



Original article

Reoperative sentinel lymph node biopsy in ipsilateral breast cancer relapse

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ABSTRACT

Sentinel lymph node biopsy (SLNB) is controversial following ipsilateral breast tumour relapse (IBTR) and previous axillary surgery. We retrospectively assessed the feasibility, outcomes and utility of this procedure. Eighteen patients with IBTR who underwent reoperative SLNB were identified. Fifteen women had previously undergone axillary lymph node dissection and three SLNB for breast cancer. Twelve of 16 patients underwent successful lymphoscintigraphy (LSG). Lymphatic drainage patterns varied widely - ipsilateral axilla (5), contralateral axilla (5), and ipsilateral internal mammary (5). Two patients had drainage to more than one nodal basin. Nine of 12 patients demonstrated drainage outside of the ipsilateral axilla. Reoperative SLNB was successful in 12/18 of patients - 4 ipsilateral axilla, 1 ipsilateral internal mammary, 1 ipsilateral intramammary, 4 contralateral axilla. Two patients had sentinel nodes in multiple nodal basins. Positive sentinel node was found in one successful case (contralateral axilla) and isolated tumour cells in two (1 contralateral axilla, 1 ipsilateral internal mammary). In conclusion, reoperative SLNB is feasible. Lymphatic drainage patterns vary widely and preoperative LSG is vital to facilitate identification of sentinel nodes in unusual sites. Its prognostic and therapeutic significance warrants further study.

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Introduction

Breast conservation therapy (BCT), consisting of wide local excision and adjuvant breast radiotherapy, with sentinel lymph node biopsy (SLNB) is a standard of care for primary localized breast cancer. The preserved breast is the site of ipsilateral breast tumour relapse (IBTR) - additional neoplastic events in the form of local recurrences or new primary tumours. Approximately 10–20% of patients treated with BCT will develop an IBTR at 10 years after initial diagnosis.^{1,2} The yearly risk approximates 1% per year up to 15 years post diagnosis; after 15 years the risk appears to be smaller.³

Following IBTR, standard surgical therapy is generally salvage mastectomy, although further wide local excision may be feasible in carefully selected patients.^{4–6} Axillary lymph node dissection (ALND) is suggested in patients with a previously undissected axilla, but usually no further treatment to the axilla if ALND was part of the initial therapy.^{4,7} A growing proportion of women who develop IBTR will have had SLNB as their first and only axillary procedure; for these patients, management of the remaining axillary nodes is problematic.

During its developmental phase, there were many suggested contraindications to SLNB⁸. Foremost among these was prior axillary surgery, on the basis that lymphatic drainage had been disrupted. Substantial data have disproved many of the contraindications, but a few remain.⁹ Current American Society of Clinical Oncology guidelines discourage SLNB in the setting of prior axillary surgery but few data either support or refute this position.¹⁰ The argument against "reoperative SLNB" - SLNB in the setting of prior axillary lymphatic surgery - is that prior axillary surgery, as well as the adjuvant breast radiotherapy in the case of BCT, will have altered or disrupted the lymphatic drainage of the breast. Paradoxically, this may be the strongest argument for reoperative SLNB. Reoperative SLNB may allow alternative lymphatic drainage pathways to sites other than the ipsilateral axillary nodal basin to be identified^{7–9,11–14}. If left undetected, these could lead to unusual patterns of breast cancer recurrence.¹⁵

The purpose of this study was to report our experience of reoperative SLNB in a series of breast cancer patients treated for IBTR.

Materials and methods

We retrospectively identified patients with IBTR who underwent reoperative SLNB between May 2000 and May 2008. All patients had previously undergone either ALND or SLNB. IBTR was defined as local recurrence or a new breast cancer following BCT or chest wall recurrence after total mastectomy.

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The medical record of each patient was used for data abstraction. Information collected included details of the initial breast cancer (pathology, surgical management, and adjuvant treatment), details of the IBTR (pathology, surgical management), lymphoscintigraphy (LSG), reoperative SLNB and follow-up information.

Each patient underwent preoperative radioisotope injection, using 99 m-technetium-labeled antimony colloid, within 18 hours of surgery. The site of the injection was either subareolar, intradermal and/or peritumoral depending on the individual surgeon's preference. LSG was performed 30–120 min post-radioisotope injection.

Intraoperative blue dye mapping was also used. 2 mL of Patent Blue V 2.5% (Aspen Pharmacare Australia Pty Ltd, St Leonards, NSW) was injected peritumorally or in the subareolar site 5 min prior to the skin incision. Once again the site of injection of the blue dye varied according to the surgeon's usual practice.

Sentinel nodes were identified by inspection, palpation, and use of the handheld gamma-probe. All palpable, blue-stained and/or radioactive lymph nodes (i.e., those with counts greater than 10 times background) were labeled as sentinel nodes. Sentinel nodes were evaluated histopathologically for evidence of metastases by serial sectioning with haematoxylin and eosin (H&E) staining and with immunohistochemistry using CAM5.2 polyclonal antibody to cytokeratin (Becton Dickinson Biosciences, San Jose, CA).

Results

Eighteen patients who had undergone reoperative SLNB for IBTR were identified. The median age of patients at breast cancer diagnosis was 56.5 years (range, 34–70 years) and the mean interval to IBTR (disease-free interval) was 118 months (range, 13–209 months). Patients of 6 breast surgeons were involved in this review. Each surgeon was experienced in the procedure of SLNB.

