

Ultrasound screening of soft tissue masses in the trunk and extremity - a BSG guide for ultrasonographers and primary care

Introduction

Soft tissue masses in the trunk and extremity are common and most are benign. However, it is very important to rapidly identify malignant tumours, including soft tissue sarcomas. Ultrasound examination is a useful screening test which quickly identifies masses with concerning features and provides rapid reassurance about benign tumours (often lipomas), avoiding the distress and service demands of an unnecessary urgent cancer referral [4, 5].

Referral guidelines recommend that masses which have any of the following features should be referred urgently to a sarcoma multi-disciplinary team (MDT) for investigation and further management:

- Increasing in size
- Size more than 5 cm (except subcutaneous lipomas) □ Painful

Masses which are deep or recur after previous excision are also more likely to be sarcomas [2].

Lipomatous tumours are common in the trunk and extremity and the vast majority, particularly in the subcutaneous tissues, are simple lipomas or benign variants such as angiolipomas or fibrolipomas. Deep lipomatous tumours (under the deep fascia) are most often inter- or intramuscular lipomas or atypical lipomatous tumours (ALTs). ALTs are indolent tumours with no capacity for metastatic spread in the absence of dedifferentiation (a rare event), and can be large (considerably greater than 5cm) at presentation. The term “well differentiated liposarcoma” is now only used to describe tumours in the abdomen where the risk of de-differentiation is higher.

5% of patients have multiple lipomas. Angiolipomas are also typically multiple [3].

Tumours which are confirmed on ultrasound to be lipomatous and located above the deep fascia are rarely malignant or ALTs, even if there are some atypical features on ultrasound (eg vascularity or thickened septae)[1]. Patients can be reassured accordingly and given advice to observe the mass for changes. Furthermore, if necessary, these can be excised by a non-specialist surgical team. In the unlikely event that such a tumour is malignant on histological examination, re-excision including the deep fascia is usually possible, without detriment to long term outcomes.

The aim of this document is therefore to clarify how to screen trunk and extremity soft tissue tumours using ultrasound and triage them appropriately. This document is a companion to the BSG guidance on the management of soft tissue sarcomas [2].

Ultrasound technique for evaluation of soft tissue masses

The following are recommended for USS of soft tissue masses:

- Scans should be performed or supervised by a clinician who is FRCR or RCR accredited to perform and report ultrasound (preferably musculoskeletal ultrasound).
- A clinical history should be taken, including details of size, duration, precipitants, growth, and associated symptoms, particularly pain.
- A clinical examination of the mass for position and local changes should be performed.
- The ultrasound machine used must be of diagnostic/medical standard with at least 6 monthly quality assurance of electrical safety, transducer, machine and monitor quality.
- Ultrasound should be performed on a high resolution scanner with a linear high frequency probe, typically up to 15/18 MHz, depending on the anatomical location.
- Ultrasound examination should evaluate mass size, mass location (relationship to fascia), echotexture, whether cystic, solid or mixed, and Doppler characteristics (at low flow settings).
- Scans diagnostic of a benign non –tumour diagnosis (such as a ganglion) should be reported to the requesting clinician and GP to manage as appropriate.
- Patients with scans diagnostic of a benign lipoma with typical* or atypical** ultrasound features and which are subcutaneous, painless and not growing can be referred back to primary care for further management. This could include excision by a non-specialist team, observation with advice to patients, or interval scan. It is reasonable to recommend that larger tumours in this category (>7cm) are assessed by MRI and referred on to the Sarcoma Service only if abnormal or >10cm.
- Patients with scans diagnostic of a benign lipoma with typical* or atypical** ultrasound features and with lipomas which are deep to fascia should be further investigated with an MRI scan. If the deep lipoma is >5cm and normal on MRI then referred to the Sarcoma Service for advice on a non-urgent basis is advised. This may include review of the imaging and/or the patient. If <5cm, then follow up MRI is advised by the local radiologist.
- If the scan indicates a lipoma with concerning ultrasound features or a nonlipoma with indeterminate or concerning ultrasound features, then an urgent MRI is required for further assessment. If abnormal, then urgent 2 week wait referral to a sarcoma service is advised.
- Scans which are diagnostic or suspicious of a malignant non sarcomatous mass (such as a lymph node mass) should be reported to the requesting clinician and GP for urgent referral to the appropriate oncology service (Figure 1).

References

1. Clay MR, Martinez AP, Weiss SW, Edgar MA. MDM2 Amplification in Problematic Lipomatous Tumors: Analysis of FISH Testing Criteria. *Am. J. Surg. Pathol.* 2015;39:1433–9. Available at: [http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00000478 - 201510000-00018](http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00000478-201510000-00018) [Accessed May 12, 2018].
2. Dangoor A, Seddon B, Gerrand C, Grimer R, Whelan J, Judson I. UK guidelines for the management of soft tissue sarcomas. *Clin. Sarcoma Res.* 2016;6:20. Available at: <http://clinicalsarcomaresearch.biomedcentral.com/articles/10.1186/s13569-016-0060-4>.
3. Fletcher CDM, Bridge JA, Hogendoorn PCW, Mertens F eds. *Who Classification of Tumours of Soft Tissue and Bone*. Fourth. Lyon, France: World Health Organization; 2013.
4. Lakkaraju A, Sinha R, Garikipati R, Edward S, Robinson P. Ultrasound for initial evaluation and triage of clinically suspicious soft-tissue masses. *Clin. Radiol.* 2009;64:615–21. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0009926009000919> [Accessed November 22, 2017].
5. Rowbotham E, Bhuvu S, Gupta H, Robinson P. Assessment of Referrals into the Soft Tissue Sarcoma Service: Evaluation of Imaging Early in the Pathway Process. *Sarcoma.* 2012;2012:1–5. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/22792037> [Accessed November 22, 2017].