Cod: PO195

THREE-PHASE PROTOCOL 18F-DOPA PET/CT IN PATIENTS WITH NEUROENDOCRINE TUMORS

R. Sanco[1], S. Zampieri[1], L. Memo[1], G. Masiero[1], E. Zaramella[1], M. Zappalà[1], L. Evangelista[1], G. Saladini[1]
[1]*Radiotherapy and Nuclear Medicine Unit, Veneto Institute of Oncology, Padua, Italy*

BACKGROUND-AIM

Neuroendocrine tumours (NETs) are a heterogeneous group of neoplasms showing a constant increase in the prevalence, especially in the developed countries. Based on their metabolism,18F-DOPA PET/CT can be used for the initial staging, restaging and monitoring the response of therapy.
The aim of the present study was to determine the improvement of employing a three-phase 18F-DOPA PET protocol in a subset of patients with NETs.

METHODS

Between 1 April and 31 August 2013, we prospectively enrolled 22 consecutive patients (11 males/11 females, median age: 59 years, range: 7-78 years) with a known/suspected NET (nine patients with a medullary thyroid cancer, five with a pheochromocytoma, five with a paraganglioma, three with a carcinoid tumour and one with an adrenal incidentaloma). All patients underwent PET/CT after the injection of 3MBq/Kg of 18F-DOPA (median dose: 216 MBq; range 102-304). A static acquisition, involving a specific region, was performed after 20 minutes (20'; early) and after 90 minutes (90'; late) from the injection. Moreover, a standard whole-body acquisition (WB) was made after 60 minutes (60') from the tracer injection. For the assessment of 18F-DOPA biodistribution over the time, a volume of interest (VOI) was drawn on the tumour, on the mediastinal blood pool, on the cortical and medullary renal parenchyma, on the liver, on the gallbladder, and on the pancreas. The maximum standardized uptake value was computed for each VOI.

RESULTS

18F-DOPA PET resulted positive in 12 out of 22 patients and negative in the residual 10 subjects. The median SUVmax after 20', 60' and 90' from the injection were 5.4, 4.6 and 4.0 for the tumour; 2.0, 1.8 and 1.6 for the blood pool; 9.0, 4.2 and 1.2 for the cortical renal parenchyma;198, 54 and 22 for the renal pelvis; 3.9, 3.0 and 1.2 for the liver; 2.8,13.5 and 11.6 for the gallbladder and 6.0, 4.9 and 4.2 for the pancreas. Tumor/background ratio (such as tumor SUVmax/background SUVmax) increased over the time (from 2.72 at 20' to 3.09 at 60' and to 3.15 at 90'). In patients with a positive PET/CT scan, the differences between the median SUVmax of the tumor resulted significantly different between early images and WB and between WB and late images (5.4 vs. 4.0, respectively; p=0.009). Finally at visual PET/CT analysis, the uptake of 18F-DOPA in the primary tumor and in the loco-regional lymph nodes showed a rapid washout from 20' to 90', whereas the uptake in the skeletal metastases demonstrated a progressive increase over the time.

CONCLUSION

From the present study, we found that an early acquisition PET has no advantages neither as compared to standard WB nor as compared to a late acquisition. Anyway, we reported some interesting information about the biodistribution of 18F-DOPA that could be useful for the qualitative and semiquantitative analysis of PET/CT images in patients with NETs.