

Improvements in sentinel node biopsy of breast cancer using freehand SPECT

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Abstract

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Objectives Evaluation of performance of sentinel node biopsy (SN) in breast cancer patients using freehand SPECT (FH).

Methods To date, 34 breast cancer patients (37-84y) undergoing SN biopsy were recruited and scanned intraoperatively using FH (declipseSPECT, SurgicEye GmbH). The number of SNs detected with gamma probe (GP) and with FH pre-incision were compared with planar scintigraphy (PS) of day before. After excision and control using GP, FH was used to verify absence of radioactivity. Additionally detected hot spots were confirmed with GP and if clinically indicated resected by surgeon.

Results Preoperatively, 65 SNs were mapped with PS. In the pre-incision scan FH managed to map all but 3 SNs in 33 of 34 patients, as well as 3 further SNs not seen in PS in 3 patients. GP mapped in total 48 of 65 SNs in 32 of 34 patients. 55 SNs were resected and confirmed to be radioactive ex-vivo. FH detected 18 SNs in 17 patients post-excision despite initial free measurement with GP. 7 additionally detected nodes were resected and confirmed to be radioactive ex vivo in 6 patients. In 11 patients harvesting of the additional nodes was discarded as higher uptake SNs had been removed already. Pre-excision FH acquisitions took approx. 2.6min (SD, 1.0min) while post-excision scans took 2.2min (SD, 0.9min). The surgical procedure was extended by approx. 5min.

Conclusions Preliminary experience indicates that intraoperative FH enables more intuitive and sensitive detection of SNs pre-incision than the use of gamma probe alone (95% vs. 74% assuming PS as ground truth). FH showed additional radioactive nodes in 50% of patients and motivated additional harvest of SNs in 18% of patients. Alteration of the surgical workflow was considered minimal given potential clinical advantages, like assurance of complete resection and minimized invasivity.

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