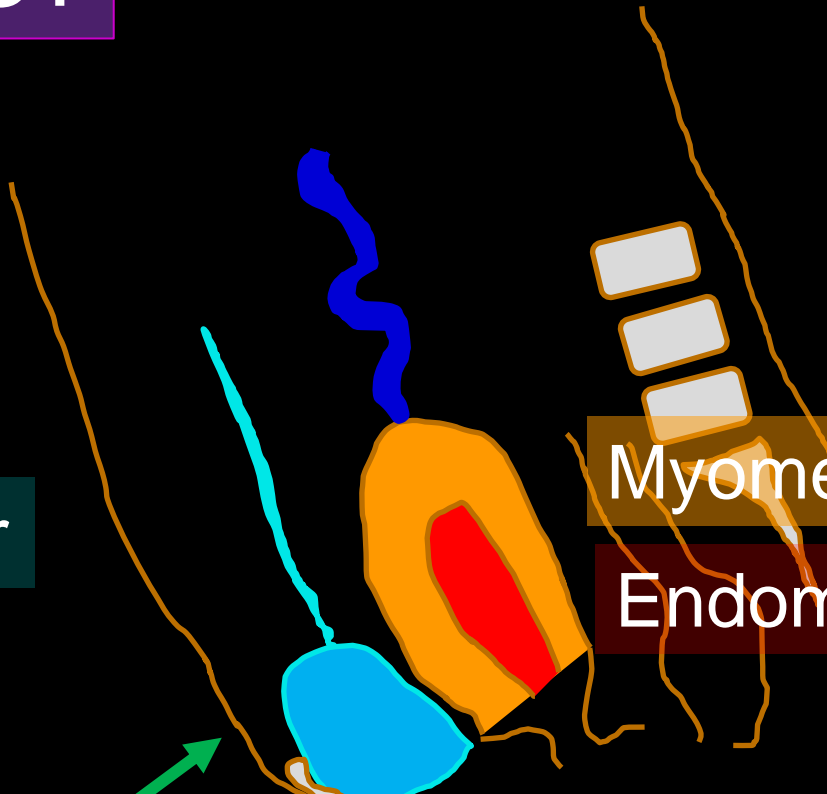
Ovarian vein

Bladder/Ureter

Myometrium

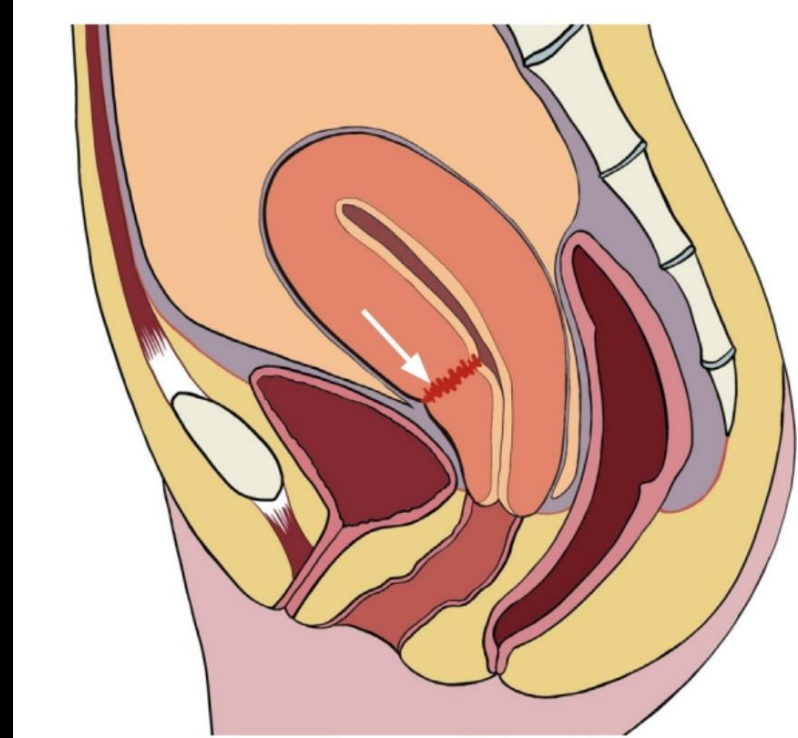
Endometrial cavity

Post Caesarian complications



# Caesarean – Operative approach

1. Laparotomy: Rectus sheath & space of Retzius
2. Into peritoneal space
3. Reflect bladder peritoneum (bladder flap)
4. Hysterotomy – low uterine incision thru myometrium



