Hypervascular pancreatic lesions: pictorial review and differential diagnosis, and pitfalls.

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Learning objectives

The purpose of this educational exhibit is to describe the imaging findings of four suspected cases of hypervascular pancreatic lesions, discussing briefly all differential diagnosis, aiming to provide a review of the topic.

Background

Hypervascular pancreatic lesions can have multiple causes, some benign, others malignant, and pitfalls are commonly observed [1]. Accurate diagnosis demand proper knowledge, and is crucial to evaluate the need of resection, avoiding unnecessary procedures. The differential diagnosis consists, mainly, of tumors (primary and metastatic) and lesions from adjacent structures, which could mimic a pancreatic disease [1,2].

The lesions may be divided into three groups based on their risk for malignancy: "no-risk" (non-neoplastic lesions like vascular abnormalities and intrapancreatic accessory spleen), "low risk" (solid pseudopapillary tumors and solid-appearing serous cystadenomas, mainly) and "high risk" (mostly acinar pancreatic carcinomas, hypervascular pancreatic metastases and neuroendocrine tumors - NET) [1-3].

Usually the diagnosis demands a computed tomographic (CT) scan or magnetic resonance imaging (MRI) [2]. On this educational exhibition, four suspected cases of hypervascular lesions will be described, including two cases of "no-risk" and two cases of "high risk" lesions, with different radiographic findings, aiming to provide a pictorial review of the subject and encourage further deepened study.

Findings and procedure details

1. Intrapancreatic spleen ("no-risk" lesion)

34 years-old, male, reported to the emergency room with a chief complaint of abdominal pain. A CT scan revealed an early arterial enhancing nodule within the pancreatic tail, measuring 1,5 x 1,0 cm. (Figure 1) The rest of the pancreas showed unremarkable form, volume and density. There was no ductal dilatation. Subsequently, a biopsy confirmed the diagnosis of heterotopic splenic tissue.

An intrapancreatic spleen has increased vascularity in comparison with the surrounding pancreatic parenchyma, the patient is often asymptomatic, and the lesion is incidentally found [4]. It is extremely important to differentiate it from pancreatic neoplasms, like neuroendrocrine tumors and carcinomas, to avoid unnecessary procedures [5]. Since this lesion poses no threat, it is considered a "do-not-touch" lesion. An important strategy is to evaluate the enhancement pattern and density or signal intensity, comparing it to the spleen [4,5].

2. Splenic Vein Aneurysm ("no-risk" lesion)

75 years-old, male, with a past medical history of an hepatic transplant 14 years ago due to cirrhosis causes by Hepatitis B. A magnetic resonance imaging (Figure 2) showed a nodular area adjacent to the pancreatic body, in contact with the splenic vein, presenting with portal enhancement and no restriction in diffusion weighted imaging (DWI), measuring 2,9 x 1,9 x 2,8 cm. Furthermore, several small cystic formations in the entire pancreas were present, most of them communicating with the main pancreatic duct, suggesting secondary ductal ecstasy. Although the nodular area was likely a splenic vein aneurism, it was not possible to exclude the chance of it being a hypervascular lesion. Angiographic CT confirmed the diagnosis of splenic vein aneurysm.

Vascular abnormalities adjacent to the pancreas may be very challenging to distinguish from hypervascular lesions within the pancreatic parenchyma. They can be divided in arterial, which are more common, or venous, which are rarer [6]. The most involved arteries are the splenic, gastroduodenal and pancreaticoduodenal arteries [1,6]. Venous abnormalities usually encompass portal or splenic aneurysms (as in our case). CT scan is an important tool to distinguish the origin of the lesion, and its location related to the pancreas: whether internal or adjacent [6,7].

3. Neuroendocrine Tumors ("high-risk" lesion)

The first case was a 42 years-old, male, identified a small pancreatic cyst with small septa, without main duct dilatation, during a routine ultrasound examination. MRI revealed

an expansive lobulated formation in the pancreatic tail with contrast enhancement, measuring 2,5 x 1,5 cm (Figure 3). The patient underwent surgery and the pancreatic tail was removed. Posterior histopathological study confirmed a neuroendocrine tumor.

