

Evaluating the accuracy of intraoperative frozen section following neoadjuvant chemotherapy in cN1 breast cancer patients

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Introduction

Intraoperative frozen section analysis (FSA) is routinely utilized during sentinel node dissection (sentinel lymph node biopsy and targeted axillary dissection) in breast cancer patients who have completed neoadjuvant chemotherapy (NAC) with cN1-2 disease. A positive FSA is used as an indication to proceed with a complete axillary dissection (ALND). Occasionally, a patient with negative FSA is found to have positive nodal disease on final pathology which raises concerns regarding the efficacy of FSA. This study aims to evaluate the accuracy of FSA of sentinel nodes compared to final pathologic evaluation for the management of axillary nodal metastases following NAC.

Methods

This was a retrospective review of a prospectively maintained single-institution database of patients diagnosed with cT1-3N1-2M0 breast cancer treated with NAC from January 2017-October 2023. Relevant clinicopathologic information was reviewed including nodal stage, operation performed, utilization of FSA, final pathologic findings, and management following surgery. The FSA results were compared to final pathology to determine accuracy, positive predictive value (PPV), and negative predictive value (NPV), with special attention to discordant cases and volume of nodal disease.

Results

83 cases of 309 meeting eligibility were randomly selected from the database and included in the analysis. Sentinel node dissection was performed in 83.1% of cases (69/83) with median retrieval of 4 lymph nodes (LN) (range 1-12). FSA was utilized in 76.8% of cases (53/69) and was positive in 41.5% of cases leading to completion ALND. During completion ALND, median retrieval of 14 LN was observed (range 3-24); however, additional positive LN were found in only 28.6% of cases (6/21). FSA was negative in 58.5% of cases with concordance with final pathology in most patients (71.0%, 22/31). False negatives were observed in 29.0% of cases (9/31) with median retrieval of 2 positive LN (range 1-3). Among discrepant cases, the burden of nodal disease was low with only 1-2 positive LN in 88.9% cases (8/9) and 77.8% demonstrating micro metastases. The overall accuracy of FSA was 83.0% with a PPV of 100% (95% CI: 84.6-100) and a NPV of 70.97% (95% CI: 51.9-85.8). Following multidisciplinary discussion, patients with false negative FSA were managed non-operatively.

Conclusions

These preliminary results demonstrate reasonable accuracy and positive predictive value for FSA. In this limited cohort, there were frequently no further positive nodes found after completion ALND and an absence of axillary re-intervention in false negative FSA cases. Together, these results suggest a need to explore when, and if, ALND can be safely omitted. Further research will need to be performed in a larger data set and clinical trials to corroborate these results and help identify potential cases where de-escalation of axillary surgery may be appropriate.