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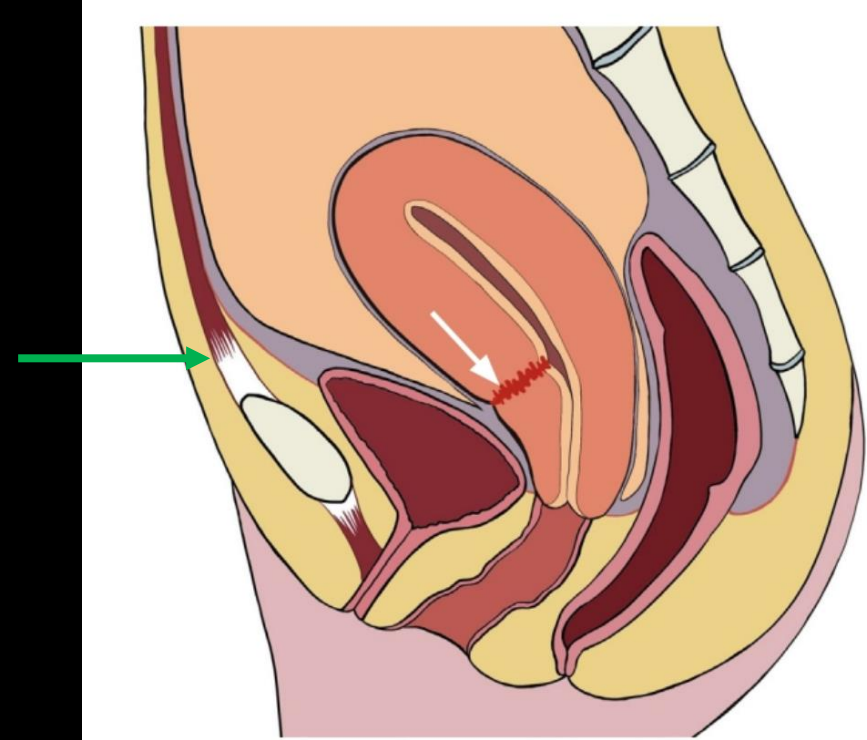
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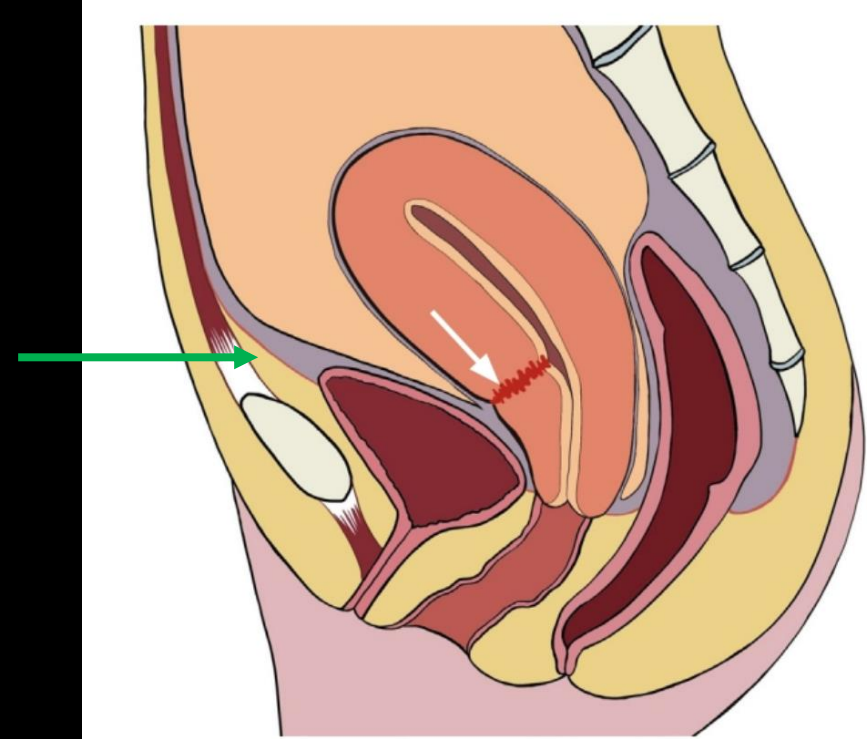
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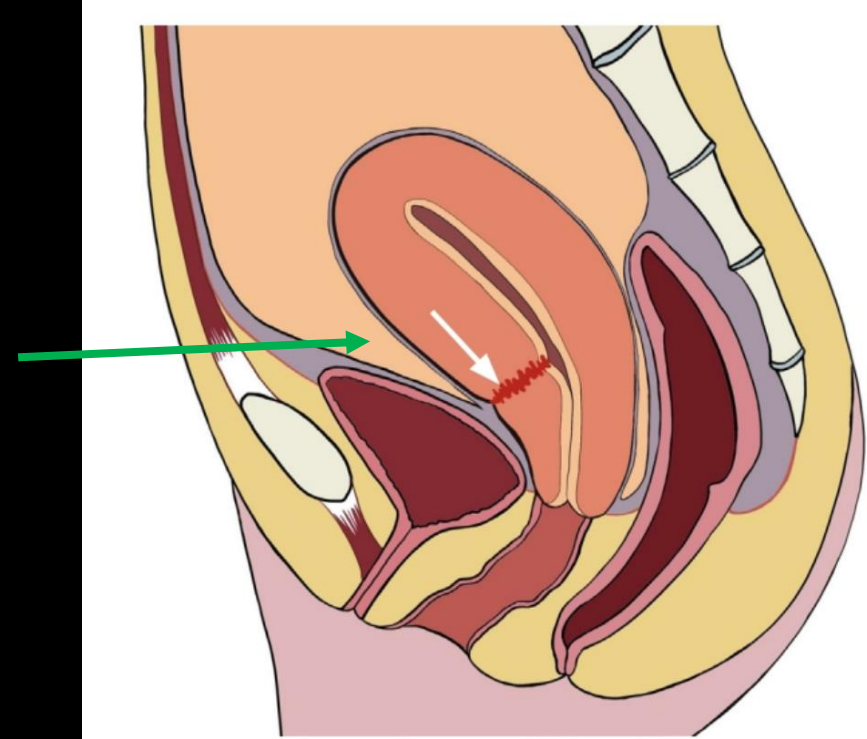
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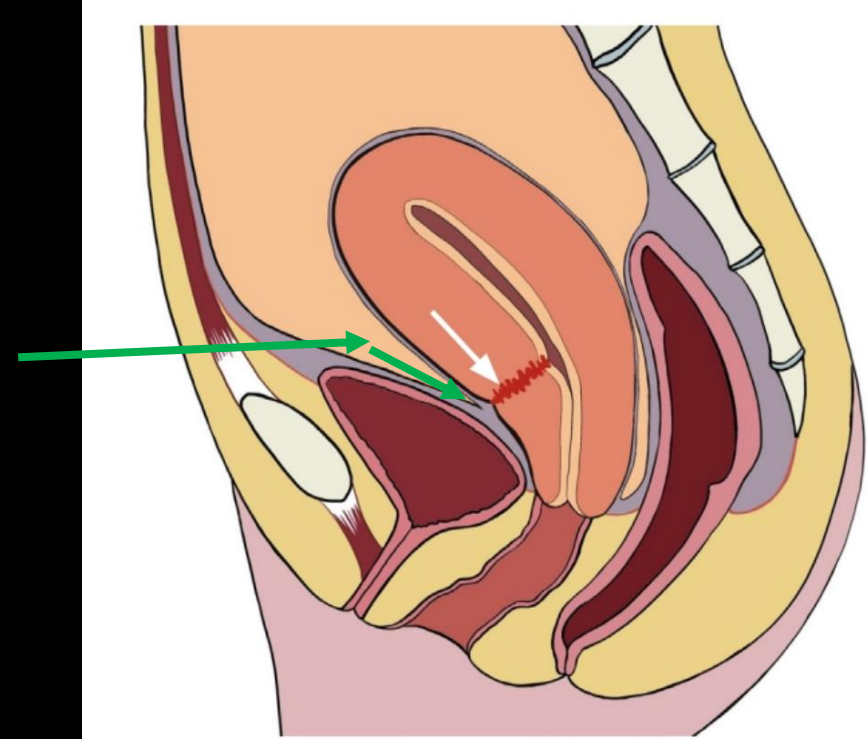
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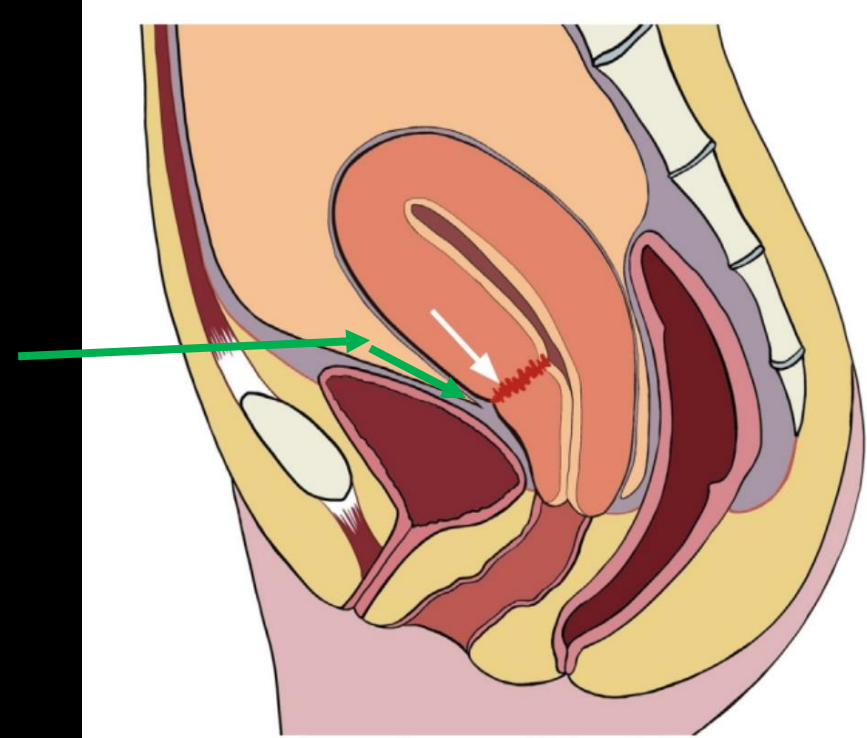
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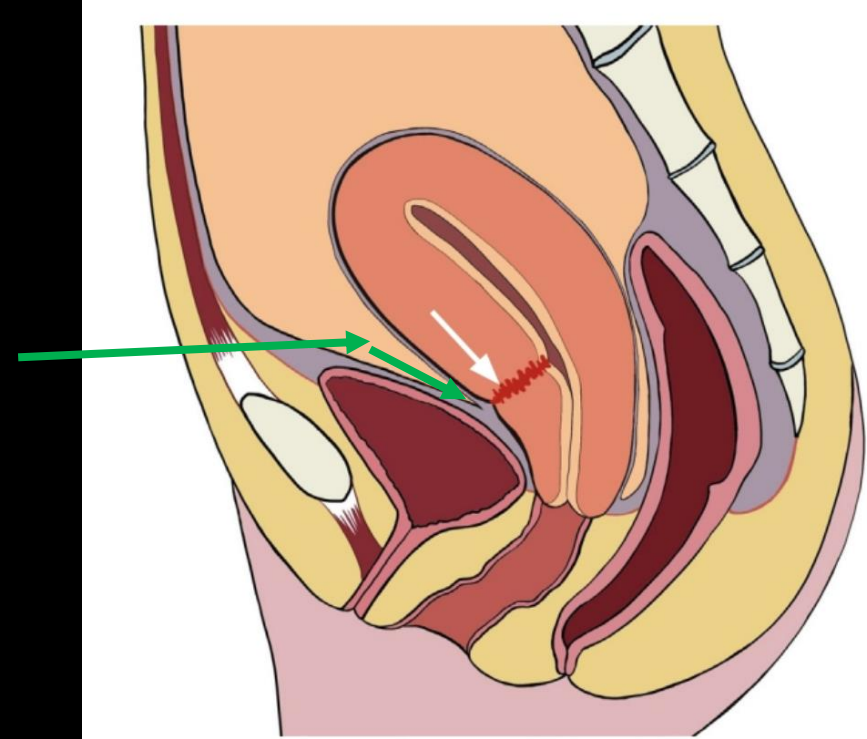
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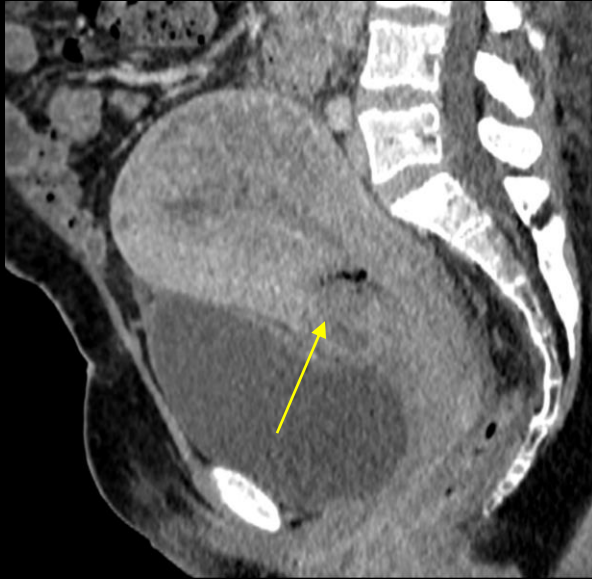
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# NORMAL RANGE post CS



