Ultrasound screening of soft tissue masses in the trunk and extremity:

a British Sarcoma Group guide for ultrasonographers and primary care

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Contents

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Authorship

This document was developed by Mike Bradley, Philip Robinson, Craig Gerrand and Andrew Hayes. It was circulated to the BSG Board and then to the wider membership for comments in 2018. Thanks to all those, including Dan Stark, Jonathan Gregory, Richard Neal, Andrew Johnston and Michael Khoo for their helpful comments.

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. This document aims to clarify how to screen trunk and extremity soft tissue tumours using ultrasound and triage them appropriately. This document complements the BSG guidance on the management of soft tissue sarcomas [3].

Clinical assessment

When a patient presents with a soft tissue mass, a clinical history should be taken, including details of size, duration, precipitants, growth, and associated symptoms, particularly pain. Clinical examination should assess site, depth, consistency, edges and whether the mass is fixed.

Referral guidelines recommend that patients with soft tissue masses with **any** of the following features should be referred urgently to a sarcoma multi-disciplinary team (MDT) for investigation and management:

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

Masses which are deep or recur after previous excision are also more likely to be sarcomas [3].

However, if clinical features are typical of a small (<5cm) superficial subcutaneous lipoma (ie a soft lipomatous consistency, smooth edges, no pain and no recent growth), then the patient can be reassured and asked to return if there are changes.

Where all these criteria are not met or if further reassurance is required, ultrasound examination quickly identifies masses with concerning features and provides rapid reassurance about common benign subcutaneous tumours (often large subcutaneous lipomas). It is therefore a useful test and is widely available in the community. This can avoid the distress to patients and service demands of an unnecessary urgent cancer referral [5, 6].

Lipomatous tumours

Lipomatous tumours are common in the trunk and extremity. The majority, particularly in subcutaneous tissues, are simple lipomas or benign variants (eg angiolipomas or fibrolipomas).

Deep lipomatous tumours (under the deep fascia) are most often inter- or intra-muscular lipomas or atypical lipomatous tumours (ALTs). ALTs are indolent tumours with no capacity for metastatic spread without de-differentiation (a rare event). ALTs can be large at presentation [1]. The term "well differentiated liposarcoma" is now reserved for tumours in the abdomen where the risk of de-differentiation is higher.

5% of patients have multiple lipomas. Angiolipomas are typically multiple [4] .

Tumours which are confirmed by ultrasound examination to be lipomatous, superficial and subcutaneous are rarely malignant or ALTs, even if there are atypical features on ultrasound (eg vascularity or thickened septae)[2].

Patients with tumours confirmed to be lipomatous, superficial and subcutaneous on ultrasound can be reassured and advised to observe the mass for changes. If necessary, confirmed superficial lipomatous tumours can be excised by a non-specialist surgical team, preserving the underlying muscle fascia. 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.

Ultrasound technique for evaluation of soft tissue masses

- Scans should be performed or supervised by a clinician with FRCR or RCR accreditation 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).
- Scan images and reports must be readily available to clinicians in primary and secondary care.

Recommendations for action after ultrasound scan

- 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 superficial, 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 (for example after 6 months). It is reasonable, if there are ongoing concerns, to refer larger tumours in this category (>7cm) for non-urgent assessment by a Sarcoma Service, although the risk of malignancy is very low.

- Patients with scans diagnostic of a benign lipoma with typical* or atypical** ultrasound features *and* which are deep to fascia, painful or enlarging should be further investigated with an MRI scan first if possible. Performing an MRI locally can help avoid unnecessary onward referral in this situation. If this confirms a deep lipomatous tumour, referral to a Sarcoma Service for advice on a non-urgent basis (non-cancer referral) is reasonable for review of the imaging and/or the patient. If the MRI suggests another more serious diagnosis then *urgent* referral to a Sarcoma Service is required.

- In the less common situation that the scan indicates a lipoma with significantly concerning ultrasound features, or a non-lipoma with indeterminate or concerning ultrasound features, raising the possibility of malignancy, then an urgent 2-week wait, suspected cancer, referral to a sarcoma service is appropriate, ideally with an urgent MRI if available in the community.