The second case was, a 27 years-old female, with a past medical history of multiple endocrine neoplasia type 1 (MEN-1), underwent a CT scan to evaluate pancreatic calcifications identified on a routine abdominal ultrasound study. It showed three nodular images, all with low attenuation and contrast enhancement in the pancreas (Figure 4). The biggest one measured 2,0 x 1,5 cm, with contrast enhancement, in the neck. Another one, in the cephalic region, measuring 1,8 x 1,1 cm, showed intense arterial contrast enhancemen. The third one, also in the cephalic region, measuring 1,9 x 1,7 cm, exhibited heterogeneous contrast enhancement, with central areas of low enhancement, which could represent cystic degenerations. Even though the enhancement was different in each lesion, all histopathological studies confirmed the diagnosis of neuroendocrine tumor in all cases.

Some neuroendocrine tumors have the capability of secreting hormones, which in turn can be clinically significant or not. Insulinoma, glucagonoma, somatostinoma are some of the NET specific names, relating to the hormone produced. The lesions vary from slow-growing indolent lesions, often diagnosed late, or aggressively metastasizing lesions with very poor prognosis [8,9].

The neuroendocrine tumors are usually described as hypervascular masses without associated ductal obstruction, our cases showed different aspects of theses tumors: contrast enhancement, growth and aggressiveness.

Images for this section:

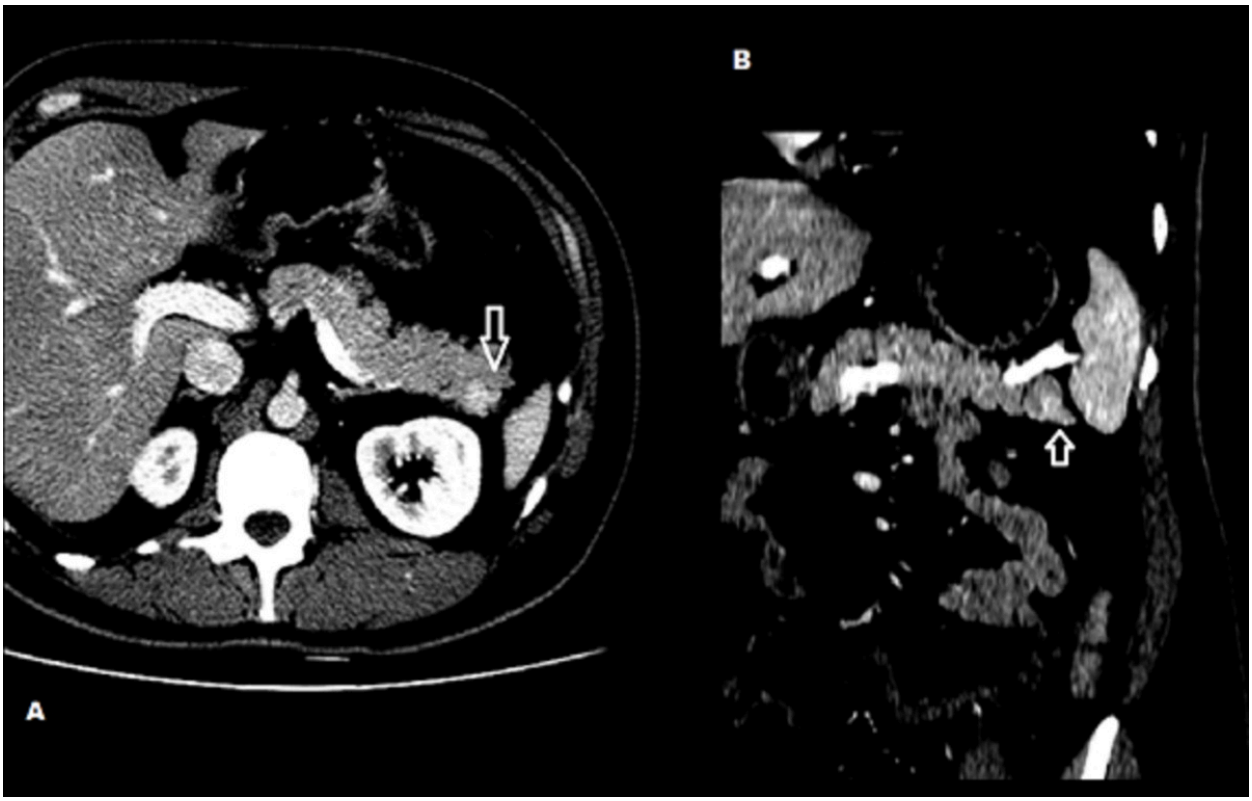

Fig. 1: CT reveals small nodular area with discrete early arterial phase enhancement in the posterior aspect of the pancreatic tail, in axial (A) and coronal (B) images. The rest of the parenchyma showed normal form, volume and density. There was no ductal dilatation. References: Radiology Department, São Carlos Imagem, São Carlos Hospital - Fortaleza/BR 2018