NORMAL week 1

Low signal triangle at lower segment incision  
-= oedema/haematoma around sutures

Day 11 post CS





# Day 11 post CS



Air in lower segment scar – too much?  
Klebsiella – cultures  
Treated with antibiotics, settled



1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air

1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean



1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

Lower segment dehiscence



1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

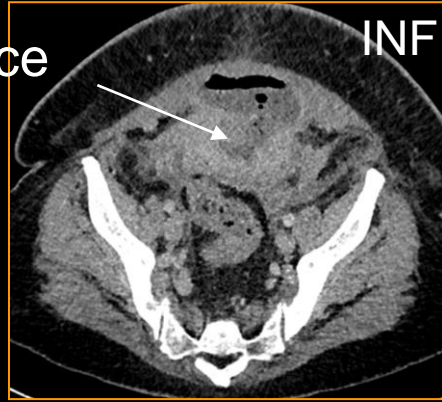
Lower segment dehiscence



Collection –  
abdominal wall,  
extra peritoneum  
uterine cavity  
communicate

1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

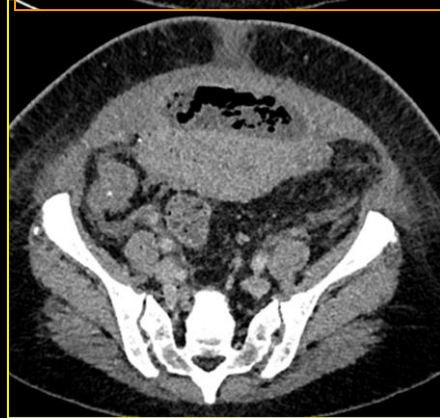
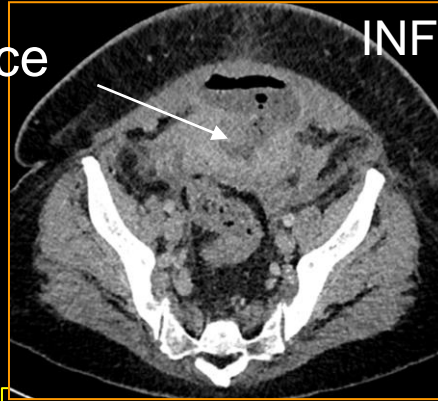
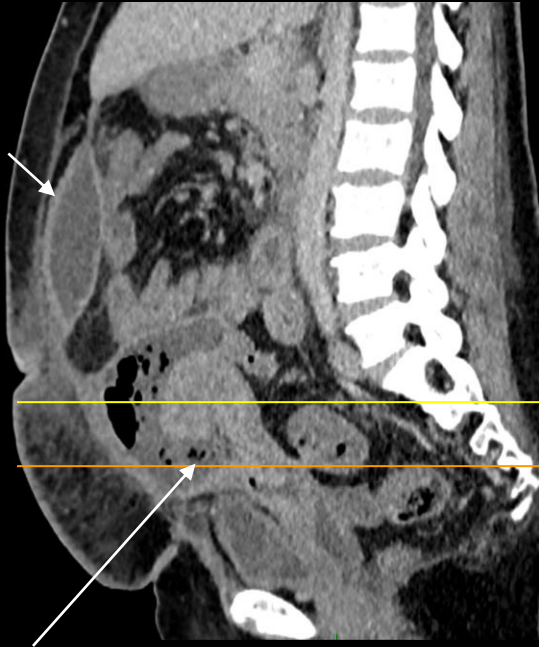
Lower segment dehiscence



Collection –  
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uterine cavity  
communicate

1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

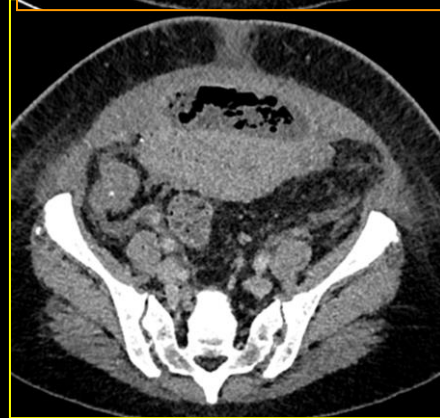
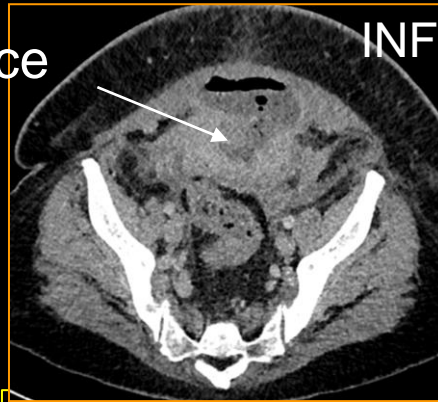
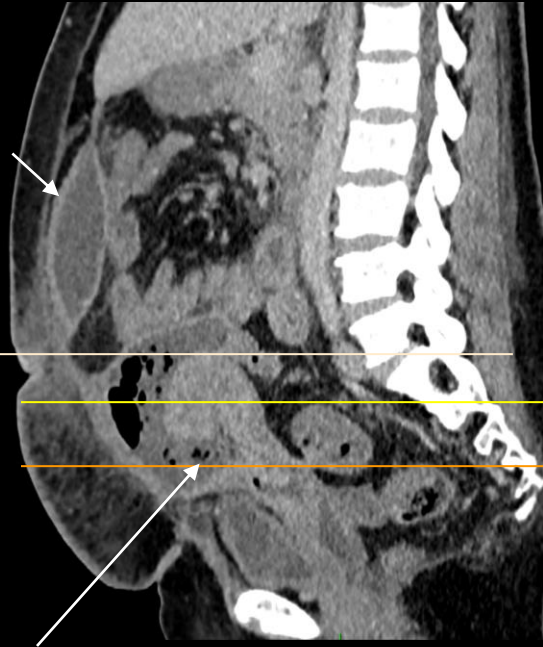
Lower segment dehiscence



Collection –  
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extra peritoneum  
uterine cavity  
communicate

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Worsened 3/52 post Caesarean

Lower segment dehiscence

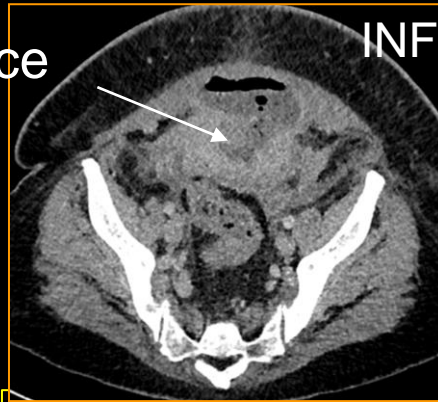
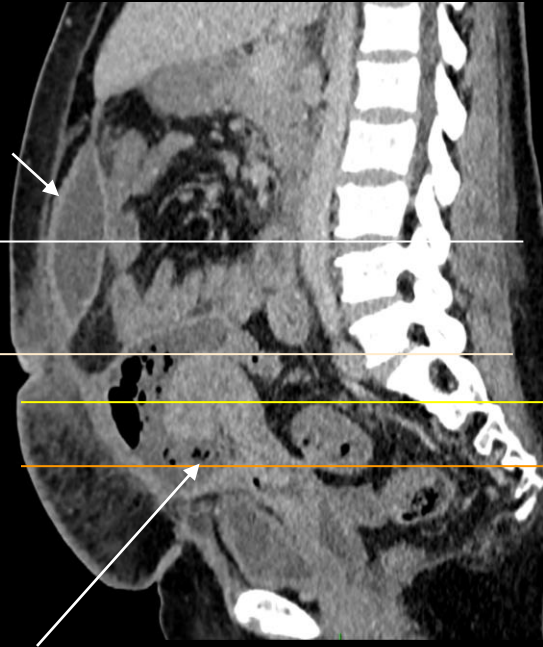


