

# Ultrasound in paediatric oncology

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# Disclosures

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None

# Aims

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General principles of oncology ultrasound in children



Principles of imaging in abdominal and pelvic tumours in young children

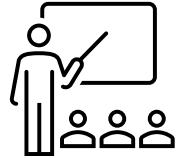


Intra-operative ultrasound in paediatric oncology



Cases with a focus on unusual or interesting ultrasound findings





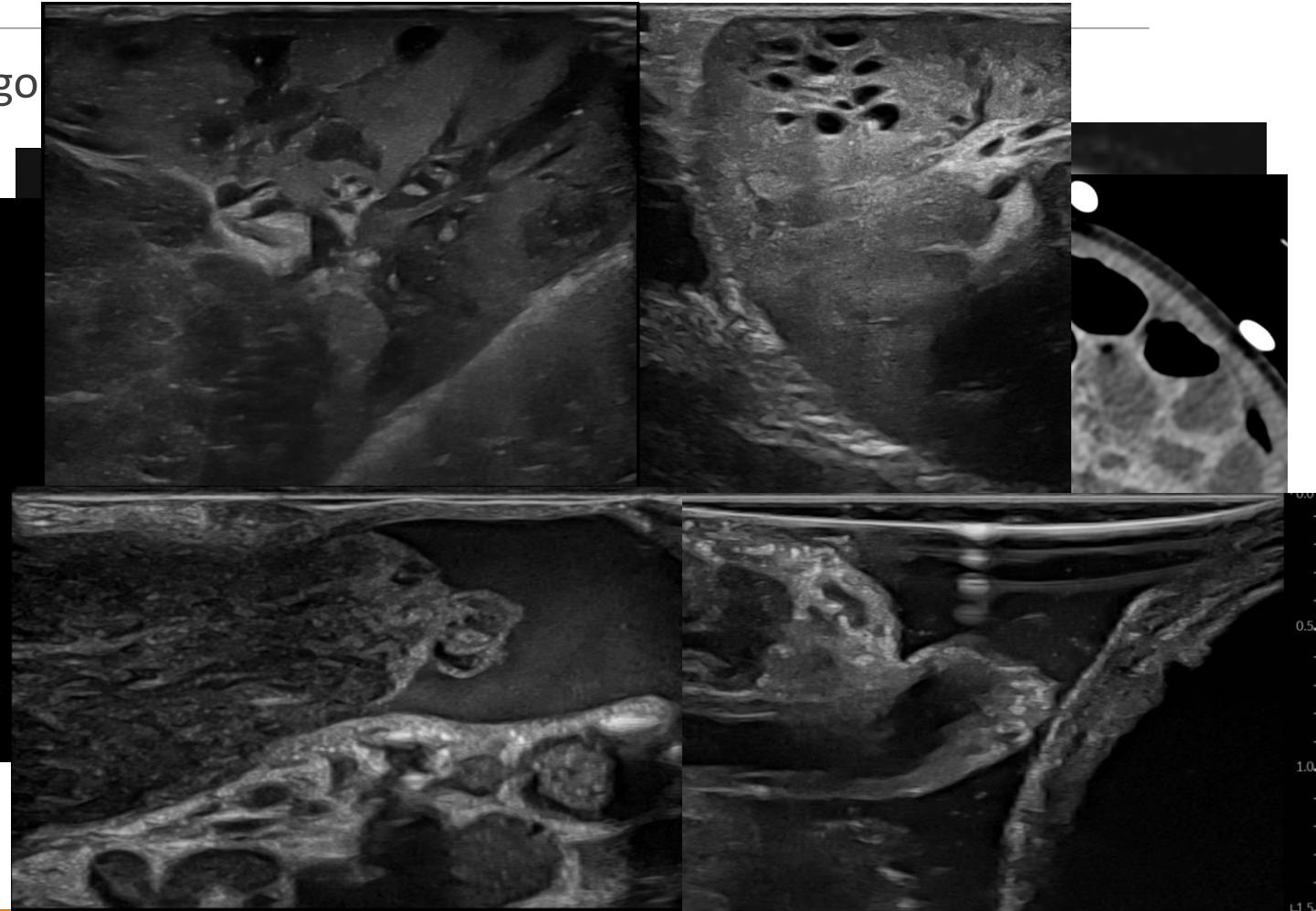
# General principles

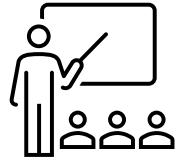
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Why bother with ultrasound, why not go

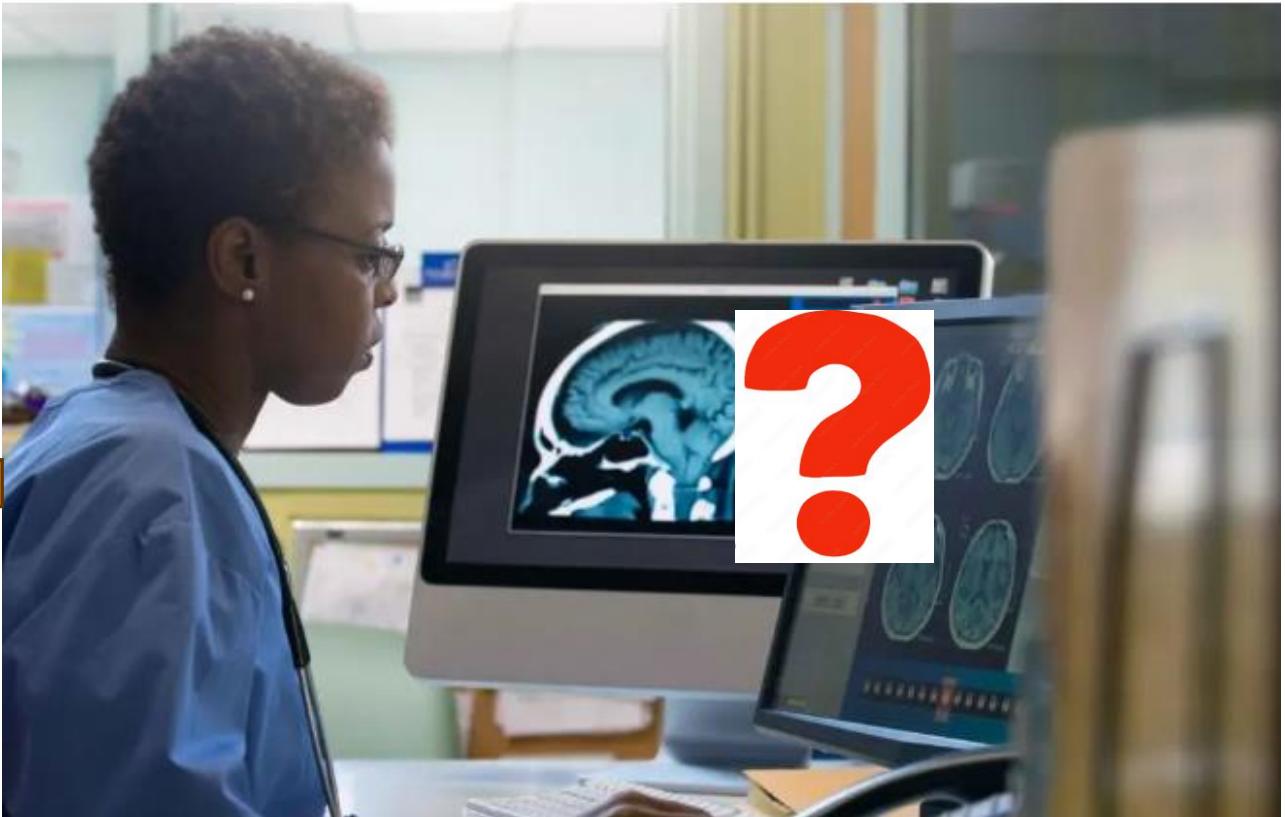
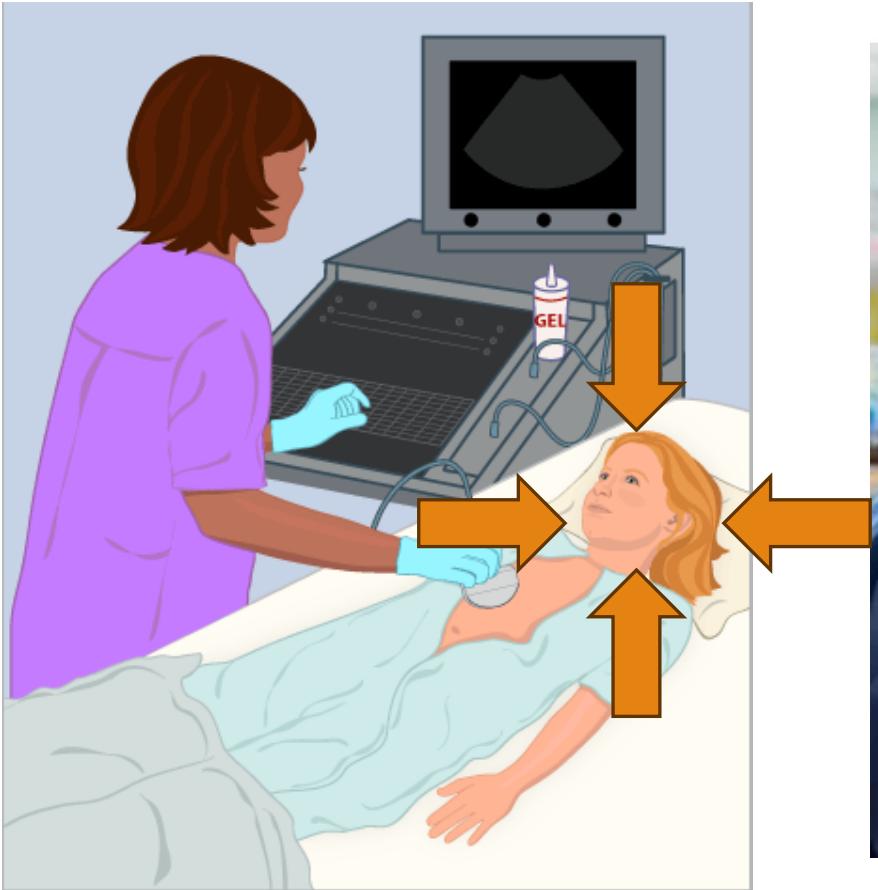
- Easy access

LOGIQ





# Benefits of ultrasound



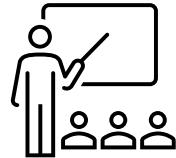


## General principles

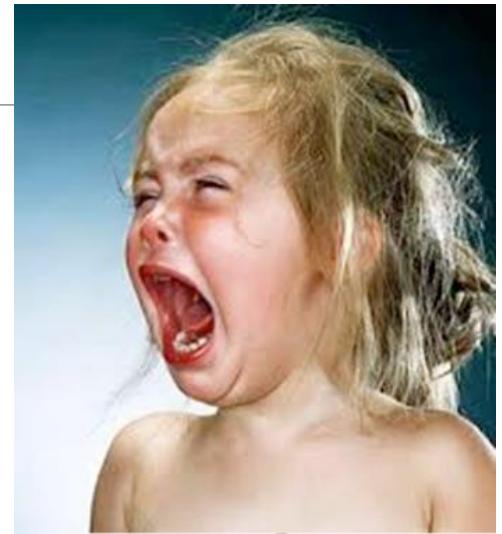
We are not  
histopathologists

Role of imaging

- Organ of origin?
- Local complications?
- Presence of distant metastases?



