Performance of Latest Generation PET/CT Scanner for detection of Metastatic Lymph Nodes in Head and Neck Cancer
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Problem Statement
A gap in the literature exists on the accuracy of the newest generation PET/CT scanners in detecting cervical nodal metastasis, a tool that is essential for cancer staging.

Identify the overall sensitivity, specificity and accuracy for the newest generation PET/CT scanners and determine if the increased spatial resolution outcalls positive nodes during staging in head and neck cancer patients.

Background
In head and neck cancer, cervical lymph node involvement is one of the most important prognostic factors.
Staging of these cancers informs treatment decisions and patient care planning.
In May 2019, the Dartmouth-Hitchcock Radiology department installed the Siemens Healthiners Biograph Vision Digital PET/CT.
This newest model contains improved spatial resolution and photon detectors when compared to older models.

Methods
55 consecutive patients who underwent surgical neck dissection for head and neck neoplasms were identified by surgical patient logs (Paydarfar).
All patients in this study had their surgical nodal dissections after the installment of the newest generation of PET/CT scanners (May 2019). Patients were excluded if their scan did not precede surgical resection.
A retrospective chart review was conducted by two reviewers (Tocci and Butt) assessing the location and number of reported PET/CT positive metastatic lymph nodes compared to the gold standard of metastatic lymph nodes found on surgical pathology following neck dissection.
Additional follow up assessing nodal response to treatment was also collected via chart review.

Problem Statement

• Of the 55 patients identified, 21 underwent scanning by the newest generation PET/CT machine. A total of 210 nodal levels were reviewed.
• Newest generation PET/CT scanners identified 14 patients (66%) with reports of fluorodeoxyglucose (FDG) avid nodal metastasis.
• Within these 14 patients, metastatic lymph nodes were identified in 24 cervical nodal levels.
• One metastatic lymph node was not identified via PET/CT scanners on pre-operative imaging but was identified via surgical pathology (measuring 9mm).
• Of all nodal levels evaluated (210) the newest PET/CT scanner had a sensitivity of 96% and specificity of 99%.
• For patients evaluated (21) with head and neck cancer the sensitivity was 93%
• For patients evaluated (21) with head and neck cancer the specificity was 93%
• Positive likelihood ratio (6.50) and Negative likelihood ratio (0.08)
• PPV: 0.93
• NPV: 0.83

Conclusion
DHMC’s newest PET/CT scanner demonstrated both a high sensitivity and specificity for the detection of head and neck cancer cervical nodal metastasis, which is comparable to other studies found in the literature.

Citations