Coated stents or stent grafts are metal mesh tubes covered in a biocompatible material that, when collapsed and placed in a suitable carrier, can be taken endovascularly to the injured vessel and released in the appropriate location. Once in place and covering the leak, the stent is able to control bleeding and restore or preserve the affected vessel, as observed in our case. A drawback to these stents is that they require periodic permeability monitoring in the medium and long term. However, in these highly vascularized areas with important collateral circulation, the implantation of intravascular ''foreign'' material does not present significant problems once the acute bleeding problem has been resolved, as any possible thrombosis is supplanted without problems by the collateral circulation. It must be remembered that, in most cases, the vessel is ligated when the bleeding point is located.

If the vascular trauma is caused by direct penetration of a bull horn, the use of this technique may be limited by significant wound contamination, as it is inadvisable to insert a foreign body under septic conditions.[6] Furthermore, open lesions require surgery in most cases.

Finally, we must remember that surgery in these patients is not simple. Frequently, the presence of the hematoma, infiltration of blood throughout the entire muscle plane and associated edema greatly complicate the location of the bleeding vessel. These procedures usually require exposing large areas to locate the bleed, which is not exempt from associated surgical morbidity.

In conclusion, we can say that endovascular therapy is useful in contusions caused by bull horns with vascular involvement.

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Differential Diagnosis of a Hepatic Mass by ^{99m}Tc-labelled Red Cells and Octreotide Scintigraphy☆

Diagnóstico diferencial de masa hepática mediante gammagrafía con hematíes marcados y octreótido

The widespread use of diagnostic imaging techniques has led to an increase in the identification of hepatic masses, making it necessary to differentiate between malignant and benign masses. For this purpose, the technique of choice continues to

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be abdominal magnetic resonance imaging (MRI), although occasionally there is persisting doubt between metastases and hemangiomas.

Hepatic hemangiomas are the most frequent benign liver tumors. They are usually asymptomatic, although large hemangiomas may cause abdominal pain. ^{99m}Tc-labeled red blood cell scintigraphy is a non-invasive technique that is able to differentiate hemangiomas from other space-occupying lesions (SOL) when there are clinical-radiological discrepancies.[1,2] Likewise, somatostatin receptor scintigraphy is able to characterize the liver parenchyma in patients with a history of neuroendocrine tumors. In this way, functional information from nuclear medicine techniques is of interest to establish the precise diagnosis of hepatic SOL of uncertain etiology.

In this paper, we present the case of a patient diagnosed with neuroendocrine cancer, discussing how nuclear medicine techniques with labeled red blood cells and somatostatin analogs (octreotide) were able to make a definitive diagnosis and guide the therapeutic approach.

Clinical case: A 43-year-old man was being studied for abdominal pain, and ultrasound detected a mass in the body/tail of the pancreas (Fig. 1A). The anatomic pathology diagnosis was non-functioning neuroendocrine tumor. On ultrasound and in the extension study with CT (Fig. 1B) and MRI (Figs. 1C and D), a hypervascular SOL was also observed in liver segments VI-VII, and there were doubts between the diagnoses of metastasis, hemangioma or hydatid cyst. In this clinical context, and to perform the differential diagnosis of hemangioma versus possible metastatic lesion, a study was done with ^{99m}Tc-labeled red blood cells, which showed scant tracer uptake by the hepatic lesion under study (Fig.s 1E and F, arrow), ruling out the possibility of hemangioma.[1] Additionally, ^{99m}Tc-octreotide scintigraphy detected a high-intensity tracer deposit in the head of the pancreas (Fig. 2, arrowhead). Regarding the liver parenchyma, a mass with hyperenhancement was observed in segment VI–VII with a central area of hypoenhancement (Fig. 2, arrow). These findings were suggestive of a neuroendocrine tumor of the head of the pancreas with a solitary hepatic metastasis.

Neuroendocrine tumors (NET) are a rare and heterogeneous group of tumors that mainly affect the gastroenteropancreatic and bronchopulmonary systems. Gastroenteropancreatic neuroendocrine tumors (GEP-NET), as in this case that we present, settle more frequently in the small intestine (30.8%), followed by the rectum (26.3%), large intestine (17.6%), pancreas (12.1%), stomach (8.9%) and appendix (5.7%).[3]

The secondary symptoms of functioning GEP-NET are due to the hypersecretion of the substances that they produce, store and secrete (serotonin, insulin, glucagon, gastrin, VIP, somatostatin), while the non-functioning ones will cause late symptoms due to a mass effect as they do not produce these substances.[3]

The diagnosis and/or follow-up of GEP-NET are carried out by determining biochemical markers. These include general markers, such as chromogranin A (CgA) and pancreatic polypeptide (PP), or specific markers according to the hormone that the tumor secretes, thus providing a more specific follow-up.