# Additional factors...



# Aims

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Intra-operative ultrasound in paediatric oncology

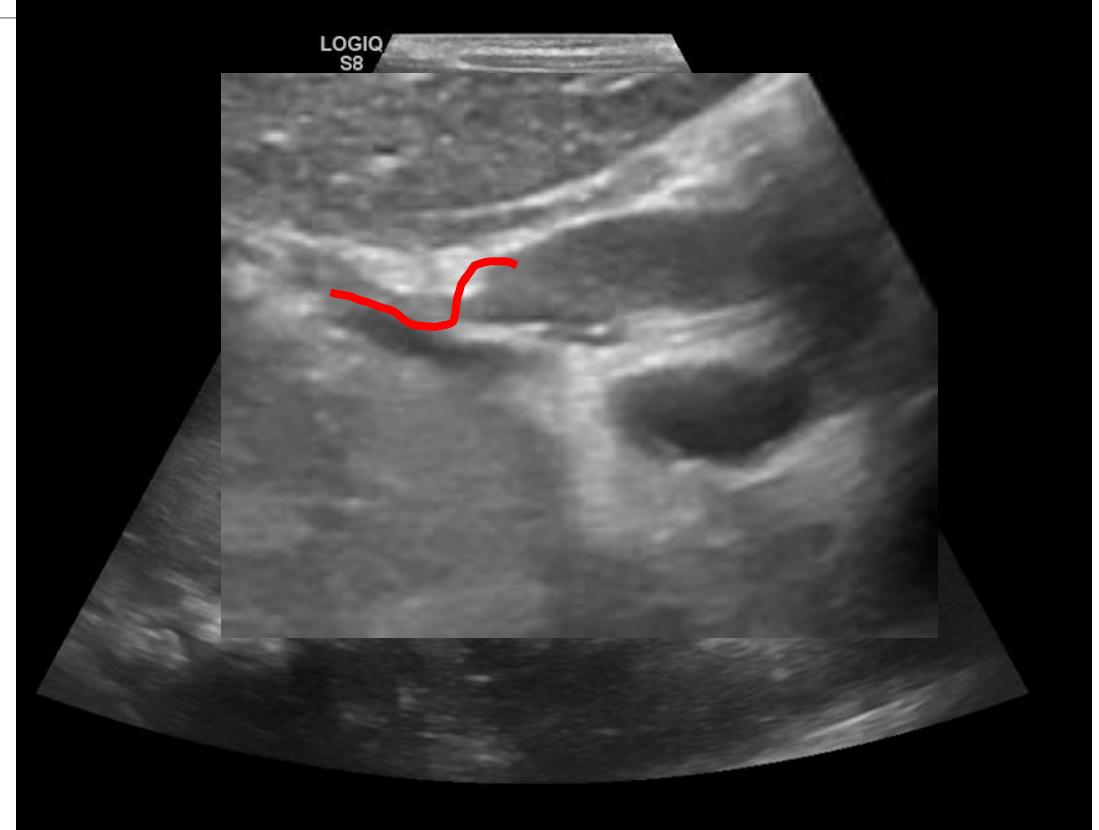
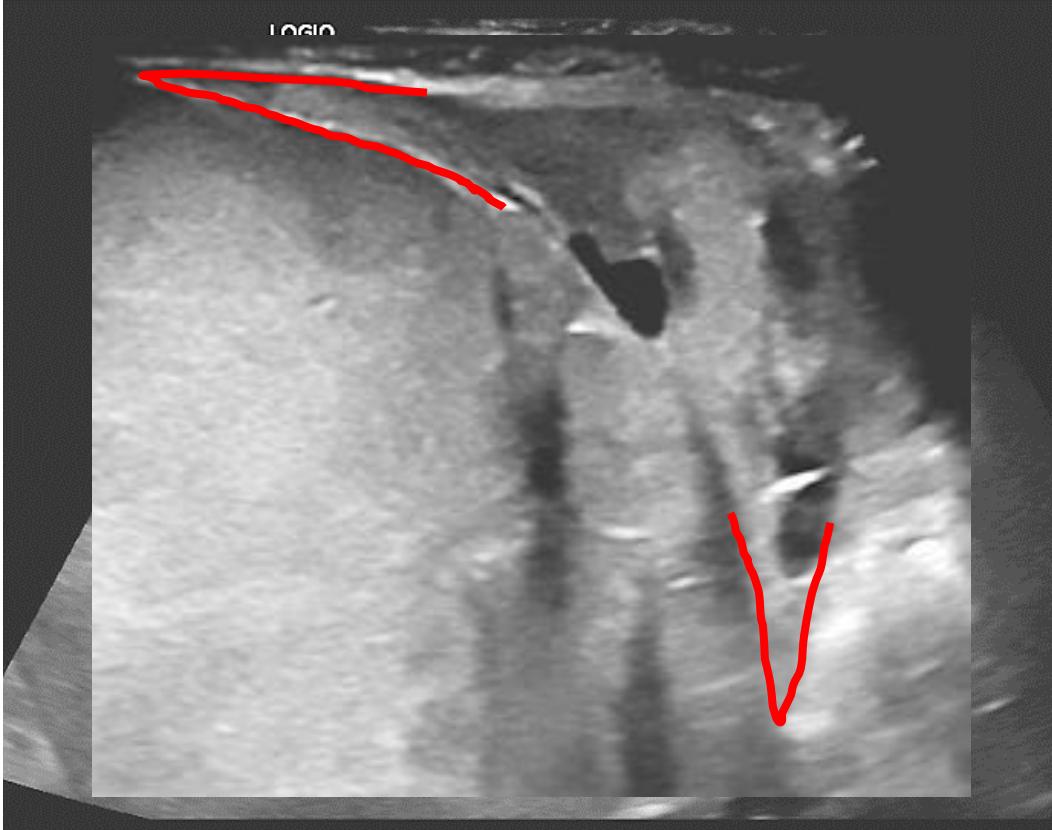


Cases with a focus on unusual or interesting ultrasound findings





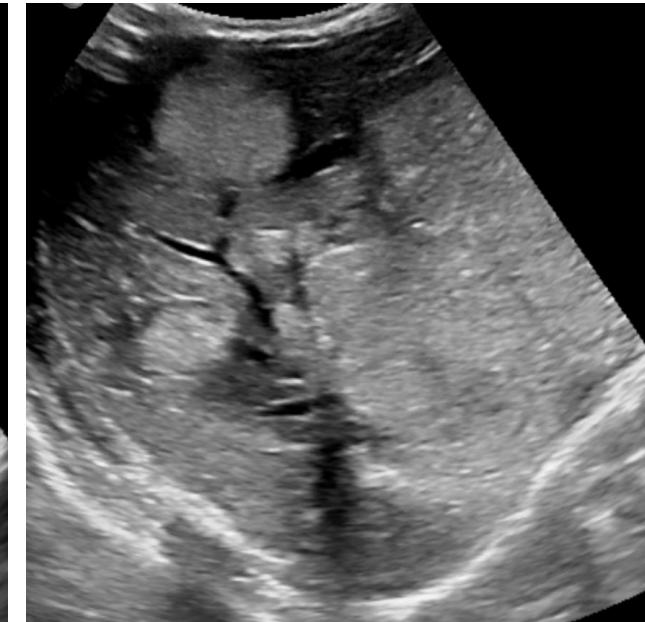
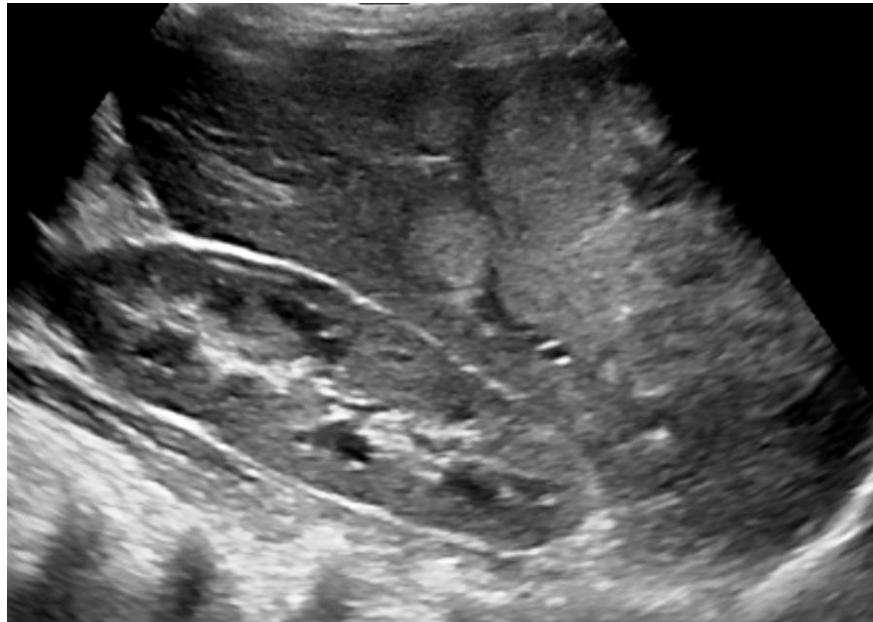
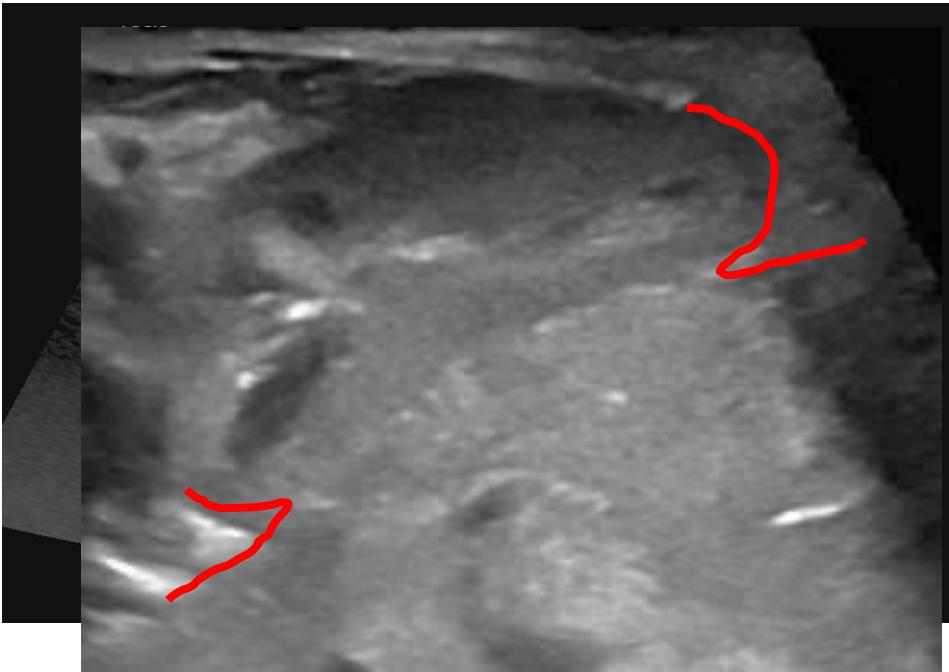
# Principles of abdominal imaging





# Principles of abdominal imaging

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# Principles of abdominal imaging

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# Principles of abdominal imaging

Is there a mass?

Where is it coming from?

Is there more than one?

What is the nature of the mass?

- Cystic or solid?
- Vascular?

What is happening to the big blood vessels of the abdomen?

# Aims

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Intra-operative ultrasound in paediatric oncology



Cases with a focus on unusual or interesting ultrasound findings





# Intra-operative ultrasound in paediatric oncology

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Nephron-sparing surgery

- Bilateral Wilms tumour
- Unilateral Wilms tumour in child with a tumour predisposition

Tumour Thrombus assessment

Testicular sparing surgery

Partial cystectomy



# Warning!

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This part includes intra-operative photographs of actual operations



# How?

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Interested surgeons

'willing' radiologist (x2)