- 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).

Guide for Ultrasound Imaging of Lipomatous Tumours

- **Benign lipoma with typical ultrasound features***
  - Homogeneous mass
  - No or septal linear power Doppler flow
  - No or thin (<2mm) septa

- **Benign lipoma with atypical ultrasound features****
  - Lipoma but very thick septa (>2mm)
  - Nodular area(s) of oedema or fat necrosis in predominantly fatty lesion
  - Disorganised power Doppler flow in predominantly fatty lesion

- **Lipoma with concerning ultrasound features*****
  - Nodular area of non-fat signal in a deep lipomatous mass

- **Non-lipoma with indeterminate or concerning ultrasound features******
  - Solid non lipomatous mass
  - Heterogeneous mass
  - Invasive margins
  - Disorganised power Doppler flow in solid heterogeneous lesion

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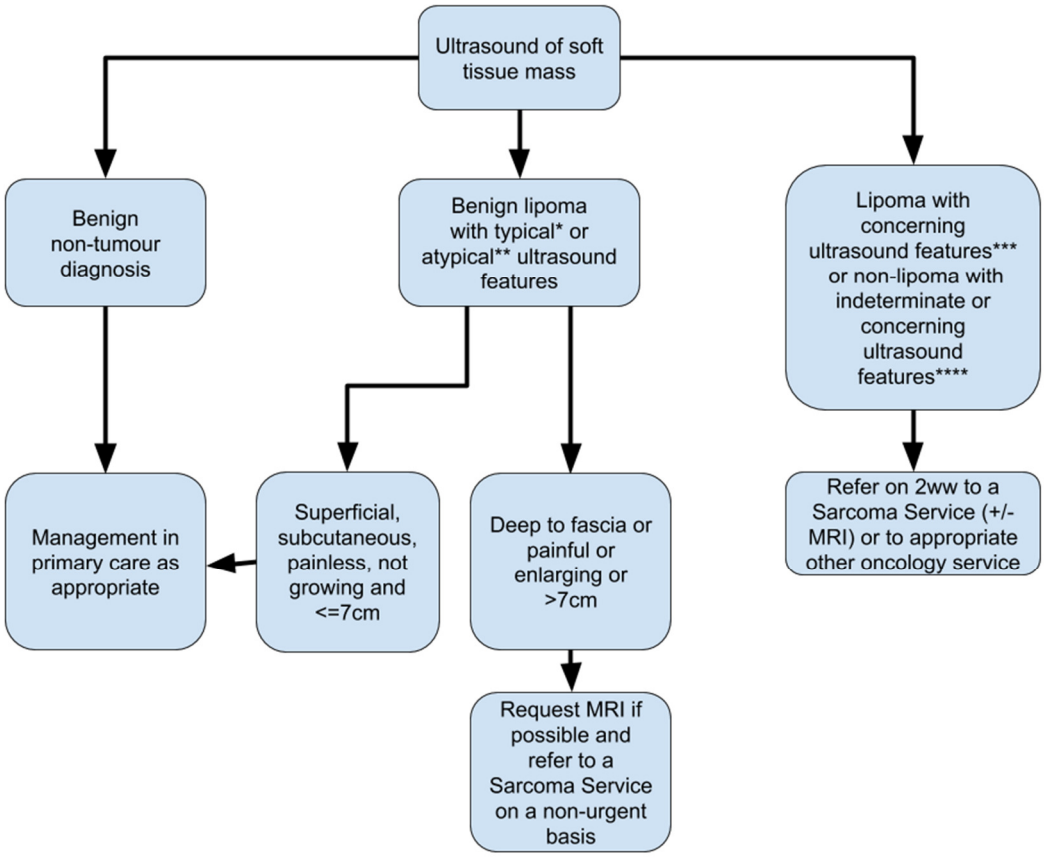
Figure 1. Guide for Ultrasound Imaging of Trunk and Extremity Tumours



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