Sarcoma or haematoma? If only it were that simple!

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Introduction:

Soft tissue (ST) masses of the trunk and extremity are common, and most are benign with sarcoma accounting for 1% of adult cancers with a 5-year survival rate of 53%. Ultrasound (US) is an excellent first line test for the evaluation of ST masses, and findings play an important role in aiding the diagnosis of both benign and malignant lesions; however, differentiating between soft tissue sarcoma (STS) and soft tissue haematoma (STH) with US can be challenging, as appearances can be variable; they have similar imaging characteristics and clinical symptoms, and both can increase in size slowly.[1] Delayed diagnosis and errors in the early management of sarcoma will lead to poor outcomes, including amputation and death, as even low-grade sarcoma can metastasise.[2]

Method:

- A retrospective audit was performed at University Hospitals Leicester (UHL) to identify cases of proven sarcoma that were mistaken as a STH
- A literature review of imaging features of STS and STH was performed with a focus on US imaging
- A literature search for guidance on the management of haematomas was performed and none was found
- A pathway and audit for the management of STH was introduced at UHL and Sheffield Teaching Hospital

STH and STS features:

- Both can present as a mass and can grow slowly
- Superficial, small STHs occur with minimal trauma and are recognised by swelling, ecchymosis, are often painful and usually resolve over a few weeks
- Presence of oedema can support the diagnosis of a STH if the clinical history fits the presentation
- STS can be present and only noticed when a patient has a trauma, highlighting the ST swelling that was previously unnoticed
- STS can bleed giving the appearances of a STH when there is in fact tumour also present
- STH should resolve over time through a process of resorption, although some large STH may not completely resolve as blood products can be replaced by fibrous tissue. [3] **(Figure 1)**
- STS will not resolve over time, although if there is a co-existing STH, this may regress [4]
- Collections should always be checked thoroughly at US using power Doppler to check for co-existing tumour