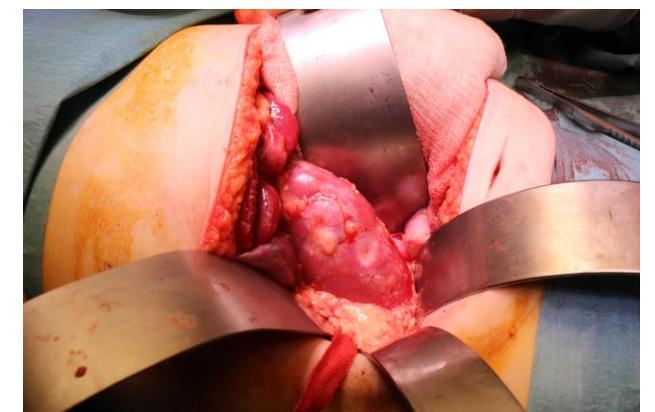
Pre-op planning

- Be realistic

Operating team notify radiologists when ready

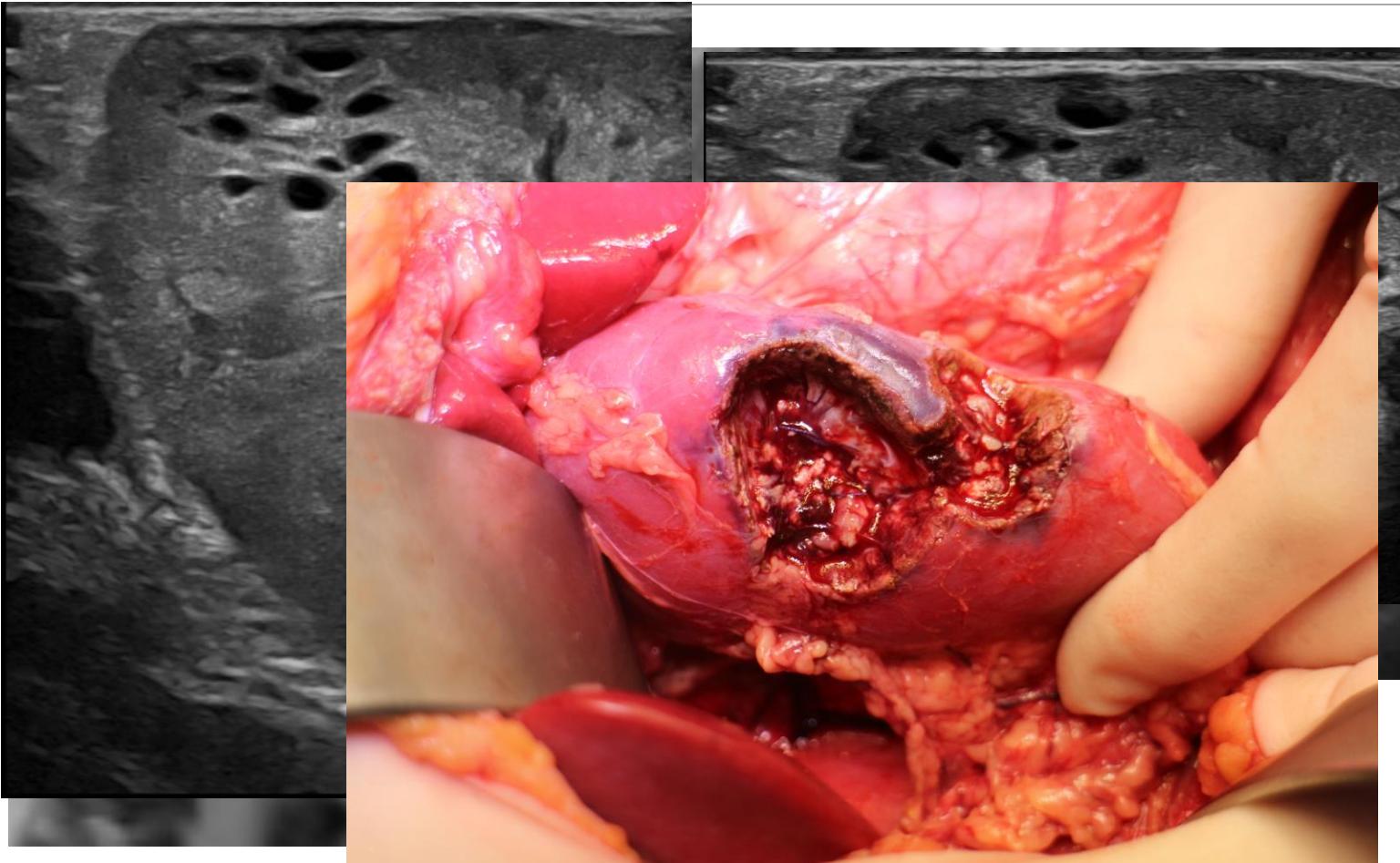
Review histopathology results

Debrief case

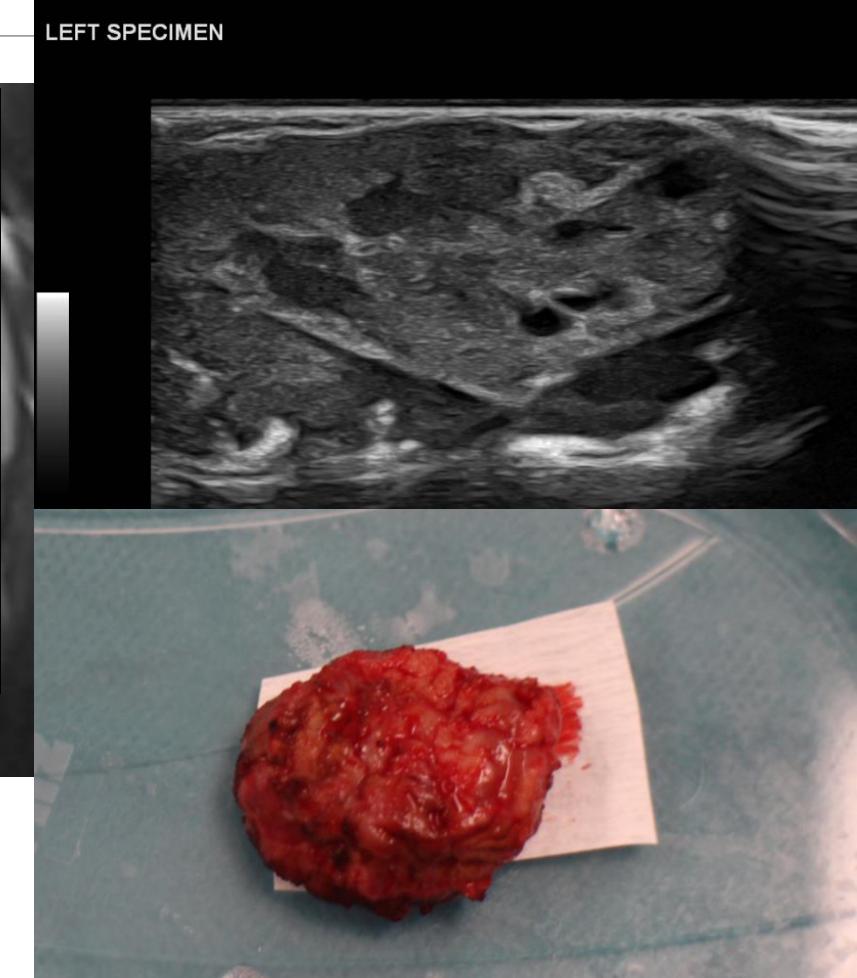




# Nephron-sparing surgery



LEFT SPECIMEN



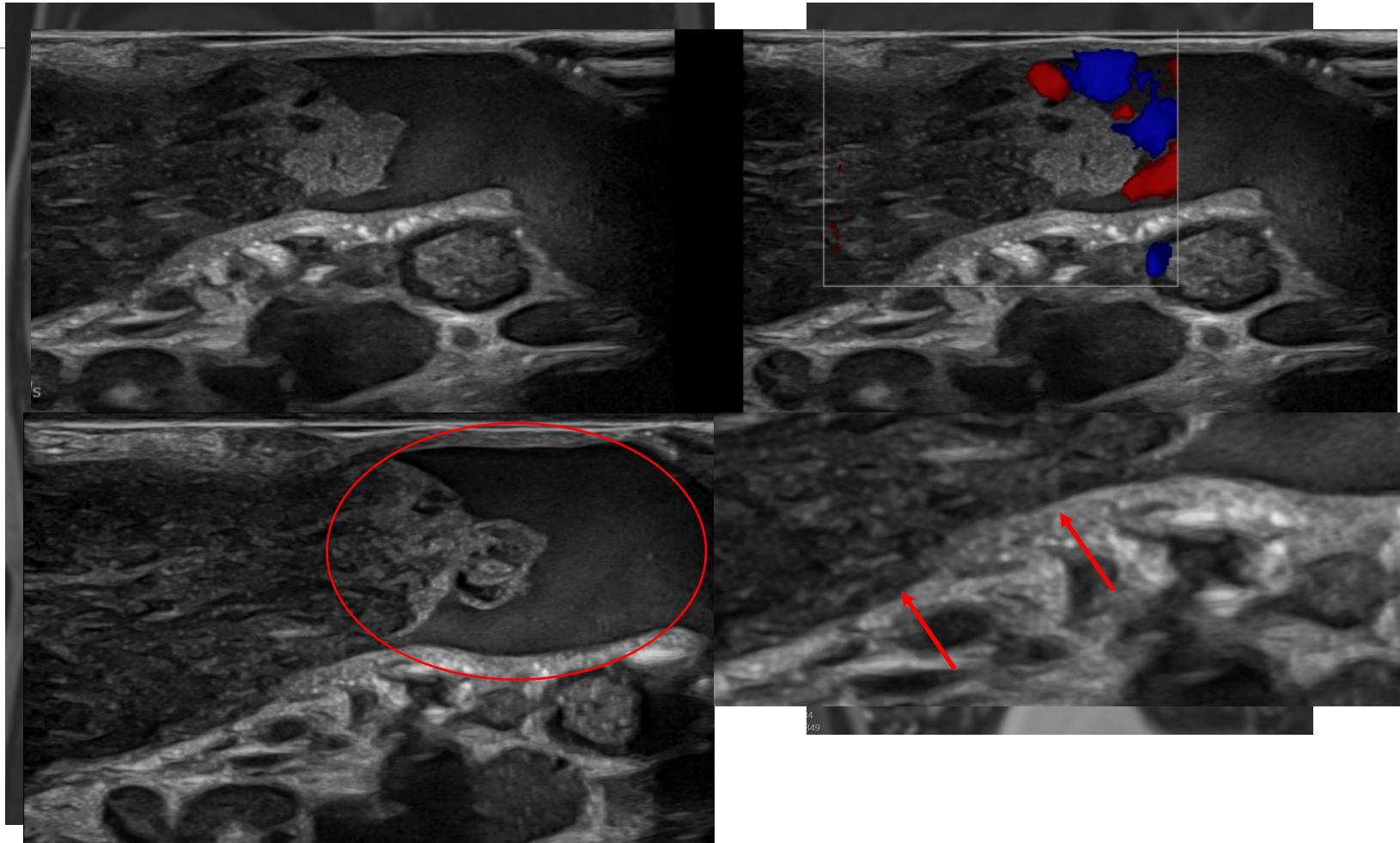


# Tumour thrombus

Is there any tumour thrombus?

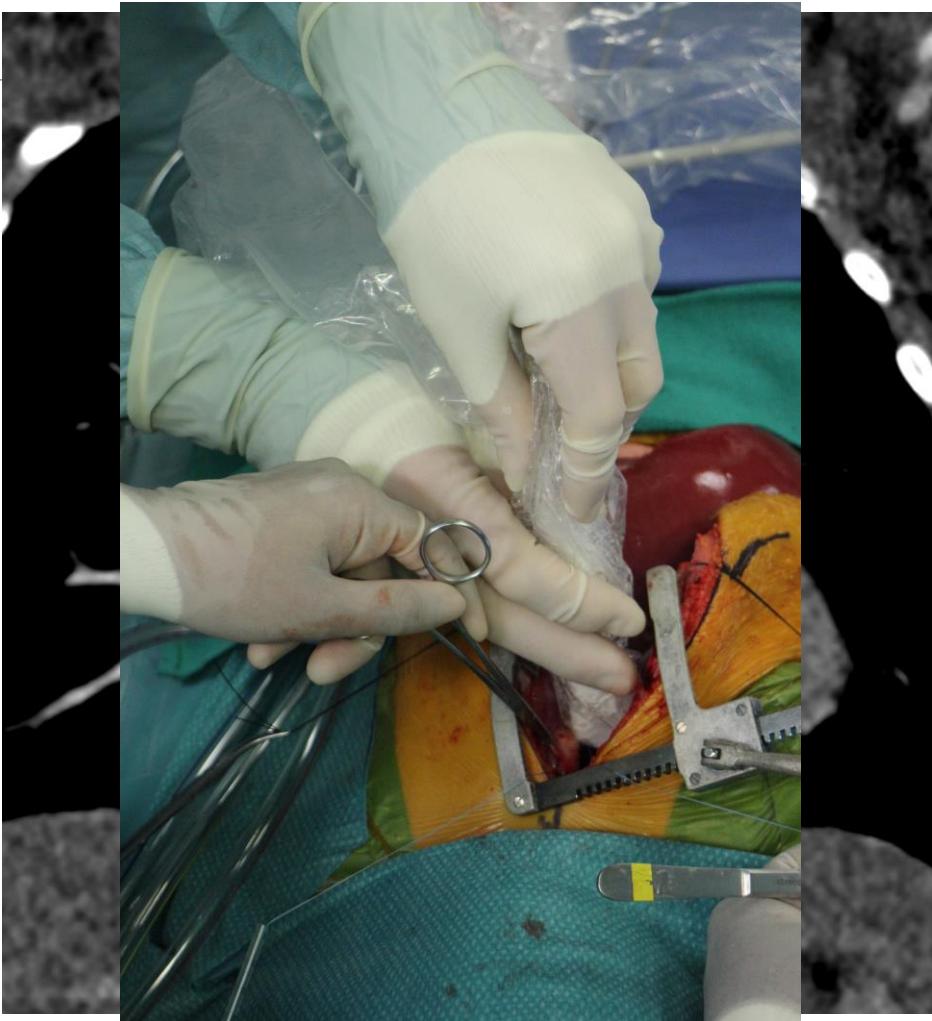
Where does it extend to?

- IVC?
- Renal vein?
- Pulmonary artery?





