AbstractID: 10593 Title: Performance of a PET-Guided Breast Biopsy System

Purpose:
Positron emission mammography (PEM) imaging has identified lesions with no anatomic correlate, thereby creating a need to sample using only PET guidance. Bench tests were designed to validate the first PET-guided breast biopsy system for clinical use.

Method and Materials:
A commercially available Naviscan PET scanner with its Stereo Navigator breast biopsy accessory is used with third party, vacuum-assisted, core needle biopsy (CNB) devices. A series of bench tests with phantoms determined the performance of the system for breast biopsy. The targeting accuracy test series compared the physical versus image coordinates in 3D of radioactive targets. The guidance accuracy test series checked the placement in guiding biopsy needles to the correct position such that it would intersect with a Na-22 point source, i.e., replicating the guidance of a biopsy needle to a suspected lesion in a human breast. The glyph placement accuracy series verified the software glyph overlays correlated to the physical location of the guidance hardware and biopsy needle. The biopsy sampling test series evaluated the ability of the system to accurately target an FDG lesion, to confirm localization of the lesion using a Ge-68 line source, and to verify accurate sampling with CNB tools.

Results:
Targeting accuracy was found to be 0.5 ± 0.3 mm in-plane and 1.0 ± 0.9 cross-plane. The needle guidance accuracy was 0.9 ± 0.6 mm parallel to the needle and 2.3 ± 1.3 perpendicular to the needle. The computer-generated glyphs were correctly placed with respect to the physical target location 100% of the time. The biopsy sampling was 96% successful.

Conclusion:
Bench testing of the first PET-guided breast biopsy system demonstrated a high degree of guidance accuracy for use in PEM-identified breast lesion sampling. The system was cleared for clinical use.

Conflict of Interest:
Research sponsored by Naviscan, Inc.