Accuracy of ultrasound scan guided needle biopsy in pre-operative diagnosis of metastatic axillary lymphadenopathy in patients with breast cancer

Mohsen M. El Gammal1*, Chin Ng2, Amrita Kumar2, Margaret Moorland2, Razan Gardy3 and Richard Sainsbury1

Abstract

Background: Pre-operative diagnosis of axillary node status is important in the management of patients with breast cancer. Ultrasound scanning (US) is an essential part of triple assessment of these patients with biopsy by either fine needle aspiration cytology (FNAC) and/or core biopsy (CB) of suspicious lymph nodes. The aim of this study is to establish the accuracy of preoperative US scan with US guided needle biopsy (USB) of suspicious nodes in the diagnosis of metastatic disease. Compliance with the current recommendations of the Royal College of Radiologists (RCR) was audited.

Material and methods: A retrospective analysis of all patients diagnosed with invasive breast cancer from April 2015 till March 2016 who underwent preoperative US axillary assessment followed by axillary surgery. Preoperative ultrasounds and US guided FNAC or CB of axillary lymph nodes were correlated with final histology of sentinel lymph node biopsy (SLN) or axillary lymph node clearance (ALND). Patients with micro-metastasis were excluded from this analysis.

Findings or results: 292 patients were identified (163 symptomatic invasive breast cancers and 129 screen detected). Following axillary surgery 95 /292 (32.5%) patients had nodal metastatic involvement on final histology. 68/163 (41.7%) of the symptomatic group had proven metastatic disease on final histology whereas only 27/129 (20.9%) of the screen detected group had metastatic disease. The sensitivity of US alone diagnosis in the symptomatic group was 73.5% and US guided sampling was 76% whereas in the screening group the sensitivity of ultrasound was 44.4% and ultrasound biopsy83% respectively.

Conclusions: Our results better the Royal College of Radiology guidelines (target of 50% or above) for both US assessment and US guided biopsy for symptomatic group. The screening group results were lower than the symptomatic group which probably is a reflection of a lower metastatic burden.

Keywords: Breast cancer, axillary lymph nodes, ultrasound scan, metastases, needle biopsy

Introduction

Ultrasound of the axilla should be performed in all patients when breast malignancy is suspected [1]. Lymph nodes showing abnormal morphology on ultrasound should undergo ultrasound guided needle biopsy-sampling (USB). Lymph node biopsy may be performed using FNAC or CB [1]. The addition of US-FNAC in cases of suspicious for malignancy may prevent more than 50% of sentinel lymphadenectomies, significantly shortening the time interval to definitive surgery [2]. There is no agreed standard for accuracy [3]. Several groups have published their results [4-8] with a reported sensitivity for detection of metastatic axillary lymph nodes ranging from 54.1% to 68.2% and the sensitivity of ultrasound guided FNAC/biopsy ranging from 28.5% to 55.6%. A positive correlation...
has been reported between the preoperative US diagnosis of metastatic disease and the underlying prevalence of ALN metastases [9]. Further studies have also confirmed that the sensitivity of US and USB depends on the extent of axillary tumor burden [10-12]. Meta-analysis studies have reported that preoperative USB of the axilla is accurate for initial staging of women with invasive breast cancer [9] and is a useful step in the process of axillary staging [13]. Approximately 50% of women with axillary involvement can be identified preoperatively [13].

The aim of this single centre retrospective study was to evaluate our results against the standards defined by the RCR (greater than 50% sensitivity). This sensitivity should be equal to prevalence of axillary nodal metastatic disease in first time presenters to the local symptomatic breast service [3].

Findings or results
A total of 292 patients were identified (163 symptomatic and 129 screen detected). All patients underwent US of their ipsilateral axilla. USB of Suspicious lymph nodes was performed with the following morphological criteria: cortical thickness of ≥2.5 mm, focal cortical bulge, complete or partial effacement of the fatty hilum, complete or partial replacement of the node with irregular or ill-defined mass, microcalcification in a node and hypoechoic node round.

After axillary surgery 95/292 (32.5%) patients had nodal metastatic involvement on final histology, 68/163 of the symptomatic group (41.7%) but only 27/129 (20.9%) of the screen detected group had proven metastatic disease on final histology (Table 1). The sensitivity of US diagnosis of symptomatic patients was 73.5% and US guided sampling of 76% compared to the screen group of 44.4% and 83% respectively.

The choice of method of axillary biopsy (cytology or core) depends on the individual radiologist and their training. False negatives occurred equally (6 and 6 for symptomatic 24% and 1 and 1 for screen detected disease 20%) for both techniques (Table 1). Positive predictive value of USB was 100% and 0% false positive USB.

48/95 (50%) of patients with metastatic lymph nodes underwent direct definitive axillary clearance following their pre-operative diagnosis on USB.47 of the 292 patients (16%) had to undergo a second surgical axillary procedure as their nodal positivity was not diagnosed on preoperative imaging(normal US or negative USB does preclude lymph node involvement). This figure may reduce in the future as trials such as PosNoc report [14].

Conclusions
Our results meet the Royal College of Radiology guidelines (targets of 50% or above) for both US assessment and US guided biopsy for symptomatic group. The screening group results were lower than the symptomatic group possibly due to smaller size and earlier stage of the tumours(lower prevalence rate). 50% of patients with metastatic nodes could be spared unnecessary SLN and proceed to definitive axillary treatment following positive USB. Better methods of detection of axillary nodal metastases, especially in the screening group, should be investigated.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions

| Authors’ contributions | ELG | CNG | AK | MM | RG | RS |
|------------------------|-----|-----|----|----|----|----|
| Research concept and design | ✓ | ✓ | ✓ | ✓ | -- | -- |
| Collection and/or assembly of data | -- | ✓ | -- | -- | ✓ | -- |
| Data analysis and interpretation | ✓ | ✓ | ✓ | -- | -- | ✓ |
| Writing the article | ✓ | -- | -- | -- | -- | -- |
| Critical revision of the article | ✓ | ✓ | -- | -- | -- | ✓ |
| Final approval of article | ✓ | ✓ | -- | -- | -- | ✓ |
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