# Tumour thrombus



# Aims

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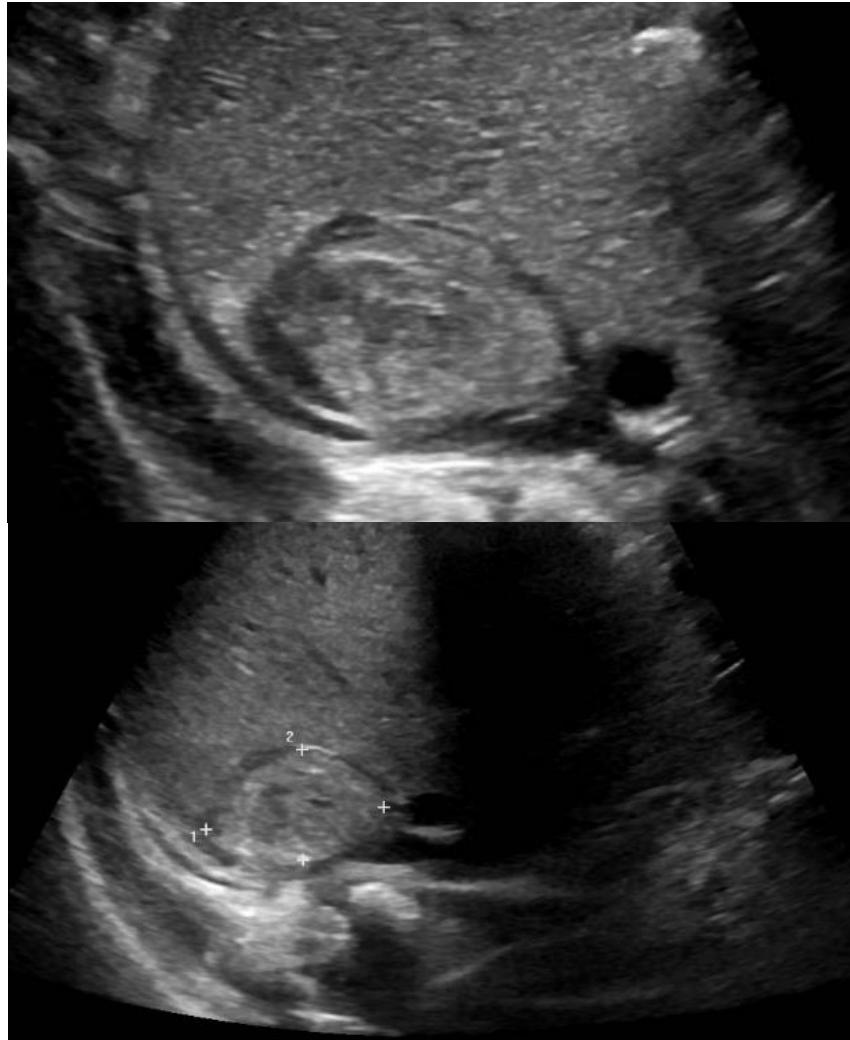


Intra-operative ultrasound in paediatric oncology



Cases with a focus on unusual or interesting ultrasound findings





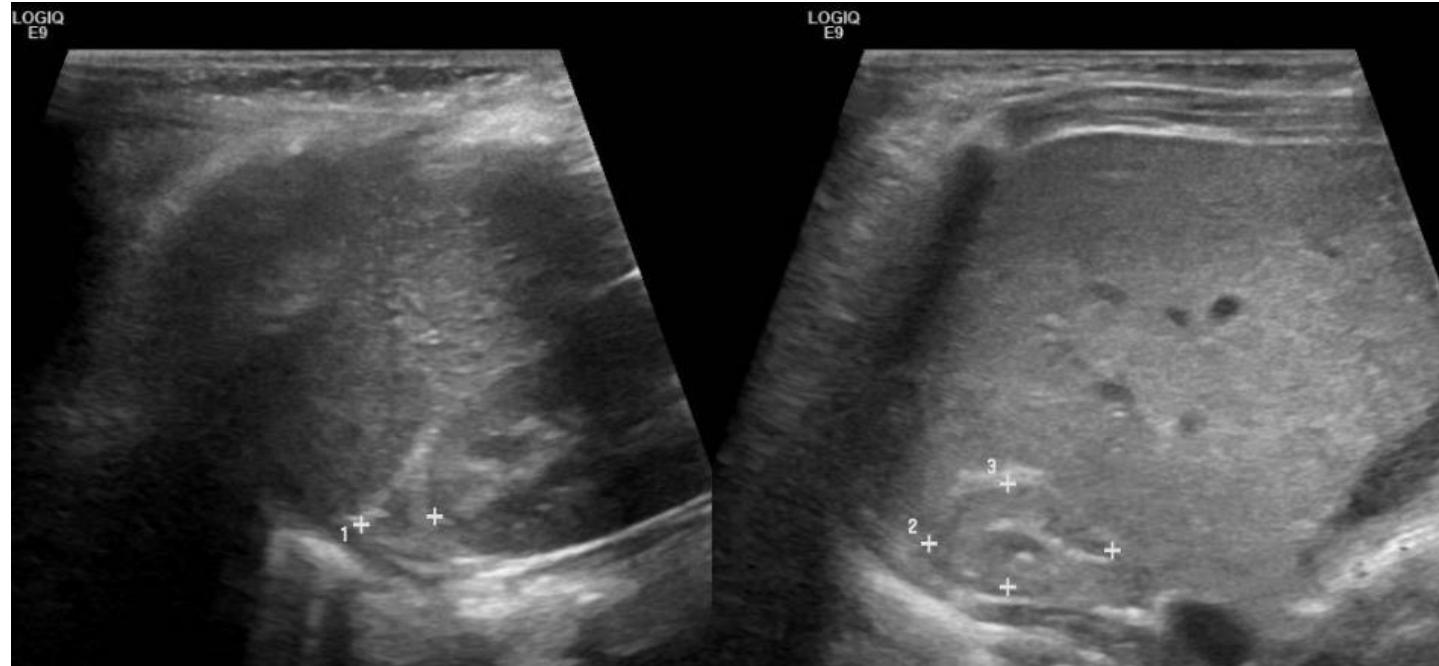
# Case 1

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Newborn baby

Born via forceps delivery

Jaundiced



# Case 1

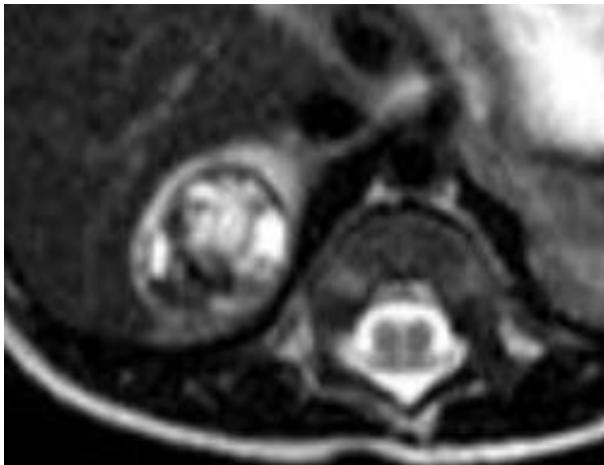
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ONE WEEK LATER...

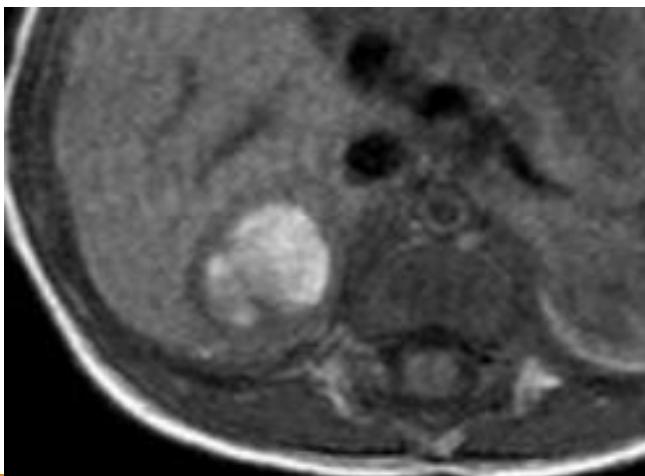
# MRI

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T2



T1



# Adrenal haemorrhage

Occurs in neonates – neonatal adrenal is 10-20x larger than the adult adrenal

More common on the right

Aetiology is multifactorial

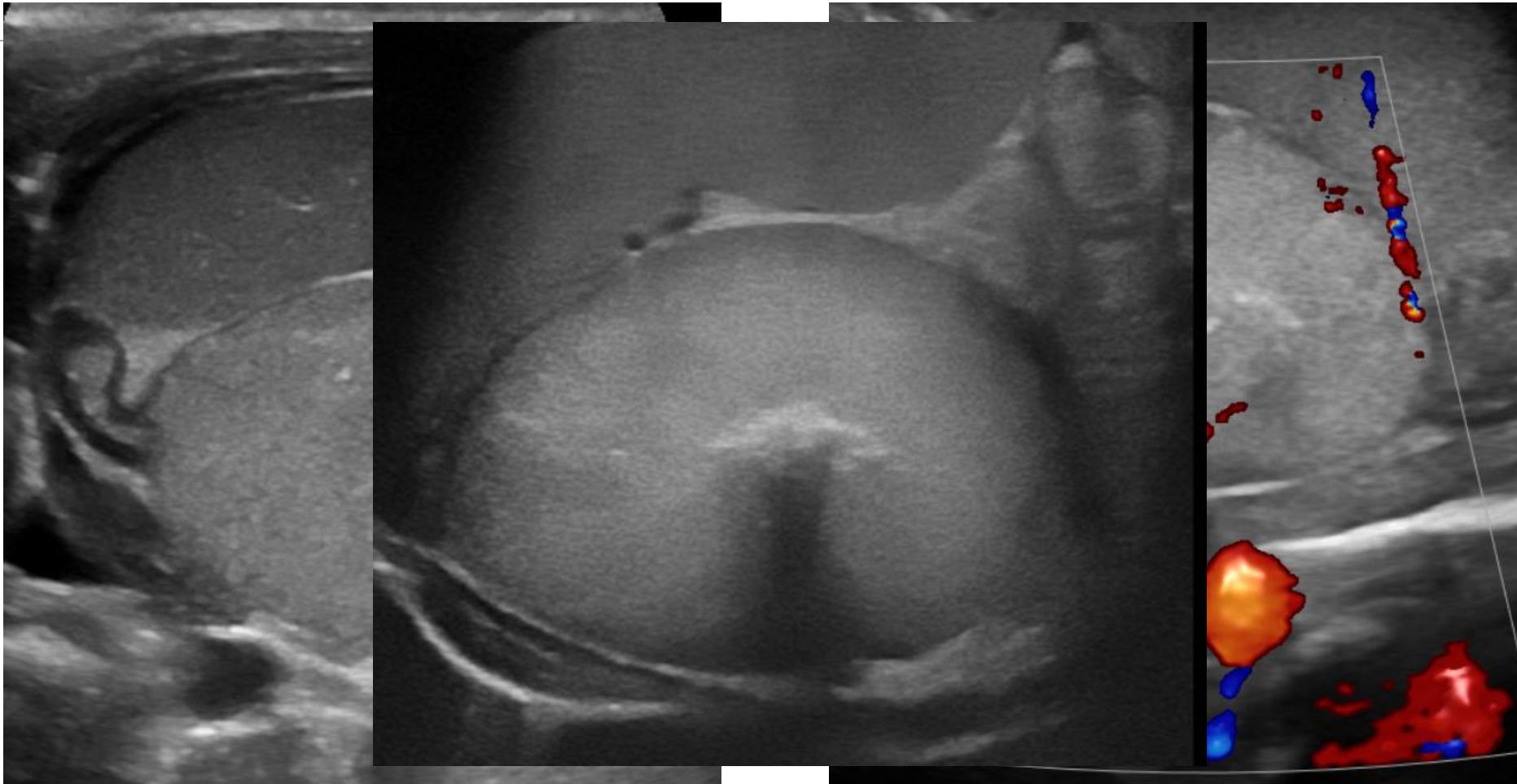
- Compressed by spine, liver and kidney
- IVC compression (right gland only)
- Renal vein thrombosis (typically left gland)
- Difficult delivery
- Neonatal stress
- Rapid involution of the fetal adrenal cortex after delivery

