Case 6640

Gastrinoma: multislice CT demonstration

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Patient: 31 years, female

Clinical History:

A 31-year-old woman was admitted in hospital with a five years history of recurrent peptic ulcer disease, gastro esophageal reflux disease, occasional diarrhea, epigastric pain and timpany. She had several episodes of elevated gastrin serum level. At the admission time, except gastrin serum level (>1000 mcU/mL), other findings were normal.

Imaging Findings:

Abdominal ultrasound was without pathological finding.
Esophagogastroduodenoscopy has shown a mild hyperhaemy in the piloric antrum. Somatostatin receptor scintigraphy has shown two lesions with the expression of somatostatin receptors: in the pancreatic head and anteromedial of lower pole of the right kidney.
Further diagnostic test was endoscopic ultrasound (EUS). In the region of the pancreatic head EUS showed: two separate, well-defined, isoechogenic lesions: one in the uncinate pancreatic process, and the other one was near the uncinate process. Their dimensions were 15x9 mm and 10x6 mm.
Multidetector computed tomography (MDCT) abdomen examination was performed using a 16-detector-row CT system (Sensation 16; Siemens, Forchheim, Germany). Arterial and venous phase were done using 16×0.75 collimation and images were reconstructed at 1-mm section thickness and 0.7-mm reconstruction increment. A total amount of 100 ml of contrast material (Ultravist 370, Schering) at 3.5 ml/s flow rate. MDCT in the arterial phase has shown three hyper vascular lesions in the pancreatic head on the axial slices. During the enucleation of pancreatic tumor three lesions, located on the edge of the pancreatic uncinate process, have been confirmed. MDCT findings correlated with in vivo findings.
Tumor localization in our case was typical of gastrinoma. Ninety percent of these tumors arise within the “gastrinoma triangle” surrounded by the porta hepatis, the neck of the pancreas, and the third part of the duodenum.
Discussion:

Neuroendocrine tumors (NET) of the gastrointestinal tract are rare and constitute 0.5-1% of all human malignancies. The incidence of these tumors is approaching 3 per 100 000, with a continuing slight predominance in women. Gastrinomas are defined as gastrin secreting tumors that are associated with Zollinger-Ellison syndrome (ZES). The incidence of gastrinomas is 1-2 per million per year. ZES is characterized by elevated fasting gastrin serum levels, positive secretin stimulation test and clinical symptoms such as recurrent peptic ulcer disease, gastroesophageal reflux disease and occasional diarrhea. The preferred localization of gastrinomas is duodenum rather than pancreas.
Their size ranges from less than 1 to 5 cm and sixty-six percent of gastrinomas are malignant; therefore their successful diagnosis and localization before surgery are very important for a complete cure. Tumors greater than 1-2 cm are easily detectable with modern imaging techniques (US, helical CT, MRI, OctreoScan), while those smaller
than 1 cm (insulinomas, some gastrinomas, and patients with multiple endocrine neoplasm) should be localized with selective or provocative angiography (A), trans-hepatic percutaneous catheterization of the portal vein (TPCPV) with vein sample collection from the splenoportal axis, and intraoperative ultrasonography (IUS). Many NET have somatostatin receptors on their surface and can be diagnosed by somatostatin receptor scintigraphy with high sensitivity and specificity. Many authors agree that; preoperative localization of gastrinomas, especially of extra pancreatic origin, remains a challenge to the radiologist and even like this nearly 30% of cases cannot be identified preoperatively.

EUS is one of the more recently introduced diagnostic techniques with sensitivity higher for digestive tract neuroendocrine tumors (85%) versus pancreatic neuroendocrine tumors (75%) and 80% specificity. Multi-detector row helical computed tomography (MDCT) has an increasing role in the diagnostic evaluation of pancreatic tumors. Rapid data acquisition, and improved z-axis spatial resolution allows image acquisitions in multiple phases and high quality multiplanar and 3D images reconstruction maximum intensity projection (MIP), and volume rendering techniques (VRT). Water is the preferred oral contrast agent because it is well tolerated by patients and acts as an excellent negative contrast agent that allows for improved visualization of the duodenum and the small bowel when intravenous contrast is given. Multiphasic scanning of the pancreas involves an initial noncontrast-scan series through the abdomen for pancreas localization. Scanning the pancreas during arterial, pancreatic, and venous phases follows this.

Islet cell tumors are highly vascular tumors with similar enhancement characteristics for both functioning and nonfunctioning ICTs. These lesions enhance more intensely than the normal pancreatic parenchyma during both the late arterial (pancreatic parenchimal phase) and venous phases.

For diagnosis, sensitivity of helical CT, was 91%, and specificity was 85%.

In our case MDCT was the only procedure that correlated with in vivo findings.

**Differential Diagnosis List:** Gastrinoma

**Final Diagnosis:** Gastrinoma
**Figure 1**

Description: Two hyper vascular lesions in the pancreatic head Origin:
Figure 2

Description: Another hyper vascular lesion in the pancreatic head Origin: