

## E14. Changing concepts in breast cancer surgery

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Surgery remains the single most effective treatment for breast cancer, and breast cancer surgery continues to become more conservative. This trend towards conservatism is supported by three landmark clinical trials [1–3] (each with follow-up of 20 years or more), an Oxford meta-analysis [4], advances in breast imaging (especially magnetic resonance imaging (MRI) [5]), increasing use of image-guided core-needle biopsy [6], and the advent of sentinel lymph node (SLN) biopsy [7] as an alternative to conventional axillary dissection (ALND).

For patients with ductal carcinoma *in situ* (DCIS), the addition of radiotherapy (RT) to surgical excision reduces local recurrence, and the addition of tamoxifen to RT may reduce local recurrence by a small additional margin, but neither has improved survival over that observed with excision alone [8–10]. There may be low-risk subgroups of DCIS patients for whom conservative surgery alone is adequate treatment [11]. For patients with invasive cancer, breast conservation remains under-utilised [12]. A small survival benefit from post-mastectomy adjuvant RT is offset by an increased incidence of cardiovascular mortality [13], a phenomenon not yet demonstrated for RT following breast conservation. Brachytherapy, either as a single intraoperative dose or as a short postoperative course, is under active study as a promising alternative to conventional whole-breast RT.

SLN biopsy represents a new 'standard of care' for axillary lymph node staging in virtually all patients with non-metastatic invasive breast cancer [7]. SLN biopsy is also reasonable in selected patients with DCIS [14,15] and in the setting of prophylactic mastectomy. It is feasible, accurate, and works best with a combination of blue dye and radioisotope mapping [16]. One's early experience should be validated by the performance of a "backup" ALND to establish a low false-negative rate, and 20 cases appear optimum to achieve this goal [17]. After proper validation studies, patients with a negative SLN do not require ALND. The first randomised trial [18] comparing SLN biopsy with conventional ALND confirms comparable staging accuracy, overall survival, and number of unfavourable events between the two study arms at 4 years of follow-up; although the SLN was falsely-negative in 9% of patients randomised to ALND, there were no axillary recurrences among the patients randomised to SLN biopsy alone.

SLN biopsy allows enhanced pathological techniques

(serial-sectioning and/or anti-cytokeratin staining) to be used routinely, thereby detecting metastatic foci missed by conventional single-section haematoxylin and eosin (H&E) examination. While the subject remains a matter of debate, SLN micrometastases detected in this manner may well prove to be prognostically significant [19–21], as are bone marrow micrometastases detected by similar methods [22,23]. Ultimately, SLN biopsy will allow the identification among conventionally "node-negative" patients of subsets at either higher or lower risk than historical norms would suggest.

Prophylactic mastectomy (PM) reduces breast cancer incidence and mortality among those with a high-risk family history [24], and/or mutations of *BRCA1-2* [25], but has significant adverse psychosocial sequelae for a small and unpredictable fraction of patients [26] and should not be undertaken lightly. Prophylactic oophorectomy reduces the risk of both ovarian and breast cancer [27,28] and should be offered to all women with *BRCA1-2* mutations, especially those beyond the years of childbearing.

The current surgical management of breast cancer remains imperfect. Future aims include, at least, the following:

1. to maximise both the sensitivity and specificity of breast cancer screening,
2. to maximise the rate of preoperative diagnosis by core biopsy,
3. to maximise the rate of breast conservation, while controlling the rate of re-operation,
4. to maximise staging accuracy, but to minimise associated morbidity,
5. to minimise the sampling error of conventional histopathological methods,
6. to define the significance of nodal micrometastases found by enhanced pathological methods, and
7. to define low-risk subgroups of patients for whom surgery alone might be adequate treatment.

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