Collection –  
abdominal wall,  
uterine cavity  
communicate

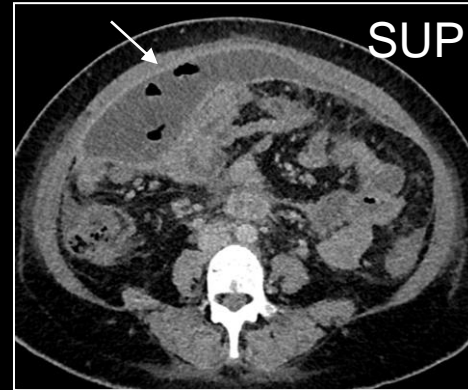
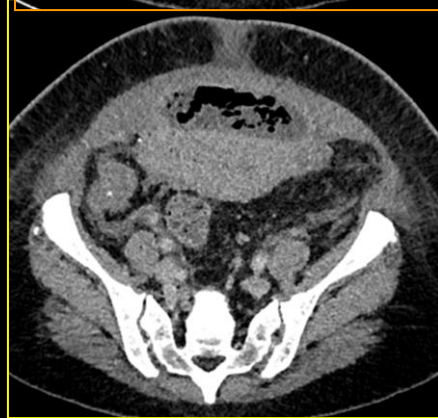


1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

Lower segment dehiscence

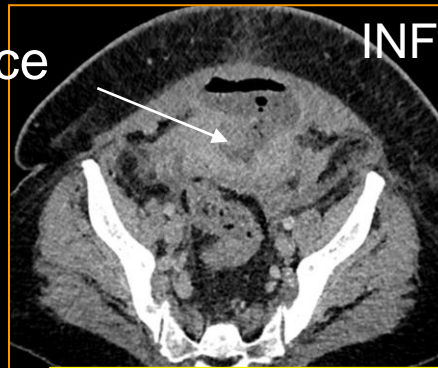
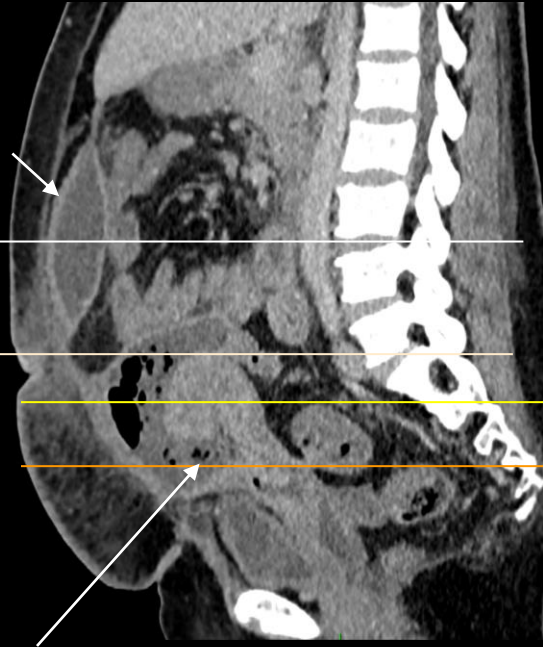


Collection – abdominal wall, extra peritoneum, uterine cavity communicate



1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

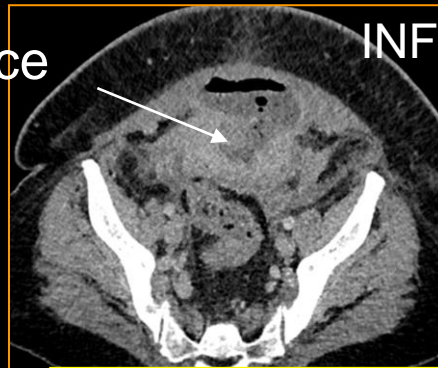
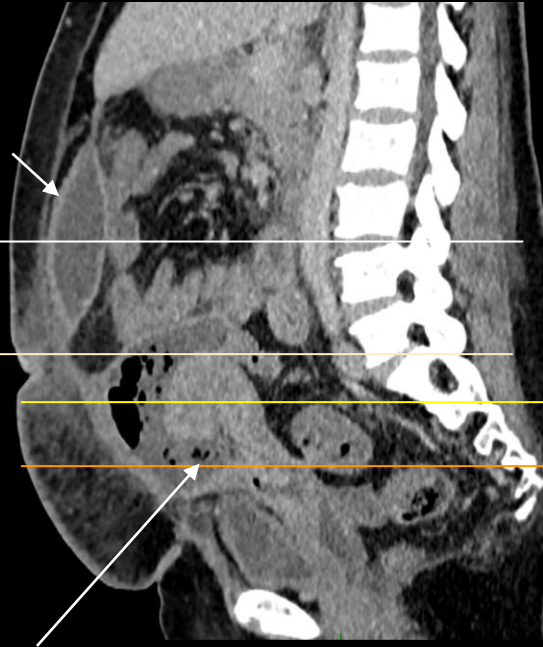
Lower segment dehiscence



Infective dehiscence:  
0.1% CS  
Rx of dehiscence:  
COMPLETE: hysterectomy  
PARTIAL: drain/conservative

1/52 Post CS, fever, CT (not shown): small volume intraperitoneal fluid, air  
Worsened 3/52 post Caesarean

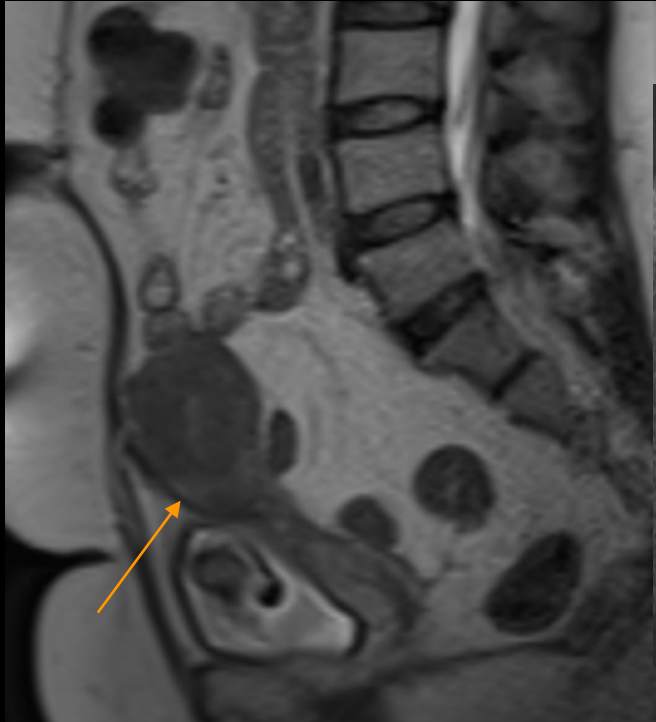
Lower segment dehiscence



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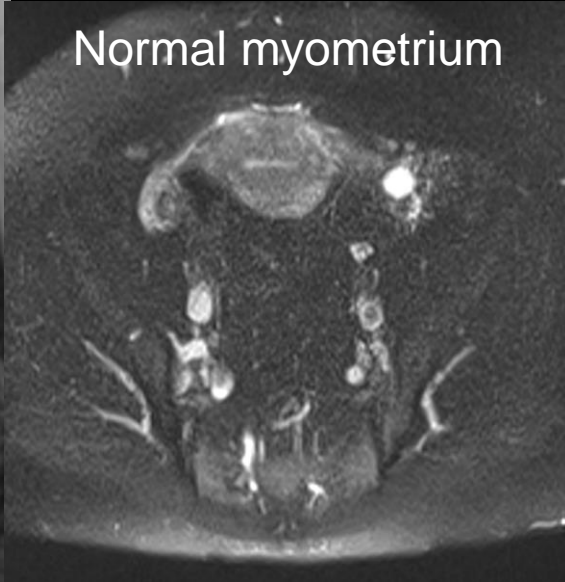
Settled w drain

