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# *Practical Radiology:* Pediatric Soft Tissue Lesions

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# Financial Disclosures

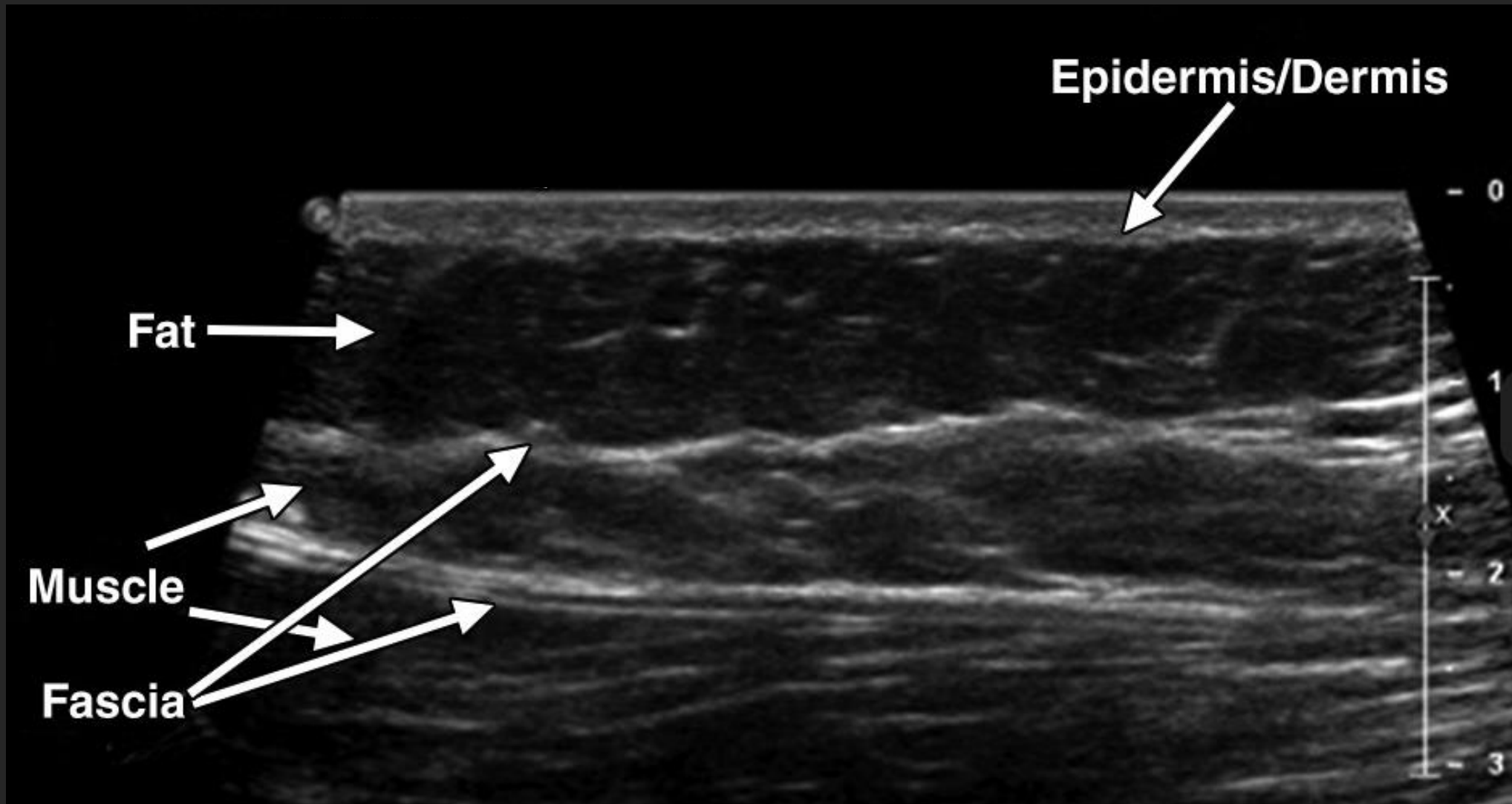
- I do not have any relationships to report with ACCME defined ineligible companies.
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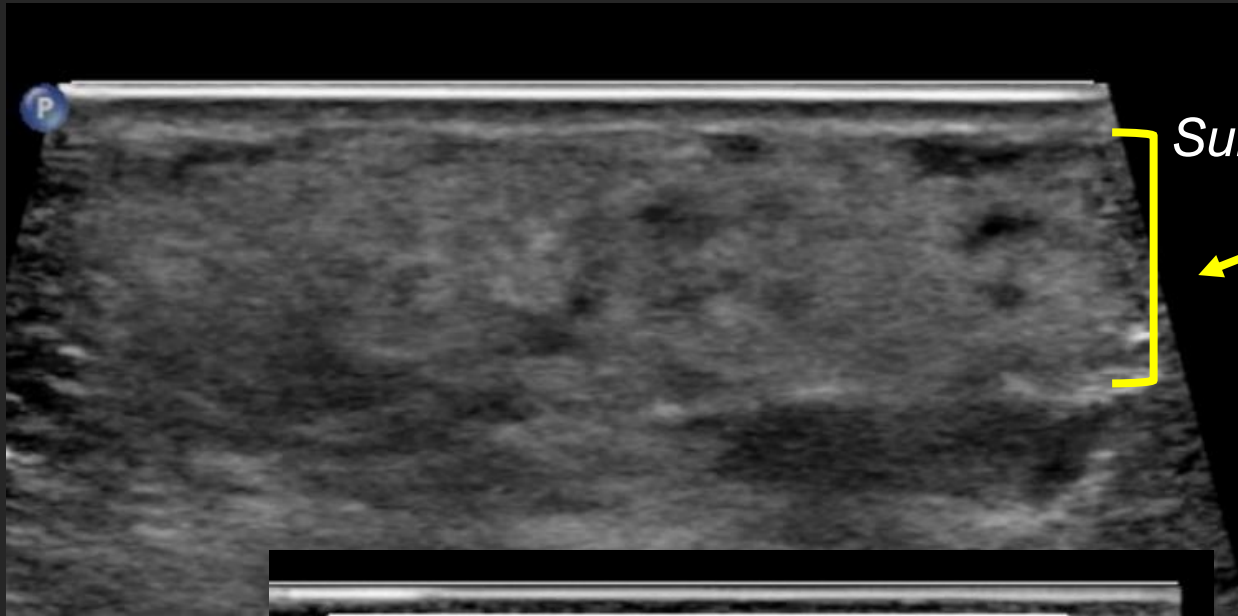
# Objectives

After this presentation, the participant will be able to:

1. Localize lesions by tissue plane
  2. Describe soft tissue lesions in children by ultrasound
  3. Recognize features of malignancy
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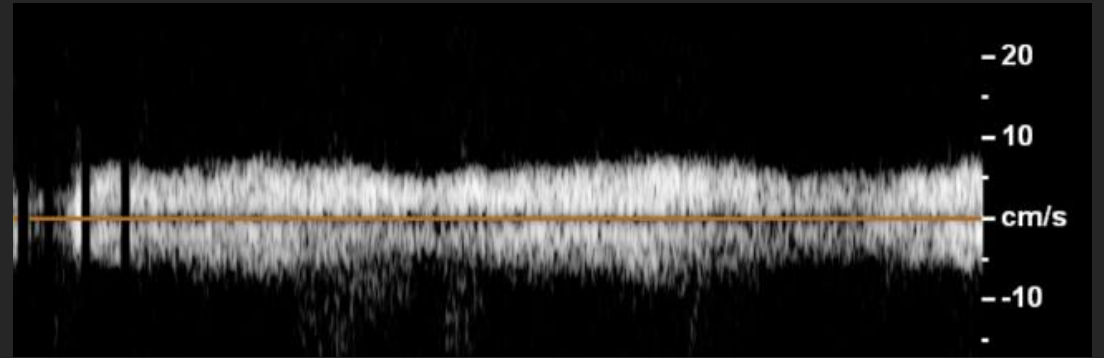
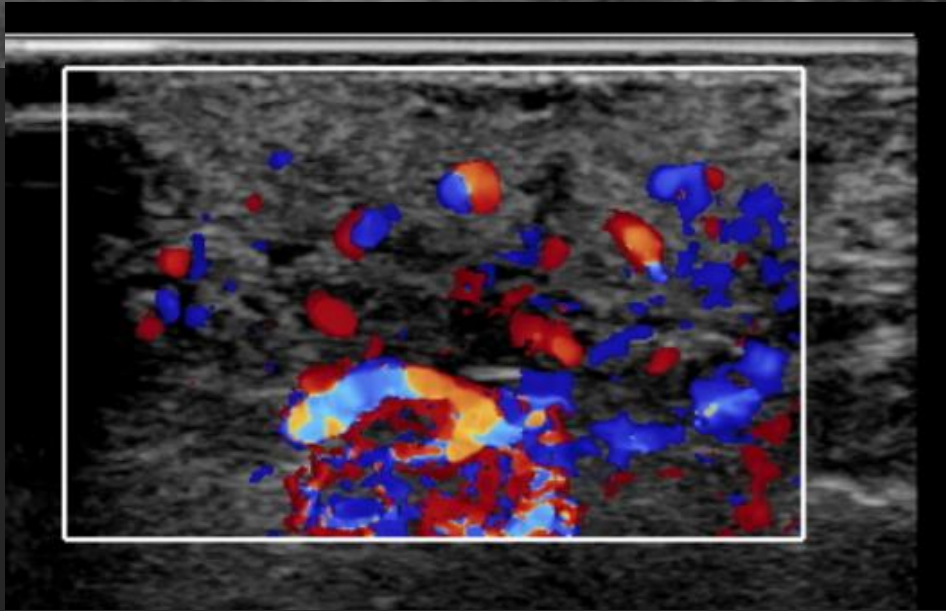
# Skin & Soft Tissue Anatomy





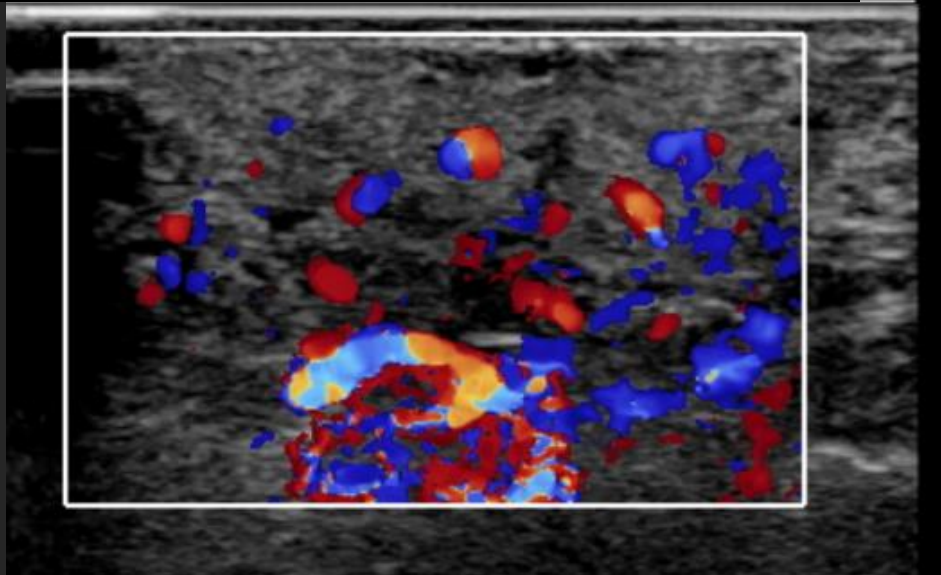
*Subcutaneous fat layer*

*Ovoid, echogenic, heterogenous ill-defined*



4-week old w/ new lump on chin

# Infantile Hemangioma



4-week old w/ new lump on chin

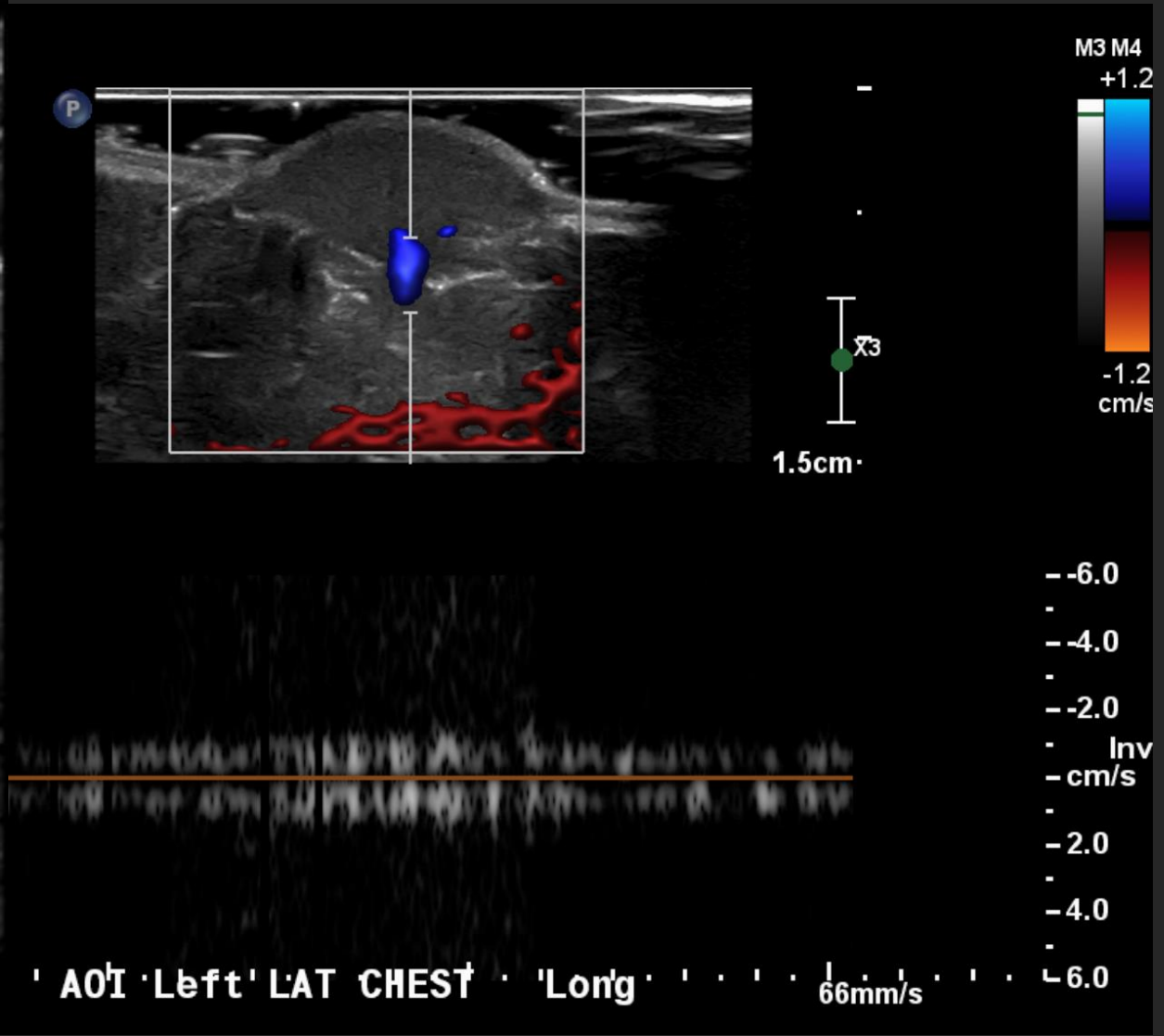
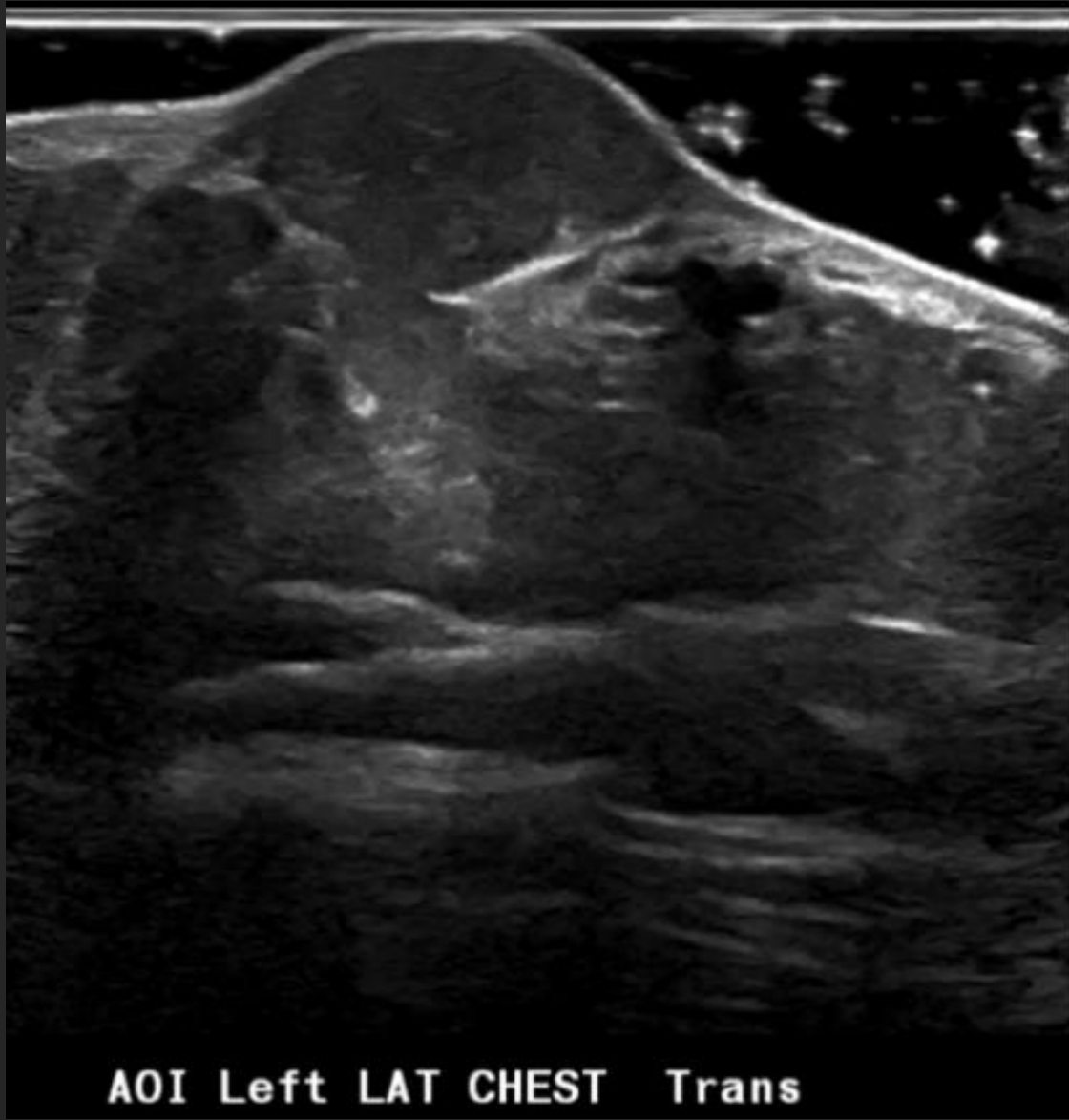
- Benign vascular tumor
  - Appears first weeks – months of life, grows rapidly
  - Involutates over years
  - Fibro-fatty remnant
- Skin markings absent in deep hemangioma
- GLUT-1 marker
- Beta blockers for large lesions

# Pediatric Hemangiomas

Type	Appears	Resolves	Marker	Treatment
Infantile	Weeks to months post-natal	Years	GLUT-1	Beta-blocker
Congenital				
Rapidly involuting	Pre-natal	3 – 12 months	N/A	None
Non-involuting	Pre-natal	N/A	N/A	Resection if needed

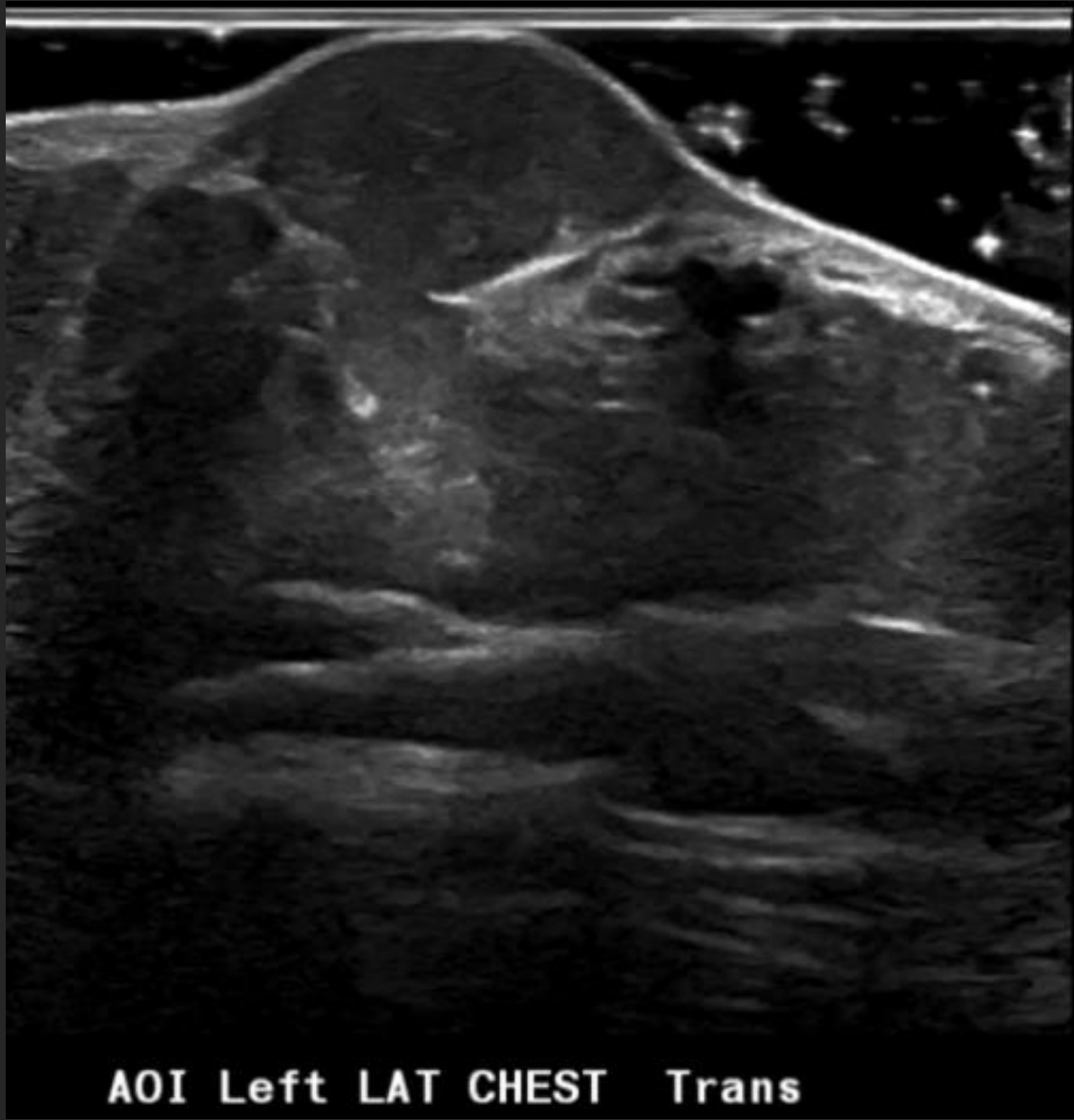
Merrow AC, et al. Radiographics, 2016.





