The detection of melanoma recurrence by an ultrasound surveillance scan

Costigan, R. [1,2], Walsh, M. [2], Cronin, K. [1]

[1] Radiography and Diagnostic Imaging, School of Medicine, University College Dublin, Ireland.
[2] Radiology Department, Mater Misericordiae University Hospital, Dublin, Ireland.

INTRODUCTION

Melanoma is a type of skin cancer that approximately 1100 Irish people are diagnosed with each year (HSE,2023). It is the 4th most common cancer in Ireland (Rafferty et al., 2023). There is a high risk of recurrence after treatment (Howard, 2020). Therefore, radiological surveillance plays an important role in the follow-up of these patients. They have improved chances if melanoma recurrence is detected early (Rafferty et al., 2023). Unfortunately, the location of this reappearance if it occurs cannot be predicted (Howard, 2020). Hence, a combination of modalities- ultrasound, PET/CT and CT, gives the highest chance of detection.

THE ROLE OF ULTRASOUND IN MELANOMA SURVEILLANCE

As a result of two landmark studies (MSLT-II and deCOG-SLT) in 2016 and 2017, treatment and follow up of melanoma was drastically changed (Broman et al., 2021). In the past, complete lymph node dissection was recommended for melanoma patients with a positive sentinel lymph node biopsy (SLNBx) (Broman et al., 2021). A positive SLNBx is where metastases are found in the first draining lymph nodes surrounding the primary site (Gjorup et al., 2024). However, research showed there was no clinical benefit to a complete lymph node dissection (Broman et al., 2021). This led to ultrasound of the lymph node basin near the primary site being introduced to the follow up surveillance plan of certain patients.

Ultrasound is the modality of choice for the detection of lymph node basin recurrence as it has demonstrated the best accuracy compared to palpation, CT and PET/CT (Garbe et al., 2022). The selection of patients for melanoma ultrasound surveillance occurs at MDM meetings in the Mater Misericordiae University hospital. The decision is based on a number of factors. The cases selected usually:

- have had a positive SLNBx
- were unable to have their sentinel lymph node accessed during surgery,
- were not appropriate for SLNBx due to comorbidities

The time interval between ultrasound surveillance scans is based on findings from the Multicenter Selective Lymphadenectomy Trial II (MSLT-II) and are described in table 1. Studies have shown the highest risk of recurrence is within the first 2 years (Gjorup et al., 2024). 90% of all disease recurrence occur within the first 5 years of diagnosis (Garbe et al., 2022).

Table 1: Time interval between ultrasound nodal basin surveillance scans as per local protocol in the Mater Misericordiae University Hospital

Year	Time interval between ultrasound surveillance scans
1	4 months
2	4 months
3	6 months
4	6 months
5	6 months

PATIENT BACKGROUND

A 56-year old male presented with a pigmented lesion on his right anterior shin in May 2023. The lesion was biopsied and the patient was diagnosed with malignant melanoma. Treatment involved wide local excision of the area of concern and a sentinel lymph node biopsy in the right groin. Histological results confirmed one lymph node containing metastatic melanoma. The pathological stage was defined as pT3b N1 as per the American Joint Committee on Cancer (8th edition) which corresponds to melanoma stage IIIC (Melanoma Research Alliance, 2024). A PET/CT scan was performed as part of staging which showed no distant metastasis.
After diagnosis, the patient underwent CT and ultrasound surveillance scans as per NICE recommendations at appropriate intervals (National Institute for Health and Care Excellence, 2015).

ULTRASOUND EXAMINATIONS

Ultrasound of the right groin was performed which was the closest lymphatic nodal basin to the primary site. A 6-15MHz linear transducer was used to allow good resolution and some flexibility with depth (Society of Radiographers and British Medical Ultrasound Society, 2023). Before scanning, careful consultation with prior imaging was key to detect even subtle changes. When assessing lymph nodes, size (using the short axis), shape, morphology and vasculature are the features that must be examined (Society of Radiographers and British Medical Ultrasound Society, 2023) Abnormal structure rather than increase in size is more an indicator of malignancy (Society of Radiographers and British Medical Ultrasound Society, 2023)

OCTOBER 2023

At the first ultrasound surveillance scan, morphological normal lymph nodes were identified. The largest lymph node measured 7.8mm in anterior-posterior (AP) diameter. Classic benign features include fusiform shape, echogenic hilum, central hilar blood flow pattern and wider than taller appearance (Society of Radiographers and British Medical Ultrasound Society, 2023). Whole body CT scan performed also at this time out-ruled distant metastasis.