Function is retained until 90% of the gland is lost

Bilateral haemorrhage does occur but is rare

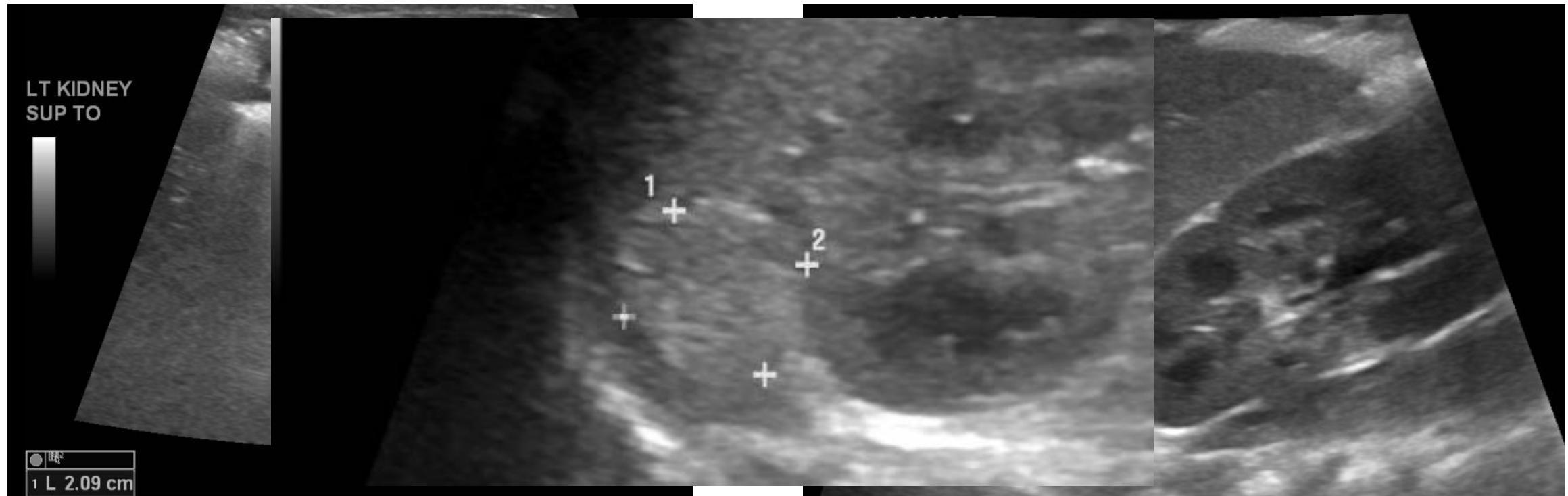
Jaundice is a common presenting feature

# Case 2



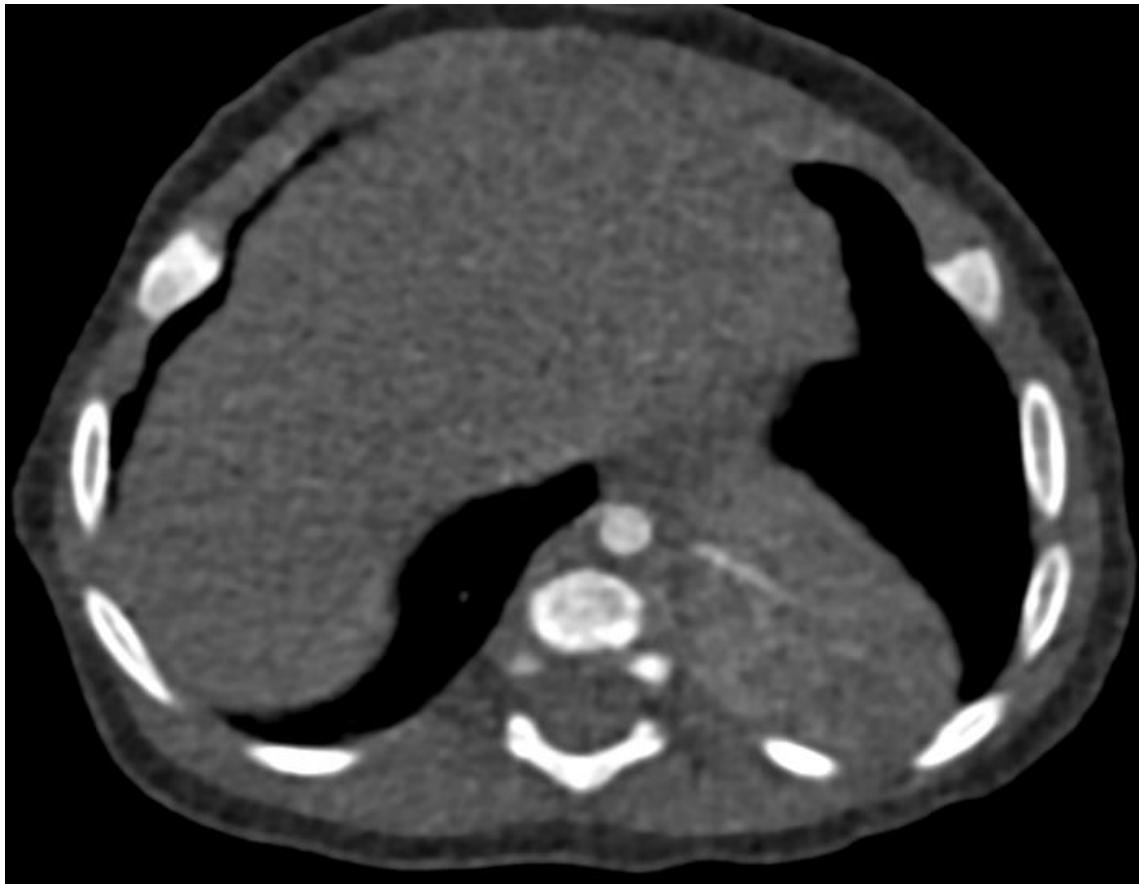
# Case 3

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# Case 3

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# Extra-lobar sequestration

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Mass of 'normal' pulmonary tissue with systemic supply, systemic drainage, no connection to the tracheobronchial tree, and a separate pleural covering

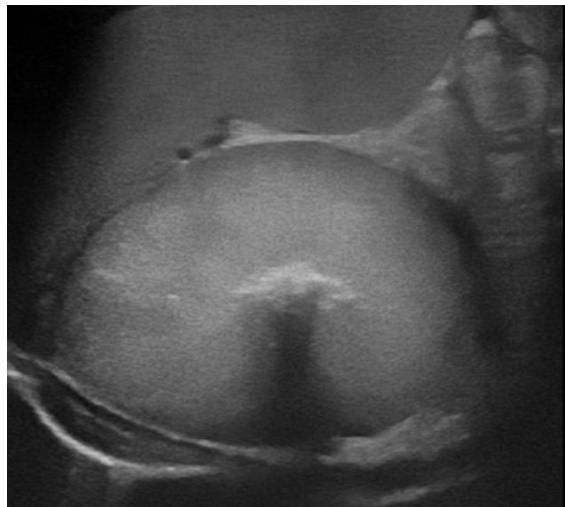
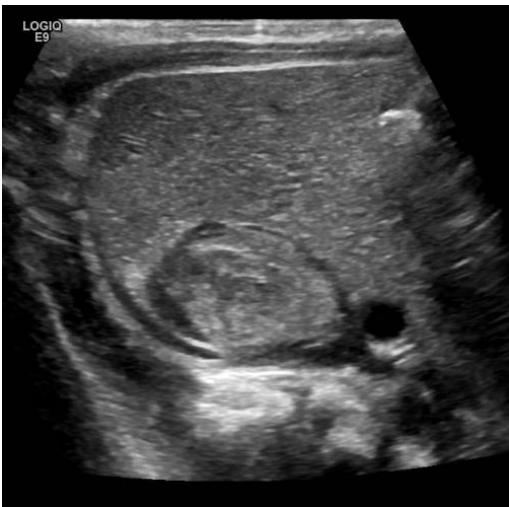
It is almost always on the left (~90%) and ~15% of these are located beneath the diaphragm

It is usually detected antenatally

More common in males

# Case 1, 2 and 3

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# Adrenal Haemorrhage Imaging

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## Ultrasound is the modality of choice

- Early: Hyperechoic irregular mass which is flattening the kidney
- With time the lesion gradually becomes cystic
- Usually, the contour of the adrenal gland is preserved
- Late: Usually becomes undetectable but may remain cystic and can calcify

## MRI would be the next best modality

- Signal will change according to standard degradation of haemoglobin
- 1-5 days may be low on T1
- 1-5 weeks T1 will be high
- Enhancement will depend on the amount of adrenal gland involved

# Case 4

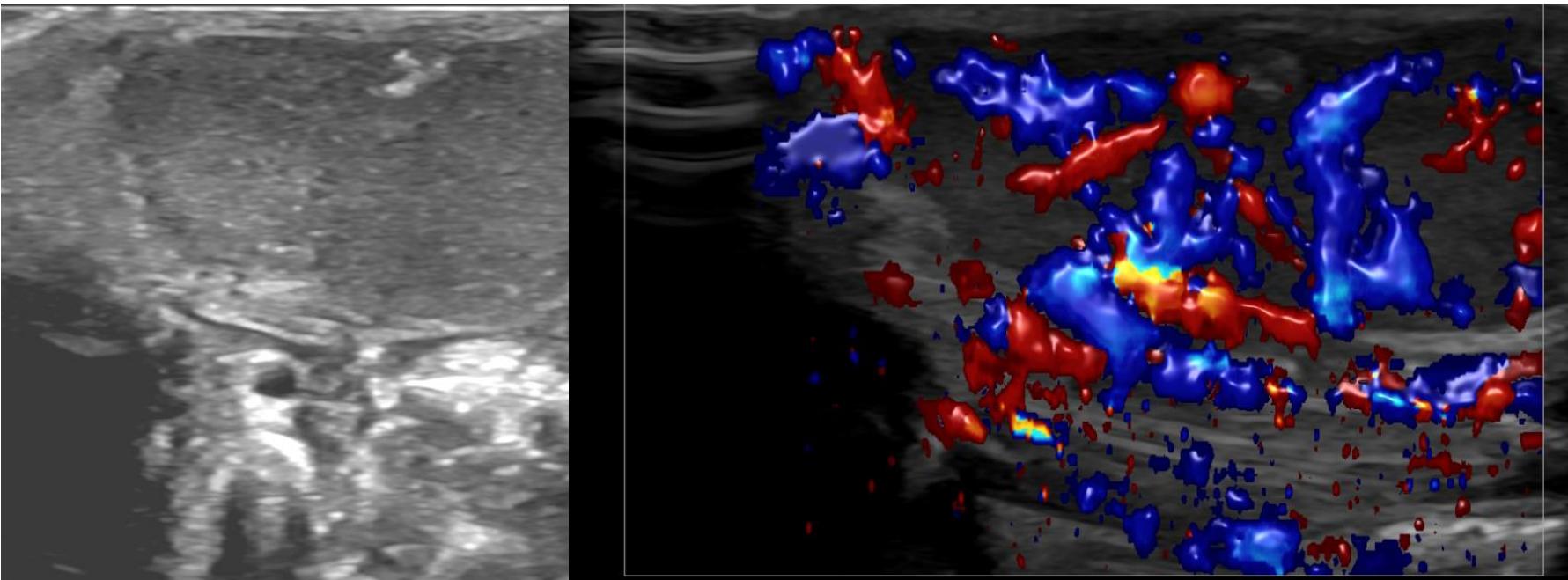
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2 month old

