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Vacuum intraoperative specimen mammography: A novel technique

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ABSTRACT

Objective: Intraoperative specimen mammography (ISM) is a diffuse technique that allows surgeons to check specimens immediately after lumpectomy. Although the specimen is slightly compressed, the radiological image can be distorted by tissue overlap, and this may affect the evaluation of tumour borders, resulting in extension of the lumpectomy. As ISM may be less precise due to inadequate compression, a vacuum effect was applied to the specimen to increase the precision of margin detection.
Study design: This study was conducted at St. Anna Hospital Breast Unit, Turin, Italy. Women who underwent lumpectomy for cancer were eligible for inclusion. Both standard ISM (sISM) and vacuum ISM (vISM) were performed. Eighteen specimens obtained after lumpectomy from 1 April 2018 to 31 April 2018 were scanned. sISM (two orthogonal projections) was performed. Next, the specimen was placed in a vacuum, and vISM was performed. The examination was completed with a second orthogonal projection after removal of the vacuum, replacement of the specimen and repositioning of the vacuum. Additional tissue was removed if the surgeon considered that excision was inadequate. Finally, the specimen was sent for definitive histopathological analysis, which is the gold standard for the assessment of surgical margins. Intraoperative histological margin assessment was not performed. The sISM and vISM images and final histopathology reports were compared.
Results: For sISM, specificity was 47 % [95 % confidence interval (CI) 25–70], sensitivity was 67 % (95 % CI 21–94), positive predictive value (PPV) was 20 % (95 % CI 6–51) and negative predictive value (NPV) was 88 % (95 % CI 53–98). For vISM, specificity was 100 % (95 % CI 80–100), sensitivity was 67 % (95 % CI 21–94), PPV was 100 % (95 % CI 34–100) and NPV was 94 % (95 % CI 72–99).
Conclusion: These data suggest that the vacuum technique is feasible, cost-saving and yields results that are similar to those from frozen sections but without the limitations, such as prolonged operating time, high variability in sensitivity due to pathologists' abilities, risk of compromising the histological report, and unreliability for small lumps and ductal carcinoma in situ.