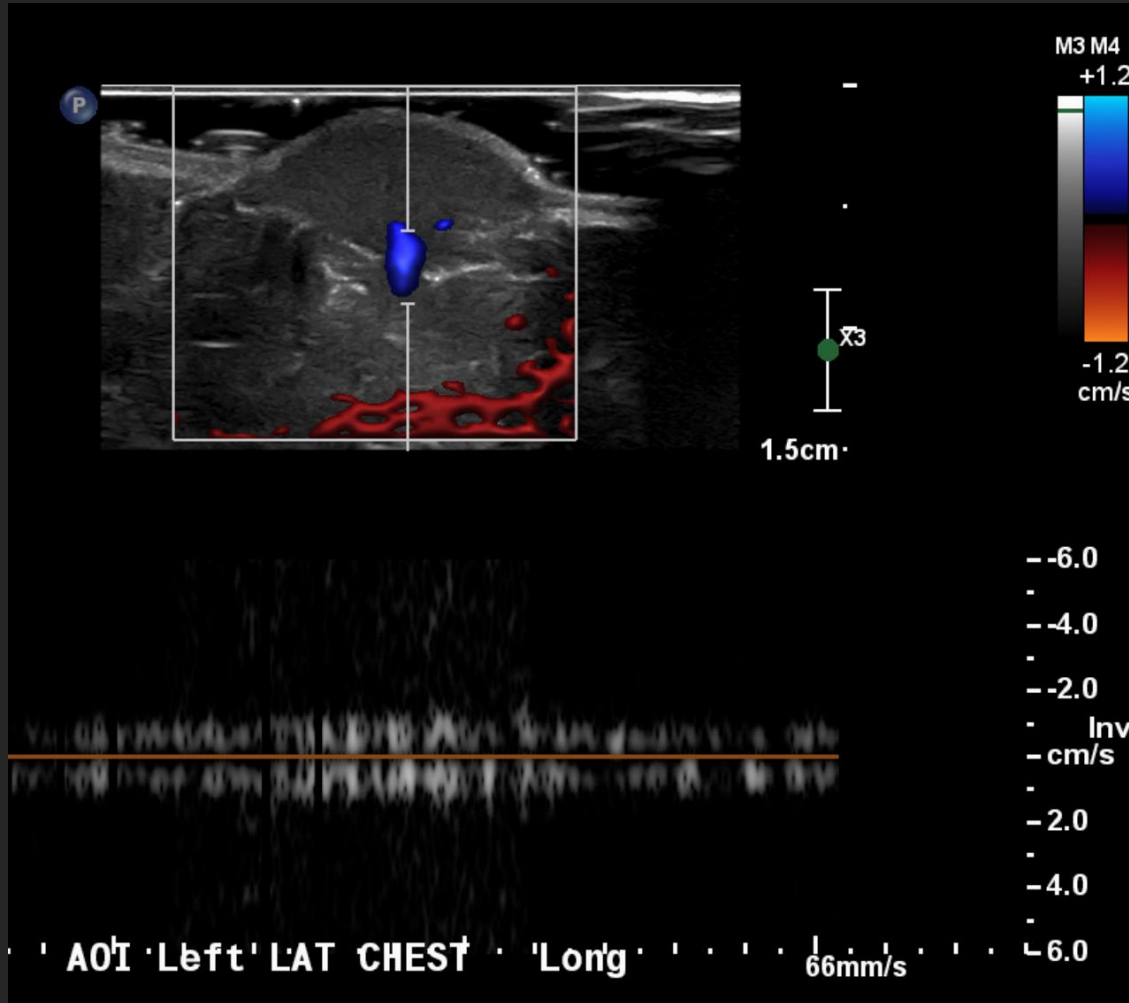
8-year old w/ left chest lesion visible since 3-years old





8-year old w/ left chest lesion visible since 3-years old

# Venous Malformation

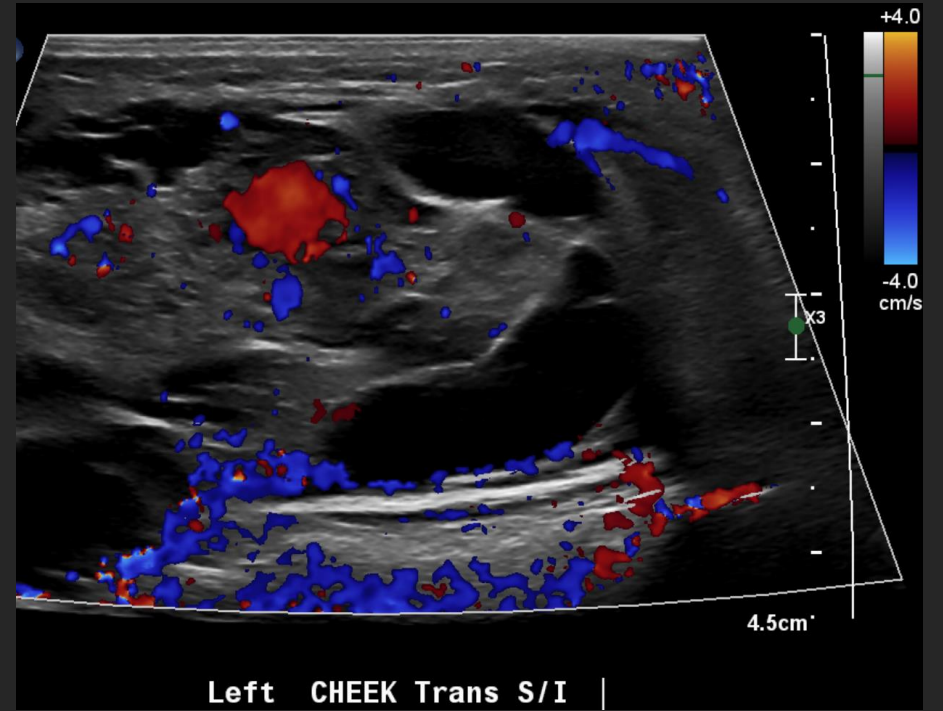


- May grow from intralesional hemorrhage
- Larger lesions may contain channels, varices, and phleboliths
- Multiple lesions suggest blue rubber bleb nevus syndrome

8-year old w/ left chest lesion visible since 3-years old

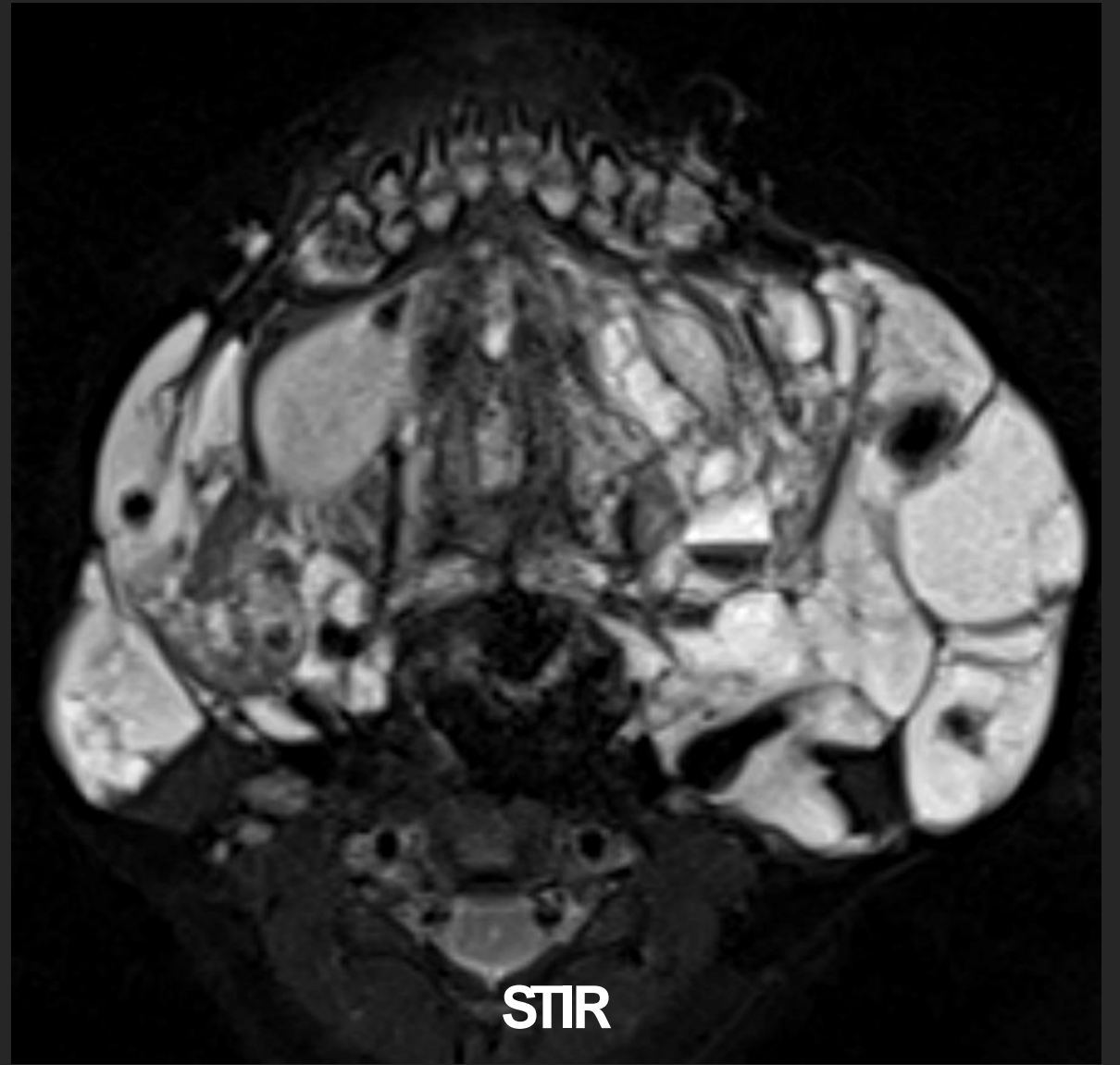


1-year old w/ left cheek swelling

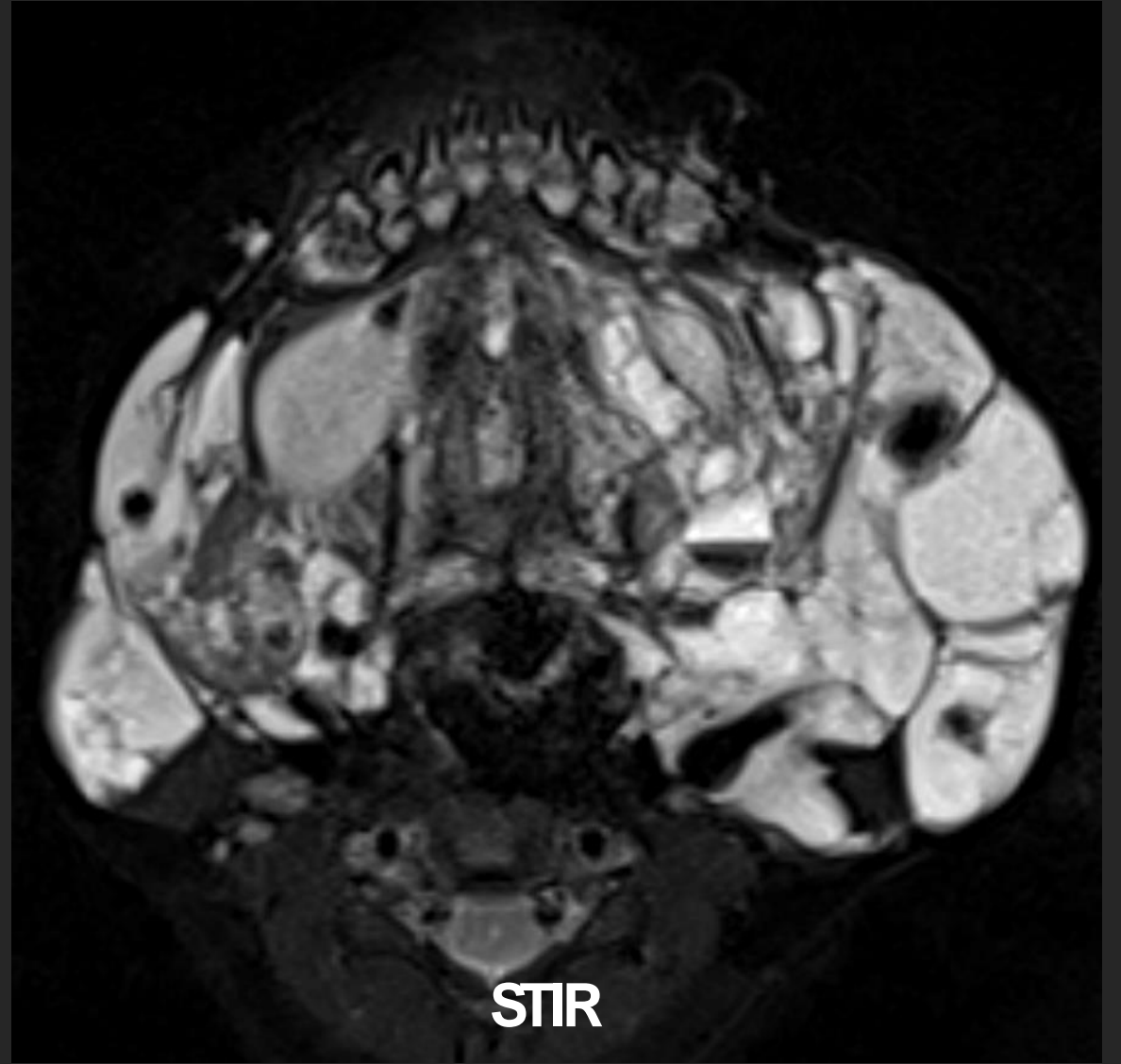
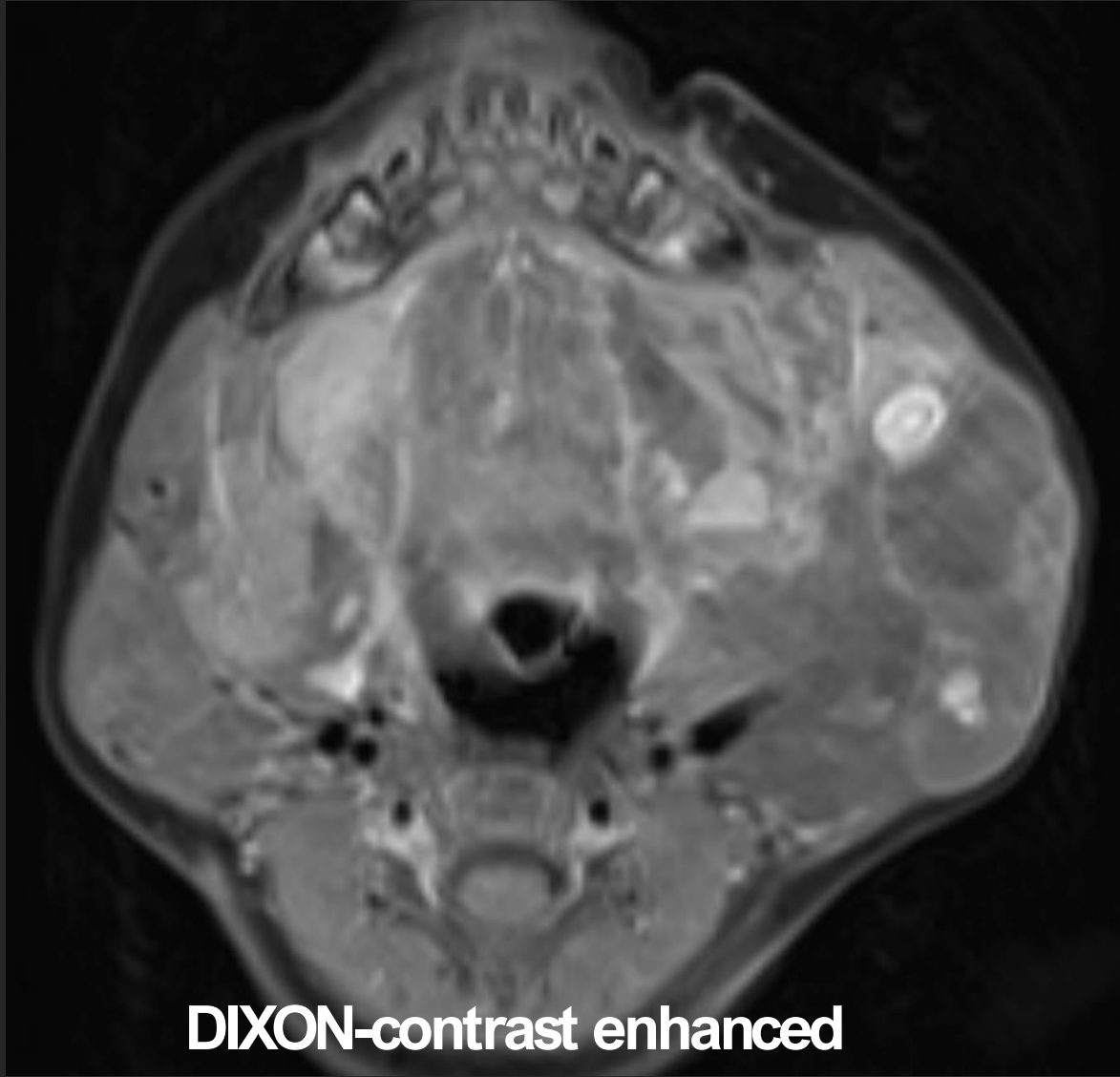