# Scar remains partially dehiscenced



FUNDUS

Normal myometrium



LOWER SEGMENT

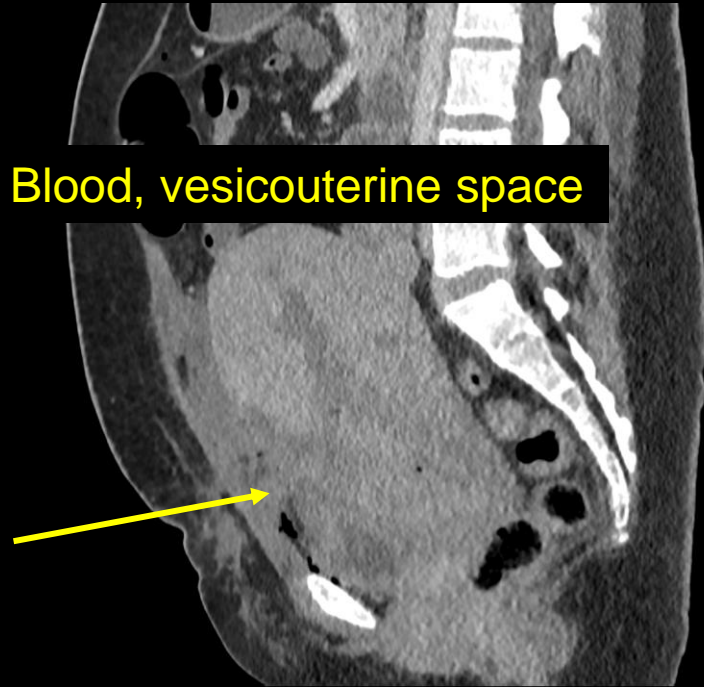
scar



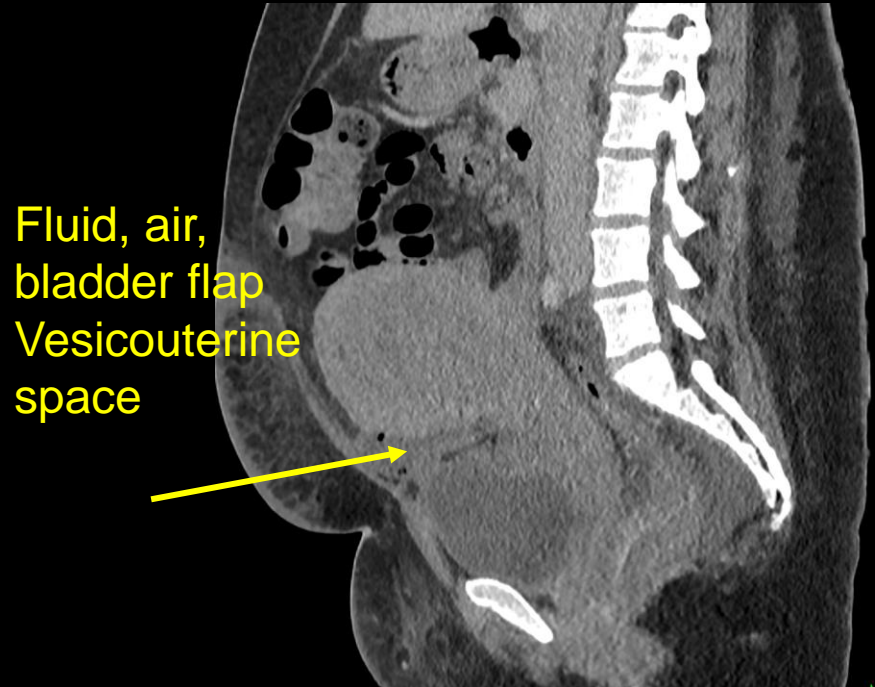
Further pregnancy risky



# Post CS Bladder Flap haematoma/seroma

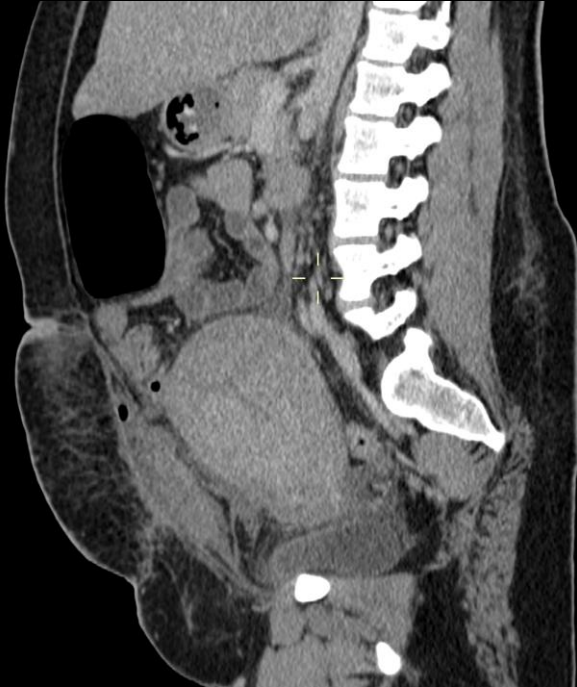


Pt#1 Day 2, complex CS (adhesions)



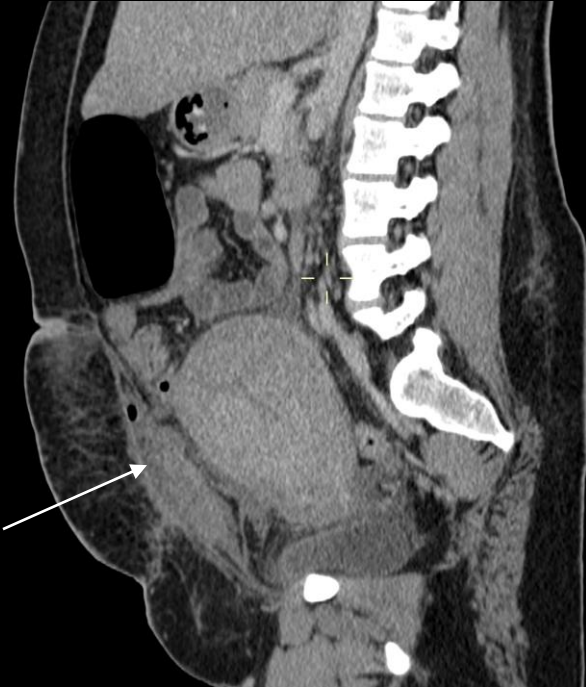
Pt#2 Day 5 BOTH settled with Antibiotics

# Rectus sheath haematoma



Pt #1 Small haematoma, settled

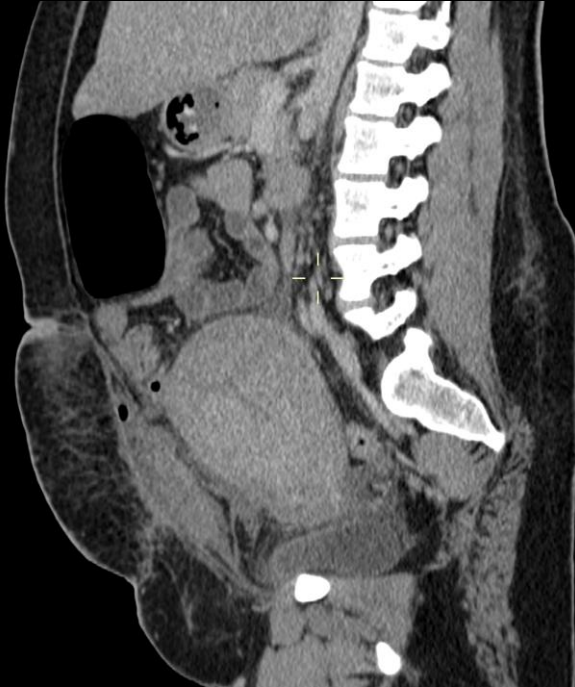
# Rectus sheath haematoma



Pt #1 Small haematoma, settled



# Rectus sheath haematoma

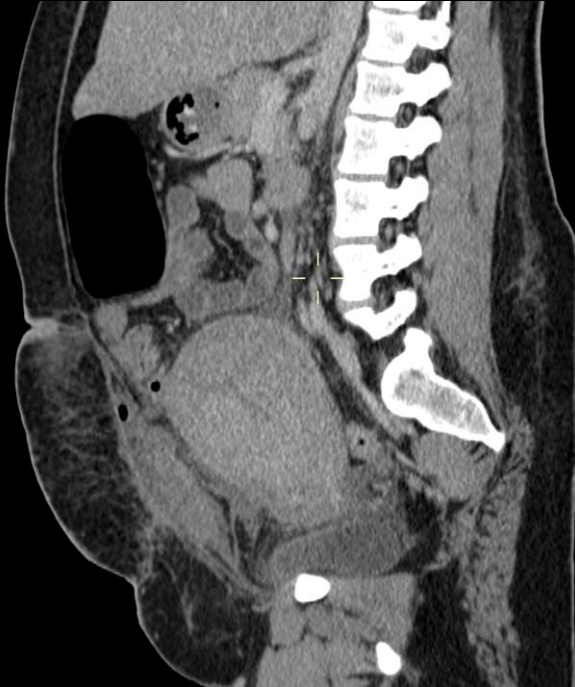


Pt #1 Small haematoma, settled



Pt #2 Large haematoma, evacuated in theatre

# Rectus sheath haematoma



Pt #1 Small haematoma, settled



Pt #2 Large haematoma, evacuated in theatre

# CS Long term risks

- Post-op – long term risks:
- Endometriosis in CS scar
- Subsequent pregnancies:
- Placenta accreta
- Ectopic pregnancy implantation in scar