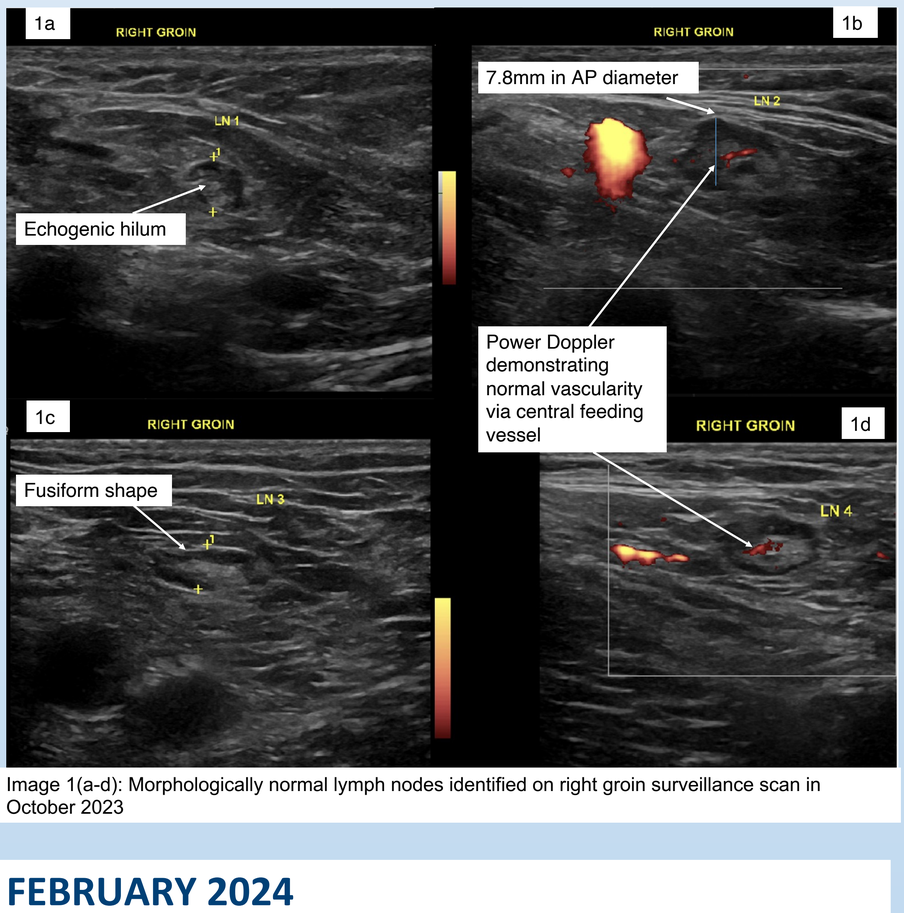

Image 1(a-d): Morphologically normal lymph nodes identified on right groin surveillance scan in October 2023

FEBRUARY 2024

4 months later, a highly suspicious lymph node was identified on the ultrasound surveillance scan. It measured 1.3cm in AP diameter. Sonographic features suggestive of malignancy included round shape, loss of central echogenic hilum, areas of coagulation or cystic necrosis and an abnormal vascularity pattern (Society of Radiographers and British Medical Ultrasound Society, 2023) The lymph node would need to be biopsied. This abnormal inguinal node was palpable by the patient. It was also identified on CT performed a week later along with prominent mesenteric lymph nodes concerning for metastatic disease.

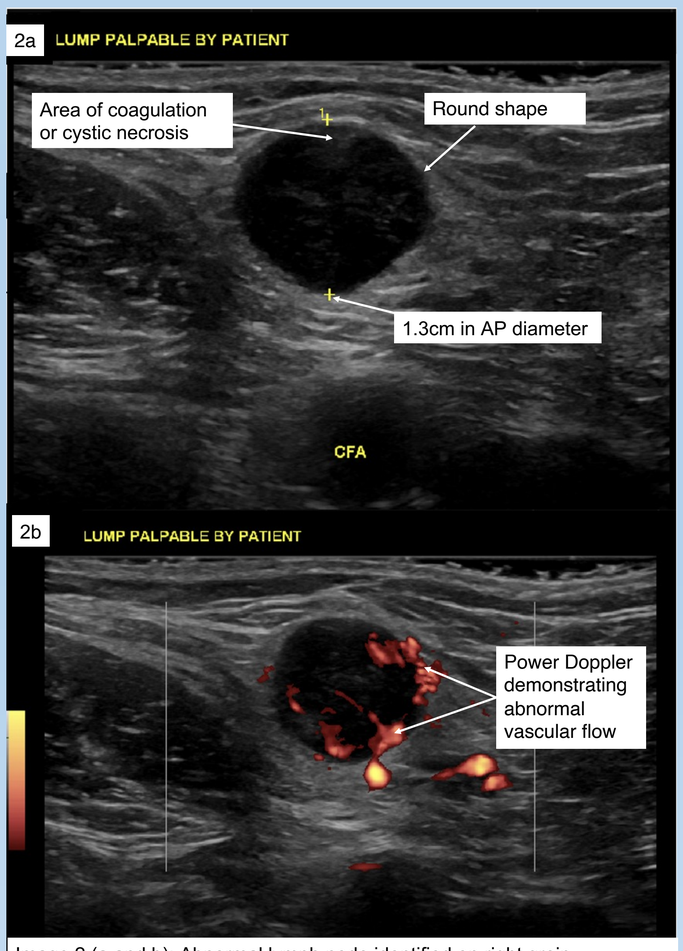

Image 2 (a and b): Abnormal lymph node identified on right groin surveillance scan in February 2024

