Interesting images

Thyroid metastases of pulmonary origin diagnosed by $^{18}$F-FDG PET-CT

Diagnóstico de metástasis tiroidea de origen pulmonar con $^{18}$F-FDG PET-TC

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PET/CT with 2-deoxy-2-$[^{18}]$fluor-d-glucose ($^{18}$F-FDG) has a very relevant role in the staging of non-small cell lung cancer due to its elevated sensitivity and specificity to rule out lymph nodes involvement and distant metastasis (not of the brain). The use of PET leads to a change in patient management in 25% of the cases.

We present the case of a 70-year-old smoker male with a pulmonary nodule in the upper left lobe suspicious of malignancy. An $^{18}$F-FDG PET/CT was performed for the initial staging. The study showed 2 synchronous pulmonary tumors in the left lung with mediastinal ipsilateral involvement contralateral to the tumor, a multinodular goiter with a hypermetabolic nodule in the right thyroid lobe (RTL) (Fig. 1) and bilateral laterocervical adenopathies (Fig. 2).

To rule out a possible second primary thyroid tumor, an ultrasonography with FNAP was performed in the RTL lesion and the right, ultrasonographically accessible, laterocervical adenopathy. The histological result of the thyroid and the laterocervical adenopathy was positive for malignant cells with a morphology of non-small cell lung cancer. Immunohistochemistry of the tumor cells showed positivity for thyroid transcription factor-1 (TTF-1) and cytokeratin 7, being negative for thyroglobulin. The results indicated a probable adenocarcinoma of pulmonary origin.

This was a case of diagnosis by PET/CT of thyroid metastasis from pulmonary origin. Metastasis of non-thyroid neoplasms to the thyroid glands is uncommon and represents only 1.4–3% of the total number of patients undergoing thyroid surgery for suspicion of thyroid cancer. Based on the literature, the primary tumors which most often metastasize in the thyroid are renal cell carcinoma (48.1%), colorectal cancer (10.4%), lung cancer (8.3%), breast carcinoma (7.8%) and sarcomas (4%). Thyroid metastasis is more frequent in women than in men (ratio: 1.4/1) and in previously abnormal thyroid glands (44.2%).

In the present case a more accurate patient staging was achieved, identifying thyroid tumor infiltration in a multinodular nodal disease.

**Fig. 1.** Whole body PET/CT images performed at 60 min after the administration of 263 MBq of $^{18}$F-FDG. Maximum intensity projection PET, axial fused PET/CT and CT images. Abnormal uptake of $^{18}$F-FDG in 2 pulmonary lesions; one in the left hilar region of the posterior segment of the upper left lobe (ULL) (SUV<sub>max</sub>: 8.2) (A) and another more cranial, paramediastinal localization, in the apical segment of the ULL (SUV<sub>max</sub>: 6.7) (B), compatible with synchronous pulmonary neoplasm. Ipsilateral hypermetabolic adenopathies in the left pulmonary hilum and the aortopulmonary window and lower right contralateral paratracheal (SUV<sub>max</sub>: 3.3) (A) suggestive of lymph node infiltration. A hypermetabolic focal uptake is observed in the right thyroid lobe (SUV<sub>max</sub>: 11.3) in a multinodular goiter with endothoracic prolongation (C).

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Fig. 2. PET/CT images of the upper cervical and thoracic region performed 2 h after the administration of $^{18}$F-FDG (delayed study). Maximum intensity projection PET image and axial fused PET/CT images with intravenous contrast (CTiv) and CTV. The hypermetabolic focal uptake was better delimited in the RTL ($\text{SUV}_{\text{max}}: 14.0$) (A), the 2 active ipsilateral laterocervical adenopathies: $\text{SUV}_{\text{max}}: 2.3$ (B) and $\text{SUV}_{\text{max}}: 2.8$ (C), without $^{18}$F-FDG uptake in the contralateral adenopathy (D). The abnormal uptake showed an increase in metabolic activity in the delayed PET-CTiv fulfilling metabolic criteria of tumor infiltration.

goiter and guiding the site of the puncture. The diagnosis of mediastinal disease, contralateral to the affected lung (N3), and thyroid M1 led to the patient being cataloged as stage IV, thereby avoiding surgery.

References