1-year old w/ left cheek swelling

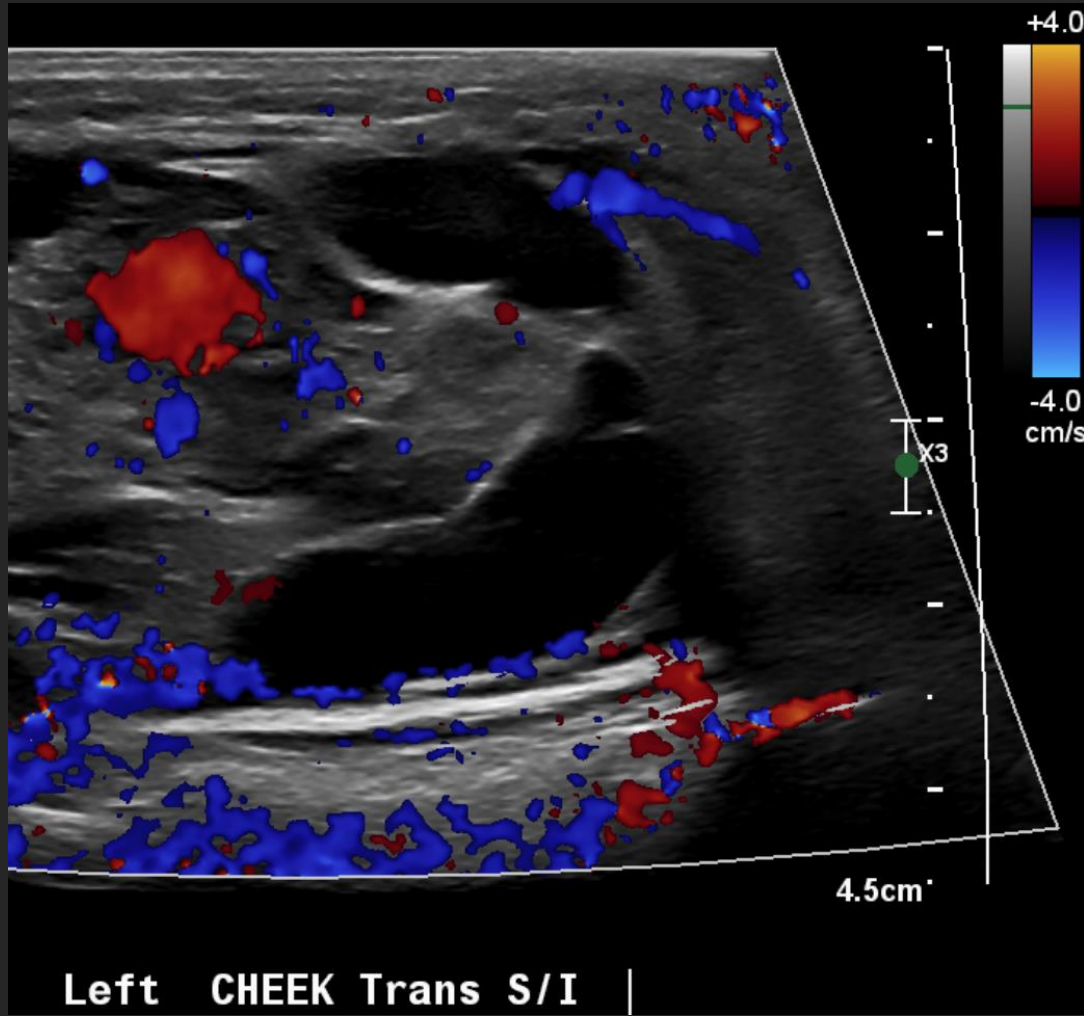






1-year old w/ left cheek swelling

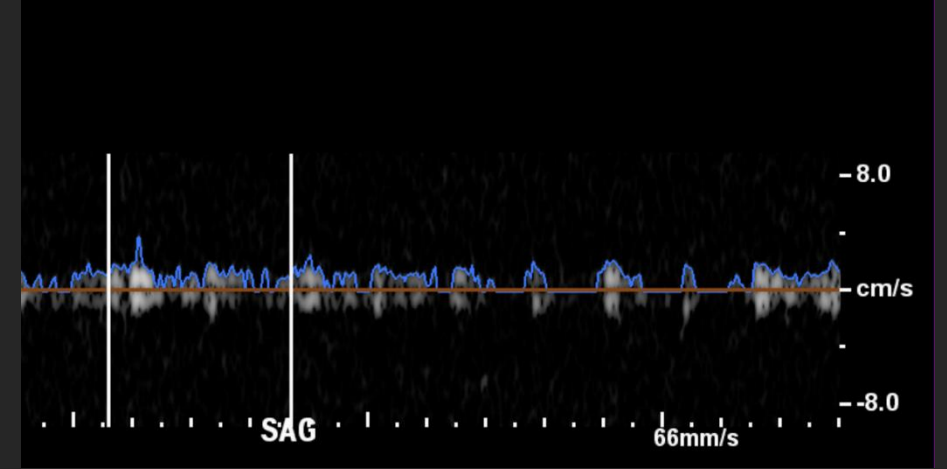
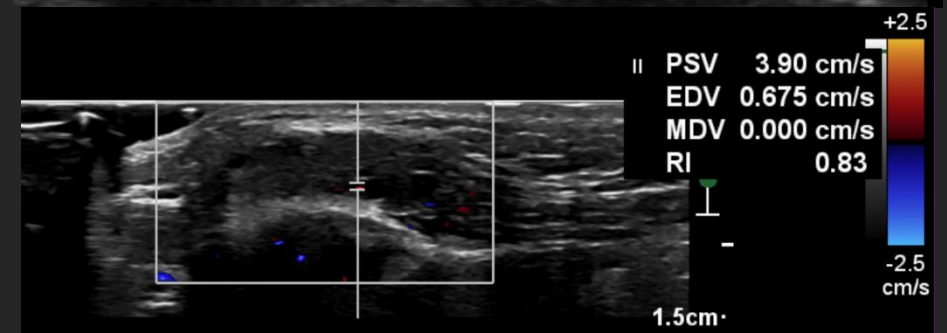
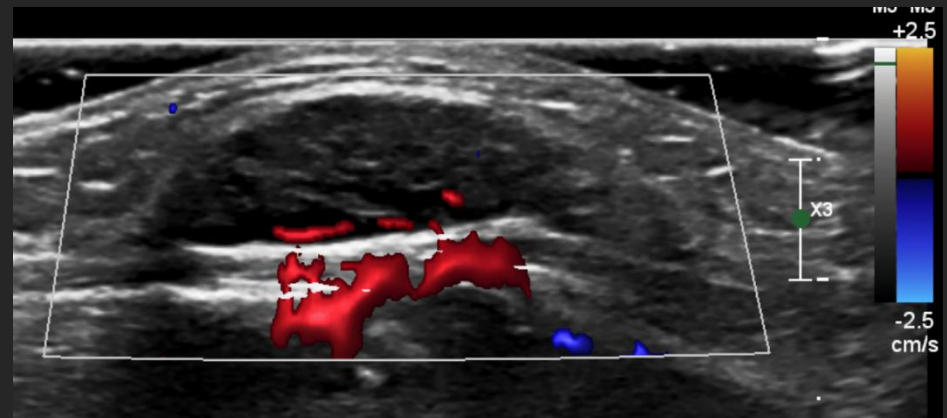
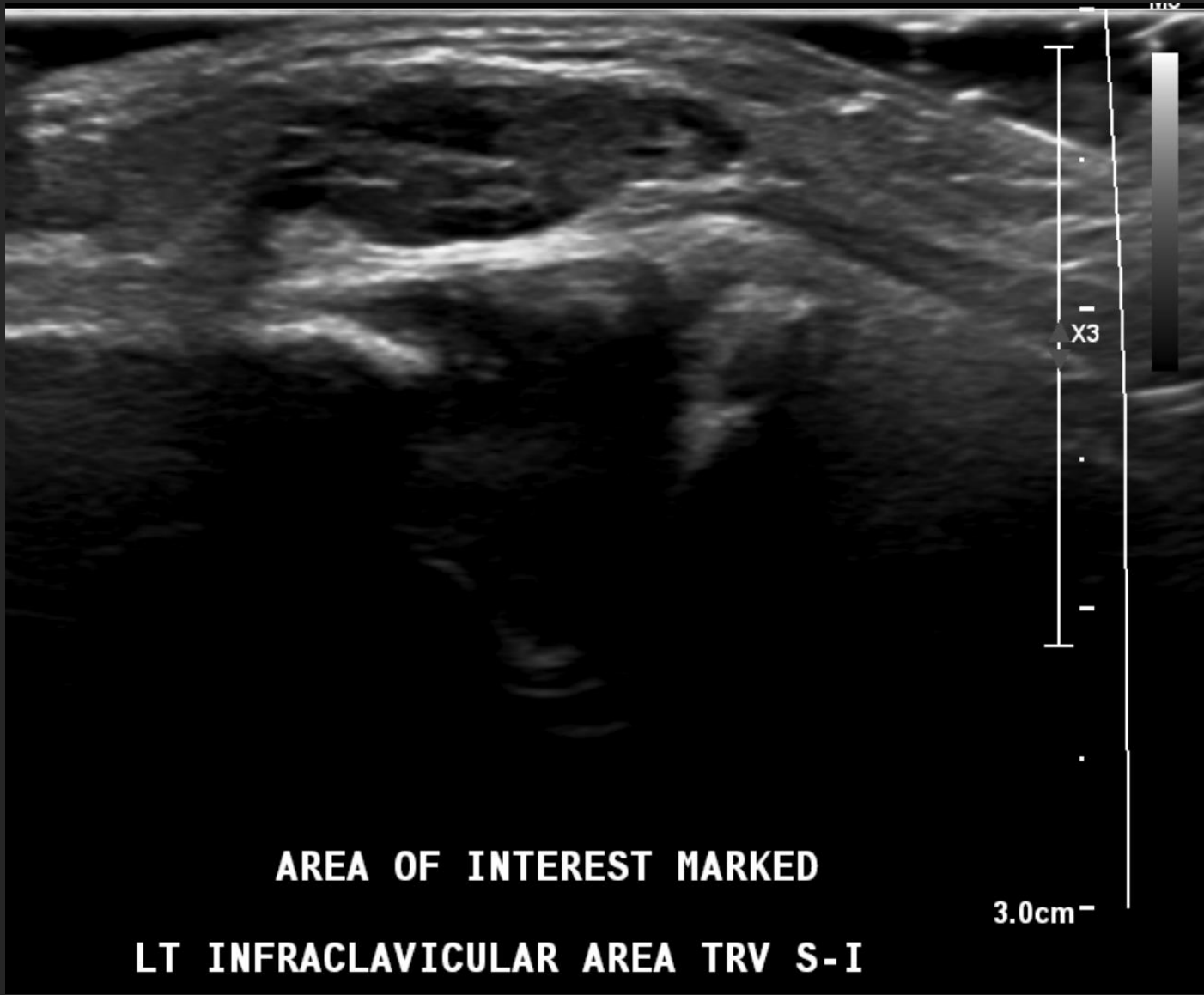
# Lymphatic Malformation



Left CHEEK Trans S/I |  
1-year old w/ left cheek swelling

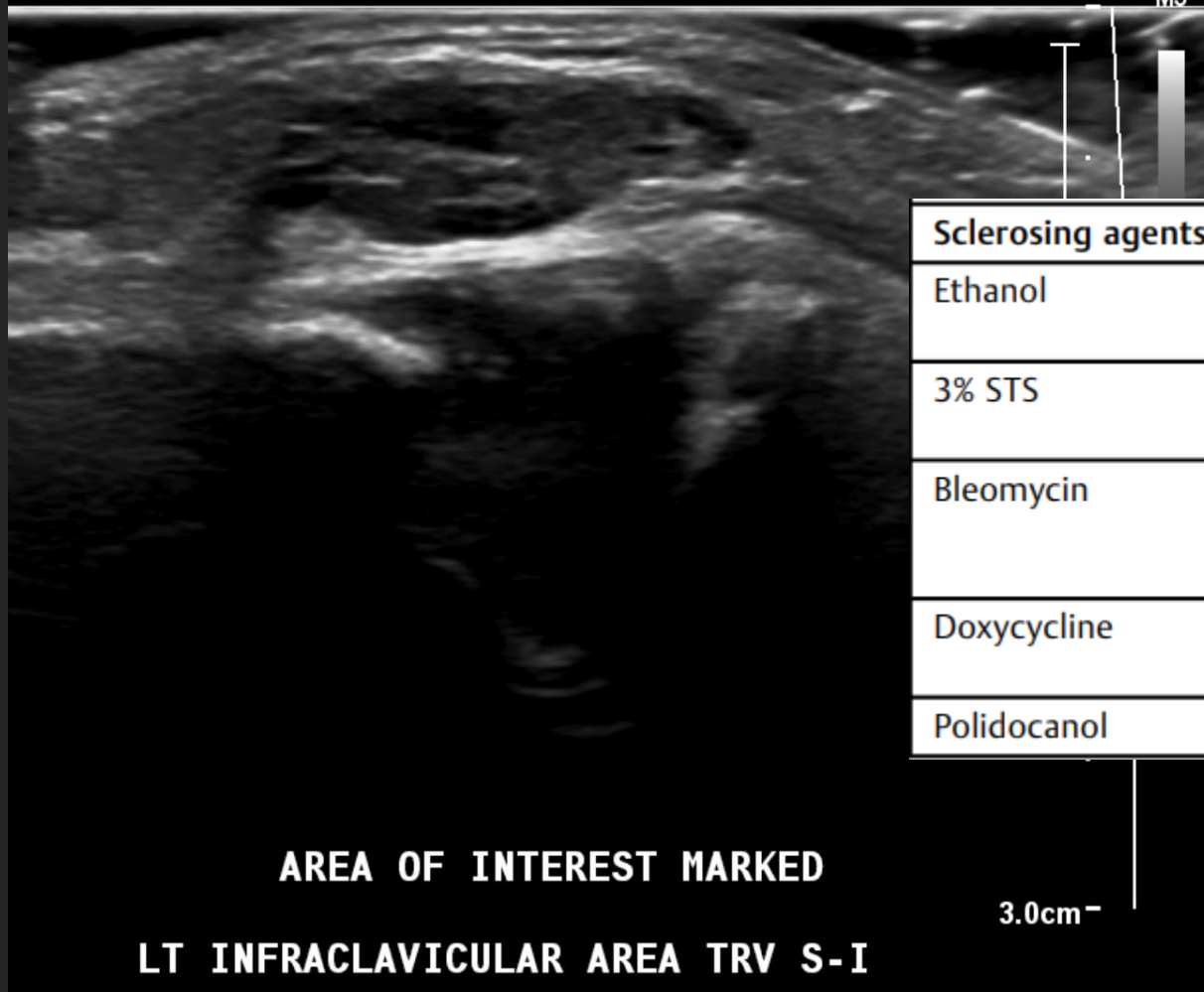
- May appear cystic, microcystic, or serpiginous
- Face/neck most common location
- Genetic markers exist
- Treatment:
  - Sclerotherapy
  - Embolic
  - Medical → sirolimus
  - Surgical





5-year old w/ left neck swelling

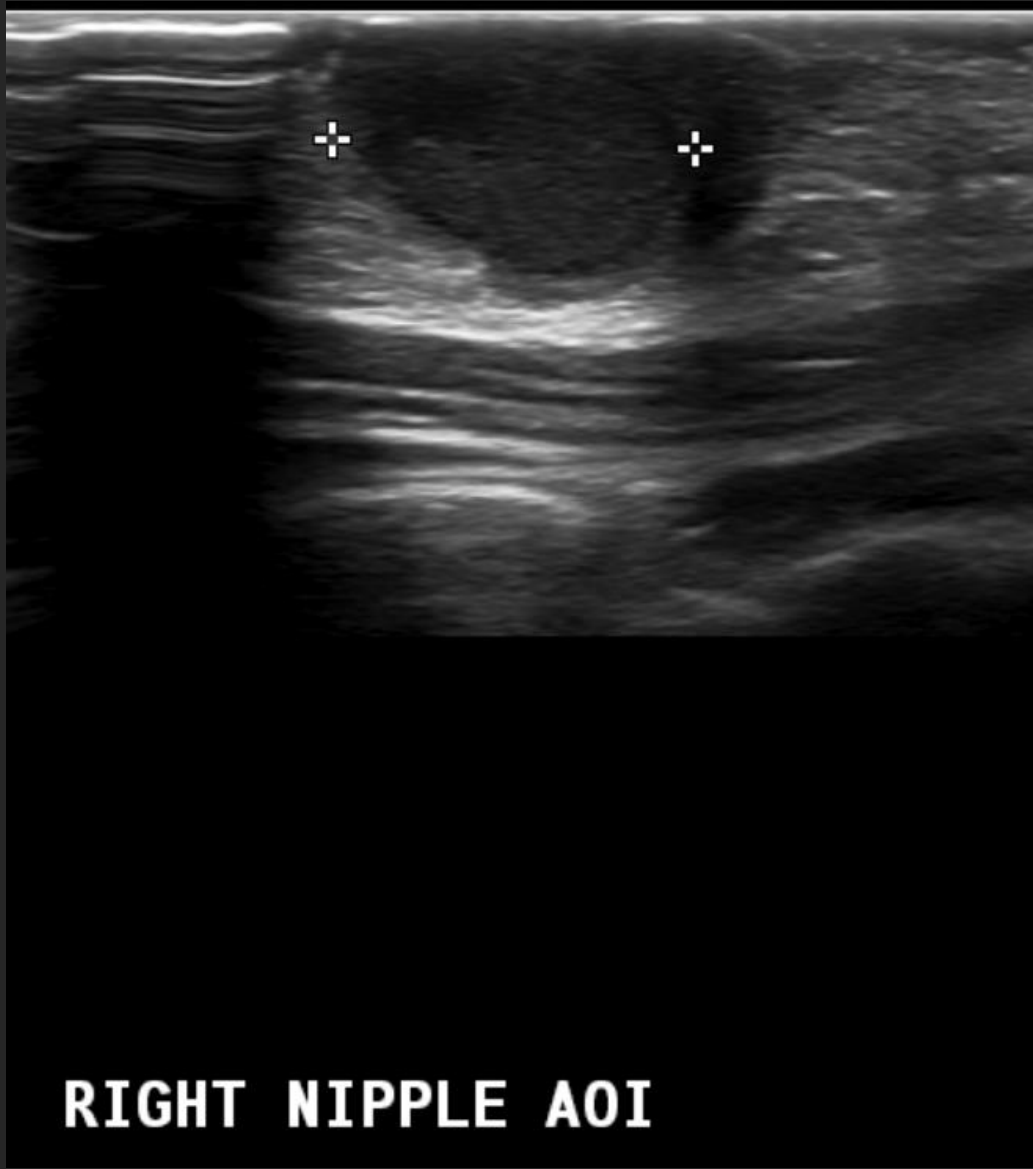
# Lymphatic Malformation (Treated)



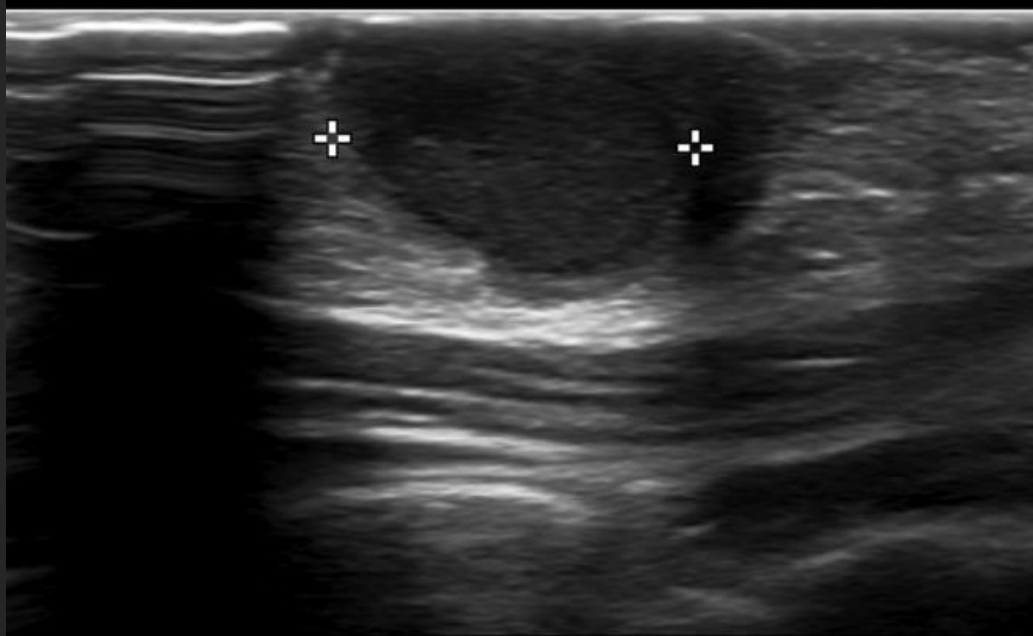
Sclerosing agents		
Ethanol	VM	- Adverse effects include intoxication, pain, cardiovascular collapse
3% STS	VM, LM	- Less adverse effects than ethanol - Possible higher recanalization rate
Bleomycin	VM, LM	- Dose-dependent pulmonary toxicity - Can be given intravascularly or interstitially
Doxycycline	LM	- Can be painful to the patient - Can administer large doses
Polidocanol	VM	- Relatively painless

Raja J, et al. Semin Interv Radiol, 2024.