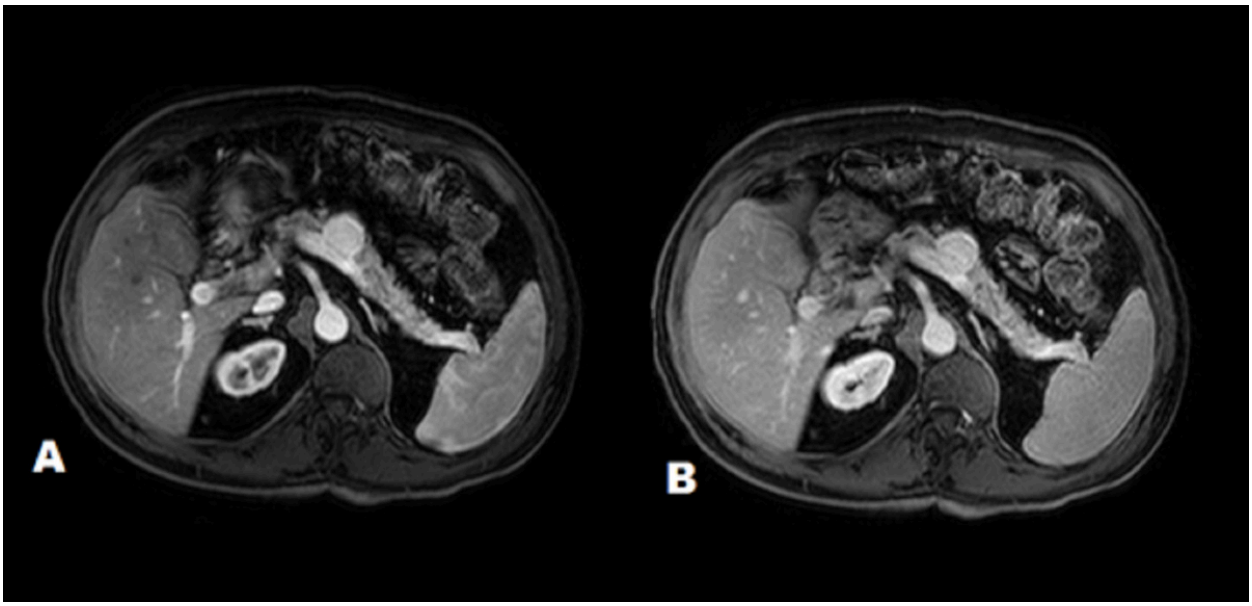

Fig. 2: Magnetic resonance imaging showed a nodular area adjacent to the pancreatic body, in contact with the splenic vein, presenting with portal enhancement. References: Radiology Department, São Carlos Imagem, São Carlos Hospital - Fortaleza/BR 2018

