Interesting image

Multimodality molecular imaging in the evaluation of pheochromocytoma. A case report

Imagen molecular multimodal en la evaluación de un feocromocitoma. A propósito de un caso

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A 63-year-old woman had gone to the emergency room several times for recurring episodes of headaches, tachycardia with palpitations, anxiety and sweating in the context of hypertensive crisis. High levels of adrenaline, noradrenaline, metanephrine and normetanephrine were found in urine. RM detected a hypervascular 5 cm in size right adrenal mass in contact with the inferior cava vein compatible with pheochromocytoma, associated with a solid exophytic hypervascular hepatic lesion suggestive of metastases at the left liver lobe (LLL) and an hepatic subcapsular hemangioma at the right liver lobe (RLL).

For a better characterization and staging, adrenal scintigraphy was recommended. Whole-body $^{131}$I-MIBG (Fig. 1) showed intense uptake in right adrenal mass concordant with the diagnosis of pheochromocytoma. There was no evidence of focal uptake at the suspicious liver metastases on planar or SPECT images. A later $^{99m}$Tc-autologous red blood cell (RBC) scintigraphy showed typical imaging of hepatic hemangioma located at the LLL (Fig. 2).

Due to the disagreement of morphological and functional images, the studies achieved were recovered from PACS and a multimodality $^{131}$I-MIBG/MR and $^{99m}$Tc-RBC/MR registration and fusion was performed. The suspicious liver metastases at the LLL according to RM evidenced a high red-cell content (Fig. 3A), while the possible angiomatosus lesion at the RLL was negative for it at merged fusion images (Fig. 3B). The final conclusion of the nuclear medicine studies was a right pheochromocytoma without extra-adrenal extension.

The patient underwent a laparoscopic resection of the right adrenal gland. During the intervention, the surgeons visualized a superficial angioma at the LLL and a smooth subcapsular lesion with benign aspect at the RLL.

Pathological analysis revealed a 39 g and $5 \, \text{cm} \times 5 \, \text{cm} \times 3 \, \text{cm}$ pheochromocytoma with more than 4 tumor morphological criteria for potentially malignant biological behavior. One year after diagnosis, no clinical or laboratory data of recurrence, metastasis or residual disease have been suspected.

This case illustrates the usual sequence in the diagnosis of functional adrenal lesions: from clinical suspicion through biochemical testing to tumor localization by imaging techniques, beginning with morphological and finally functional studies. Also, this report shows the simple and desirable possibility of performing multimodality fusion imaging in hospitals with PACS facilities, without needing dedicated equipments. Finally, it exemplifies a differential aspect of the actual techniques included or wanted to be included on the “molecular imaging” concept: not all biomedical imaging modalities are capable of detecting cellular processes at the molecular level in vivo, as those using radionuclide linked biomarkers in a remote and noninvasive way.
Fig. 2. Maximum intensity projection image (MIP; right) and selected slices (left) from $^{99m}$Tc-RBC SPECT study showing typical findings of liver angioma, but at left side.

Fig. 3. Multimodality images. The suspicious liver metastases at the left lobe according to RM (A) had a high red-cell content. The possible angiomatous lesion at the right (B) was negative for it at merged $^{99m}$Tc-RBC/MR fusion images. Both lesions did not show any uptake of $^{13}$I MIBG.
References