# CHECKLIST

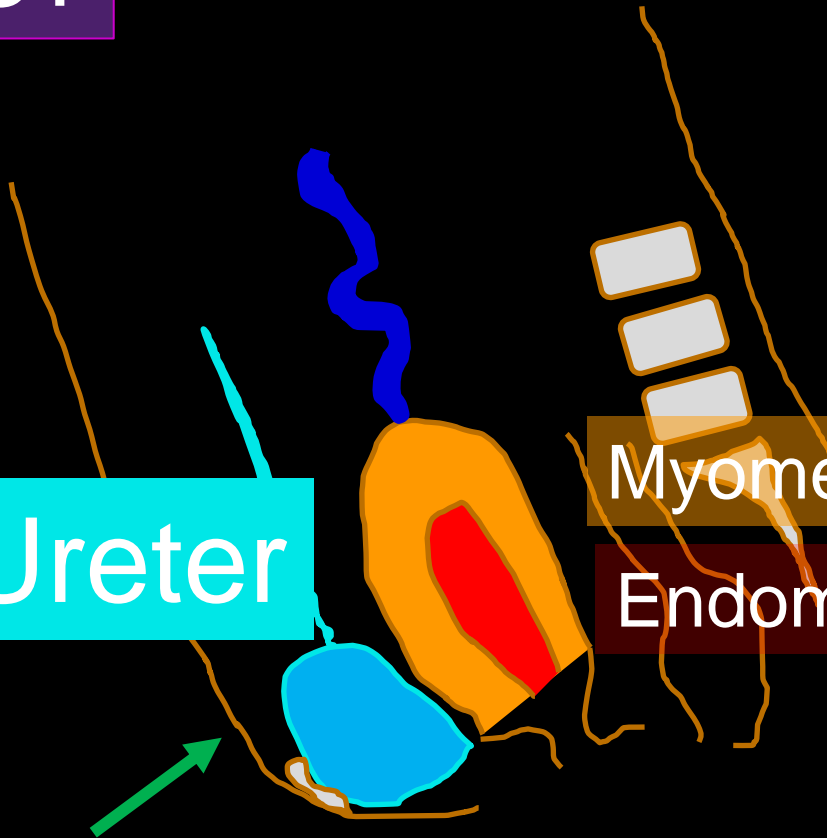
Ovarian vein

Bladder/Ureter

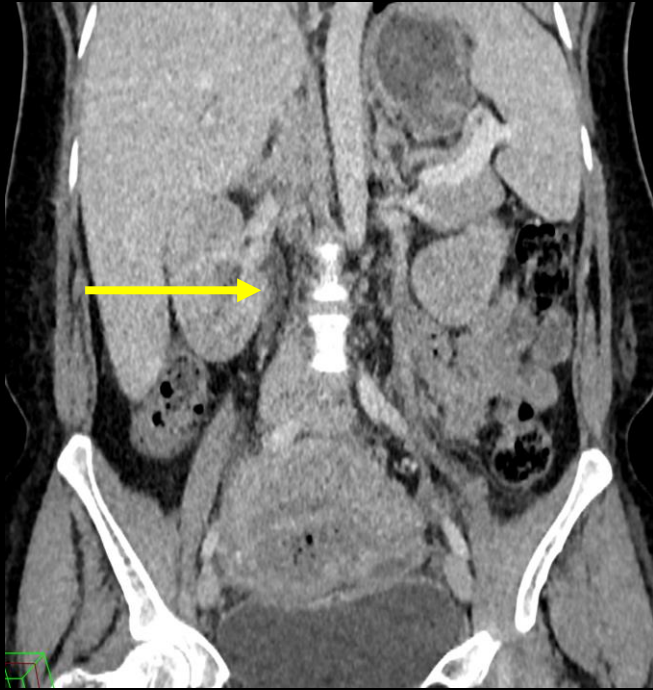
Myometrium

Endometrial cavity

Post Caesarian complications

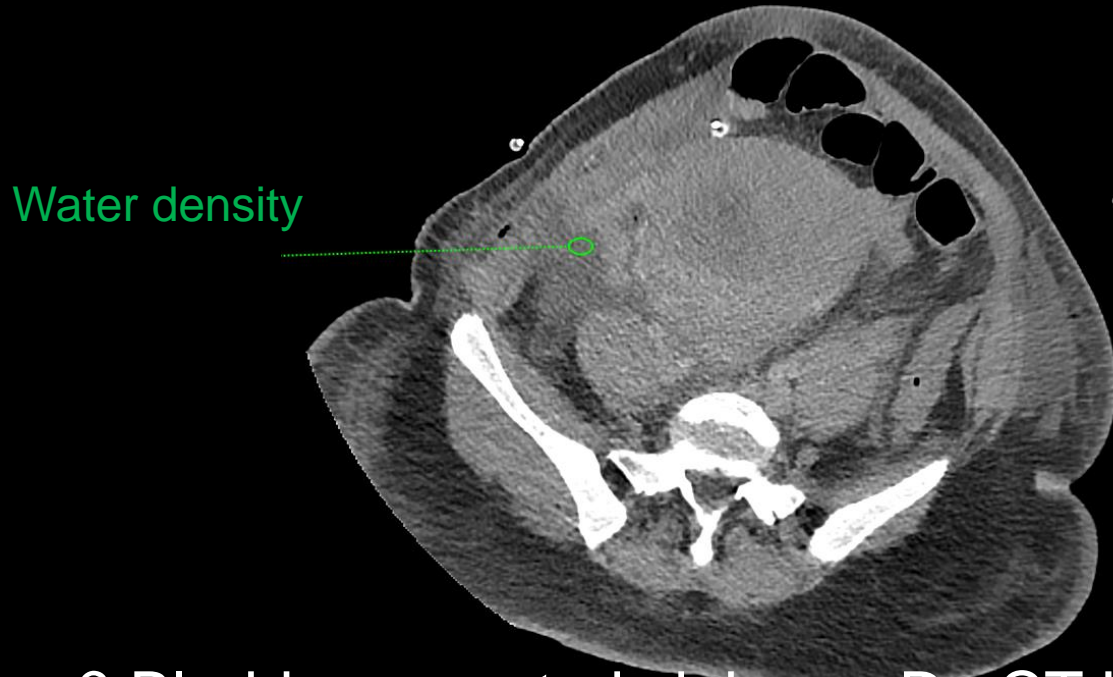


# Post CS Mildly dilated ureters



Bladder and ureter injury rare (<1%) associated with previous adhesions

# Day 1 post CS, difficult operation



? Bladder or ureteric injury – Do CT UROGRAM