Bluish lump on foot

Not present at birth

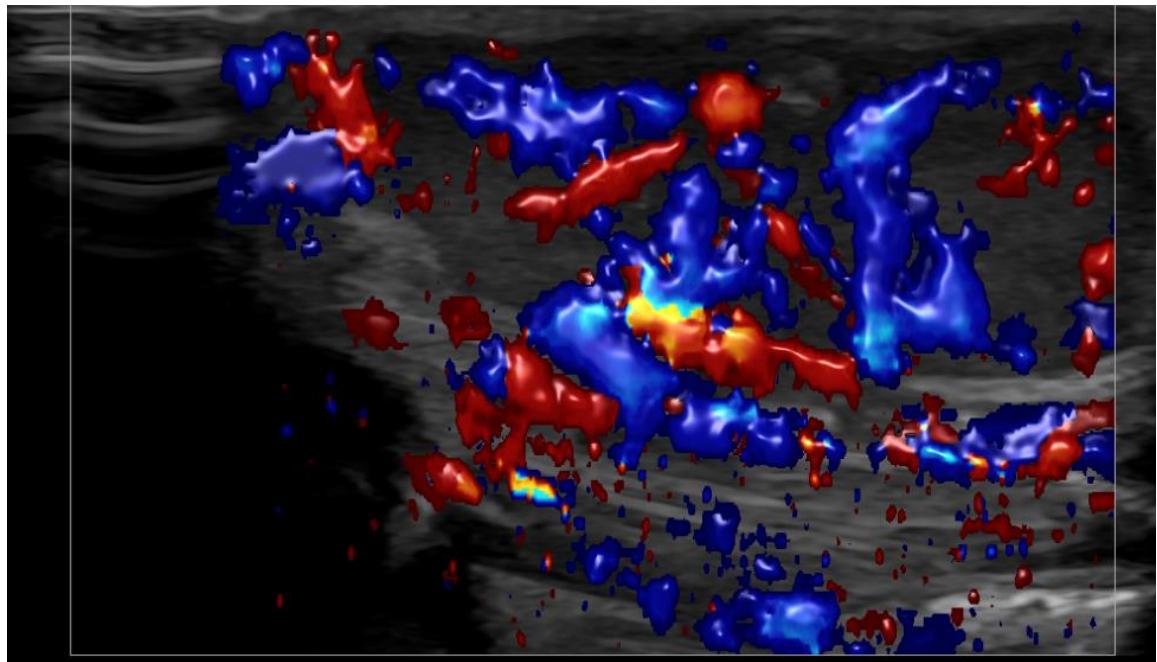
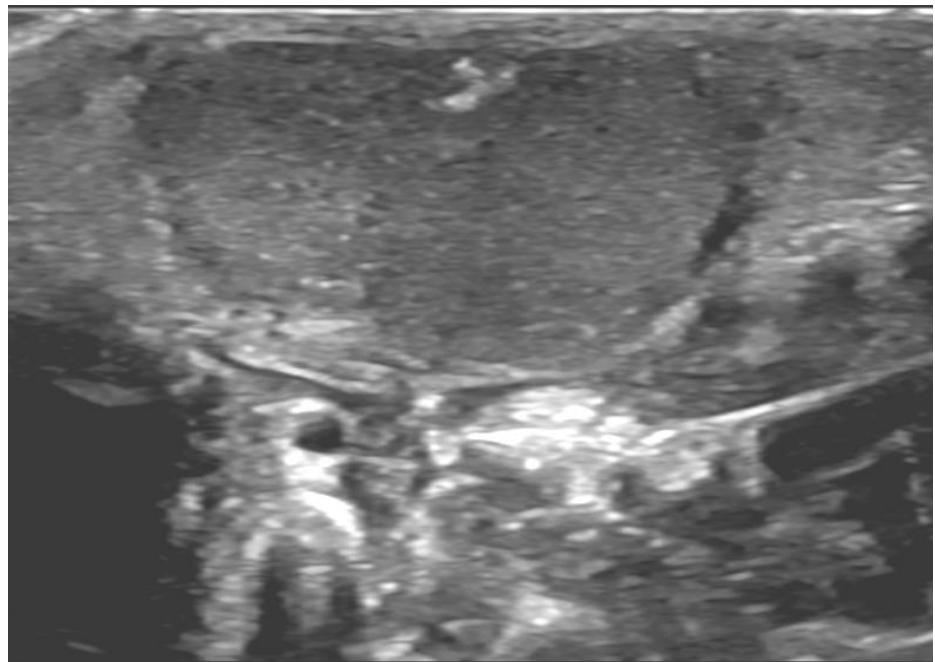
Growing



# Case 4

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Infantile haemangioma



# Case 5

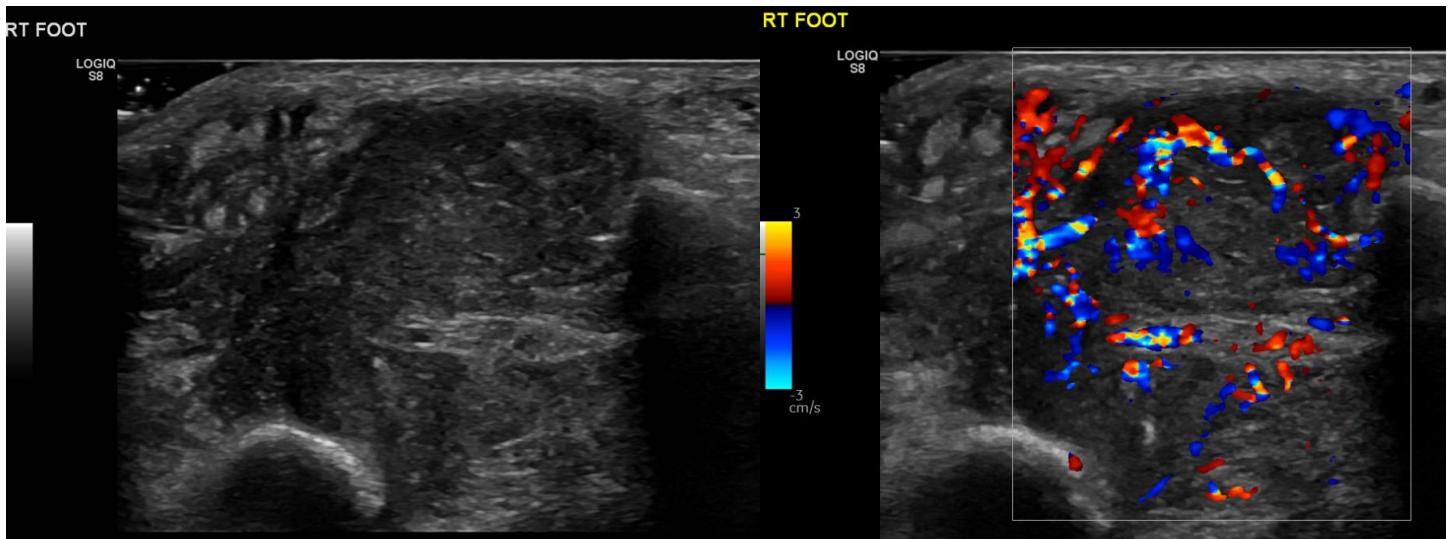
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9 year old

Bluish lump on foot for 3 months

Non tender

Growing

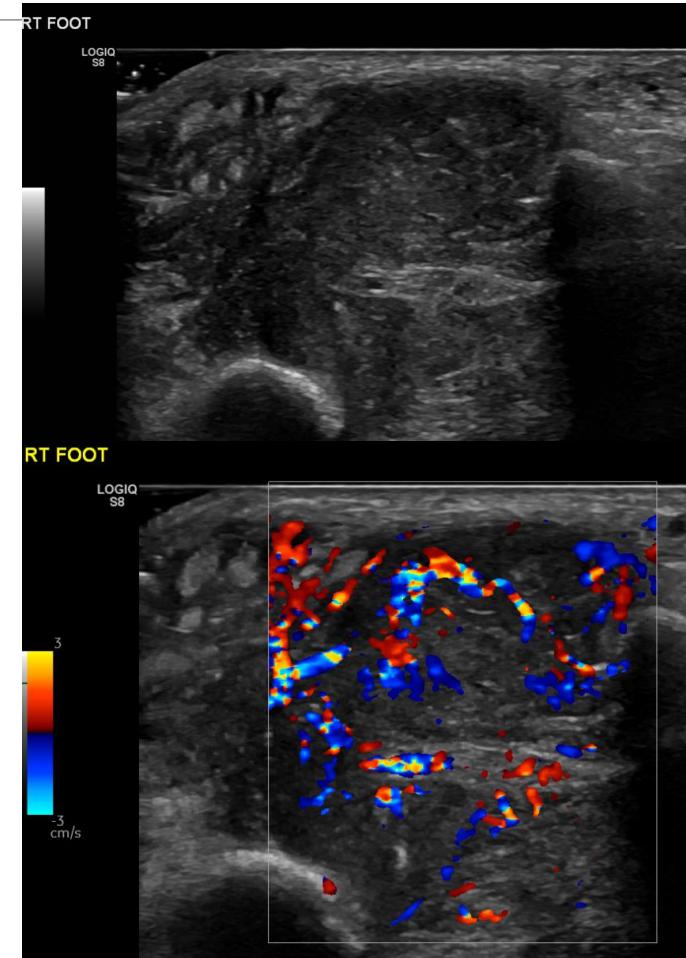


# Case 5

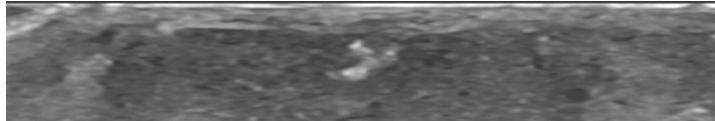
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## Rhabdomyosarcoma

- Malignant tumour of skeletal muscle
- Commonest malignant soft tissue tumour in children
- Usually a rapidly growing lump
- Common in the head and neck region
- On ultrasound these are often highly vascular soft tissue masses



# Case 4 and Case 5

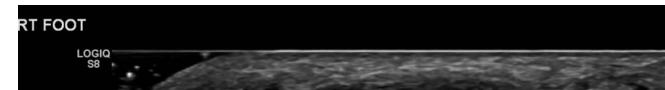
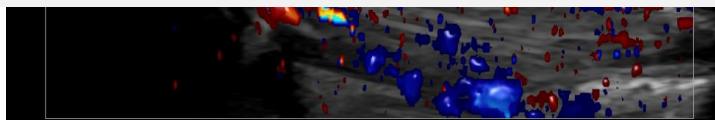


2 month old

Bluish lump on foot

Not present at birth

Growing

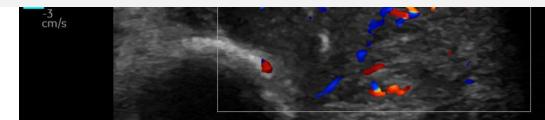


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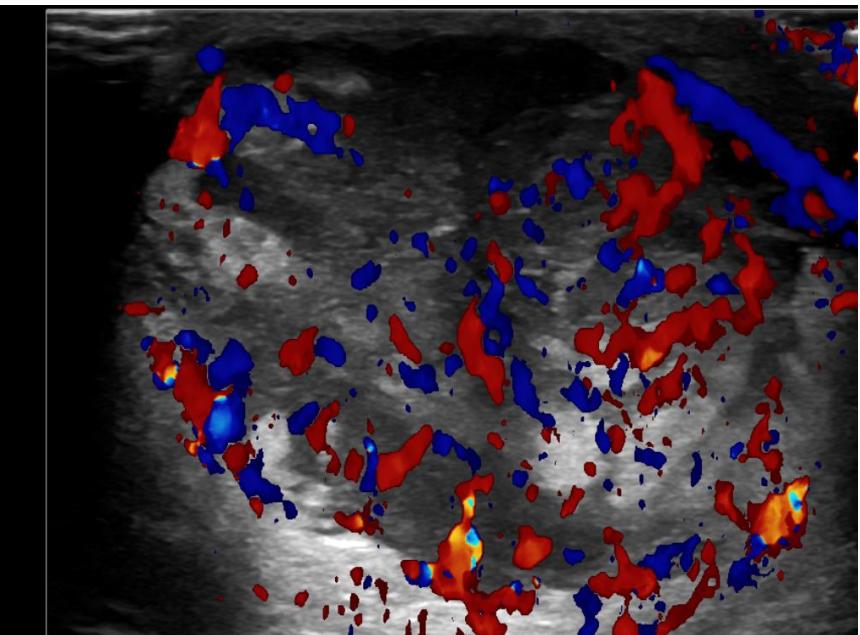
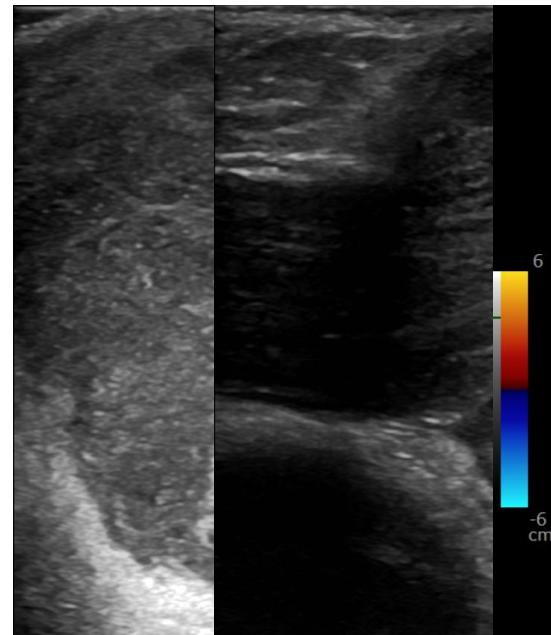
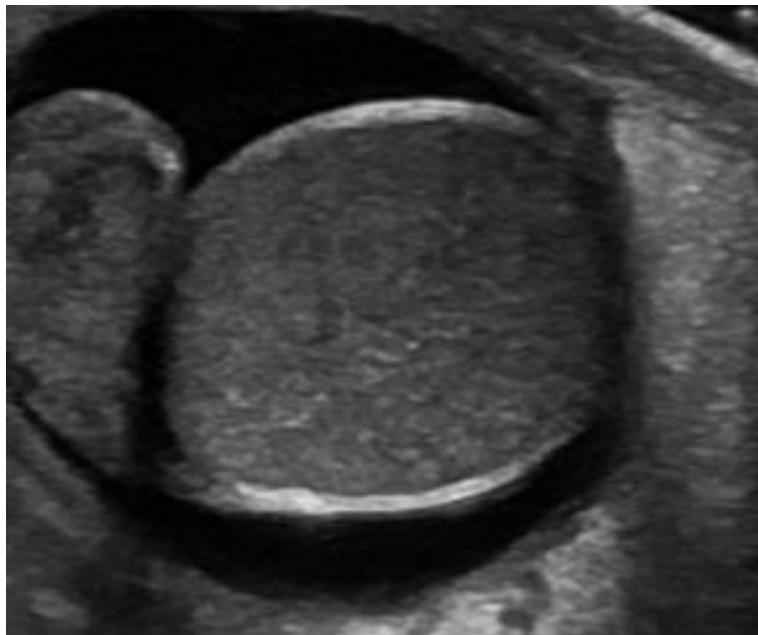
Growing