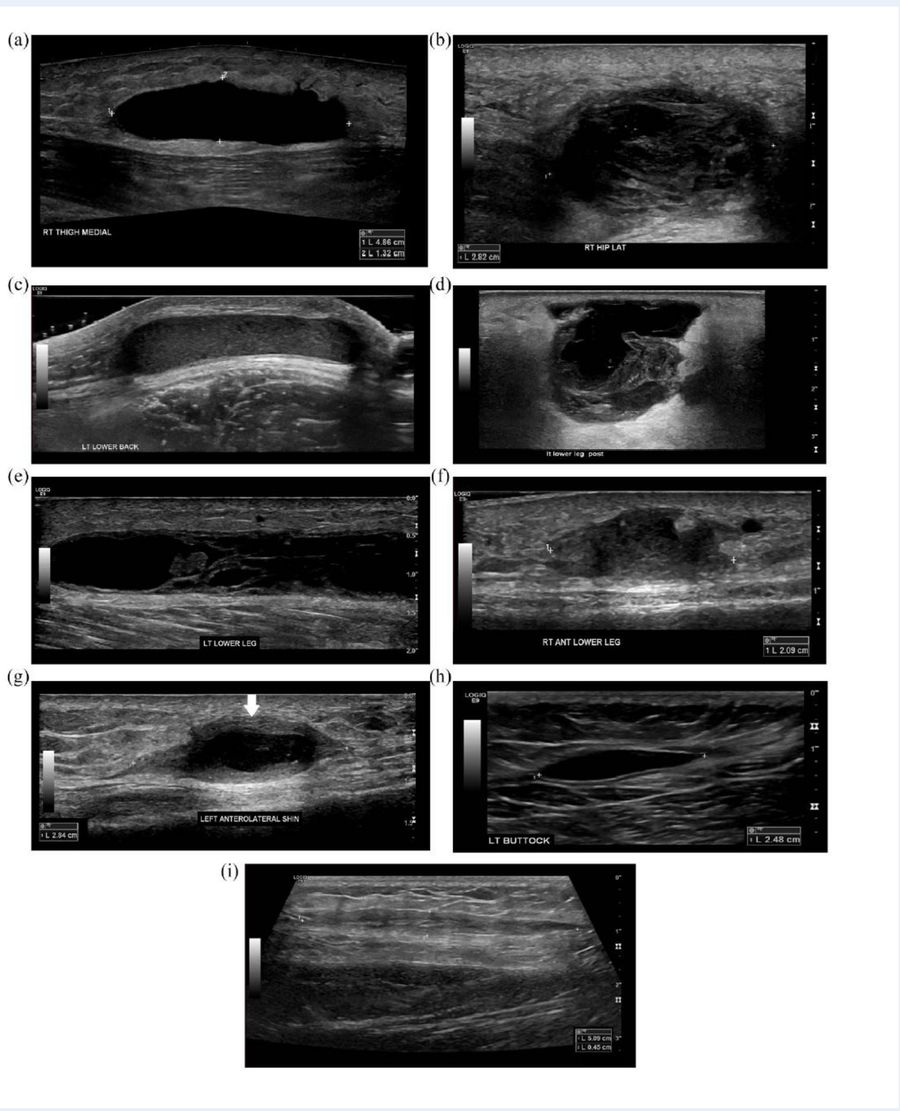

Figure 1.
(a) US image demonstrating a well-defined, anechoic, subcutaneous STH in the acute phase. (b) US image demonstrating a STH with internal echoes and a heterogeneous appearance in the acute phase. (c) US image showing a STS in the late phase with low-level internal echoes. (d) US image of a complex STH in the late phase seen as more organised with cystic areas and septations. (e) US image STH demonstrating blood clot and fibrin strands. (f) US image of STH in the chronic phase, becoming more hyperechoic and organised and less well-defined. (g) US image of a chronic STH. Note that the haematoma is now predominantly anechoic with a thickened wall (white arrow). (h) STH that has almost resolved and become anechoic. (i) Fibrous changes of an almost resolved STH.

STS V's STH

- US and MRI appearances of STS can vary significantly
- US and MRI imaging support STS diagnosis but cannot give an outright result from the scans alone
- Common US and MRI features of STS include a hypoechoic and hyper vascular, deep ST mass with ill-defined margins and areas of cystic degeneration or necrosis [4]
- Some STS such as myxofibrosarcoma and undifferentiated pleomorphic sarcoma have features that can be misinterpreted as a STH due to similar imaging characteristics (fig. 2 and 3)

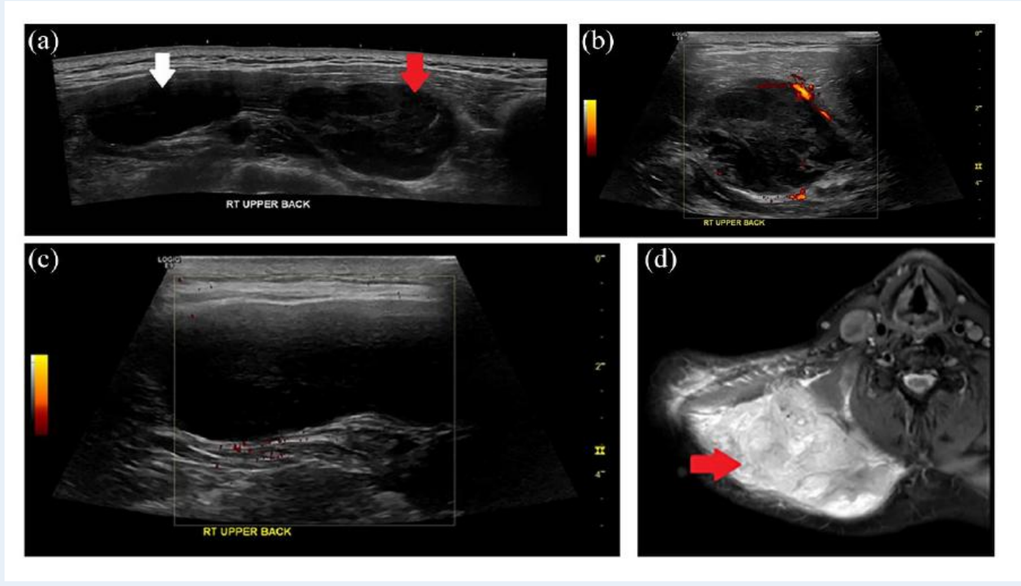

Fig. 2.
(a) US image of the right upper back depicting an extensive bilobular intramuscular mass. There are both cystic (white arrow) and complex (red arrow) components to the abnormality. (b) US image of the complex component in the patient in (a). Despite the complex appearances, there is only minimal vascularity on power Doppler in the periphery, which is easily thought to represent a normal vessel. (c) US image of the cystic component in the same patient in (a) and (b). There is no vascularity within this component. (d) A SPAIR image of an extensive undifferentiated pleomorphic sarcoma in the right upper back (red arrow).

