

In Breast Cancer Patients Microbubble Enhanced Ultrasound Identification of the Sentinel Lymph Node (SLN) allows Targeted Fine Needle Aspiration (FNA) and reduces Futile SLN Surgery

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INTRODUCTION - Breast cancer and the Axilla

Assessing axillary node status is important:

- To stage the disease for prognosis
- In recommending adjuvant therapies
- For treatment and prevention of local recurrence in the axilla

Sentinel Lymph Node Biopsy

- Studies have shown the sentinel, or lead node provides accurate assessment of all nodes without having to remove them
- The sentinel node is the first node to which cancer would spread
- By finding this node and proving it to be free of cancer, removal of all the other nodes can be avoided
- Now almost universally standard practice

Sentinel Node Identification - Aim of Study

To investigate the use of FNA/core biopsy of the SLN identified by contrast enhanced ultrasound using SonoVue microbubbles in breast cancer patients whose routine axillary ultrasound +/- FNA/core biopsy is negative

Our results of routine ultrasound evaluation of axilla Jan 2005-April 2008

- 653 patients with invasive breast cancer had U/S pre-op
- 232 underwent FNA/core for suspicious nodes (U3, U4, U5)
- 150 confirmed positive by u/s guided core/FNA (65% of bx)
- 23% avoided SLNB and 2nd operation
- 503 underwent SLNB
- 94 node positive (18.7%) = false negative U/S
- 22 micromets/ITCs only
- 72 macromets (14%) --? represents false negative U/S
- 37% overall node positive (244 of 653pts)

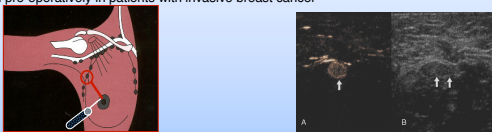
Sentinel Node Identification

18.7% patients node positive despite normal U/S +/- FNA/core biopsy in our series
2nd operation indicated in most to clear axilla

What can be done to try to reduce this number further?

Sentinel Node Identification

Using SonoVue microbubbles we have shown, for the first time, it is possible to identify the SLN pre-operatively in patients with invasive breast cancer



Microbubbles

Phospholipid membrane



Sulphur Hexafluoride

2.5µm

Microbubble



7.7µm

Red Blood Cell

Sentinel Node Identification Methods

- 50 consecutive consenting patients (full ethical and MRHA approval)
- SonoVue microbubbles injected sub-areolar (intra-dermal and sub-dermal)
- Tracked to the axilla using pulsed inversion ultrasound with a grey-scale parallel screen
- Ultrasound guided FNA/core biopsy of the SLN
- Comparison with final histology of surgically removed SLN

Targeted SLN FNA/core using Microbubbles – Results

SLNs seen in 55 of 60 patients

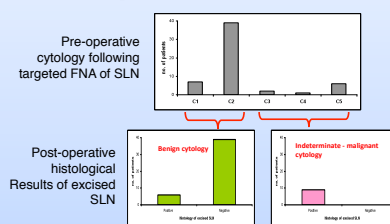
- C1 7 pts 4 benign, 1 micromet, 2 ITC
- C2 39 pts 35 benign, 1 pos node, 2 micromets
- C3 2 pts
- C4 1 pt all 9 malignant nodes
- C5 6 pts

39 pts correctly predicted negative

Targeted SLN FNA/core using Microbubbles – Results

- 6 patients avoided a second operation
- 39 correctly predicted node negative
- 3 C3/4 were all node positive
- 6 false negative
 - 1 macromet
 - 3 micromets
 - 2 ITCs

91% (55/60) of SLN were identified pre-operatively using microbubbles and CEUS



Targeted FNA of SLN identified pre-operatively using microbubbles and CEUS detected SLN metastasis with a **sensitivity of 60%** and a **specificity of 100%**. The positive predictive value was 100% and the negative predictive value was 87%.

Conclusions

- Confirmed that intra and sub-dermal injection of SonoVue microbubbles is safe and well tolerated
- Confirmed the SLN can be identified in the majority of cases
- Reduces the number of patients needing a second operation by identifying positive nodes