The imaging techniques available for the diagnosis of these tumors are CT scan for the initial study and follow-up, MRI as the most sensitive technique for the assessment of liver lesions, and ultrasound to guide biopsy sampling.

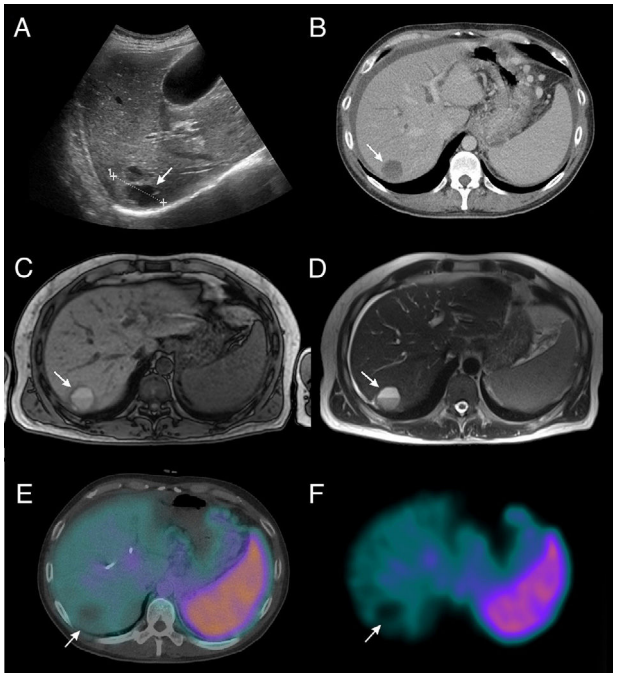

Fig. 1 – (A) Abdominal ultrasound showing a well-defined, solid nodular image measuring 4.5 cm in diameter in the liver parenchyma (arrow); (B) abdominal CT scan showing hypodense hepatic lesion (arrow) with hypervascular behavior and little enhancement, solid-cystic characteristics at the lower end, and levels inside, suggesting that it is a hypervascular SOL with rapid growth and necrosis, compatible with a hydatid cyst, abscess, hemangioma or metastasis; (C and D) MRI in sequences T1 and T2, respectively, which highlight a nodular lesion (arrow) with cystic-necrotic areas and irregular contrast uptake that presents portal lavage; also the size has increased compared to previous tests; (E and F) SPECT/CT and SPECT, respectively, with ^{99m}Tc-marked red blood cells of the abdomen showing an absence of tracer uptake compared to the hepatic lesion being studied (arrow).

In addition, nuclear medicine techniques with somatostatin analogs (octreotide) labeled with ^{99m}Tc or ^{111}In are considered fundamental for the study of NET that overexpress somatostatin receptors (SSTR), and type 2 SSTR are especially important. The somatostatin analog (octreotide) technique is highly sensitive (70%–90%) and useful for the assessment of primary tumors, possible metastatic involvement and to make correct therapeutic decisions, since a positive study predicts a good response to treatment with somatostatin analogs.[4]

The only curative treatment of resectable NET is radical surgery, hence the importance of an accurate and early

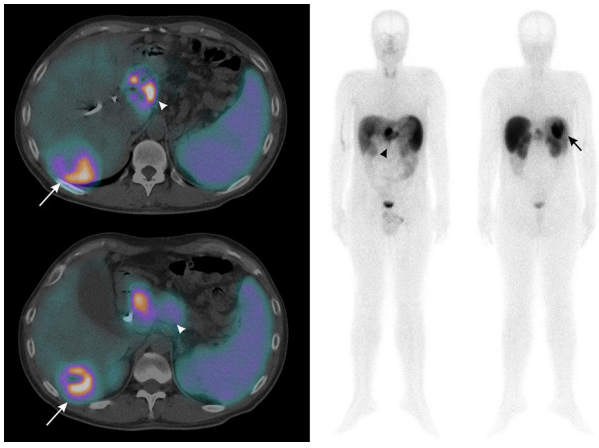

Fig. 2 – SPECT/CT (left) and complete body (right) of ^{99m}Tc-octreotide showing an epigastric mass with increased heterogeneous uptake of somatostatin analogs, correlating with the mass in the body and tail of the pancreas that had been observed in previous tests (arrowhead). Regarding hepatic nodular lesion, hyperuptake was seen in the peripheral halo (arrow), with absence of uptake enhancement, probably related to areas of central necrosis, being therefore compatible with metastasis of a primary pancreatic neuroendocrine tumor.

diagnosis. For more advanced stages, there are multiple different therapeutic options, such as somatostatin analogs, interferon (IFN), chemotherapy, monoclonal antibodies and therapy with radionuclide-labeled peptides.

In conclusion, scintigraphy techniques with different radiotracers, such as those described in this article, accurately define relevant metabolic aspects of hepatic lesions that are of interest in the differential diagnosis of unidentified SOL of the liver. Furthermore, they correctly establish neuroendocrine tumor stages.[1–5]

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