# Case 6

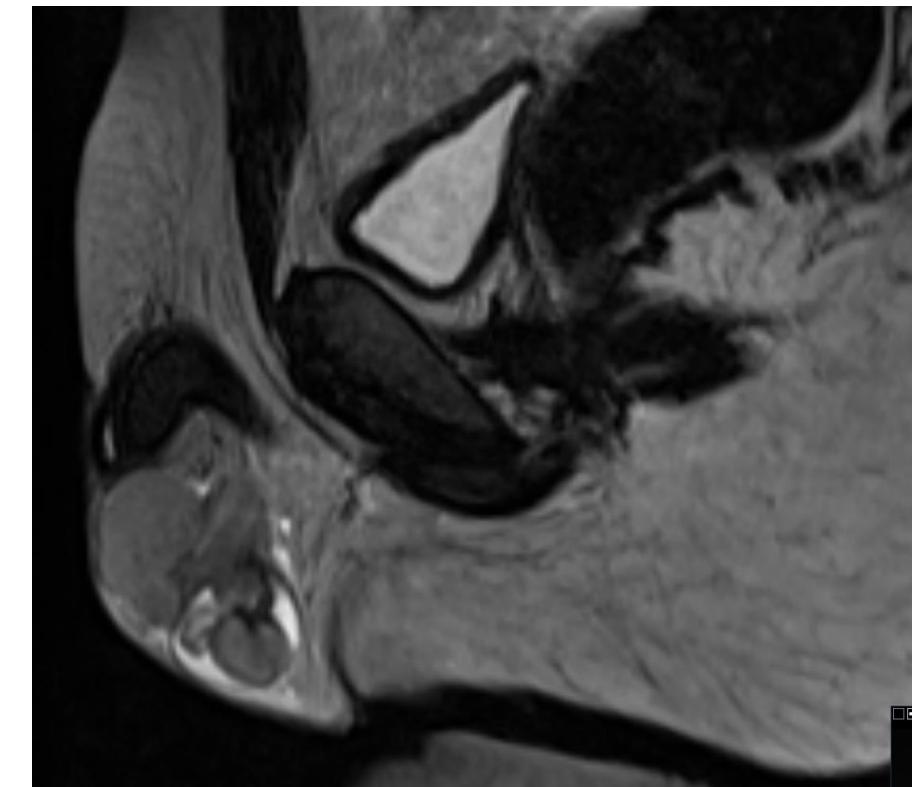
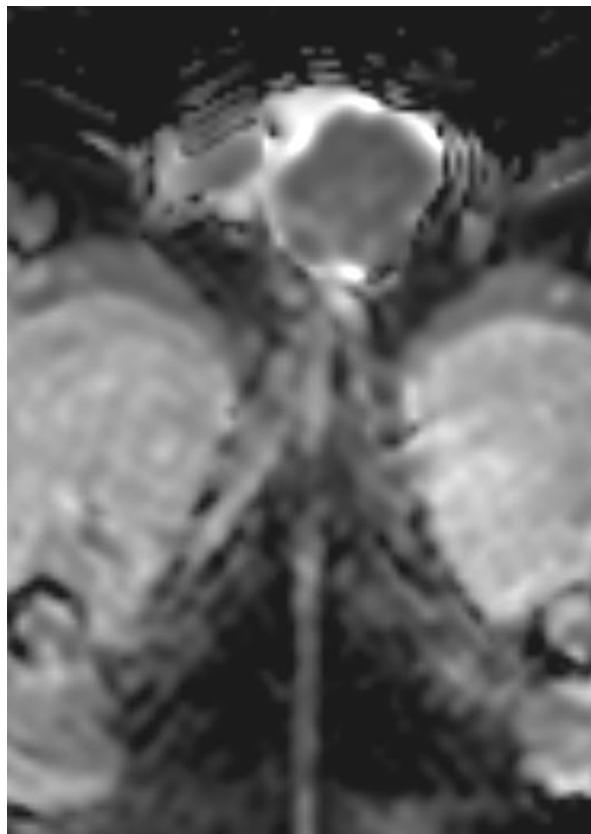
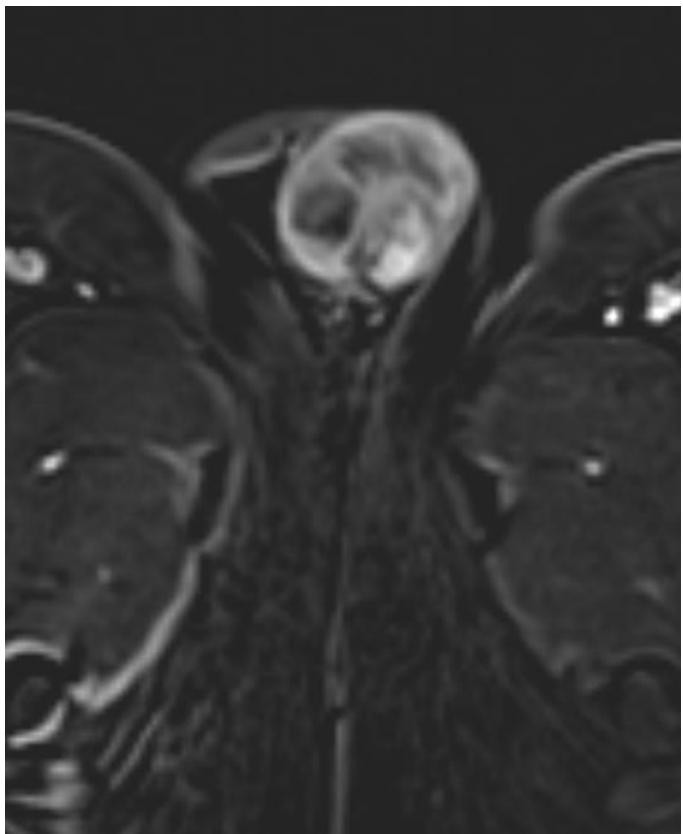
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- School age boy
- Kicked in groin during sports and now presents with a lump



# Case 6

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# Case 6

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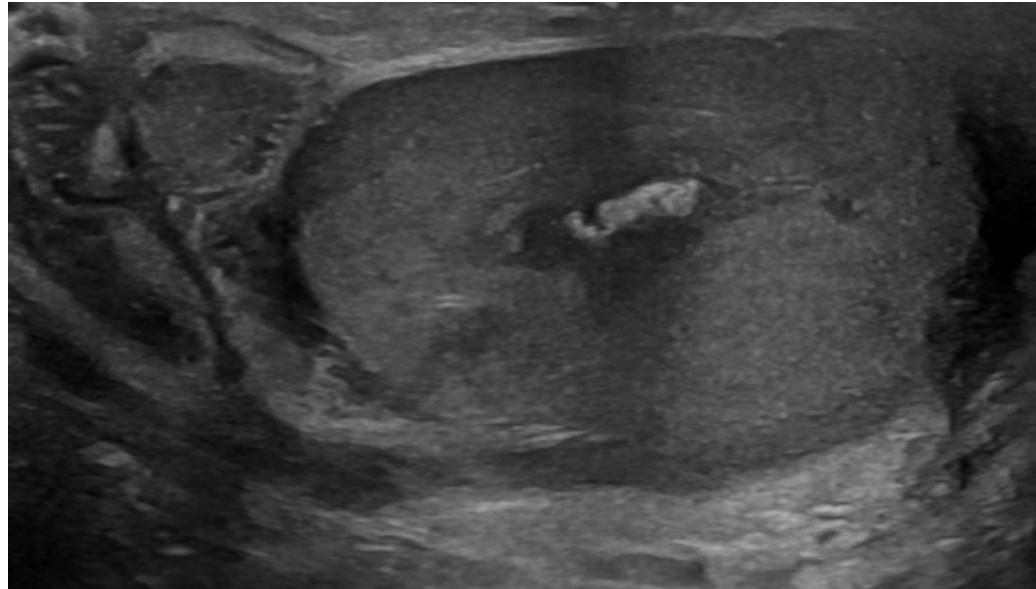
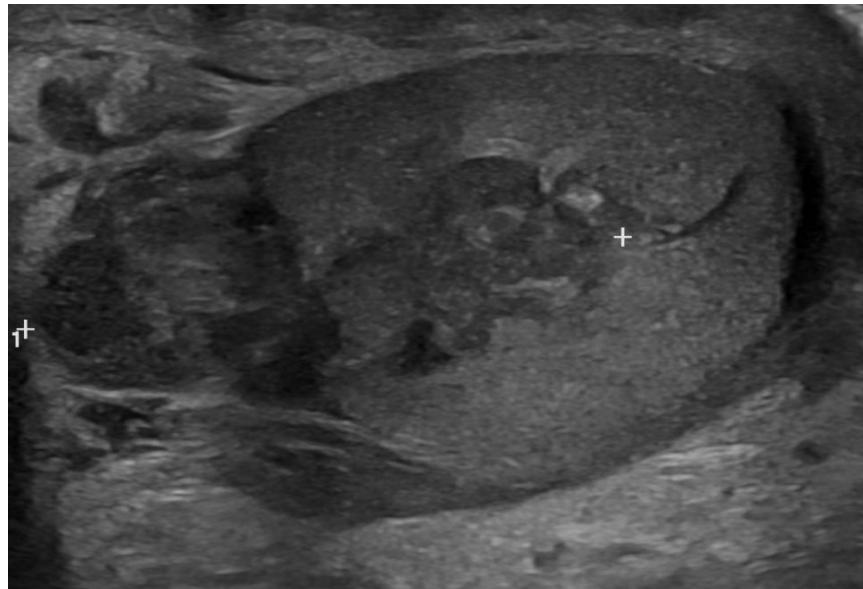
Paratesticular Rhabdomyosarcoma

# Case 7

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Adolescent boy

Kicked in the groin during sports and has pain and a lump in the testicle



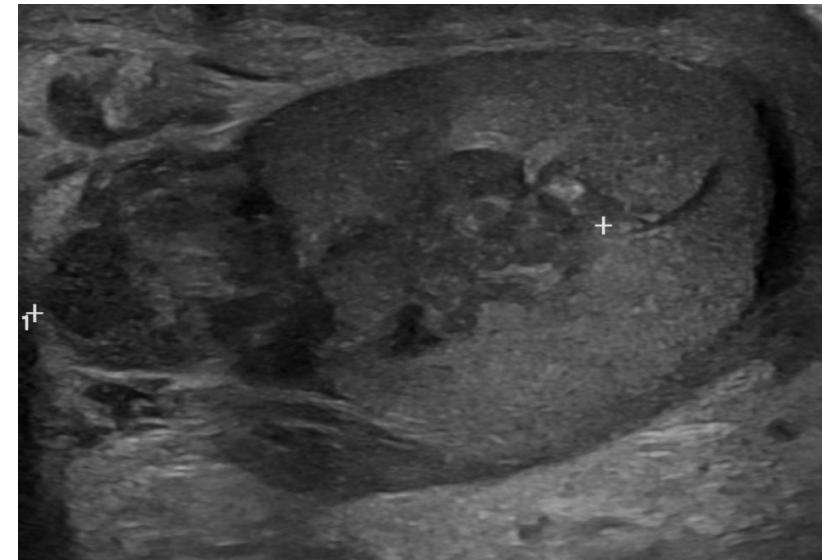
# Case 7

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Malignant germ cell tumour

# Case 6 and 7

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# Case 8

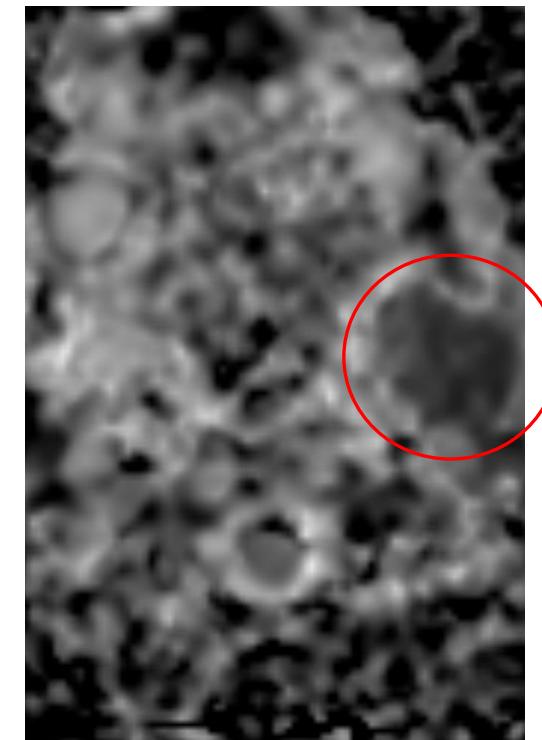
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5 year old