5-year old w/ left neck swelling, history treated venolymphatic malformation

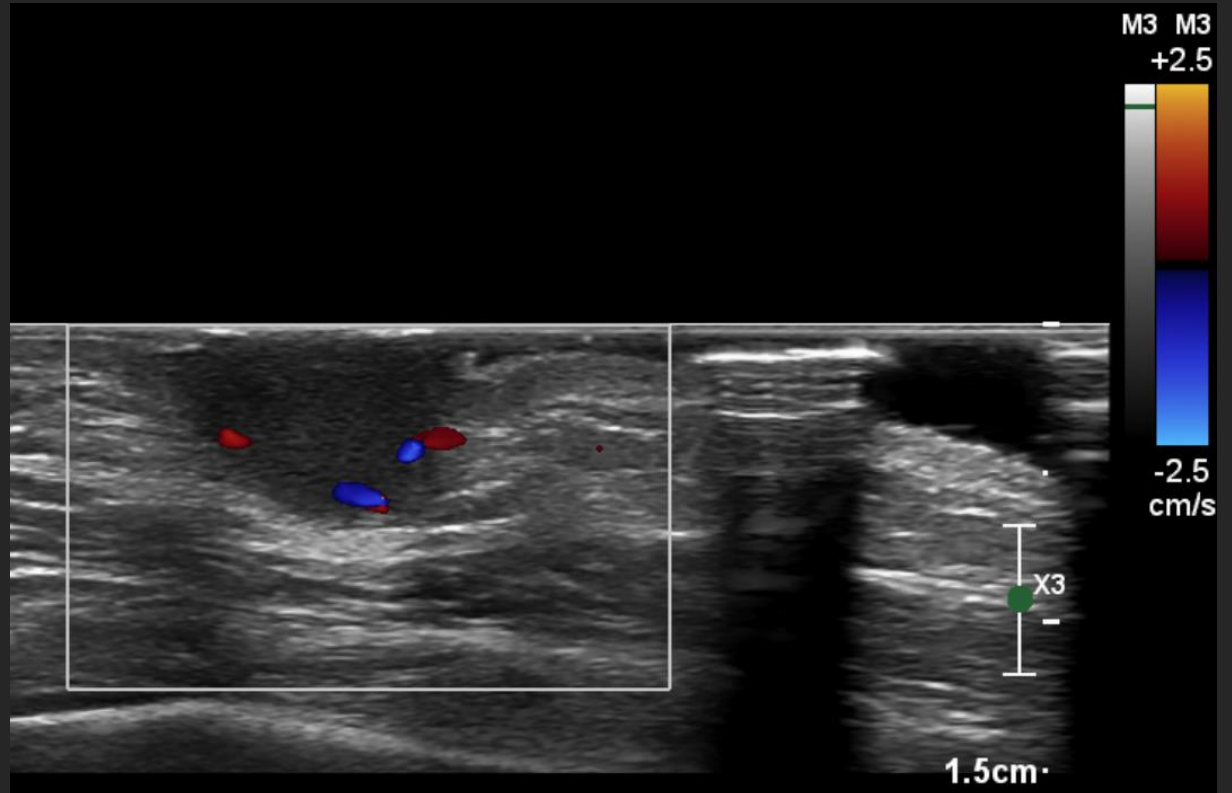


4-yo, nipple swelling and lesion



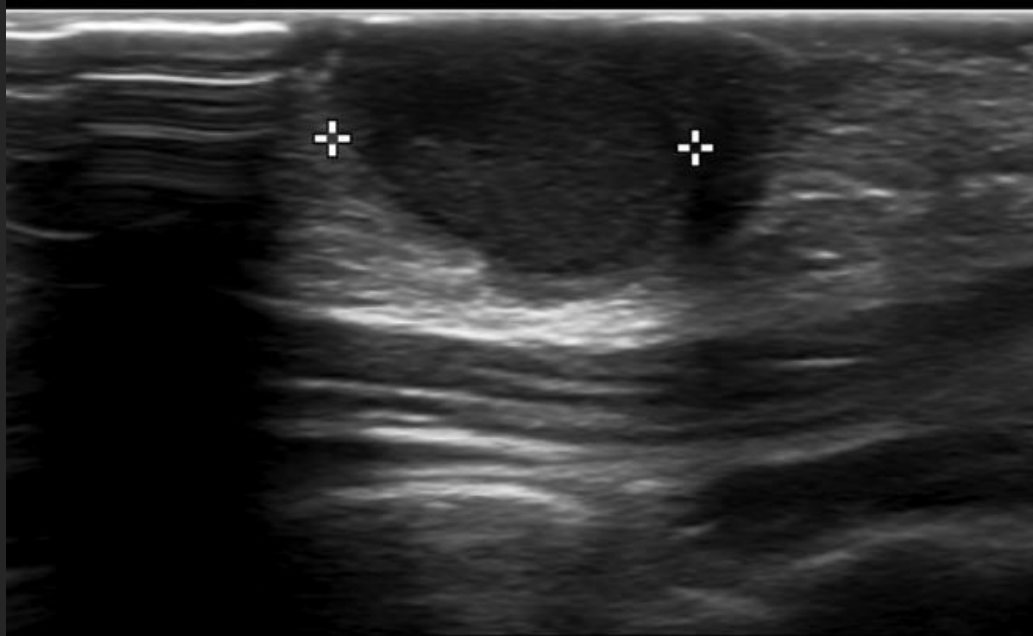
**RIGHT NIPPLE AOI**

4-yo, nipple swelling and lesion



**RIGHT NIPPLE AOI**

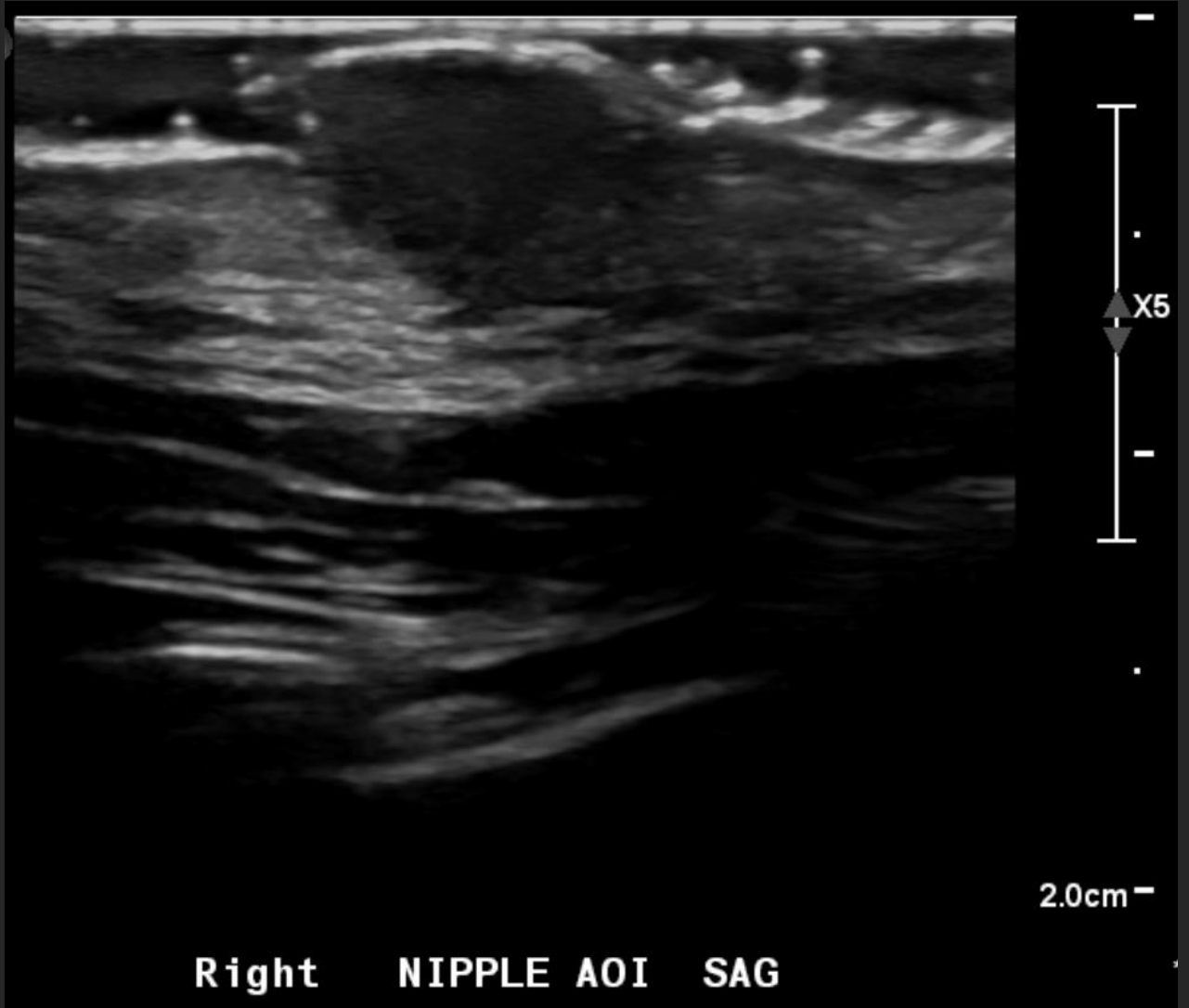
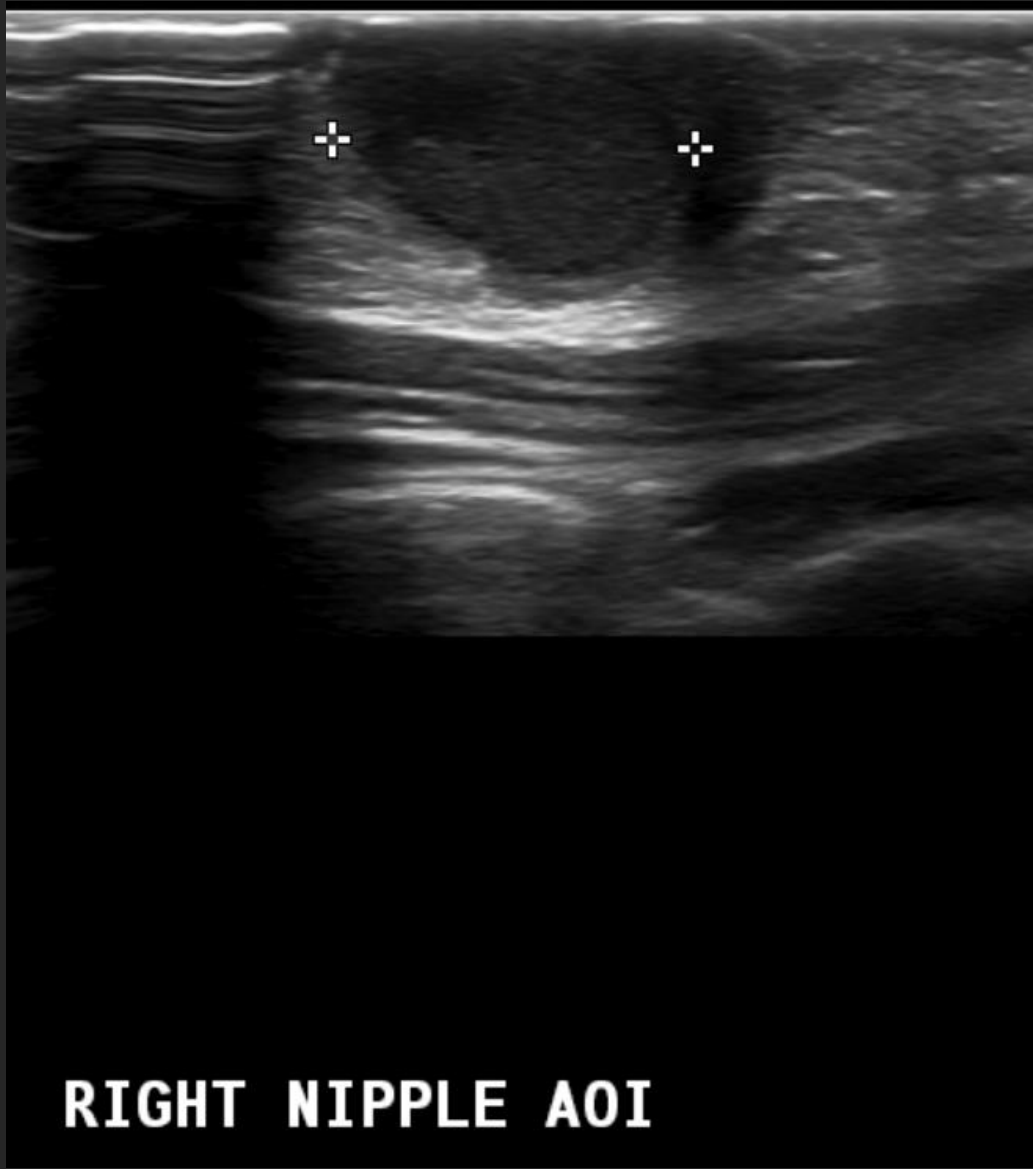