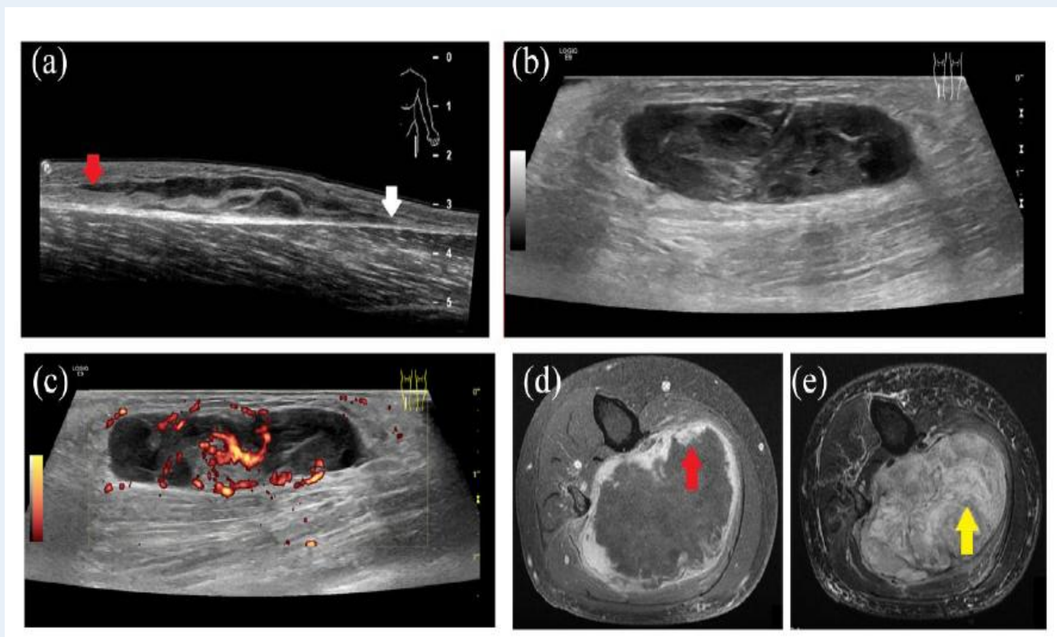

Figure 3.
(a) US image of a myxofibrosarcoma in the thigh, demonstrating an irregular hypoechoic soft tissue mass infiltrating the fascia (white arrow) and surrounding subcutaneous tissues (red arrow). (b) US image of a calf myxofibrosarcoma, showing a hypoechoic complex abnormality in the subcutaneous tissues. The complex internal content could be easily confused with clot or fibrin strands within a haematoma. (c) US image of the myxofibrosarcoma in (b) with moderate internal vascularity on power Doppler, confirming that this is a solid mass. (d) T1WI fat saturated image with contrast showing an intramuscular soleus lesion with a thick peripheral enhancement (red arrow). (e) T2WI fat saturated image showing the same lesion demonstrating internal loculated fluid signal within, suggesting progressive necrosis (yellow arrow).

Results:

- Although sarcoma is a rare cancer, there are documented cases in UHL audit and peer reviewed journals where STS has been mistaken for a haematoma
- The pictorial review papers provide information on the clinical and imaging features of STS and STH and describe when to escalate for further imaging or sarcoma MDT review
- An audit of cases of traumatic STH is on-going at UHL and Sheffield Hospitals, to obtain evidence for resolution times and to help guide future directions

Conclusion:

Consideration of the clinical history, clinical findings and imaging appearances should be considered before diagnosis of a simple STH. Understanding the type and intensity of the injury sustained is important as a low impact should not cause a large STH[3]. When imaging appearances and the clinical presentation of a suspected STH do not align, a cautious approach to further imaging or onward management should be made so that STS is not missed, especially in the absence of any national guidance for the management of STH.

References:
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