Survey: PET/CT Imaging
Improving Patient Diagnosis

Jessica J. Tran
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Combined PET/CT

- New medical imaging technique
- Combines two high-quality imaging techniques into one machine
- Structural and metabolic information under almost the same conditions
Positron Emission Tomography (PET)

- Examines chemical activity in parts of the human body
- Nuclear medicine
Computed Tomography (CT)

• Provides anatomical structural information
• Uses x-rays to generate cross-sectional views or 3D images
CT, PET, and PET/CT images
Literature Review

Head & neck malignancy

Non-small lung cancer

Liver metastases from colon cancer

Staging Hodgkins and non-Hodgkin lymphoma

Differentiated Thyroid Cancer

Breast cancer

Ovarian cancer

Prostate cancer
Select Results

• Liver Metastases from colon cancer\textsuperscript{1}
  – lack of identifying hidden tumors spurred development of new methods
  – PET scans allowed new diagnostic method to monitor metabolic activity
    • poor resolution
  – PET/CT enables exact identification of lesions which allows for accurate biopsies and targeted surgery

Select Results

• Differentiated Thyroid Cancer\(^2\)
  – PET and fused PET/CT images

• Overall staging of patients
  – PET/CT (sensitivity (95%) & specificity (91%) )
    • 121 true lesions
  – PET-only (sensitivity (79%) & specificity (76%) )
    • 79 true lesions

Summary

- Diagnostic accuracy and staging malignancies
- Improves patient management
- Improved accuracy, sensitivity, specificity in detection in thyroid cancer, ovarian cancer
- Future of medical imaging in diagnosis of various cancers