Each of the 18 patients had previously been treated for breast carcinoma (8 invasive ductal carcinoma, 3 invasive lobular carcinoma, 1 atypical medullary carcinoma, 2 ductal carcinoma in-situ, 4 histology unknown as primary pathology report not available). Sixteen patients had undergone wide local excision and two a total mastectomy with transverse rectus abdominis muscle (TRAM) flap reconstruction. Eight of 16 patients treated with wide local excision underwent adjuvant breast radiotherapy. No patient had clinical evidence of regional or distant metastases.

All patients had undergone previous axillary surgery – 15 (83.3%) patients an ALND and 3 (16.7%) a SLNB. The clinicopathological profile for these patients is shown in Table 1.

All 18 patients were injected with radioisotope, and LSG was performed in 16. In two patients a lymphoscintigram was not obtained – in one case it was the surgeon's usual practice to inject radiotracer for intraoperative localization only, and in the second case it was omitted due time constraints. In 12 patients the LSG demonstrated at least one sentinel node.

Blue dye was used in 14 patients – in two cases the surgeon decided not to inject blue dye after the LSG and gamma probe failed to identify a sentinel node, in one case the surgeon decided not to proceed with SLNB after the LSG mapped the sentinel node to the ipsilateral internal mammary site, and in one case it was the surgeon's routine practice not to use blue dye (uses radioisotope injection alone).

Lymphoscintigraphy results, reoperative SLNB outcome and surgical pathology results are summarised in Table 2. The drainage patterns on the LSG (Fig. 1) varied widely and included ipsilateral axilla (5 patients), ipsilateral internal mammary (5 patients), and contralateral axilla (5 patients). Two patients demonstrated drainage to two or more nodal basins. Of the four patients whose LSG did not identify a sentinel node, three had previously undergone an ALND and the other a SLNB. Only 3 of 12 patients with

Table 1

Clinicopathological features of the study patient population undergoing treatment for ipsilateral breast tumour relapse (IBTR).

Patient No.	Age at primary cancer diagnosis (years)	Primary cancer histology	Primary cancer treatment	Interval to IBTR (months)	Type of recurrence
1	58	ILC	WLE/ALND /TAM	74	ILC
2	40	N/A	WLE/ALND /RT	203	IDC
3	70	IDC	WLE/ALND /RT/TAM	142	IDC
4	63	AMC	WLE/ALND /CT/TAM	44	ILC
5	76	IDC	WLE/SLNB /TAM	13	IDC
6	60	ILC	WLE/ALND /RT/TAM	68	IDC
7	51	N/A	WLE/ALND /RT	161	IDC
8	41	IDC	WLE/ALND /RT/TAM	99	IDC
9	34	N/A	WLE/ALND /RT	158	IDC
10	57	IDC	WLE/ALND /CT/TAM	112	IDC
11	57	IDC	TM&TRAM /SLNB/CT	57	IDC
12	59	IDC	WLE/ALND /TAM	182	IDC
13	40	IDC	WLE/ALND /RT	209	IPC
14	45	ILC	WLE/ALND /CT	128	IDC
15	56	N/A	WLE/ALND /TAM	167	ICC
16	56	DCIS	TM&TRAM /SLNB	57	IDC
17	60	IDC	WLE/ALND /TAM	176	IDC
18	34	DCIS	WLE/ALND /RT/CT	74	IDC

ILC, invasive lobular carcinoma; N/A, pathology report not available; IDC, invasive ductal carcinoma; AMC, atypical medullary carcinoma; IPC, invasive papillary carcinoma; ICC, invasive cribriform carcinoma; DCIS, ductal carcinoma in-situ; WLE, wide local excision; TM, total mastectomy; TRAM, transverse rectus abdominis muscle flap reconstruction; TAM, tamoxifen; RT, radiotherapy; CT, chemotherapy.

a positive LSG demonstrated drainage to the ipsilateral axilla only, while the remainder (9 of 12) had drainage to other sites.

Reoperative SLNB successfully identified one or more sentinel nodes in 12 of 18 cases overall. The mean number of sentinel nodes removed was 1.9. In one case the surgeon elected not to proceed with the SLNB after the LSG revealed a solitary sentinel node in the ipsilateral internal mammary site. In three unsuccessful cases blue dye was not used as a mapping agent (the LSG did not identify a sentinel node in two cases, and in the third case radioisotope was injected but a LSG was not obtained). In the other two unsuccessful cases a sentinel node was also not identified on the LSG.

The reoperative sentinel lymph node(s) were located in a single nodal basin in 10 patients – 4 patients in the ipsilateral axilla, 1 patient in the ipsilateral internal mammary site, 1 patient in the ipsilateral intramammary site, and 4 patients in the contralateral axilla. Two patients had sentinel nodes in multiple nodal basins. In Patient 6, the LSG identified a sentinel node in the contralateral axilla, however during the SLNB extensive nodal disease was palpated and this patient proceeded to a contralateral ALND. Hence, 8 patients had a reoperative sentinel node located outside the ipsilateral axilla.

Accuracy of the LSG was high, the LSG being concordant with the reoperative SLNB findings in 14/15 of cases. The only discordant LSG result was in Patient 12, where the LSG suggested an ipsilateral internal mammary sentinel node, however an ipsilateral

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