



Australian Government
Department of Health and Ageing



Australia and New Zealand Horizon Scanning Network

ANZHSN

AN INITIATIVE OF THE NATIONAL, STATE AND
TERRITORY GOVERNMENTS OF AUSTRALIA
AND THE GOVERNMENT OF NEW ZEALAND

National Horizon Scanning Unit

Horizon scanning prioritising summary

Volume 1, Number 9:

**Combined PET/CT scanner: Enhanced
imaging for diagnosing and monitoring
patients with cancer (and possibly other
indications).**

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PRIORITISING SUMMARY

REGISTER ID: 0000013

NAME OF TECHNOLOGY: COMBINED POSITRON EMISSION TOMOGRAPHY (PET) AND COMPUTERISED TOMOGRAPHY (CT) SCANNER

PURPOSE AND TARGET GROUP: ENHANCED IMAGING FOR DIAGNOSING AND MONITORING PATIENTS WITH CANCER (AND POSSIBLY OTHER INDICATIONS)

STAGE OF DEVELOPMENT (IN AUSTRALIA):

- | | |
|--|---|
| <input type="checkbox"/> Yet to emerge | <input type="checkbox"/> Established |
| <input type="checkbox"/> Experimental | <input type="checkbox"/> Established <i>but</i> changed indication or modification of technique |
| <input type="checkbox"/> Investigational | <input type="checkbox"/> Should be taken out of use |
| <input checked="" type="checkbox"/> Nearly established | |

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

- | | |
|---|---|
| <input checked="" type="checkbox"/> Yes | ARTG number 118077 |
| <input type="checkbox"/> No | <input type="checkbox"/> Not applicable |

INTERNATIONAL UTILISATION:

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
USA, cross-classification on test and reference standard (ovarian cancer)	✓		
USA, animal study	✓		
USA, cross-classification on test and reference standard (aortic wall calcification)	✓		
USA, cross-classification on test and reference standard (colorectal carcinoma)	✓		
AUSTRALIA		✓	

IMPACT SUMMARY:

Siemens Limited currently have TGA approval for marketing the combined positron emission tomography (PET) and computerised axial tomography (CT) scanner in Australia. The product is marketed as the Siemens ECAT PET scanner. Several devices have been approved for use by the American FDA, including systems manufactured by CTI PET Systems Inc (in conjunction with Siemens Ltd) and GE Medical Systems.

PET is a minimally invasive procedure, which utilises the radionuclide 2-[¹⁸F] fluoro-2-deoxy-D-glucose (¹⁸F-FDG), a radio-analogue of glucose, to produce images. The main clinical application of PET is oncological imaging due to the tendency of tumours to have an

increased utilisation of glucose. CT scans use a computer to assimilate multiple X-ray images into a 2 dimensional cross-sectional image, which may reveal many soft tissue structures not shown by conventional radiography. Hybrid PET/CT scanners offer the ability to produce, in a single examination, information on cancer location and metabolism. There is also the potential for the technology to be utilised for the diagnosis and management of other clinical indications, including cardiovascular disease and Alzheimer's disease.

The level of use of this hybrid technology is potentially high. 85,231 people were diagnosed with cancer in Australia in 2000, whilst there were approximately 50,000 deaths from cardiovascular disease in Australia in 2001 (AIHW). Two of the conditions that have been assessed using this technology are colorectal cancer and ovarian cancer, with 12,405 and 1,202 people, respectively, being diagnosed with these diseases in Australia in 2000 (AIHW).

Initial comparative studies appear promising with increased imaging accuracy reported for PET/CT versus PET or CT alone. The study by Bristow et al (2003) reported that the sensitivity of combined PET/CT scanning at detecting recurrent ovarian cancer was 83.3%, with a positive predictive value of 93.8%. The study by Cohade et al (2003) reported that overall correct staging increased from 78% with PET alone to 89% using PET/CT.

CONCLUSION:

There is limited diagnostic accuracy studies available on PET/CT scanning for ovarian and colorectal cancer, however it is possible that PET/CT scanning may diffuse rapidly throughout the Australian health system.

HEALTHPACT ACTION:

Therefore it is recommended that a Horizon Scanning report be conducted.

SOURCES OF FURTHER INFORMATION:

Bristow, R. E., del Carmen, M. G. et al (2003). 'Clinically occult recurrent ovarian cancer: patient selection for secondary cytoreductive surgery using combined PET/CT', *Gynecol Oncol*, 90 (3), 519-528.

Chin, B. B., Patel, P. V. et al (2002). 'Quantitative evaluation of 2-deoxy-2-[18F] fluoro-D-glucose uptake in hepatic metastases with combined PET-CT: iterative reconstruction with CT attenuation correction versus filtered back projection with 68Germanium attenuation correction', *Mol Imaging Biol*, 4 (6), 399-409.

Cohade, C., Osman, M. et al (2003a). 'Direct comparison of (18)F-FDG PET and PET/CT in patients with colorectal carcinoma', *J Nucl Med*, 44 (11), 1797-1803.

Cohade, C., Osman, M. et al (2003b). 'Initial experience with oral contrast in PET/CT: phantom and clinical studies', *J Nucl Med*, 44 (3), 412-416.

Cohade, C. & Wahl, R. L. (2003). 'Applications of positron emission tomography/computed tomography image fusion in clinical positron emission tomography-clinical use, interpretation methods, diagnostic improvements', *Semin Nucl Med*, 33 (3), 228-237.

Nakamoto, Y., Chin, B. B. et al (2003). 'Effects of nonionic intravenous contrast agents at PET/CT imaging: phantom and canine studies', *Radiology*, 227 (3), 817-824.

Osman, M. M., Cohade, C. et al (2003). 'Clinically significant inaccurate localization of lesions with PET/CT: frequency in 300 patients', *J Nucl Med*, 44 (2), 240-243.

Tatsumi, M., Cohade, C. et al (2003a). 'Fluorodeoxyglucose Uptake in the Aortic Wall at PET/CT: Possible Finding for Active Atherosclerosis', *Radiology*, 30, 30.

Tatsumi, M., Nakamoto, Y. et al (2003b). 'Initial experience in small animal tumor imaging with a clinical positron emission tomography/computed tomography scanner using 2-[F-18]fluoro-2-deoxy-D-glucose', *Cancer Res*, 63 (19), 6252-6257.

SEARCH CRITERIA TO BE USED:

Neoplasm Recurrence, Local/blood/*diagnosis/pathology/*surgery

Ovarian Neoplasms/blood/*diagnosis/pathology/*surgery

Tomography, Emission-Computed/*methods

Tomography, X-Ray Computed/*methods

Treatment Outcome

Image Processing, Computer-Assisted

Radiopharmaceuticals/diagnostic use