**RIGHT NIPPLE AOI**



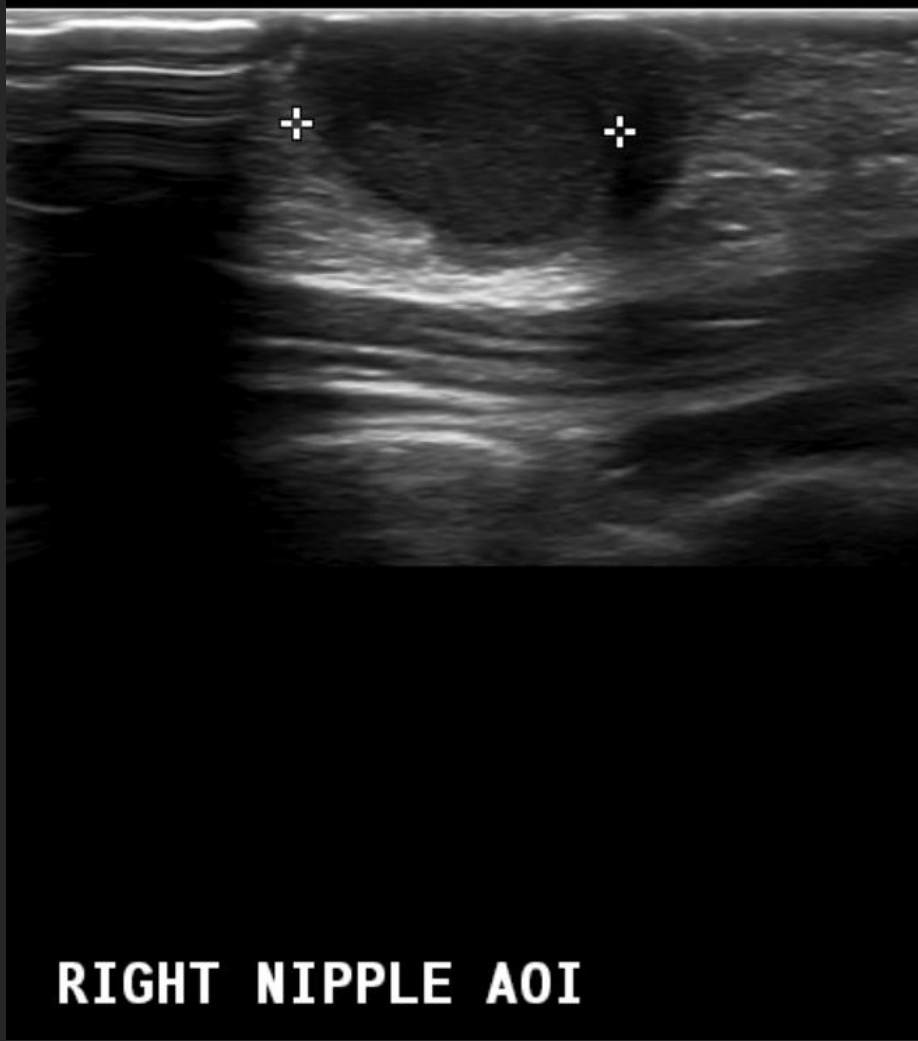
4-yo, nipple swelling and lesion



4-yo, nipple swelling and lesion



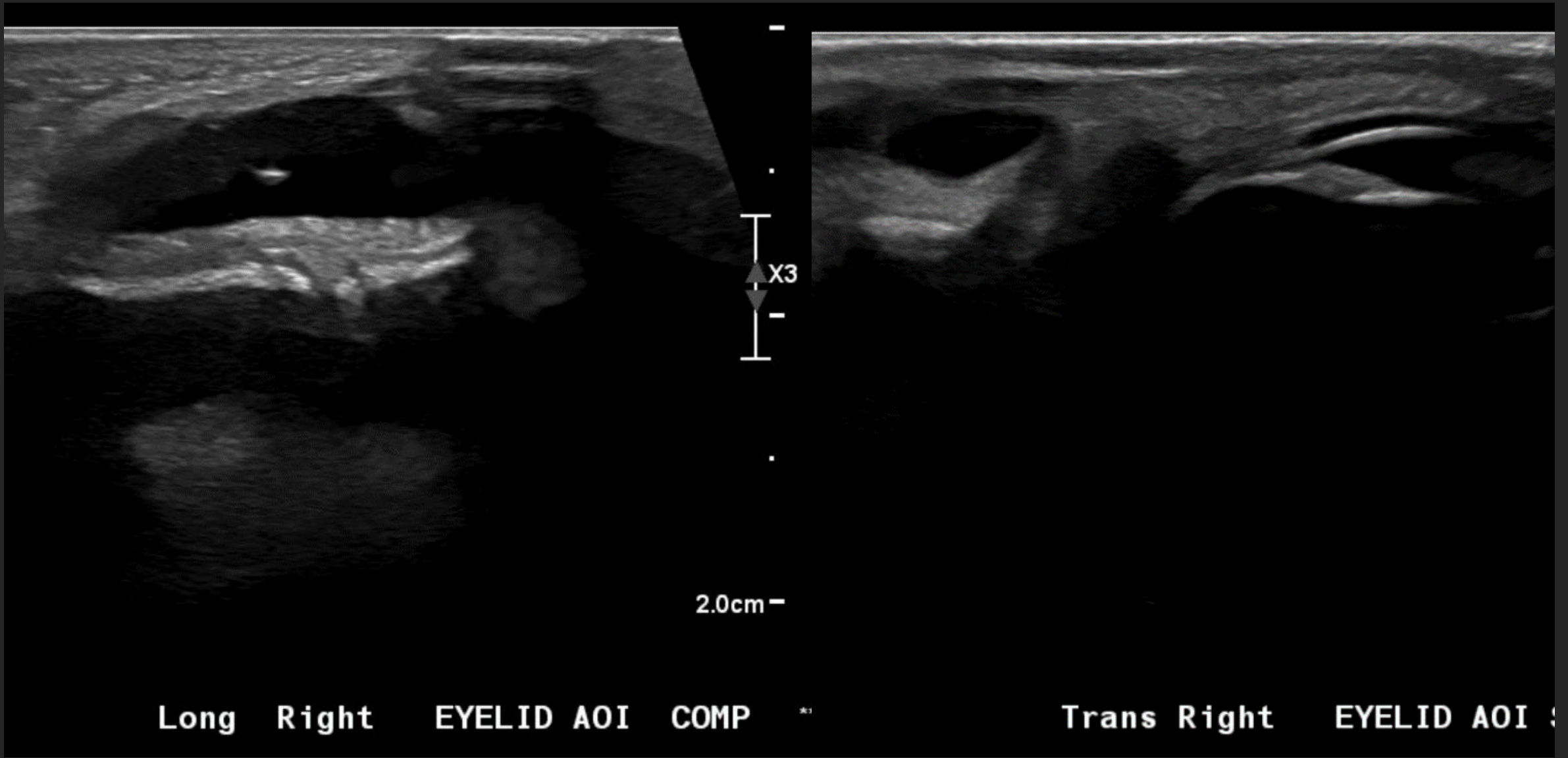
# Pyogenic Granuloma



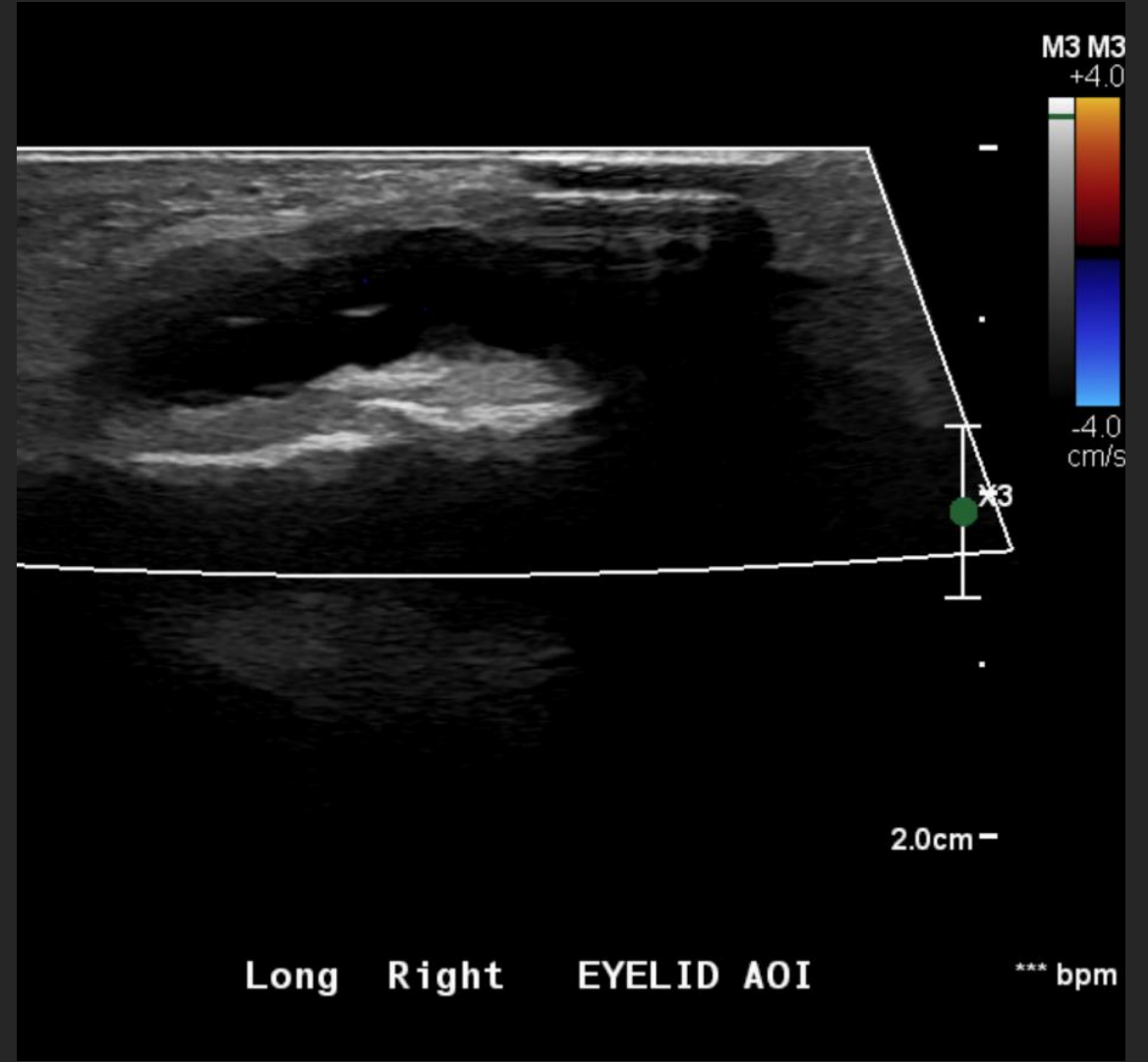
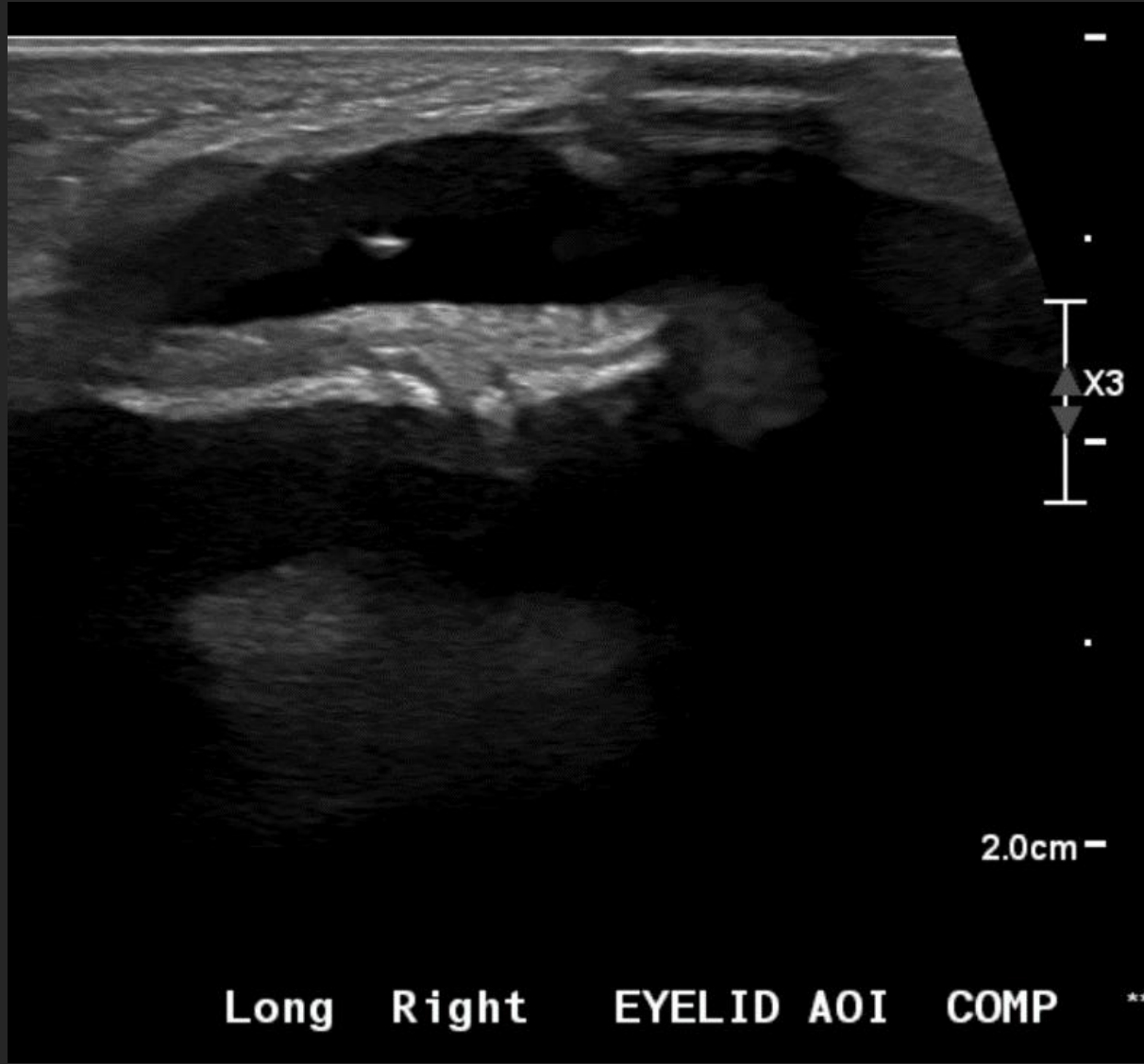
- Also called “lobular capillary hemangioma”
- Highly vascular, may ulcerate and bleed
- Acquired vascular lesion following inflammation or trauma

4-yo, nipple swelling and lesion

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5-mo, periorbital swelling



5-mo, periorbital swelling



5-mo, periorbital swelling

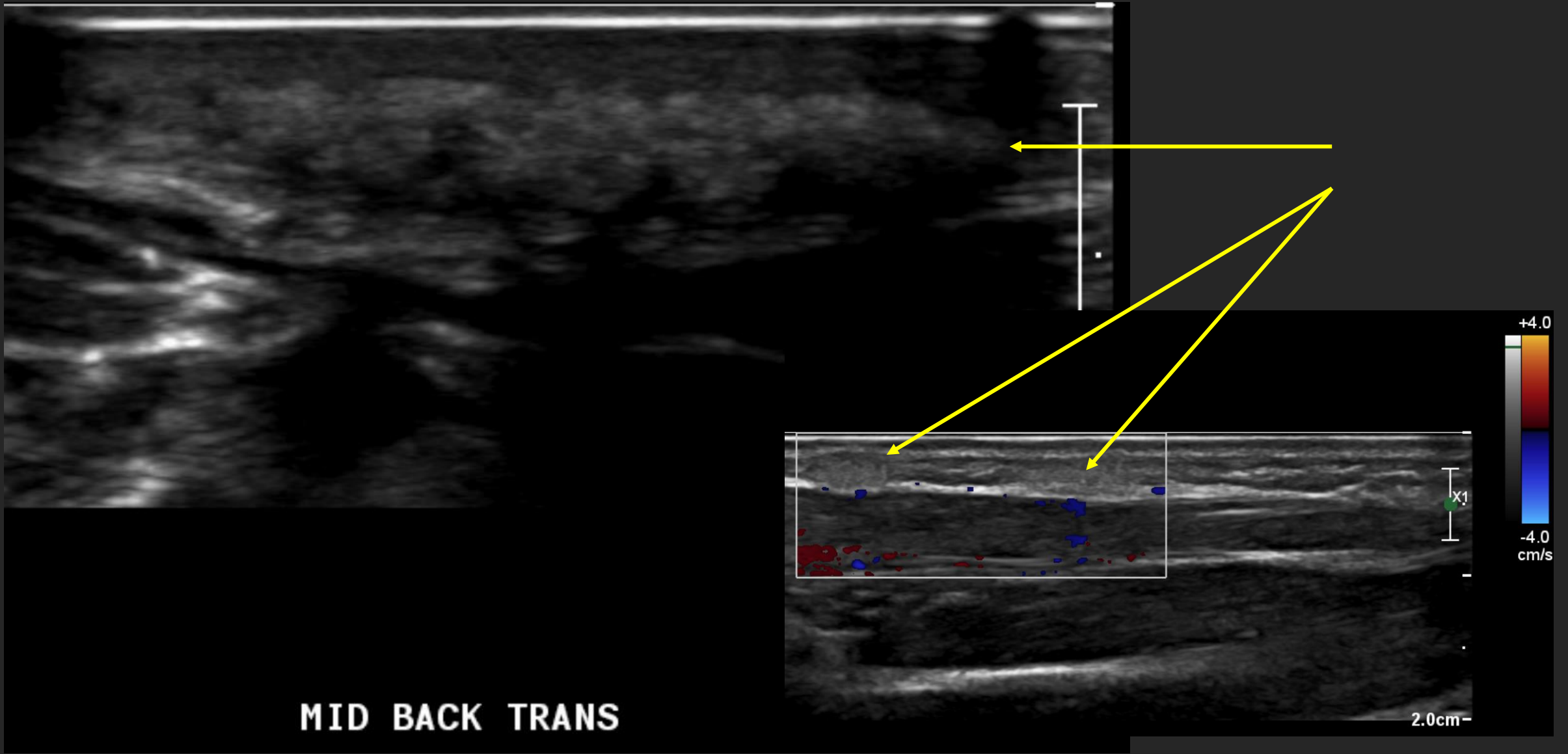
# Dermoid Cyst



5-mo, periorbital swelling

- Congenital lesion remnants ectoderm, dermal appendages
- Frequent eyebrow, scalp, neck (midline)
- Resection

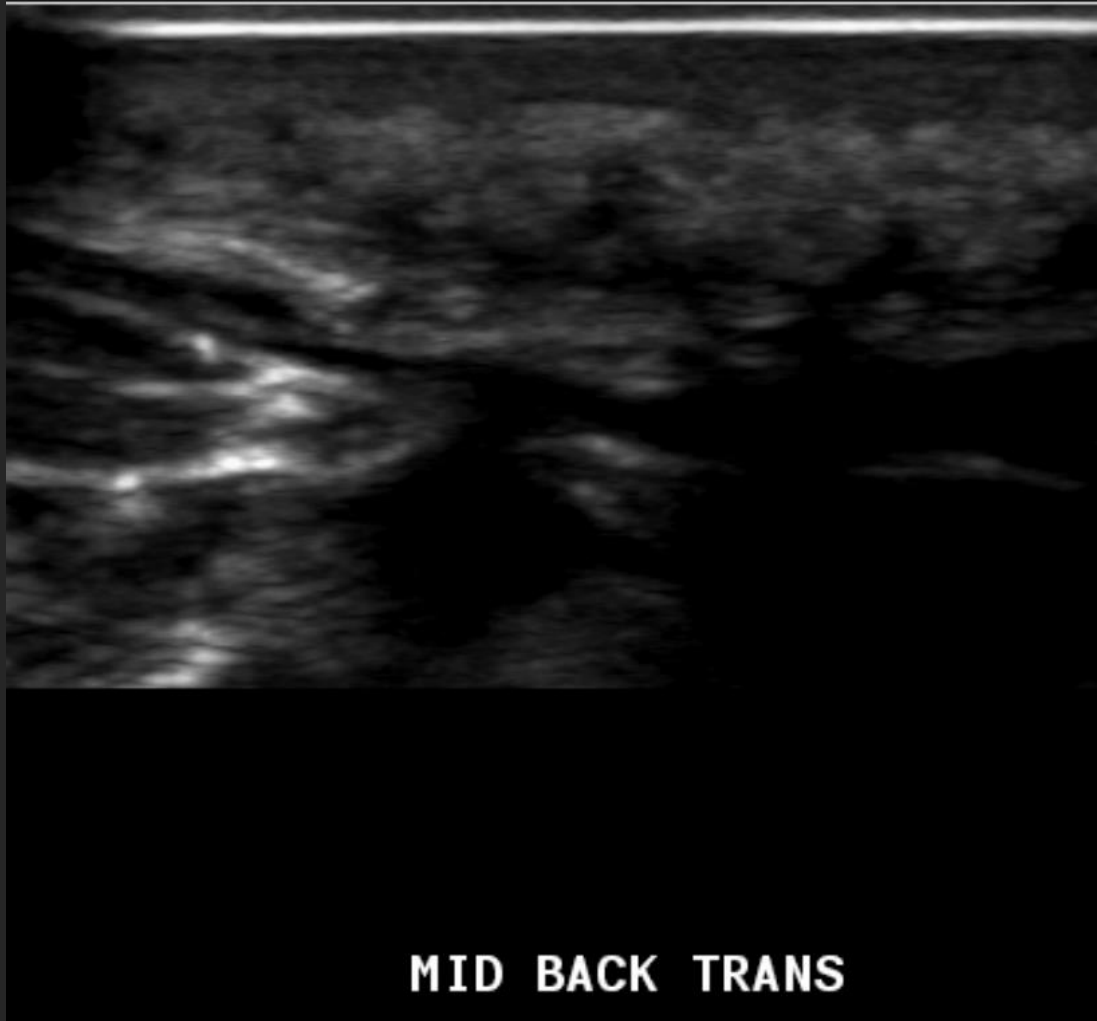




5-week old w/ palpable lumps on back

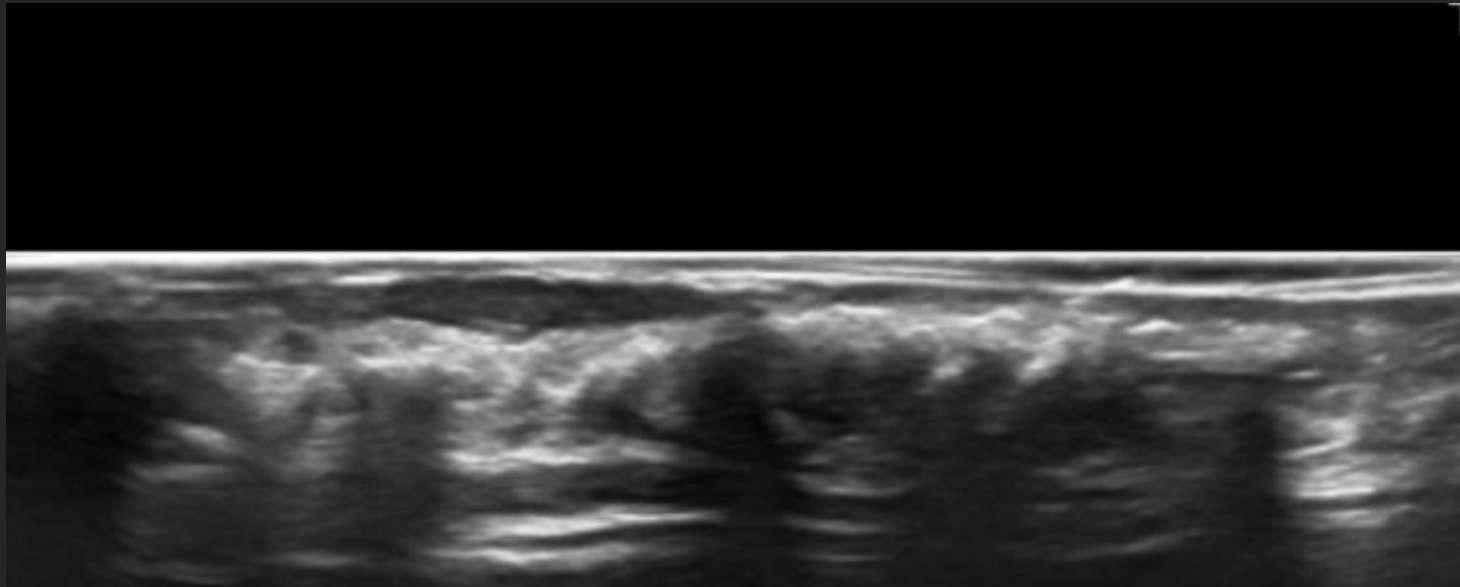


# Neonatal Fat Necrosis

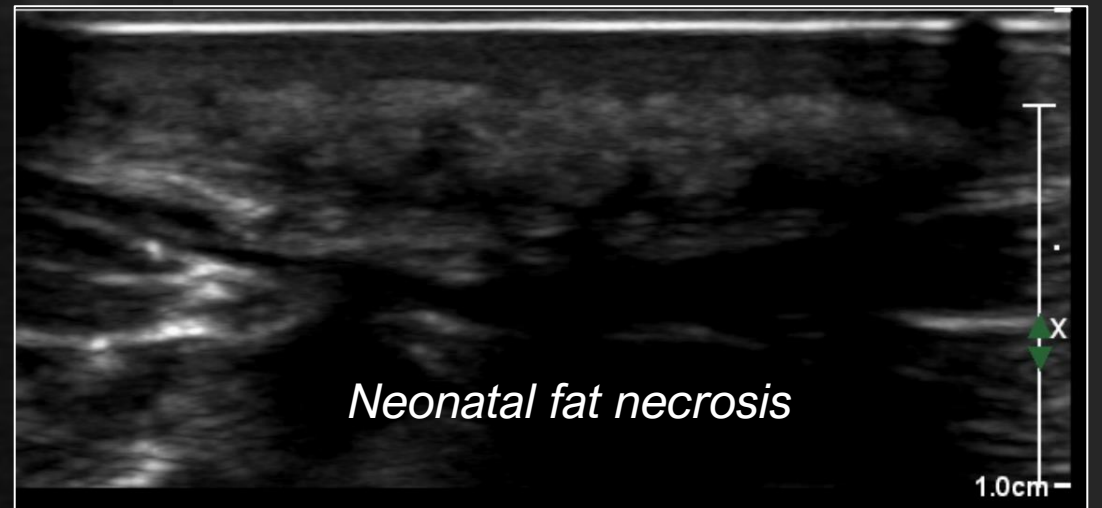


5-week old w/ palpable lumps on back

- Term infants
  - Appears first few days of life
  - Upper back, cheeks, buttocks, limbs
- Self-limited, disappears by 6 months
- Associated with hypercalcemia
  - Risk factors include gestational diabetes, maternal hypertension, neonatal asphyxia