Neck mass seen incidentally  
on MRI head being done to  
investigate seizures

No symptoms

Soft mass palpable clinically



# Case 8 USS

SUBSTERNUM THY

LOGIQ

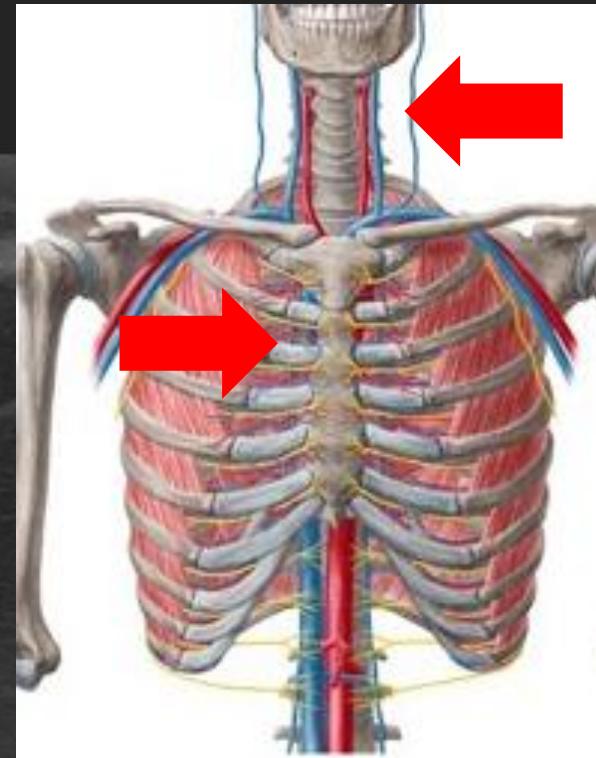
1

1

2

3

LT 2 NECK



# Ectopic thymus

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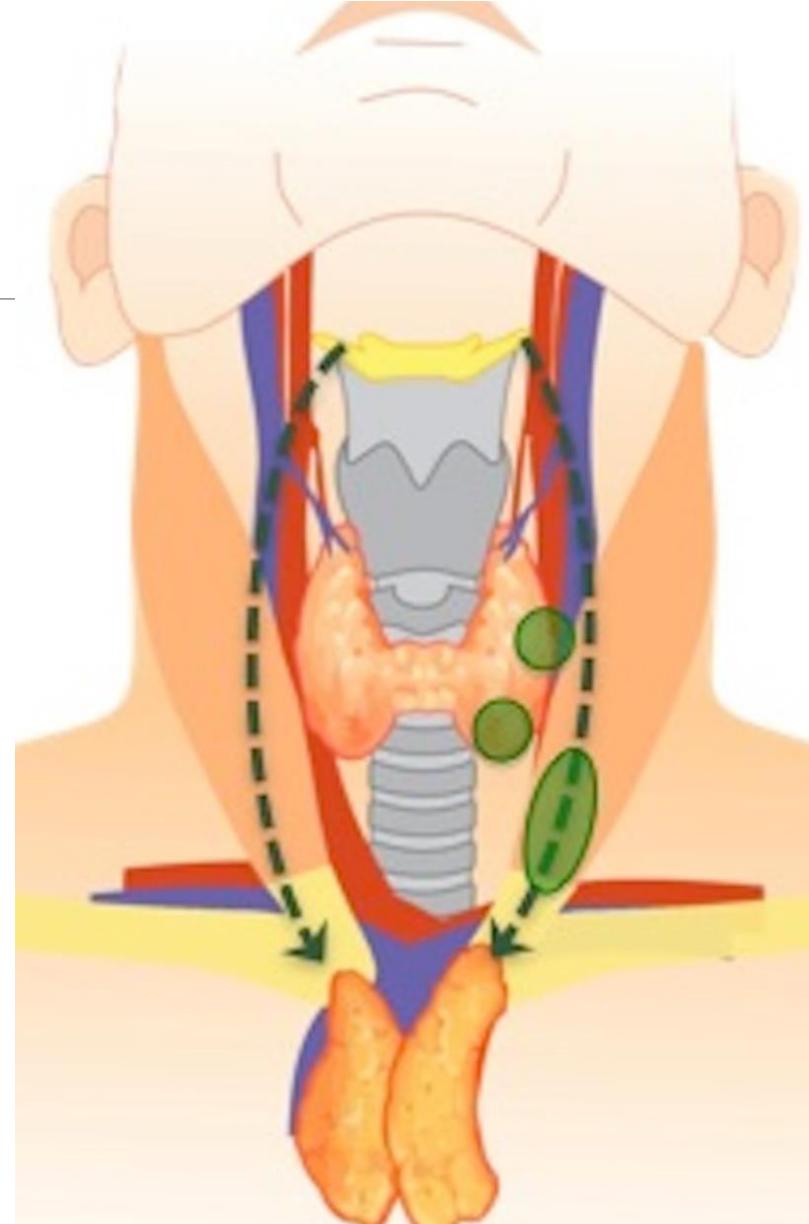
Thymus begins in the 3<sup>rd</sup> branchial cleft on either side of the neck

Each lobe descends into mediastinum along the thymopharyngeal duct paths

Fuse in the midline in the mediastinum

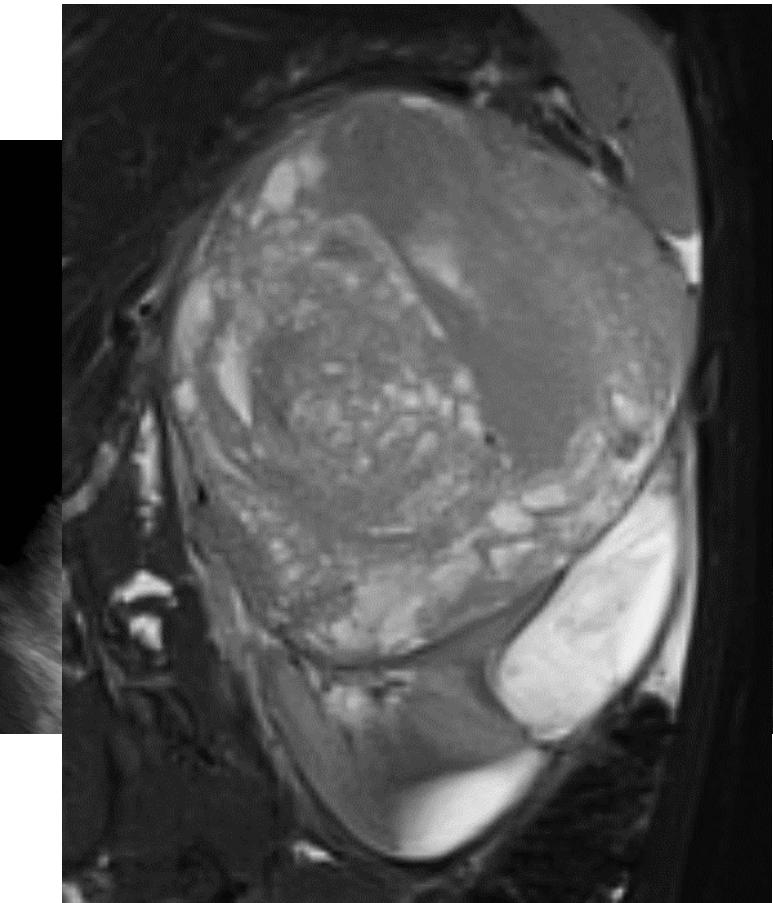
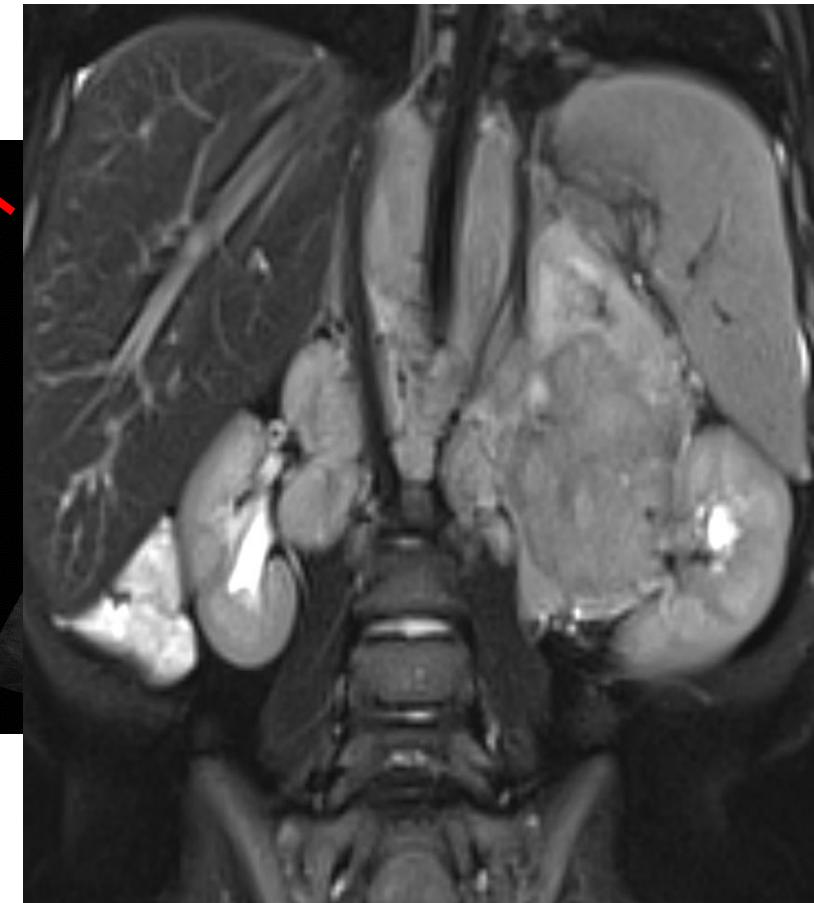
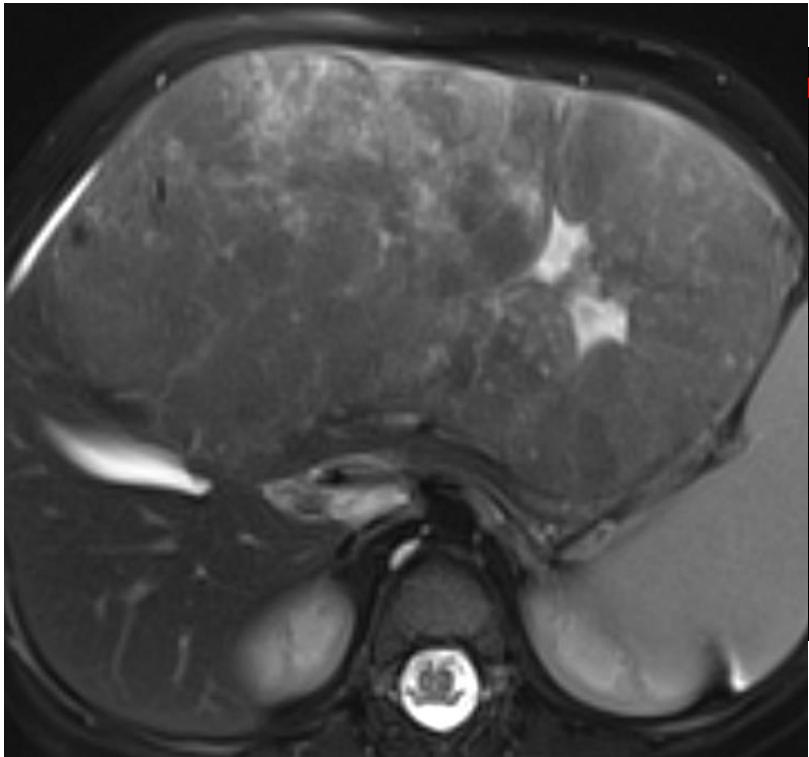
Ectopic thymic tissue may be seen anywhere along this path

This may or may not be contiguous with the thymus in the chest



In case you were worried

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# Conclusion



Ultrasound in paediatric oncology is the first imaging modality and often makes the diagnosis or at least provides the information for the next steps



Always have the general principles in mind:

Where is it coming from?  
Is there more than one?  
Cystic or solid?  
What is happening to the main blood vessels in the abdomen



Most importantly, remember that we are not histopathologists...