



Frozen sections in patients undergoing breast conserving surgery at a single ambulatory surgical center: 5 year experience

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Accepted 26 January 2017

Available online ■ ■ ■

Abstract

Objectives: To evaluate outcomes of our breast frozen section (FS) practice in its first 5 years, including our specialized FS of margins (FSM) procedure for breast conserving therapy (BCT) patients.

Methods: One thousand two hundred and forty eight patients undergoing 1303 breast FSM and/or sentinel lymph node (SLN) FS were included. Clinicopathologic features were assessed by chart review.

Results: Use of SLN FS declined, from 43.5% of FS cases before to 19.2% of FS cases after 2012. FSM patients had a decline in overall reexcision to 12.3% in 2013–2014 ($p = 0.063$). There was also decline in reexcision for focally close margins ($p < 0.0001$) but no change in reexcision for extensively close margins. Reexcision was significantly associated with lobular subtype, multifocality and larger ($\geq T2$) size. False negative FSM cases were most often influenced by extensively close or positive final (reexcised) margins sent for permanent section only (96/148; 64.9%).

Conclusions: Despite changing surgical practices, FSM remains a valuable service that reduces reexcision in BCT patients.

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Keywords: Frozen section; Breast conserving therapy; Intraoperative; Breast cancer

Introduction

Breast conserving therapy (BCT) for early stage breast cancer has comparable outcome to mastectomy given adequate margin status and appropriate post-surgical radiation therapy.^{1–4} However, there has been considerable debate as to what defines an adequate surgical margin. Previously many institutions defined adequate as tumoral distance ≥ 0.1 cm from margin^{3,5–12} whereas others defined it as the absence of transected tumor (i.e. positive margin(s)).^{8,13,14} Most recently, consensus statements by the Society of Surgical Oncology (SSO) and American Society for Radiation Oncology (ASTRO) proposed guidelines for the management of surgical margins in BCT patients which

set the standard of an adequate margin as no tumor on ink for stage I–II invasive cancers¹⁵ and ≥ 0.2 cm for ductal carcinoma in situ (DCIS).¹⁶ However, in practice the decision for reexcision is often influenced by other features such as multifocal or extensively very close (< 0.1 cm) margins, young patient age and high risk tumor features.¹⁷

Reexcision of lumpectomy margins is quite variable, but often high, in the published literature, ranging from 20 to 70%. Reexcision causes increased risks to and dissatisfaction of patients, delays to further care and increased utilization of health care resources.^{1,3–11,13,14,18–24} High reexcision rates are due to varying definitions of adequate margins as well as the subtle, infiltrative nature of some breast cancers and difficulty in grossly distinguishing cancerous from benign tissue. Despite decline in reexcision due to adherence to new SSO/ASTRO consensus guidelines many BCT patients will still require reexcision.

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<http://dx.doi.org/10.1016/j.ejso.2017.01.237>

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Intraoperative evaluation, including frozen section (FS), can reduce reexcision in BCT patients but is challenging via standard FS techniques. We previously developed a pathology laboratory at an ambulatory surgical center (ASC) with a specialized breast FS evaluation of margins (FSM) practice. In the first year of practice we saw a 34% reduction in margin reexcision with FSM.²⁵ FSM was also shown to be time- and cost-effective.²⁶ In the current study we sought to examine the evolution of our ASC FS practice in light of new SSO/ASTRO guidelines and to evaluate its impact during the first 5 years.

Patients and methods

Case selection

Following institutional review board approval, all patients who had FSM and/or SLN FS at our ASC from 2009 to 2014 were included. FSM patients had a previous pathologic diagnosis of invasive carcinoma, DCIS and/or pleomorphic lobular carcinoma in situ (pLCIS) and were candidates for BCT based on clinical and radiographic evaluation. SLN FS patients had a previous diagnosis of invasive carcinoma or high grade DCIS. Preoperative ipsilateral axillary staging with ultrasound was performed for patients with a radiologic mass of a specified size (≥ 1 cm prior to 2011 and ≥ 2 cm from 2011 to present) with fine needle aspiration (FNA) of suspicious lymph nodes. Any patient with a positive preoperative axillary FNA did not undergo SLN FS.

SLN FS

SLN were dissected from adipose, sectioned at 0.2 cm intervals and entirely submitted for FS. Tissue sections were embedded and frozen within Optimal Cutting Tissue (OCT) media and cut on a standard -20 °C cryostat, creating sections of 6–7 microns thickness. Two levels of each tissue block were evaluated for FS. The number of positive lymph nodes and largest metastatic focus were reported to the surgeon. If SLN FS triggered completion axillary lymph node dissection (cALND), FS of subsequent SLN specimens was canceled and these were submitted for permanent section (PS) analysis. All SLN FS tissue blocks were also processed for PS.

FSM

FSM was performed via the procedure outlined in detail in our previous publication.²⁵ Briefly, intraoperative evaluation included gross assessment by pathology assistant and pathologist, with or without assistance by the surgeon, followed by submission of radial tissue sections to margin(s) of interest. Tissue was mounted on a chuck with a minimal amount of OCT, immersed in liquid nitrogen (-196 °C) for 10–15 s and cut on a standard cryostat (-20 °C) by a

histotechnologist. Sections were cut at 16–20 micron thickness. Slides were then rapidly H&E-stained, coverslipped and evaluated by a pathologist. At least two FS levels from each block were evaluated. Selection of tissue for FS was based on gross and microscopic assessment. Submission of additional blocks or cutting of additional levels was based on communication of findings amongst pathologist, pathologist assistant and histotechnologist.

FSM of additional intraoperatively-reexcised specimens were performed via the same procedure. For these specimens, standard policy is to submit at least 3 FS blocks per specimen.

Positive margin(s) were defined as tumor (invasive carcinoma, DCIS or pLCIS) extending to the inked margin(s), and close margin(s) were defined as tumor extending to ≤ 0.2 cm of the margin(s). If a margin was close, the closest distance to margin and linear extent of close margin was reported to the surgeon. Close margins were further subdivided into focally close (1–2 foci extending ≤ 0.2 cm to margin with linear extent of < 0.1 cm for each close focus), and extensively close (more than 2 foci extending ≤ 0.2 cm to margin with linear extent of 0.1 cm or greater for close foci). A negative margin was defined as tumor greater than 0.2 cm from margin.

All FS and additional PS blocks were submitted per routine evaluation. All or most (more than half of the specimen if large) of the tissue was typically submitted for PS for intraoperatively-reexcised margin specimen(s) sent for PS only.

Turnaround time (TAT) was measured from the time the specimen was delivered to the time the final FS diagnosis was conveyed to the surgeon; in multipart specimens which were sent concurrently, TAT was measured from the delivery of the first part until the final FS diagnosis from the final part was conveyed.

Statistical analysis

Features were summarized using means with standard deviations, medians with minimum and maximums, and frequencies with proportions. Groups were compared using 2-sample t tests for continuous factors and appropriate chi-squared tests for categorical factors. A logistic model was used to determine factors associated with the odds of reexcision. Number of blocks submitted for FS was regressed on TAT using a linear regression model. Reexcision proportions by year was tested using the Jonckheere–Terpstra test. Analyses were performed using SAS software version 9.2 (SAS Institute, Cary, NC).

SLN FS false negative (FN) was defined as being reported as negative at the time of FS and later found to be positive in the FS or deeper PS levels at the time of PS review. True positive (TP) or true negative (TN) results were defined as either a positive or negative lymph node on FS, respectively, which was confirmed on review of FS and correlative PS slides.

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