

also determined by other contributing factors such as oxygen consumption in tissue.

#### Reference

- [1] Koh, T.S. et al. *Phys. Med. Biol.*, 46: 1519-1538, 2001.

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POSTER

### CT scans versus 111 In-pentetreotide SPECT imaging in tumour response assessment

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**Objectives:** Therapeutic strategy of neuroendocrine tumours is complex, due to their heterogeneity. There are various treatment options available for the management of the carcinoid tumours. Quantification of tumour volume is essential for assessment of therapy-induced changes. Traditional methods of assessing response of neuroendocrine tumours using radiology have been poor at predicting response. The aim of this study was to establish if it was possible to identify a method using Nuclear Medicine SPECT functional volumes to predict the response of tumour to various therapies.

**Methods:** 34 patients (18 males and 16 females) with tumours in the liver were treated with chemo-embolization, chemotherapy and <sup>90</sup>Yttrium labelled Somatostatin analogues. All the patients had <sup>111</sup>In- pentetreotide SPECT imaging (Nuclear Medicine scan to image Somatostatin receptor positive neuroendocrine tumours) and CT scan pre and post treatment. Tumour uptake volume, a measure of metabolically active tumour tissue, was calculated from the SPECT images (transverse slices) using 10 point colour display and drawing a region of interest around 50% of maximum tumour activity slice by slice and then multiplying by the slice thickness (9.3mm). Normal structures were avoided. Any difference in function volume was compared with CT response and clinical outcome. Clinical improvement was based on reduction in diarrhoea, reduced flushing, reduced painkillers, increased ability to work and perform other activities of daily living.

**Results:** At 6 months post treatment 19 patients had good clinical response and the volume of the tumour in these patients dropped by a mean of 27%(range-15-80%). Of those who worsened clinically (10 patients), the functional volumes increased by a mean of 77%(range-20-254%). 5 patients had stable disease. Using a >10% change as significant, SPECT predicted 79.4% of clinical outcome correctly but CT only predicted 47% correctly.

**Conclusions:** The assessment of functional volume by SPECT quantification is more useful in monitoring the tumour response after treatment than CT. The changes in functional volumes after therapy correlate well with clinical response.

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### 99mTc-MIBI myocardial perfusion scintigraphy for assessment of radiation induced cardiac damage - preliminary results

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In radiation therapy to the thorax, cardiac injuries may be induced involving the myocardial capillaries and causing myocardial fibrosis. The injuries have a less dramatic clinical expression with slow functional impairment. Early detection of subclinical myocardial damage is of important use for these patients in order to compare their magnitude in relation to the different treatment schedule. The aim of the study is to assess the role of 99mTc-MIBI myocardial perfusion scintigraphy (MPS) for mapping the radiation-induced cardiac injuries. The study involves 15 patients with early left-sided breast cancer after breast-conserving surgery received postoperative radiotherapy with dose level 50 Gy in 25 fractions to the residual breast including underlying chest wall without boost and no anthracycline chemotherapy. In these cases the anterior wall of the myocardium often is included in target field. All of the patients are asymptomatic. Ejection Fraction (EF) of the left ventricle measured echocardiographically and 99mTc-MIBI SPECT MPS were performed 6-9 months after treatment. 99mTc-MIBI SPECT was performed at rest using Diacam (Siemens) gamma-camera. Tracer activity

of 555 MBq was injected in each occasion. SPECT imaging was performed 60 min. after injection and the images were analyzed dividing the left ventricle into 17 segments on the tree short axes slices and one vertical long axis slices and each segment was graded according to perfusion using a semiquantitative four-point system. All of the patients had normal EF. MPS was normal in 11 patients. In 4 of the patients MPS established moderately reduced perfusion: two of the patients had hypoperfusion of the anterior wall segments, two patients had hypoperfused septum and apex. These patients had EF at lower limit (56%-59%). Despite modern treatment planning techniques, cardiac effect after irradiation occur and their early detection may minimize the severe cardiac damage. MPS may be feasible method to that purpose.

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### Impact of positron emission tomography in radiation therapy treatment planning

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**Background:** Positron emission tomography (PET) as a functional imaging method has gained increasing influence in oncological imaging. This additional information derived from PET has to be included into radiation therapy decisions. The role of PET for radiation therapy treatment planning therefore had to be evaluated.

**Patients/Methods:** In 60 patients referred for radiation therapy an additional PET examination was performed. There were 23 female and 37 male patients, mean age was 51 years ranging from 34 to 90 years of age. Main cancer diagnoses in these patients were cancers of unknown primary (CUP) in the head and neck region (20), ENT tumors (11), breast cancer (9), CUP outside the head and neck region (6), lung cancer (4) and miscellaneous other tumors (10). PET was performed as a whole body scan with 300 MBq 18F-FDG. Retrospectively the impact of PET was assessed with regard to alterations of the radiotherapeutic target volume, the basic oncological treatment strategy and with regard to affirmation of a previously doubtful situation.

**Results:** In 18 of 60 patients (30%) there had been an alteration of the treatment regimen due to the information gained from the PET examination. In 13 of these patients the target volume had to be modified, in 5 patients the entire treatment strategy had to be revised. In further 6 cases (10%) the treatment regimen could be affirmed following the PET findings. In 36 cases (60%) PET did not affect the cancer therapy of our patients.

**Conclusions:** PET has proved to be a useful tool in cancer therapy management. It is cost effective especially in cases of unknown primaries. PET should be performed for radiotherapeutic target volume definition in cases of ENT-tumors and metastatic breast cancer.

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### Magnetic resonance neuroimaging in breast cancer carcinomatous meningitis

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**Aim:** The aim of the study is the type and frequency of abnormalities on Magnetic Resonance (MRI) in breast cancer patients (pts) with carcinomatous meningitis (CM).

**Material and Methods:** The MRI was abnormal in 32 pts (80%). In those pts sulcal/dural enhancement of craniospinal leptomeninges was observed. The localization of leptomeningeal enhancement was as follow: whole brain and spinal cord in 4 pts, spinal cord in 4 pts, infratentorial in 11 pts, infratentorial and fronto-temporal lobe in 4 pts, infratentorial and spinal cord in 3 pts, supratentorial in 4 pts and frontal lobe in 2 pts. secondary hydrocephalus was detected in 14 pts. In 8 pts (20%) with CM MRI did not revealed any abnormalities typical to CM. Beside of leptomeningeal morbidity, brain metastases were detected in 15 pts.

**Conclusions:** MRI is important and very sensitive method to establish the diagnosis of CM in breast cancer patients and should be performed in all patients who have cancer cells in CSF detected.