Interesting image

Low diagnostic yield of the $^{11}$C-choline PET/CT in the detection of liver metastasis from prostate cancer

Bajo rendimiento diagnóstico de la PET/TC con $^{11}$C-colina en la detección de metástasis hepáticas de origen prostático

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A 60-year-old patient with a history of prostate cancer treated with radical prostatectomy and lymphadenectomy in March 2010 (Gleason 4+3, T3N1M0) presented a progressive elevation in PSA serum values (current value 10 ng/ml) and therefore underwent PET/CT with $^{11}$C-choline for the detection and localization of recurrence.

PET/CT with $^{11}$C-choline showed retroperitoneal adenopathies with metabolic activity, more intense in the left internal iliac chain. In addition, it should be noted the presence of moderate hepatomegaly with multiple hypodense lesions in the low-dose CT and heterogeneous $^{11}$C-choline uptake, with hypoactivity in the morphologic lesions (Fig. 1).

Since metastatic lesions of prostate cancer usually have glycidic activity it was therefore decided to perform an enhanced-contrast CT in an integrated PET/CT study with $^{18}$F-FDG. The hepatic lesions showed peripheral uptake of contrast and $^{18}$F-FDG, with a

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Fig. 1. PET/CT with $^{11}$C-choline. Axial PET, CT and fusion mages. (A) Intensity threshold adjusted to evaluate the hepatosplenic parenchyma. Multiple hypodense hepatic lesions, in the context of moderate hepatomegaly with hypometabolic behavior with $^{11}$C-choline. (B) Metabolic tumor activity in adenopathy of the left internal iliac chain.

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hypodense and hypoactive center, a pattern compatible with metastatic lesions. Subdiaphragmatic lymph node involvement was evident but with a lesser degree of uptake (Fig. 2). An ultrasound-guided puncture was carried out, confirming the presence of hepatic metastases of prostatic origin.

Locoregional (iliac, obturator foramen) and retroperitoneal lymph node infiltration as well as bone metastasis are frequent in prostate cancer, being typically of blastic appearance with predominant involvement of the lumbar spine and the pelvis in relation to a pattern of hematogenic dissemination of venous drainage from the prostate to the vena cava. PET/CT with 11C-choline has demonstrated its utility for the early detection and localization of biochemical recurrence of prostate cancer. The results of local recurrence are excellent post-surgery and are somewhat more limited post-radiotherapy due to the presence of inflammatory changes. Likewise, this study allows the detection of involvement in lymph nodes greater than 5 mm, although the presence of microscopic infiltration cannot be ruled out. The diagnosis of bone metastasis remains controversial, but good early detection has been reported with a similar sensitivity to that of bone scan.2

Other metastatic lesions, including supradiaphragmatic lymph node involvement and metastasis in organs are infrequent. Of these lesions, the most frequently described are those affecting the lungs, the liver and the adrenal glands. Nonetheless, correct early localization and extension of recurrence are important to allow the selection between patients who may benefit from radical treatment and those requiring systemic treatment.3

In the present case the PET/CT with 18F-FDG showed peripheral hypermetabolism of the liver metastases with a hypoactive center. These findings correspond with the rim uptake in the enhanced-contrast CT. Characterization of the liver lesions is difficult with 11C-choline, because of the elevated, albeit heterogeneous, physiologic activity of the hepatic parenchyma.

Thus, despite the promising results of PET/CT with 11C-choline in the biochemical recurrence of prostate cancer, the intense physiologic hepatic activity makes the evaluation of metastatic lesions in this organ difficult thereby making directed studies advisable in the case of the detection of undetermined lesions in the CT component of the study.

**Conflict of interest**

The authors have no conflicts of interest to declare.

**References**