# CHECKLIST

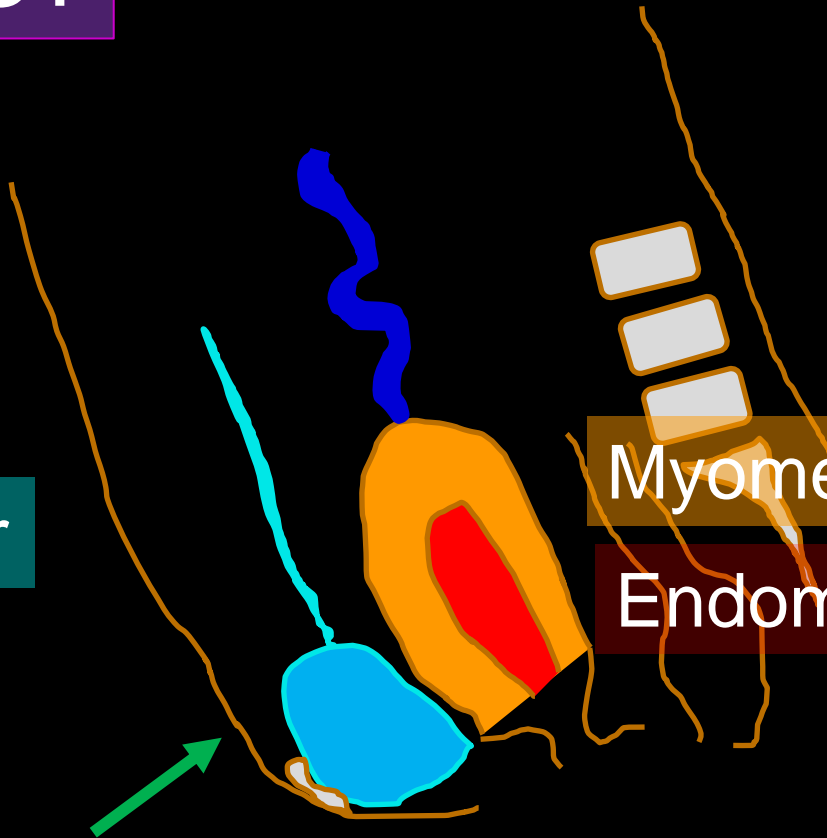
Ovarian vein

Bladder/Ureter

Myometrium

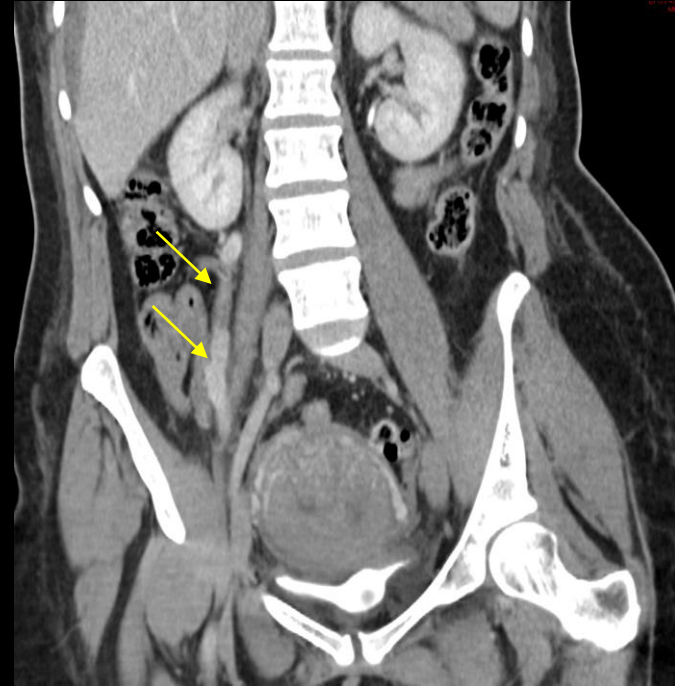
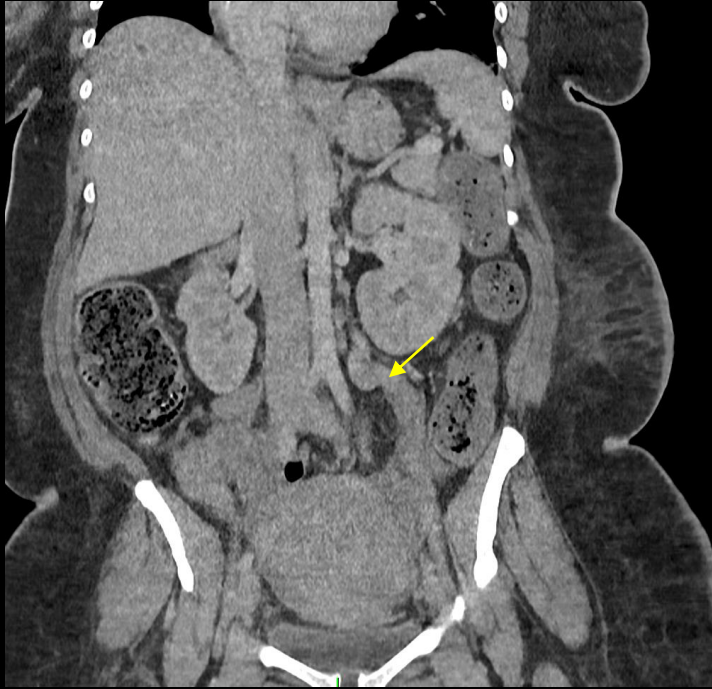
Endometrial cavity

Post Caesarian complications



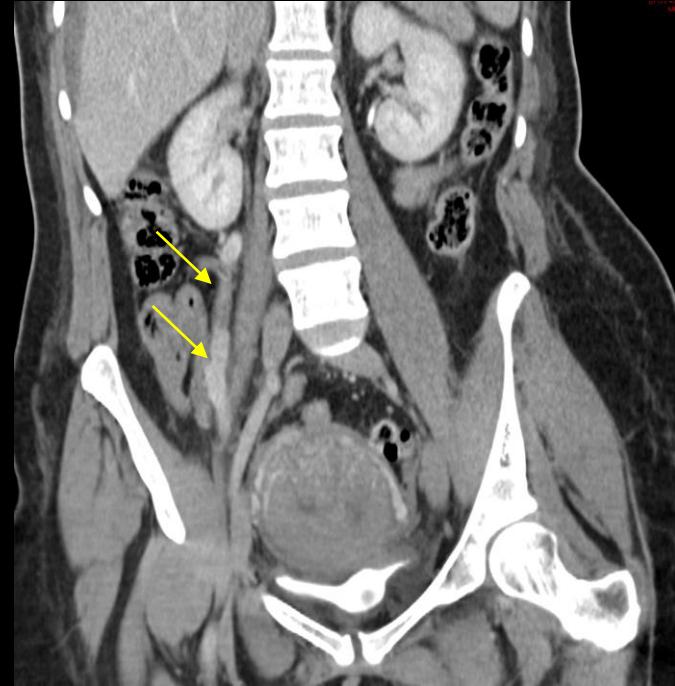
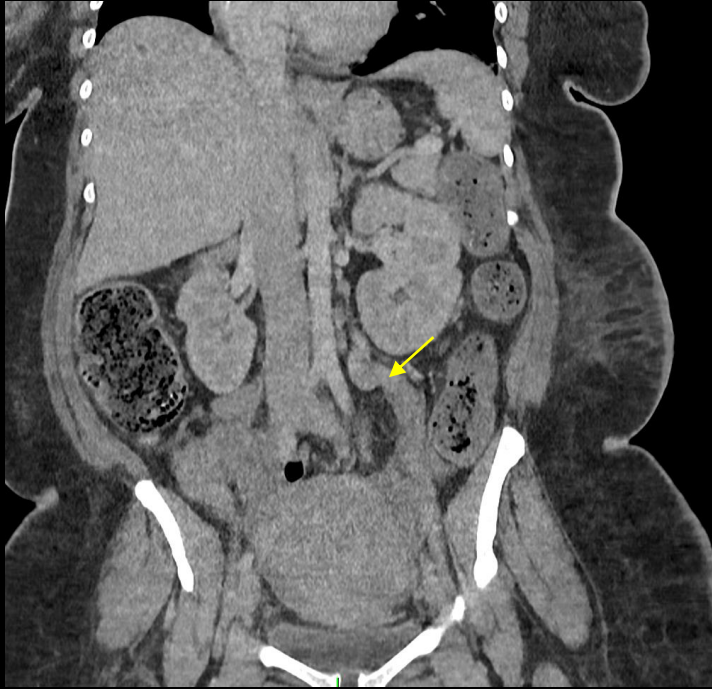


# Normal prominent ovarian veins – smooth contours



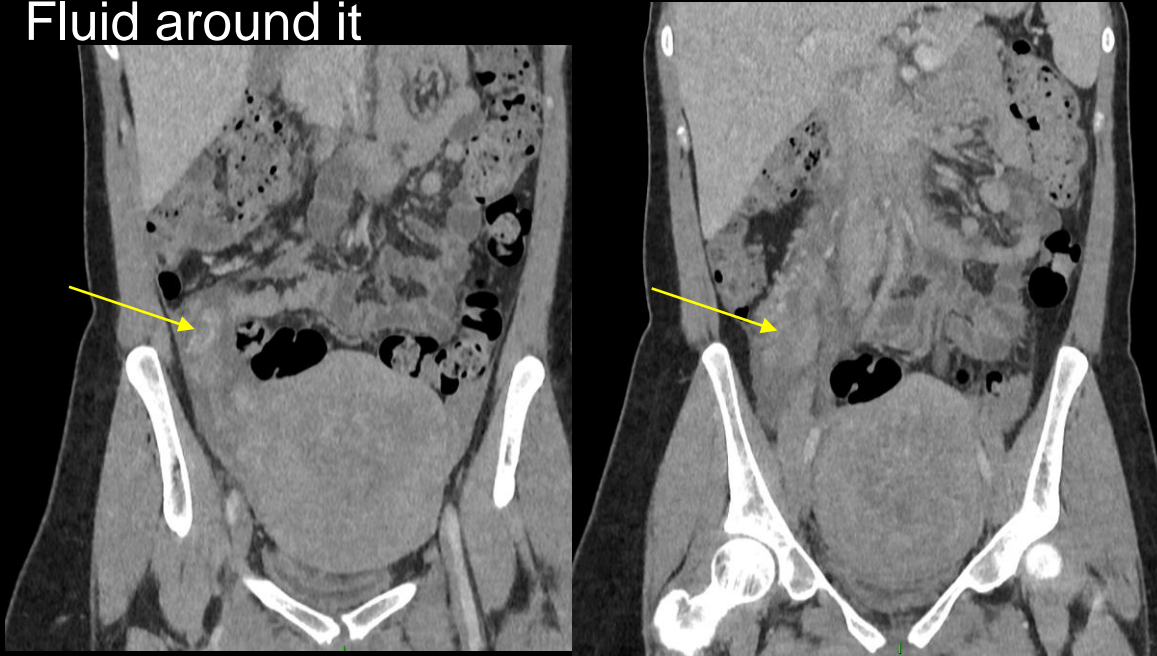
# Normal prominent ovarian veins – smooth contours