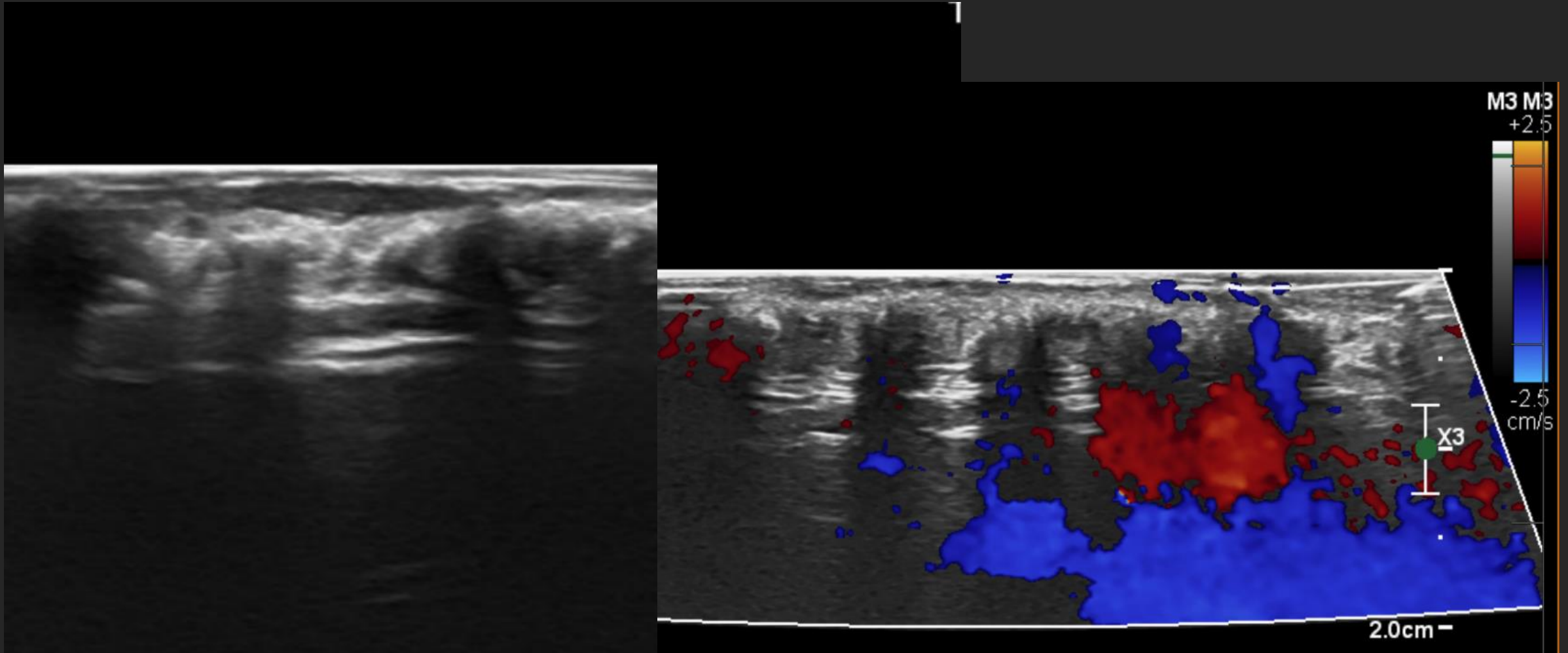
**Linear 18-4 probe  
2.0 cm depth**



*Neonatal fat necrosis*

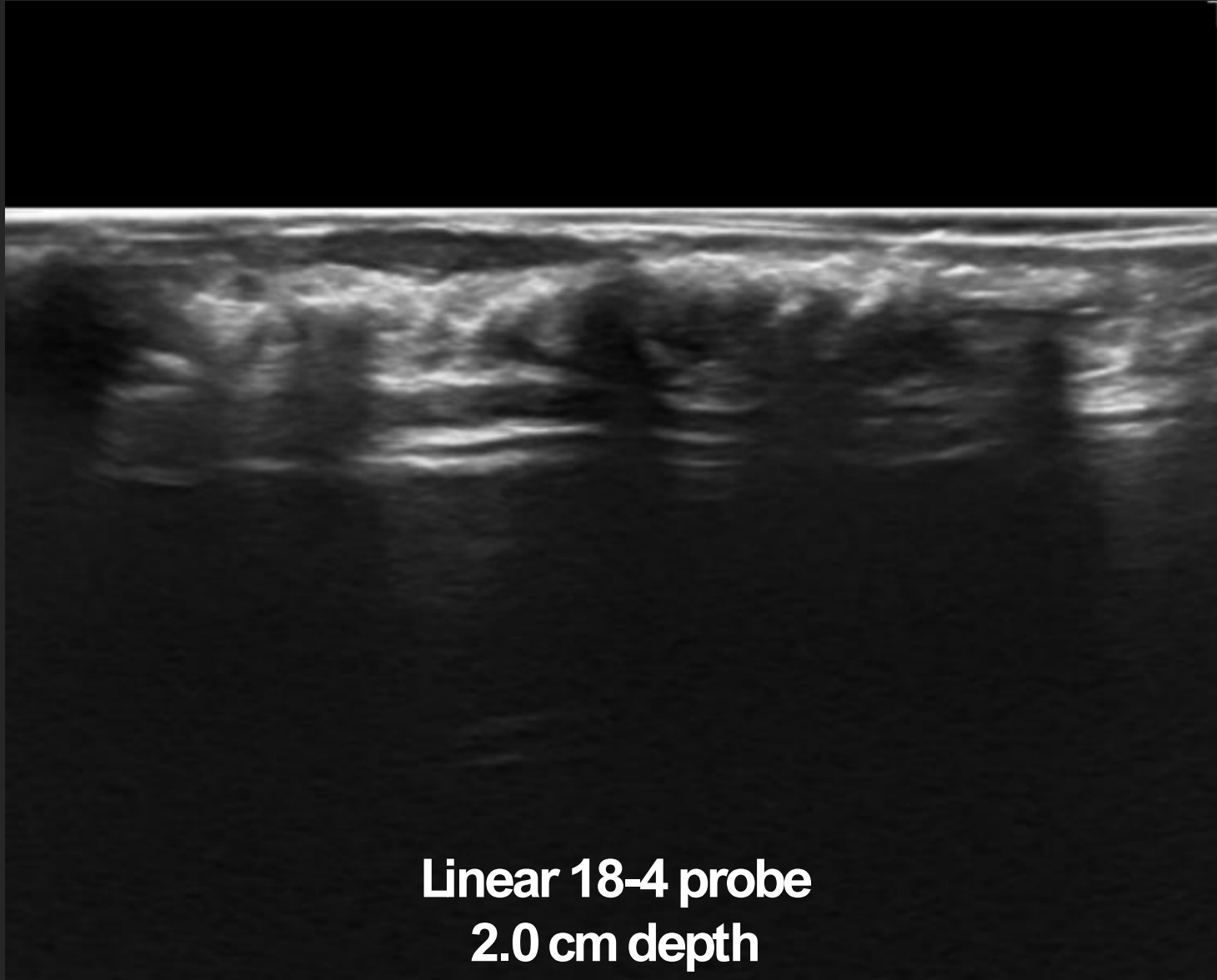
1.0cm

6-mo, multiple cardiac anomalies, sepsis



**Linear 18-4 probe  
2.0 cm depth**

6-mo, multiple cardiac anomalies, sepsis

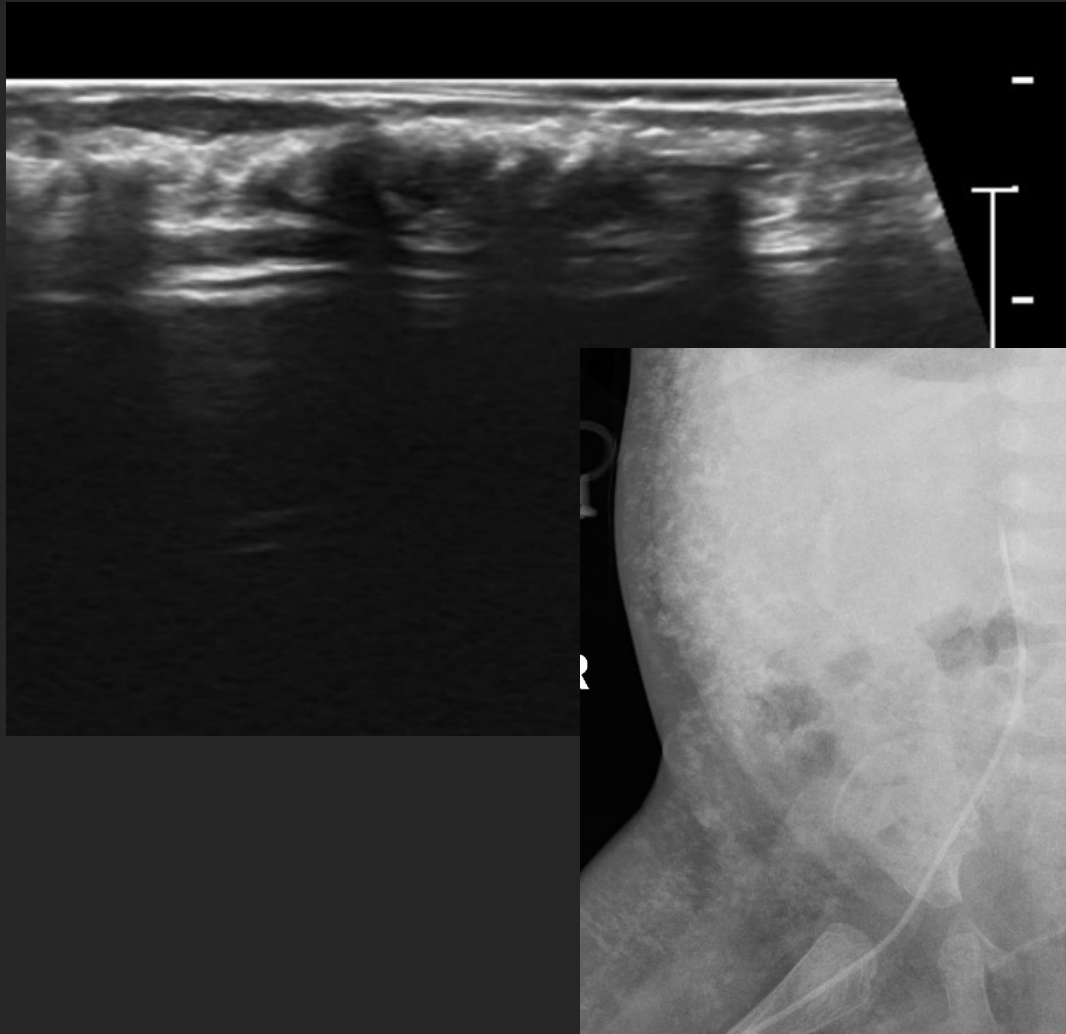


**Linear 18-4 probe**  
**2.0 cm depth**

6-mo, multiple cardiac anomalies, sepsis



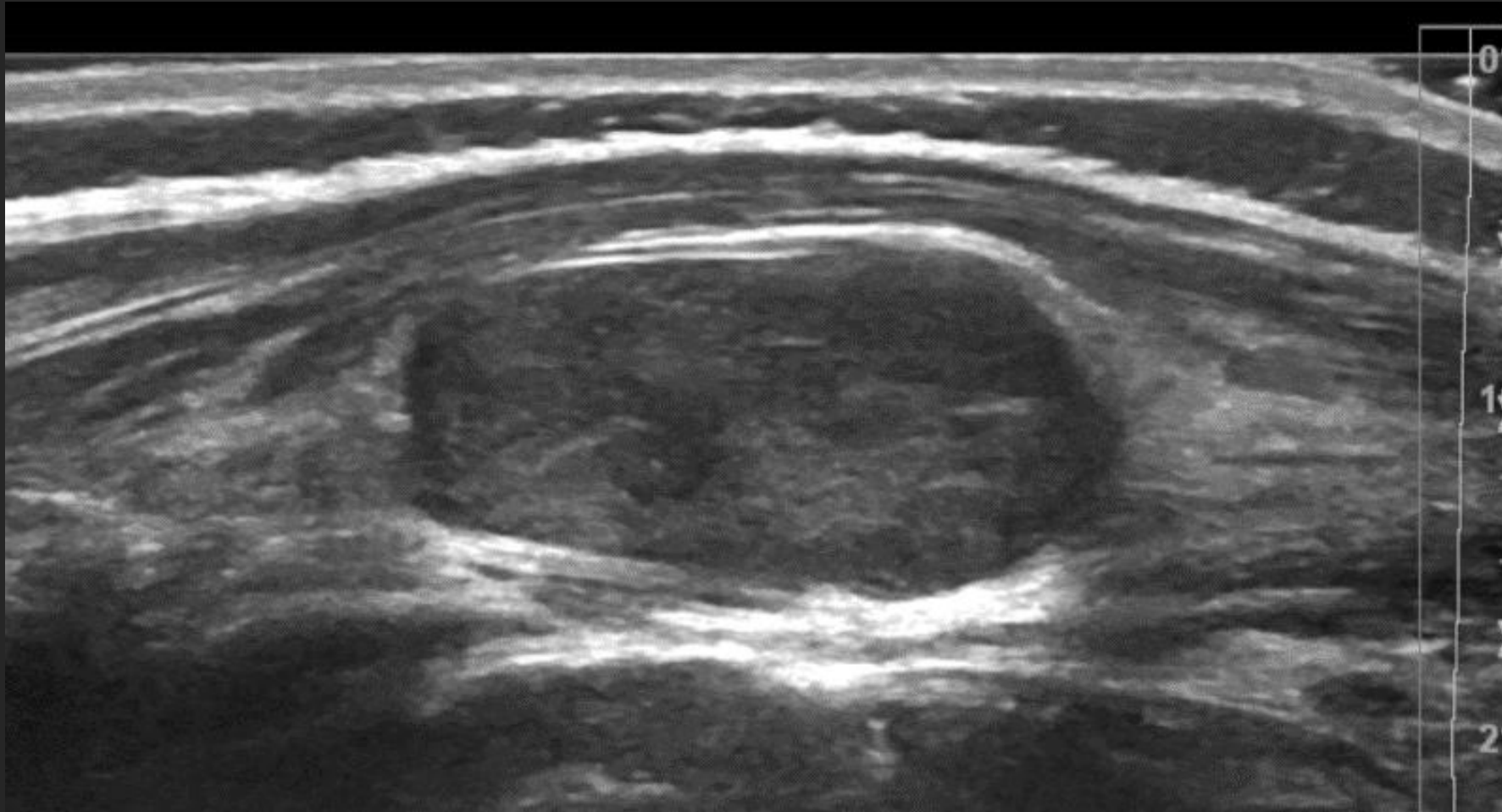
# Calcinosis cutis



- Dystrophic
  - **Normal**  $\text{Ca}^{++}$  & phosphate
  - Tissue damage
- Metastatic
  - **High**  $\text{Ca}^{++}$  & phosphate
  - Renal failure, systemic diseases
- Idiopathic
  - **Normal**  $\text{Ca}^{++}$  & phosphate
  - Familial
- Iatrogenic
  - **Administered**  $\text{Ca}^{++}$  & phosphate

6-mo, multiple cardiac anomalies, sepsis

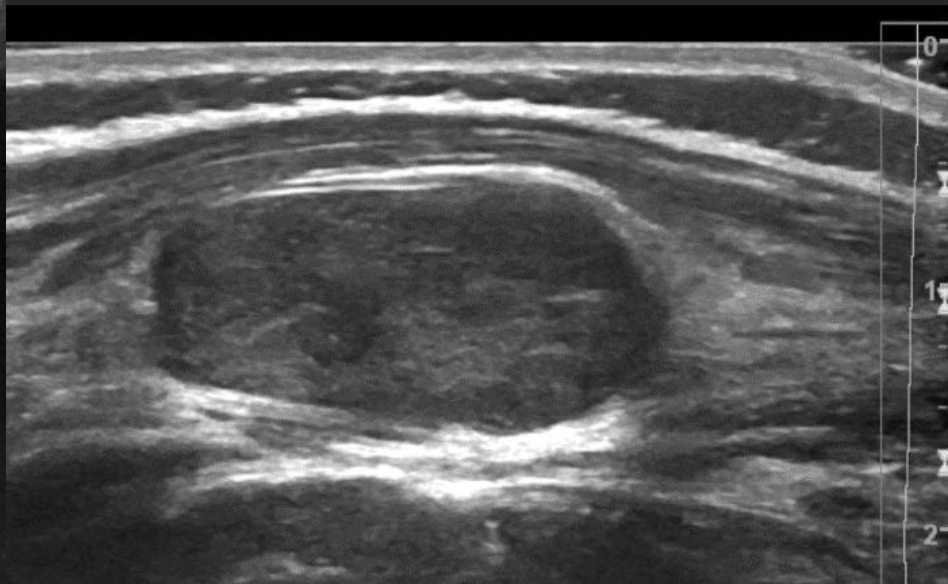
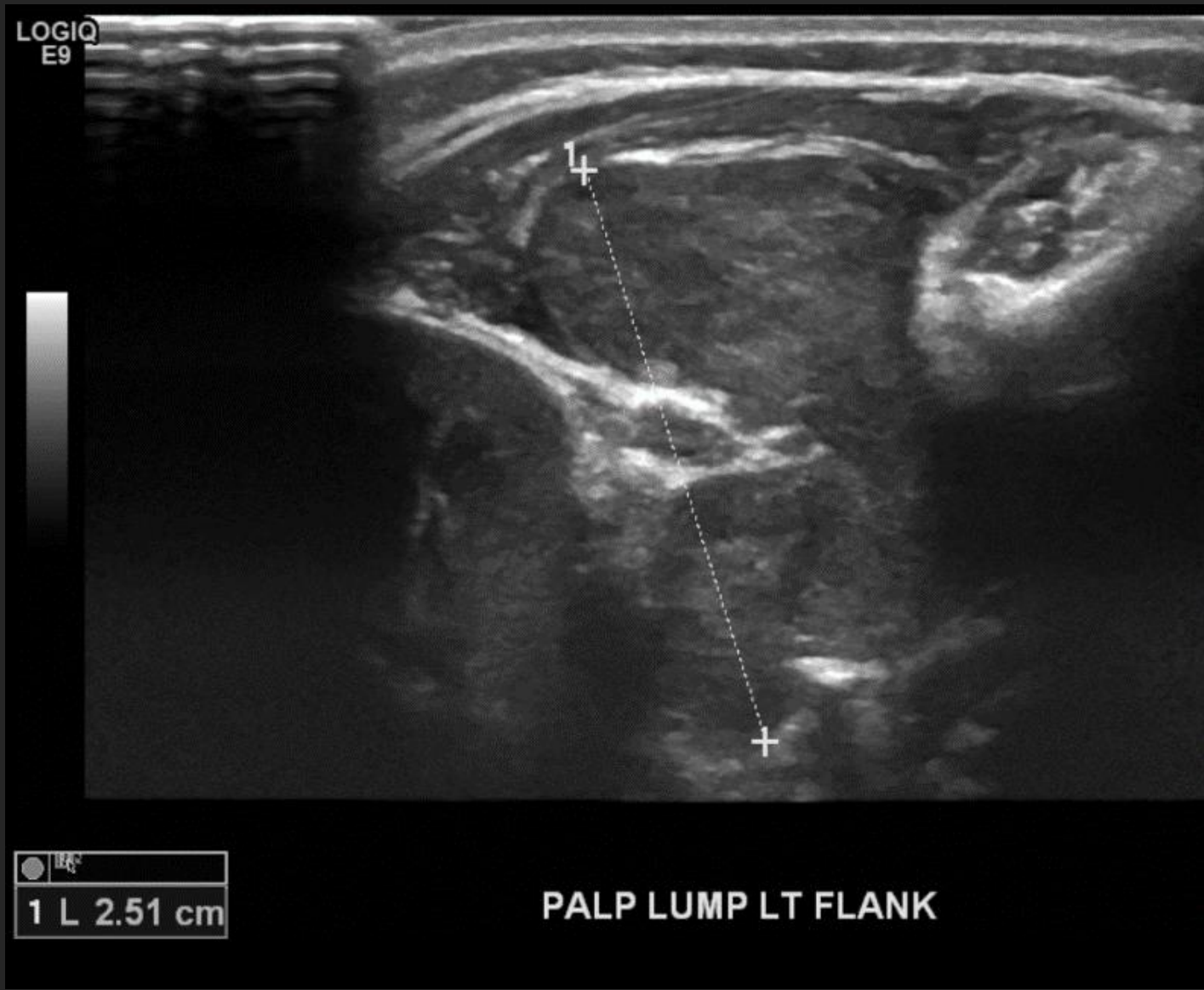




