

Cod: PO033

## **111IN-PENTETREOTIDE SPECT/CT IN NEUROENDOCRINE TUMOR (NETS) DIAGNOSTIC MANAGEMENT**

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### **BACKGROUND-AIM**

111In-pentetreotide somatostatin receptor scintigraphy (SRS) has proven to be an important diagnostic functional imaging technique in detecting NET tumors, both primary and metastatic lesions with elevated somatostatin receptor density. We further investigated hybrid SPECT/CT imaging diagnostic usefulness in NET pts for also evaluating whether this procedure may give more useful information than conventional procedures (CIP), such as MRI, CT, US.

### **METHODS**

In this study 234 pts with ascertained NETs, 127 gastroenteropancreatic (GEP) tumors and 107 pulmonary carcinoid (PC) were enrolled, 91 at initial diagnosis and/or staging and 143 in follow-up. At histology obtained by surgery, percutaneous biopsy and laparotomy for abdominal metastases, 76 GEP tumors were classified as grade 1 tumor, 31 grade 2, 13 neuroendocrine carcinoma, 5 mixed adenoneuroendocrine carcinoma, 2 pre-neoplastic lesions; 84 PC were classified as typical, 16 atypical, 7 poorly differentiated tumors. All pts underwent at least two CIP within a month before SPECT/CT and were initially classified as with non evidence of disease (NED) in 71/234 cases and with neoplastic lesions including primary and metastatic lesions, in 163/234 cases. In all cases, 4 and 24h after 148/222 MBq 111In-pentetreotide i.v. injection, both whole body scan and SPECT/CT over chest, abdomen and other suspect regions were performed using a hybrid double head system including a low-dose x-ray tube (INFINIA-GE Medical System) with medium energy, parallel-hole collimators.

### **RESULTS**

In 143/163 (87.7%) pts with neoplastic lesions SPECT/CT was true positive, while CIP was in 124/163 (76.1%) cases; both SPECT/CT and CIP were concordantly positive in 106/163 (65%) cases, only SPECT/CT in 37/163 (22.7%) and only CIP in 18/163 (11%). Both SPECT/CT and CIP were true negative in all 71/234 NED pts. Per-patient sensitivity, specificity and accuracy were 87.6%, 100%, 91.4%, respectively, for SPECT/CT and 76.1%, 100%, 83.3%, respectively, for CIP without statistical difference when mutually compared. In the 163 positive pts, 670 lesions were ascertained and SPECT/CT detected 561/670 neoplastic foci, while CIP 433/670. Per-lesion sensitivity was 83.7% for SPECT/CT and 64.6% for CIP; the difference was statistically significant ( $p < 0.0001$ ). SPECT/CT correctly changed both pts classification and management established by CIP in 84/234 (35.9%) of cases identifying and characterizing additional lesions; however, SPECT/CT downstaged disease in 34/234 (14.5%) pts.

### **CONCLUSION**

In the present study 111In-pentetreotide SPECT/CT proved a reliable tool in detecting NET tumors, both GEP and PC, showing higher sensitivity and accuracy than CIP with an incremental diagnostic value. SPECT/CT correctly characterized the lesions also specifying a precise anatomic site, thus giving a more correct classification and a more useful information for the most appropriate therapy. However, SPECT/CT and CIP combined use can give the highest accuracy value.