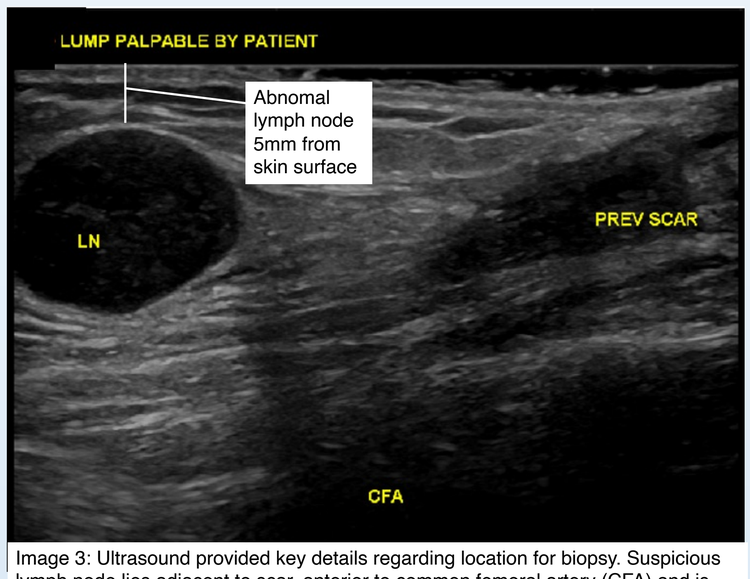

Image 3: Ultrasound provided key details regarding location for biopsy. Suspicious lymph node lies adjacent to scar, anterior to common femoral artery (CFA) and is only 5mm below the skin surface.

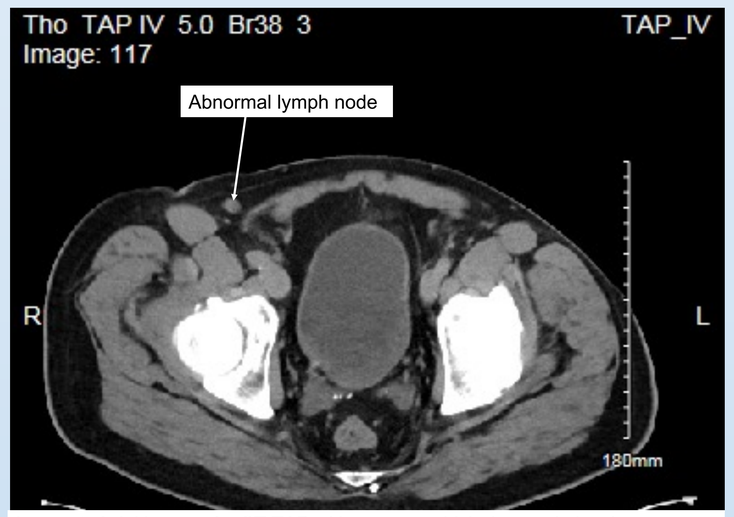

Image 4: Axial image of a CT TAP with contrast which detected also the suspicious right inguinal lymph node

BIOPSY AND FOLLOW UP

A biopsy was performed on the suspicious right inguinal lymph node using ultrasound guidance. Histology results confirmed metastatic malignant melanoma. Complete right groin lymph node dissection was performed which is recommended when there is recurrence in the nodal basin (Faries et al., 2017). The patient will undergo a PET/CT scan to re-stage. Further treatment may be required.

CHALLENGES

Unfortunately, there are barriers which inhibit ultrasound being offered as part of melanoma surveillance service. Firstly, to the best of the author's knowledge, ultrasound melanoma surveillance is only provided by two hospitals in the Republic of Ireland. The rare availability is presumed to be caused by the lack of training. Nodal ultrasound requires specific ultrasound skill (Rafferty et al., 2023). Every effort should be made to allow sonographers develop this technique which would help to increase access rates.

As well as the high skill required, continuity and familiarity with each case is also important for success. Because of this, only one sonographer performs these scans for the 35 patients currently on surveillance in the Mater. Dependence on one sonographer for the service is a very limiting factor.

Recent research has also called into question the need for ultrasound surveillance when a patient is getting regular cross sectional imaging. One study showed that PET/CT had the same detection success for nodal recurrence as ultrasound (Gjorup et al., 2024). However, with a significant proportion of young people diagnosed with melanoma (Howard, 2020), reliance on regular PET/CT should be avoided.

CONCLUSION

This case illustrates how accurate ultrasound is in detecting metastatic melanoma spread to the nearby lymph node basin. Though this recurrence was also detected on CT, ultrasound has been proven to be the most sensitive and specific for lymph node surveillance (Howard, 2020). 6 out of 44 surveillant patients in the Mater hospital had their melanoma recurrence spotted with ultrasound. This allowed early detection and therefore better survival rates. In the future, more training should be provided to sonographers to allow this service be provided in more clinical sites.

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