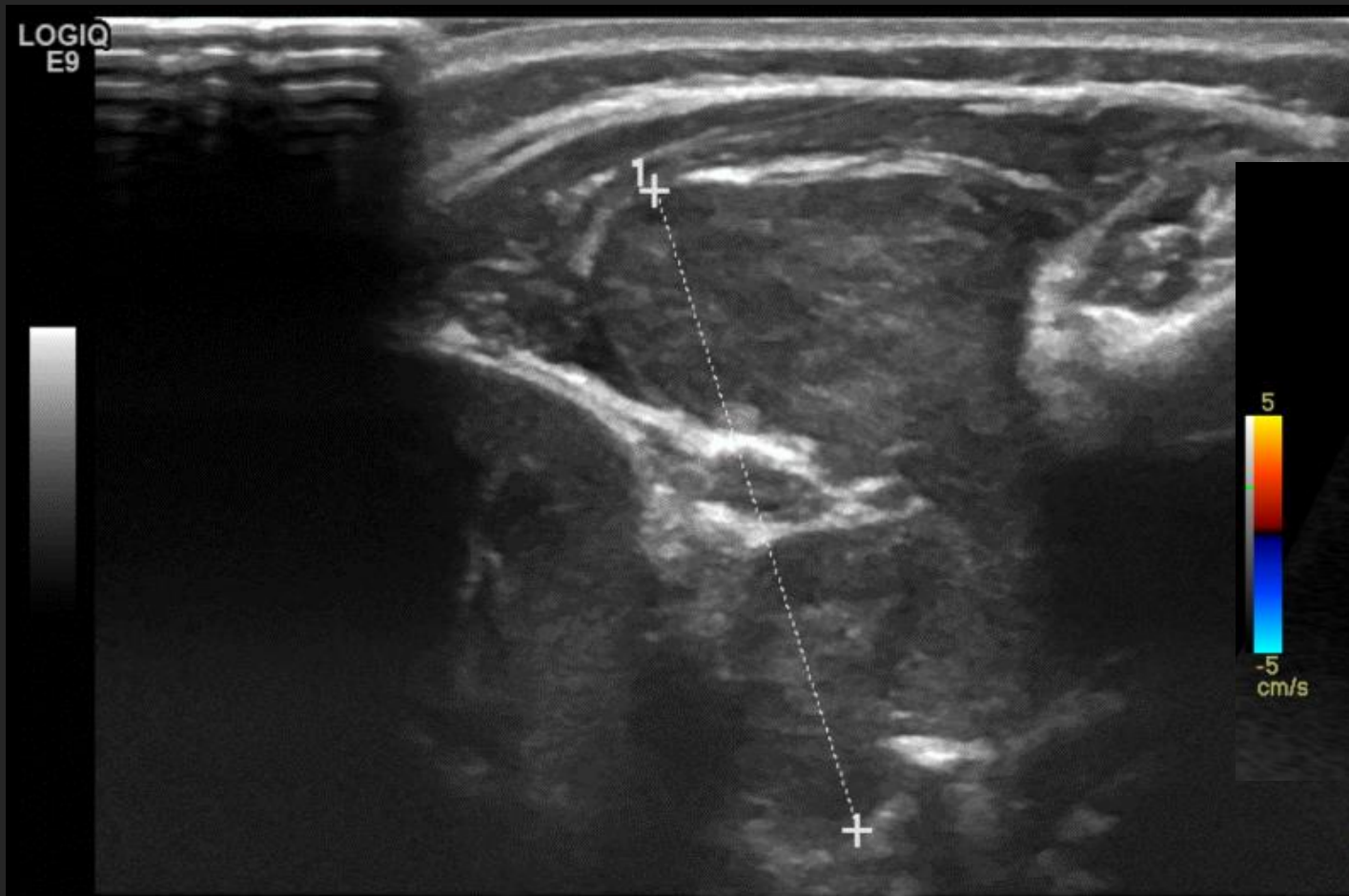
6-month old w/ lump on back

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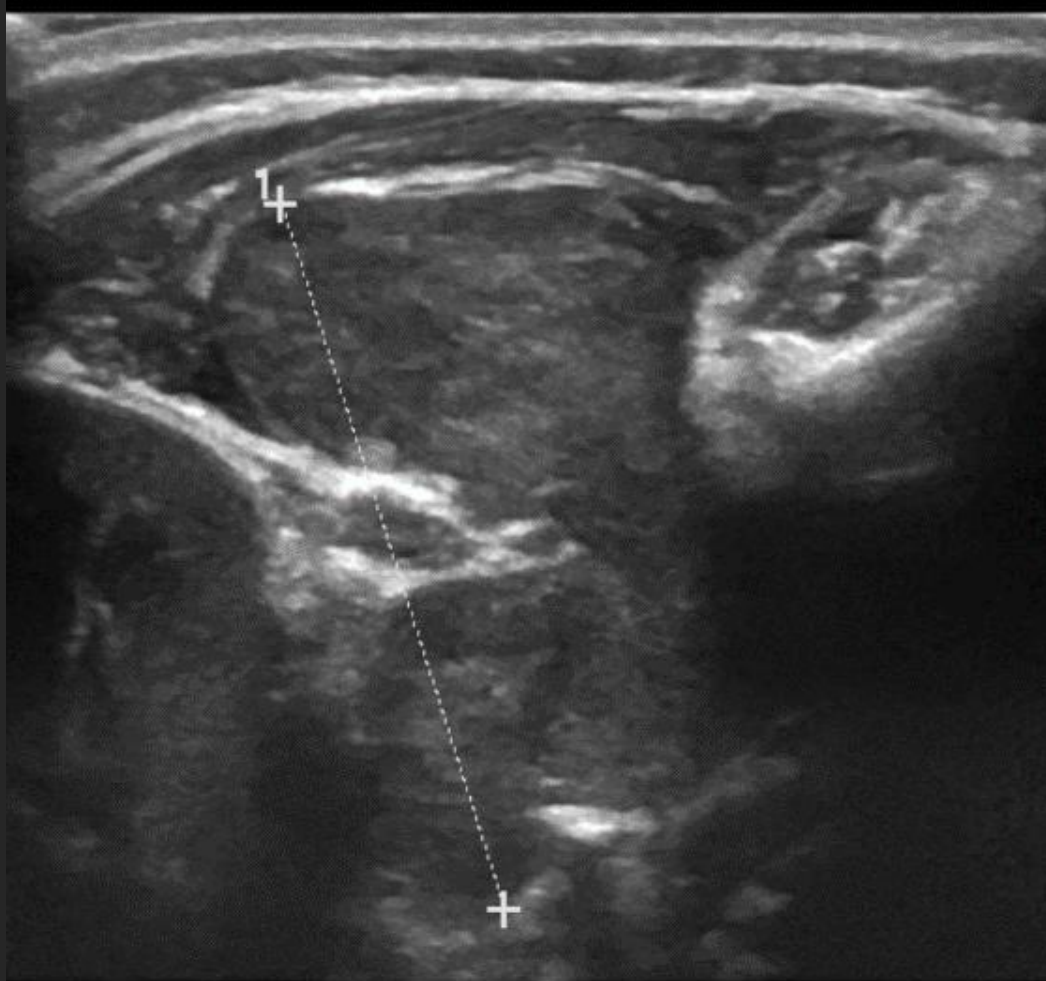
6-month old w/ lump on back



1 L 2.51 cm

PALP LUMP LT FLANK

6-month old w/ lump on back



**PALP LUMP LT FLANK**



**T2-fat sat**

6-month old w/ lump on back



# Atypical Teratoid/Rhabdoid Tumor

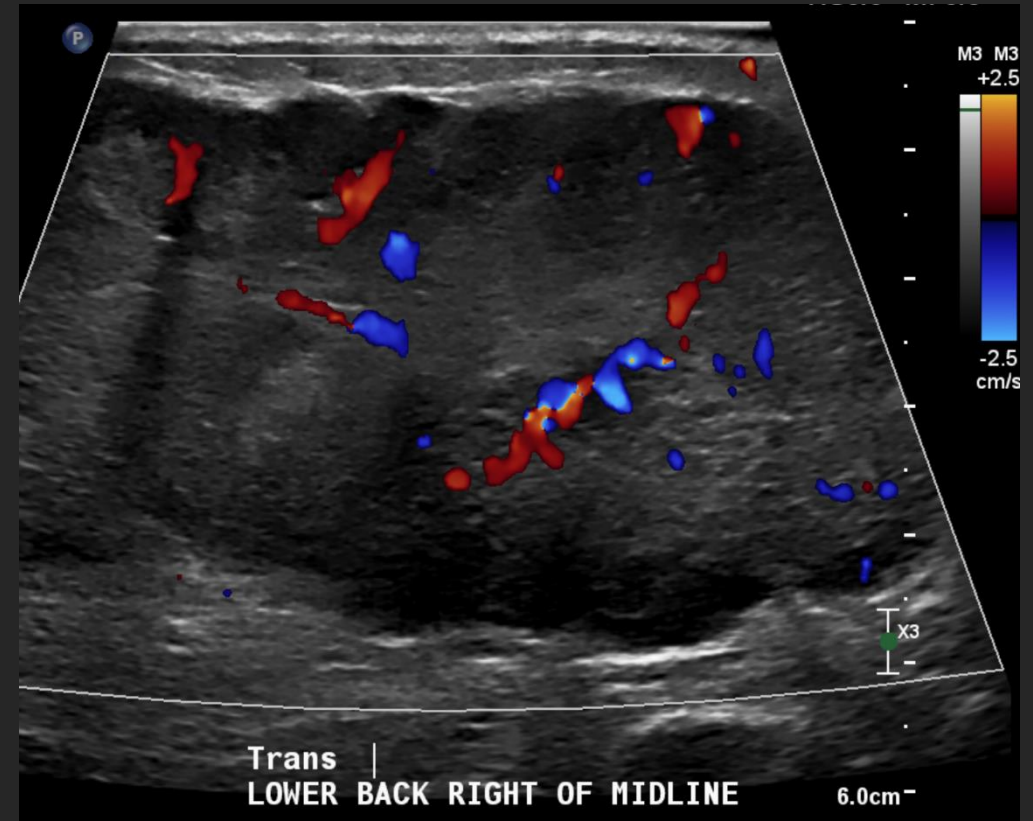


6-month old w/ lump on back

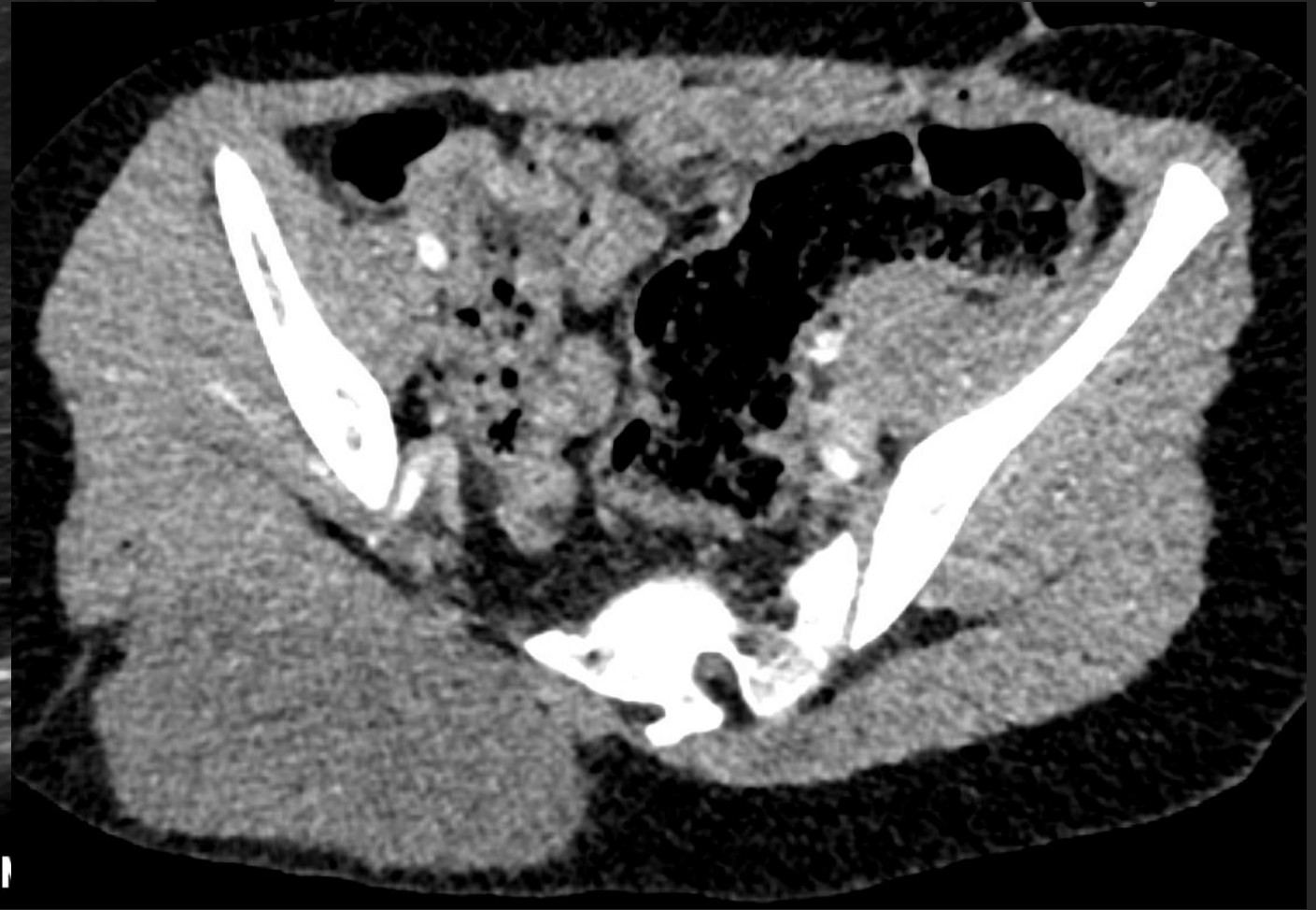
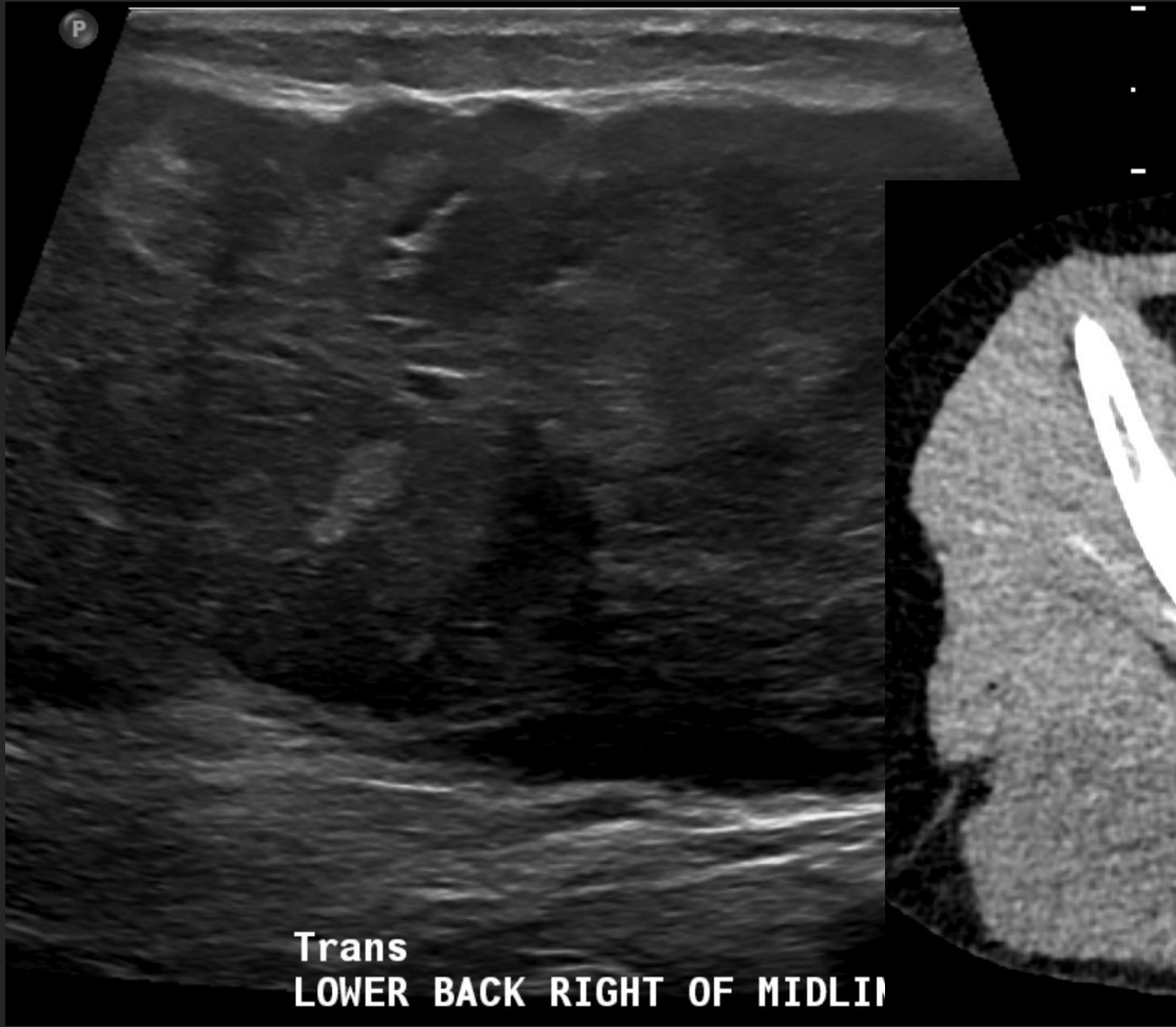
- “ATRT”, rare CNS tumor
  - Most < 3-years old
  - Cervico-thoracic most common spine site
- WHO Classification embryonal grade IV neoplasm
  - 4-year survival 40-70%
- May associate with rhabdoid tumor predisposition syndrome type 1
  - ATRT, malignant rhabdoid tumor of kidney, extrarenal rhabdoid tumors



7-yo, VACTERL, new lower back swelling

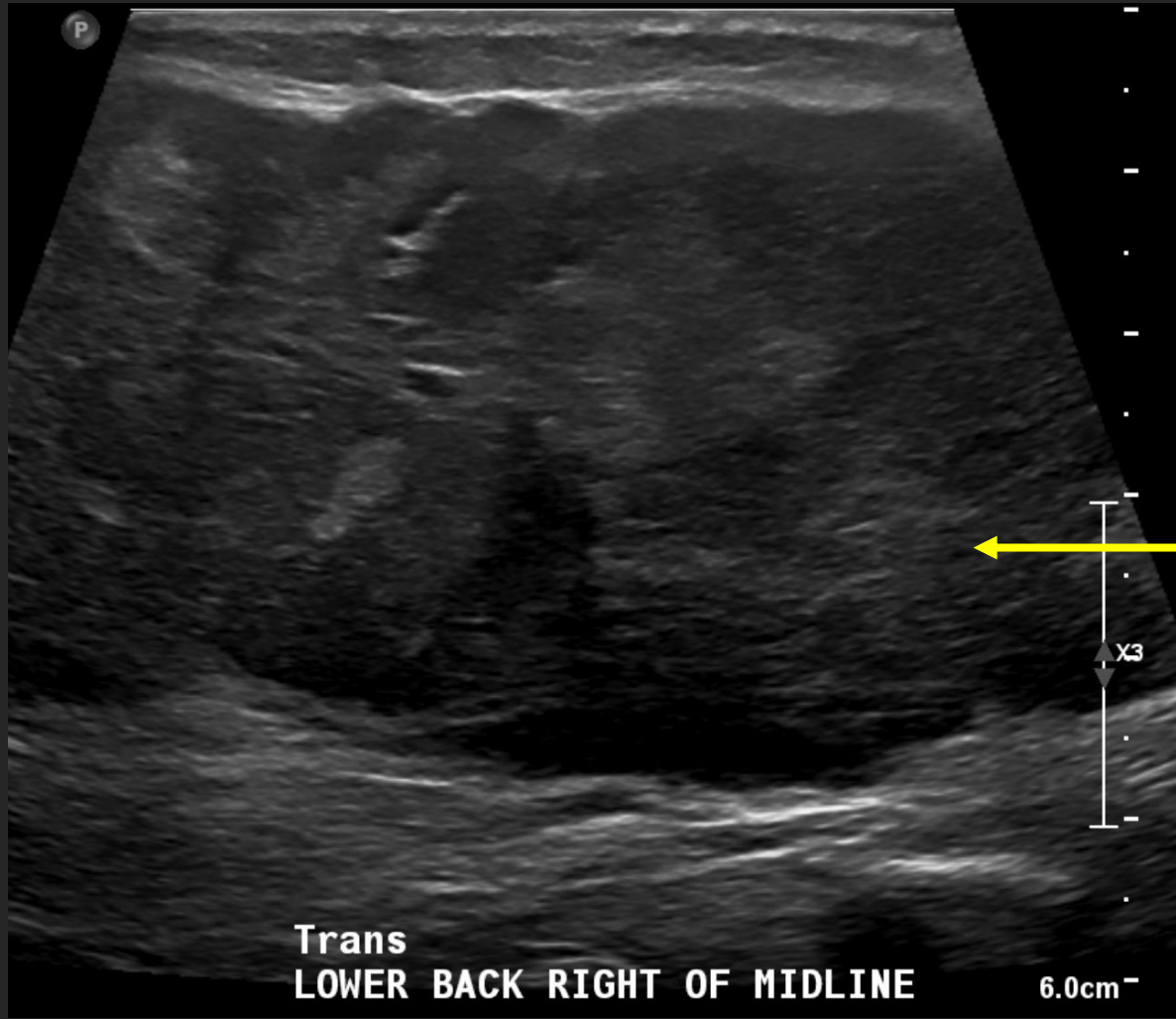






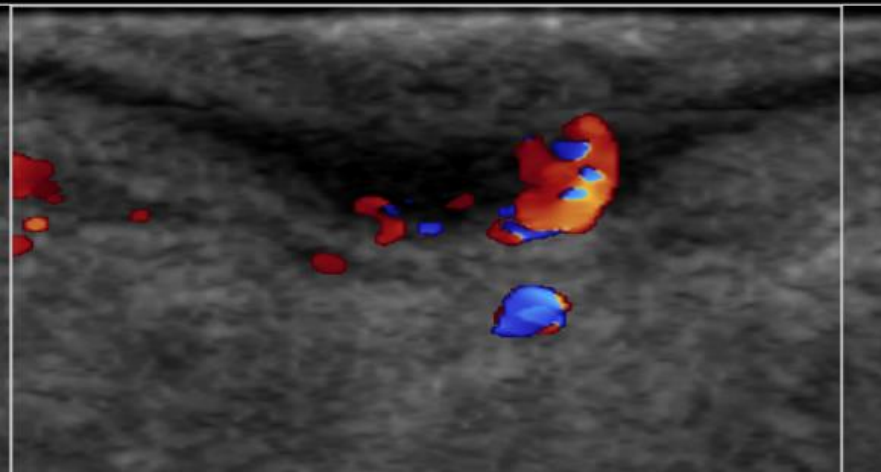
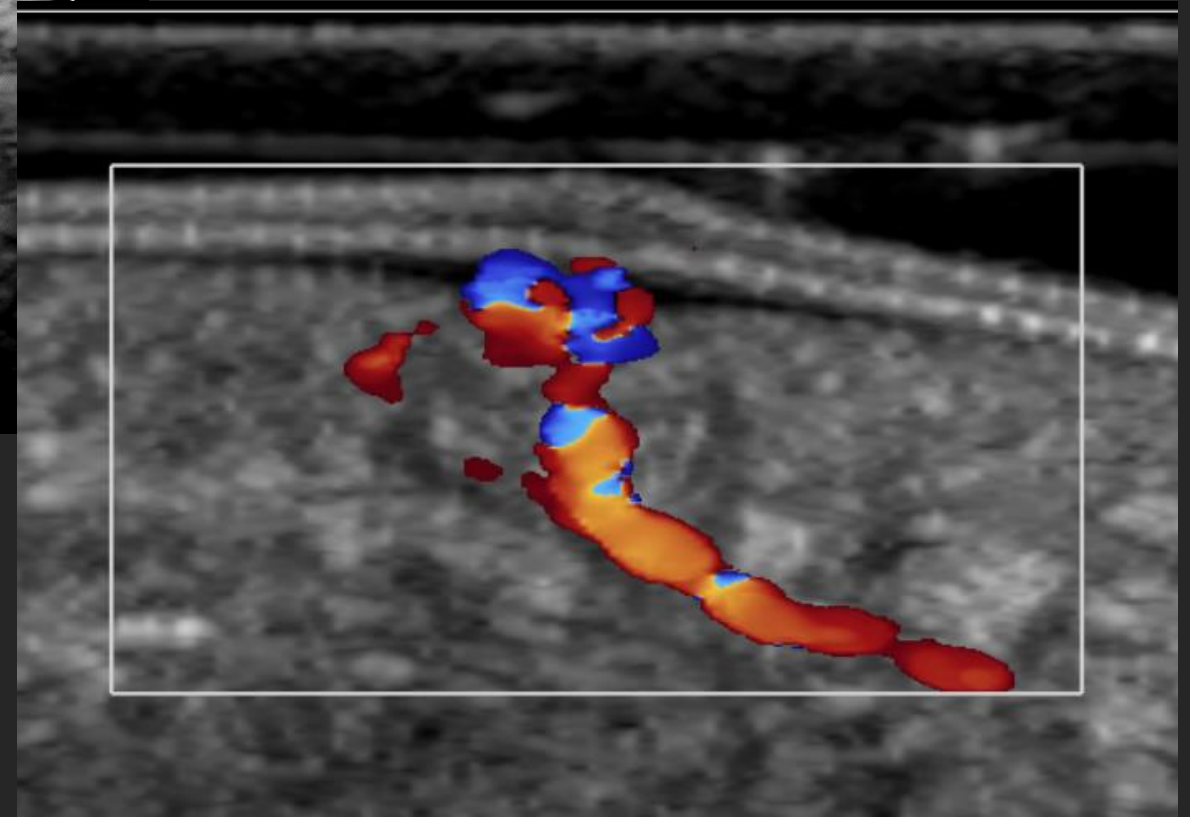
7-yo, VACTERL, new lower back swelling