## Pregnancy: pro thrombotic state



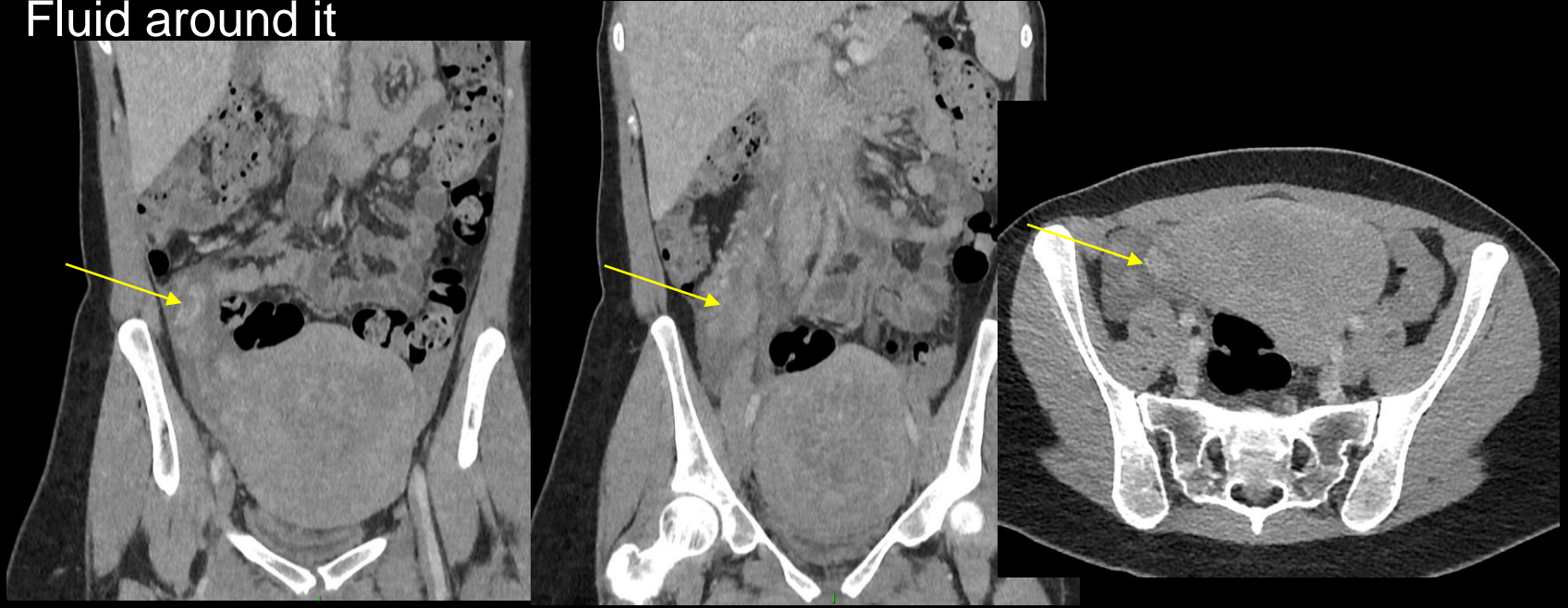
# Ovarian vein thrombosis

Engorged, inflamed R ovarian V, filling defect  
Fluid around it



# Ovarian vein thrombosis

Engorged, inflamed R ovarian V  
Fluid around it

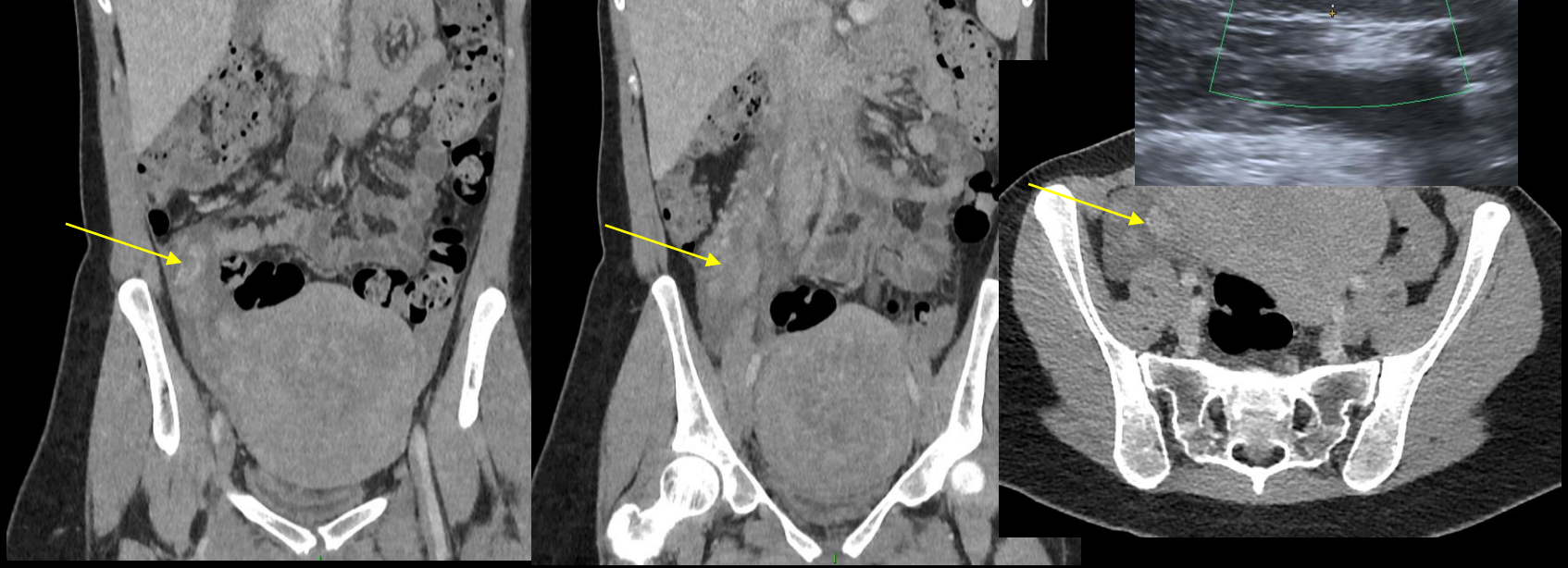




# Ovarian vein thrombosis

US: no flow in R ovarian Vein

Engorged, inflamed R ovarian V  
Fluid around it



# CHECKLIST

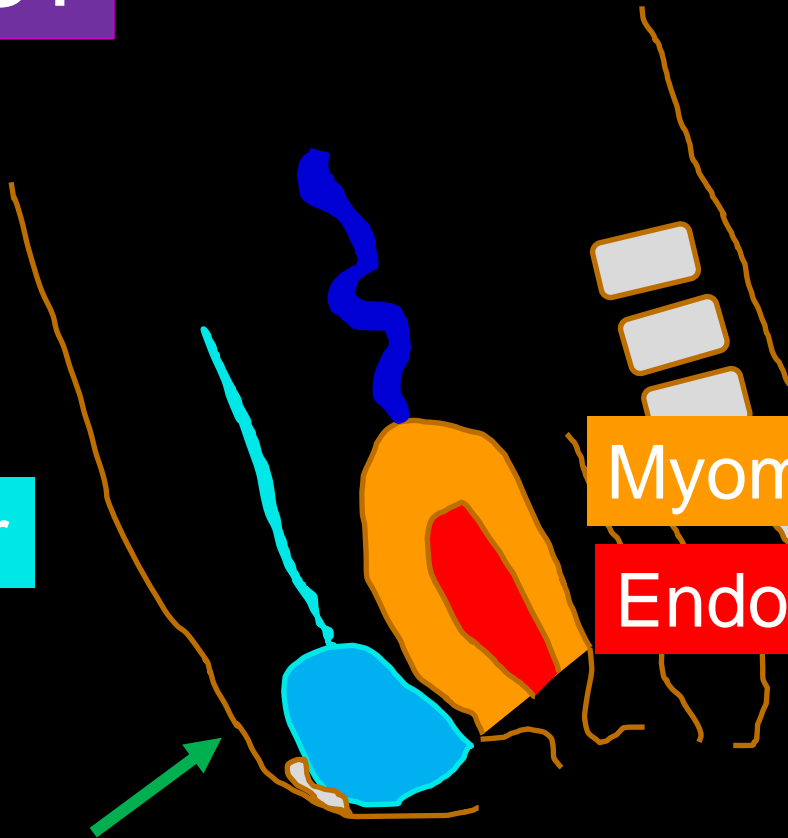
Ovarian vein

Bladder/Ureter

Myometrium

Endometrial cavity

Post Caeserean complications



**one new thing you have learnt today**





# Thanks to the team:

- Dr Marcela de la Hoz Polo
- Dr Andreas Shekkeris
- Dr Lisa Meacock
- Dr Susan Cross
- Dr Rebecca Greenhalgh
- Dr Maureen Dumba
- Miss Nicola Batrick
- Dr Wendy Matthews
- Dr Patricia Ward
- Dr Raghu Kamanahalli
- Dr Erika Kashef
- Dr Olga Kirmi
- Dr Amandeep Sandhu
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