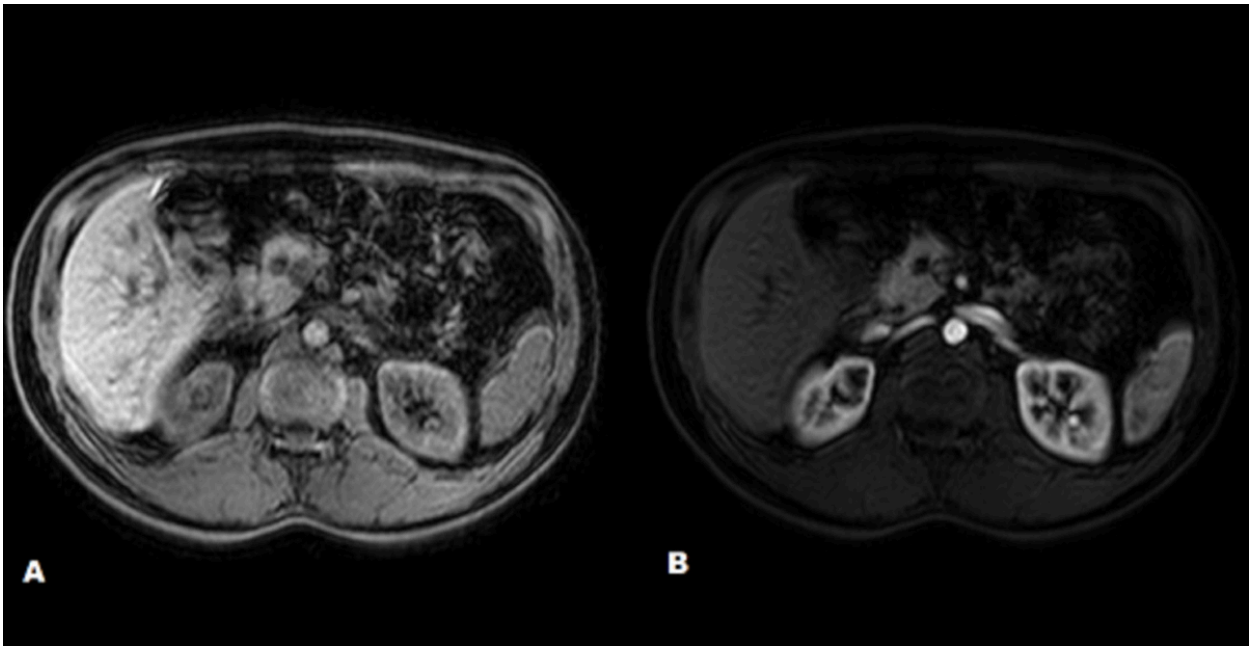

Fig. 3: MRI axial dynamic sequences showed pancreas with normal dimensions, but with expansive lobulated formation in its tail, with a solid component and cystic degeneration. References: Radiology Department, São Carlos Imagem, São Carlos Hospital - Fortaleza/BR 2018

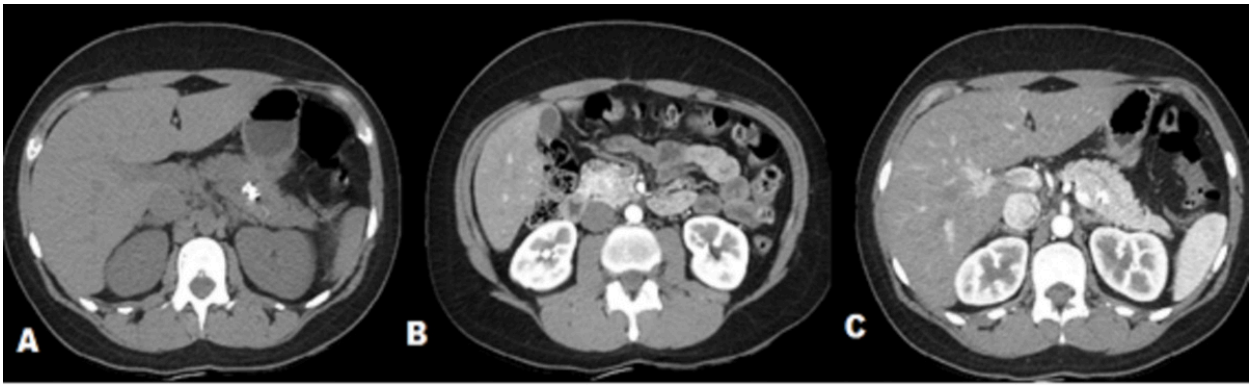

Fig. 4: Axial CT images, with no contrast enhancement (A), and arterial (B and C) enhancement showed three nodular images, all with low attenuation, in the pancreas, one in the neck, and two in the cephalic portion. References: Radiology Department, São Carlos Imagem, São Carlos Hospital - Fortaleza/BR 2018

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Conclusion

Hypervascular pancreatic lesions can be diagnostic challenging, therefore radiologists must recognize the different forms of presentation in CT and MRI. Radiologists play a crucial role in diagnosis, therefore improvement in criteria and better methodology for diagnosis is necessary.

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