# Childhood Soft Tissue Sarcoma



7-yo, VACTERL, new lower back swelling

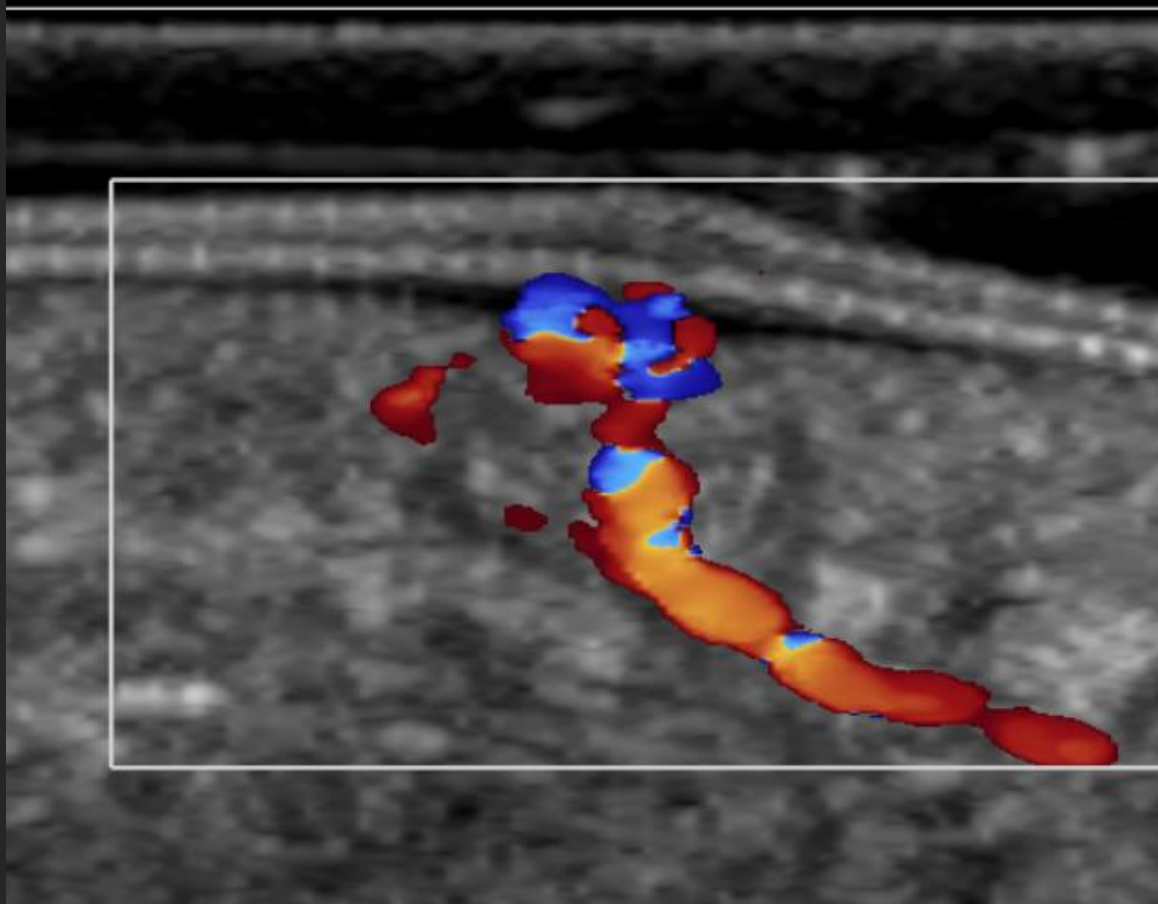
- Rhabdomyosarcoma
- **Non-rhabdomyomatous sarcomas**
  - 3.5% of childhood tumors
  - Associated chromosomal abnormalities
  - **CIC-rearranged type**
  - 5-year survival varies based on tumor type, other factors
    - Low risk, 96%
    - Intermediate risk, 80%
    - High risk, 35%



12-year old w/plantar foot bump

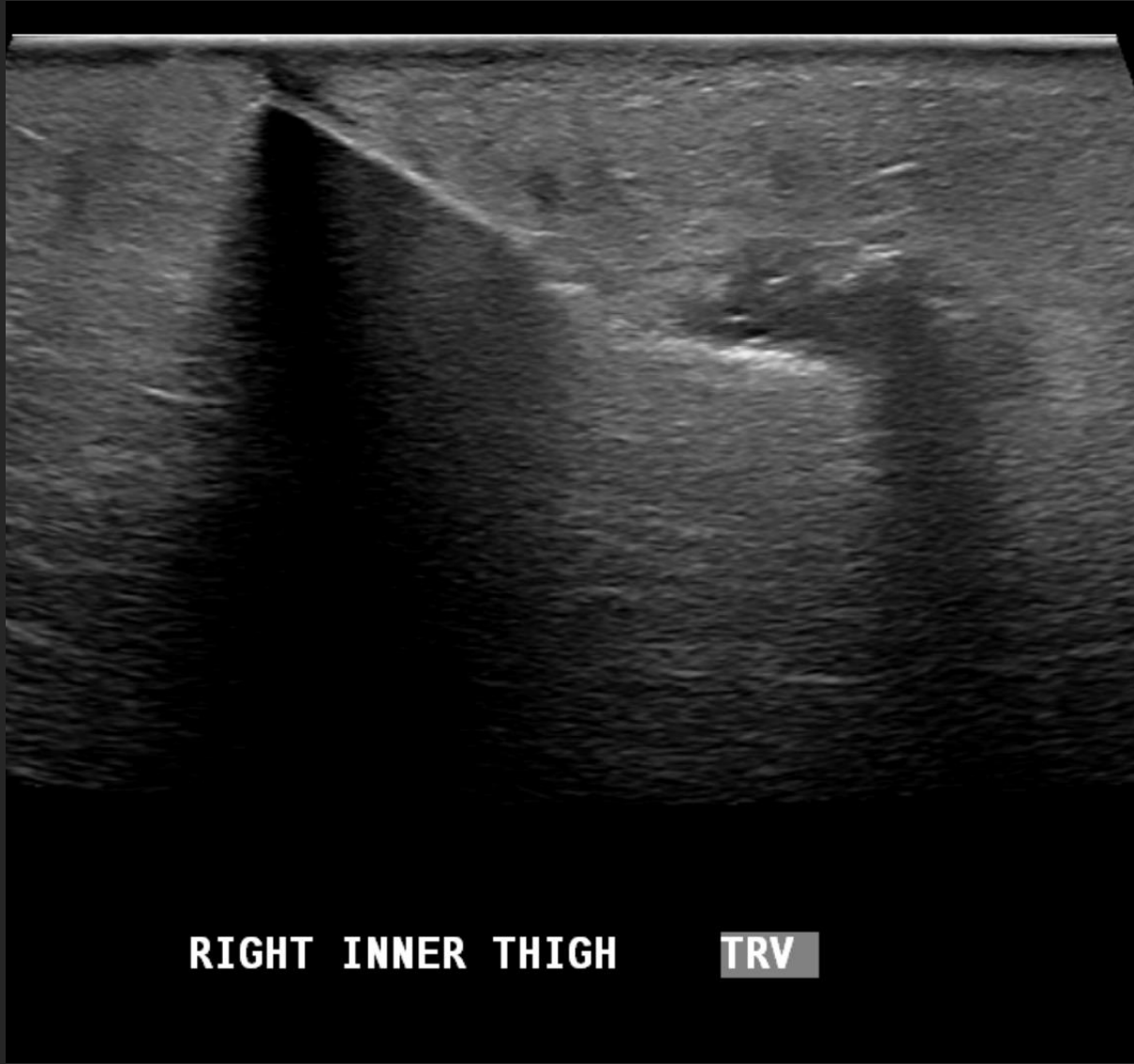


# Plantar Wart



12-year old w/plantar foot bump

- Painful when walking
- Clinical history may be concern for foreign body
- Treatment with salicylic acid, freezing
- Human papillomavirus

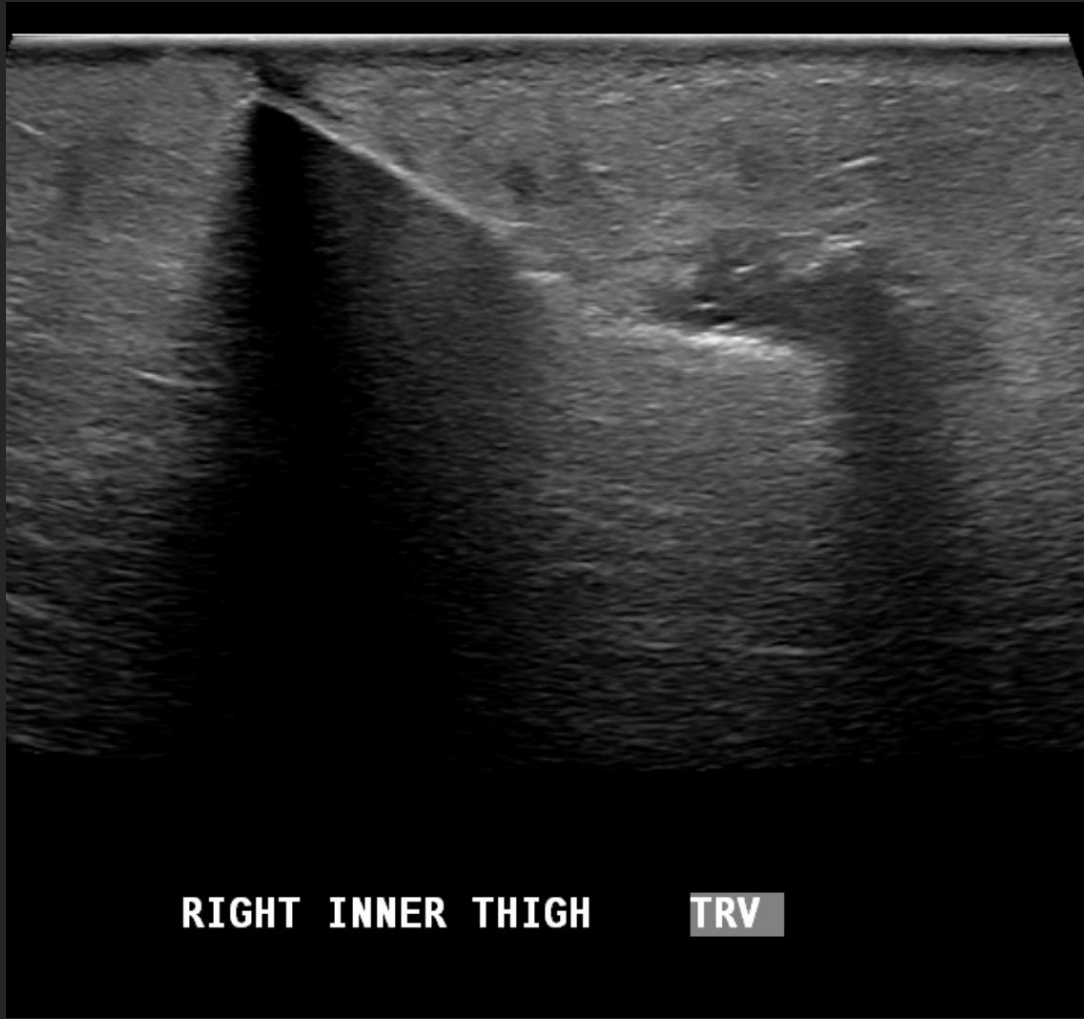


10-yo, fell out of a tree

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# Retained wood (foreign body)

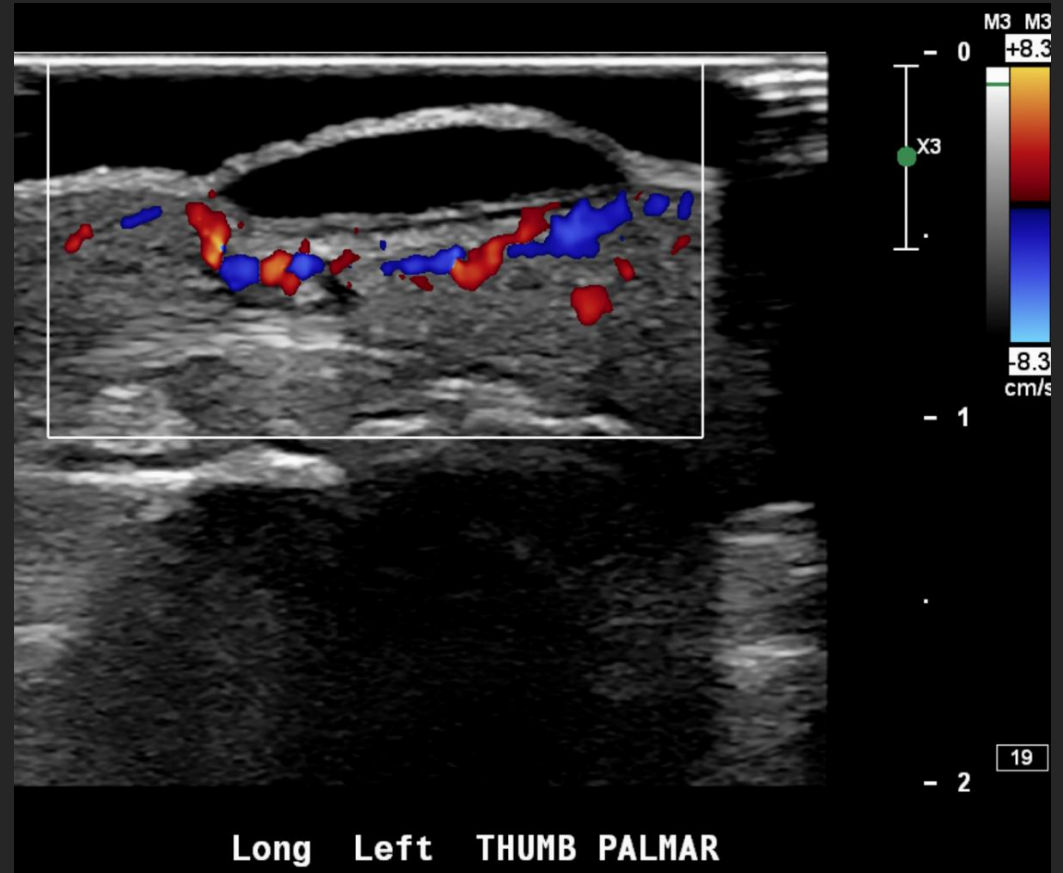


- All foreign bodies echogenic
- Typically shadowing
- Report depth from skin
- May see surrounding fluid

10-yo, fell out of a tree



6-yo, splinter recently removed



# Blister



6-yo, splinter recently removed

- Water bath technique
- Avoid compression

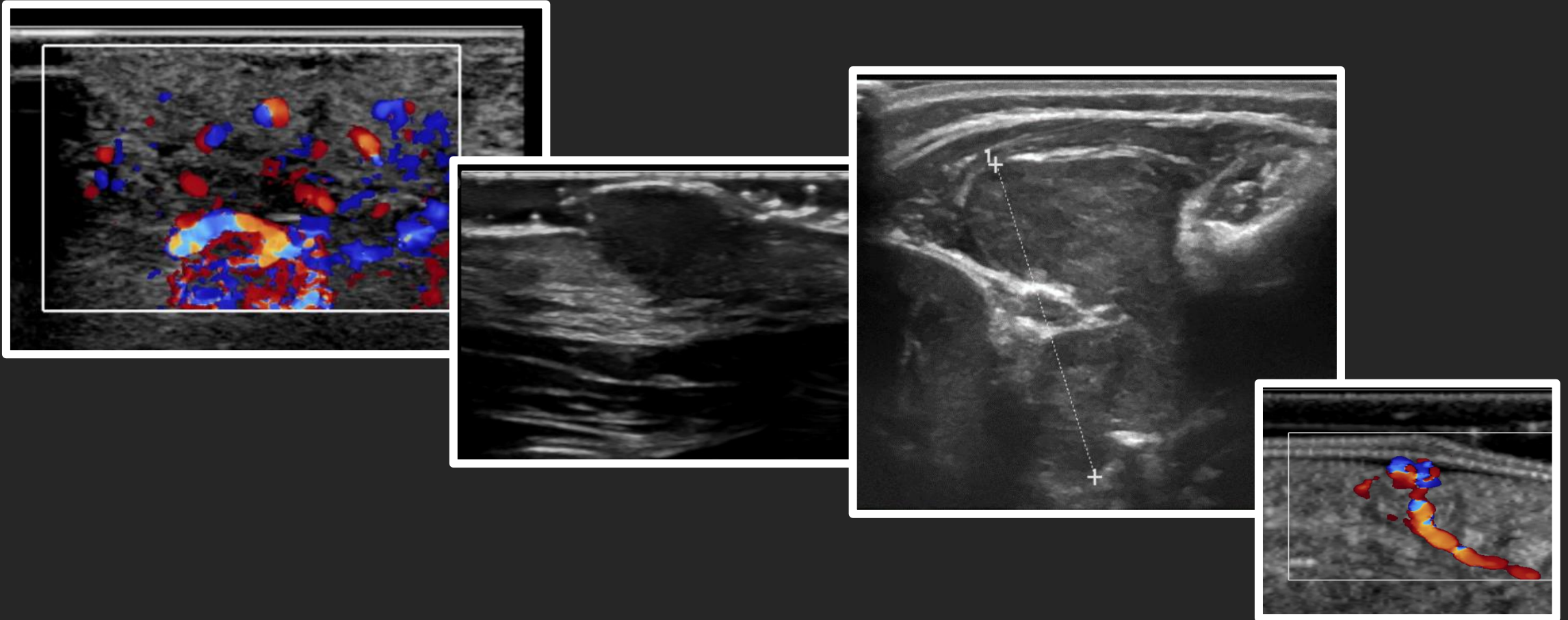


# Key Points

- Assess which layers of soft tissue are involved
  - Technique:
    - Use spectral Doppler to assess vascularity
    - Use water bath if possible
    - Avoid compression of tissue
  - Vascular lesions may enlarge with internal hemorrhage
  - Neonatal fat necrosis is self-limited
  - Beware solid lesions deep to subcutaneous fat layer
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# Pediatric Soft Tissue Lesions



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