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## **18F-CHOLINE PET/CT DETECTS HYPER-FUNCTIONING PARATHYROID TISSUE**

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### **BACKGROUND-AIM**

Although the correct pre-surgical localization of the pathological hyper-functioning parathyroid tissue (PPT) is a prerequisite for the success of treatment, accurate non-invasive localization of PPT in patients with hyper-parathyroidism (HPT) remains a challenge despite the continuous technological advancements. The incidental finding of <sup>11</sup>C/<sup>18</sup>F-Choline uptake by PPT suggested that a correlation would exist between the Choline uptake and the presence of PPT. Aim of our study was to determine whether <sup>18</sup>F-Choline PET/CT (CH-PET) could accurately localize the PPT and allow a non-invasive characterization.

### **METHODS**

15 patients were enrolled in our study: 13 had primary and 2 had secondary HPT due to renal failure, 1 patient had HPT and high suspicion of recurrence of parathyroid carcinoma. All patients underwent neck ultrasonography (US), CH-PET and dual-phase, double-tracer parathyroid planar and SPECT scintigraphy with <sup>99m</sup>Tc-sestaMIBI and <sup>99m</sup>TcO<sub>4</sub><sup>-</sup>. All the patients underwent surgical excision of the identified pathological tissue. The histological examination was done with standard and immuno-histochemical staining. Sensitivity, specificity and diagnostic accuracy of CH-PET for detection of PPT were calculated (PPT included: parathyroid hyperplasia, adenoma and carcinoma).

### **RESULTS**

Parathyroid scintigraphy detected 21 lesions and CH-PET 25 in 15 patients. CH-PET identified 2 hypertrophic parathyroid glands, 3 parathyroid adenomas and 1 oxyphilic adenoma not detected by parathyroid scintigraphy. The latter did not detect lesions smaller than 1 cm and 1 posterior adenoma. 2 lesions detected by parathyroid scintigraphy were thyroid adenomas and were considered as a false positive. CH-PET detected 2 oxyphilic adenomas, one of which was also sestaMIBI positive: intact parathormone showed that these 2 adenomas were PPT, therefore these locations were considered as true positive. The smallest adenoma detected with CH-PET had long axis of 5mm (the results are summarized in table I). Diagnostic accuracy was 76% for parathyroid scintigraphy and 100% for CH-PET.

### **CONCLUSION**

CH-PET is a new, promising imaging tool for the detection of PPT. Our preliminary results show a very high accuracy of CH-PET which must be confirmed by further studies involving a larger cohort of patients.