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(CASE REPORT)

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Spiral CT appearances of pancreatic tail insulinoma

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Abstract

Introduction: Insulinomas are the most common category of pancreatic endocrine tumors, with an incidence of 1-7 cases per million people.

Material and Methods: Most are intrapancreatic, benign and solitary. Therefore, they have an excellent prognosis after surgical resection. However, the localization diagnosis of insulinomas still poses a challenge to surgeons and radiologists.

Results: We present two cases showing classical appearances on helical CT In these two cases the tumors were occult and could not be found by either abdominal enhanced spiral computed tomography (CT) or ultrasonography. We would like to emphasize the need for performing helical CT whenever the diagnosis is suspected, due to the ability to image the pancreas in the early arterial as well as in the equilibrium phase.

Conclusions: We reminded of surgeons that insulinomas represent the most frequently found functioning endocrine tumors .Therefore, they have an excellent prognosis after surgical resection. However, the localization diagnosis of insulinomas still poses a challenge to surgeons and radiologists.

Keywords: Insulinoma; Computed tomography; Localization diagnosis; Dynamic enhanced scan; Enhancement val

1. Introduction

Endocrine tumors of the pancreas originate from multipotential stem cells that have retained the capacity to proliferate and differentiate themselves in the various cellular lines that make up this group of neoplasms.

2. Material and methods

A 37-years old man presented with a one-month history of fainting attacks and dizziness. On routine blood examination, all parameters were within limits, except for a reduced blood glucose level. A blood sample during one of the episodic attacks showed the blood glucose level to be 38 mg/dl.

A 40-year-old woman was brought to our attention because of typical symptoms of hypoglycemic crisis episodes recurring for about 1 year, 1 of which had led to a hypoglycemic coma.

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3. Results

Blood analysis revealed a serum glucose level of 2.2 mmol/L (40 mg/dL) and a corresponding serum insulin level of 103.3 pmol/L (14.4 µU/ mL), data that supported the diagnostic indication of an insulinoma. We were asked to locate it. The ultrasound examination showed no expansive formations in the pancreatic area (Fig. 1).

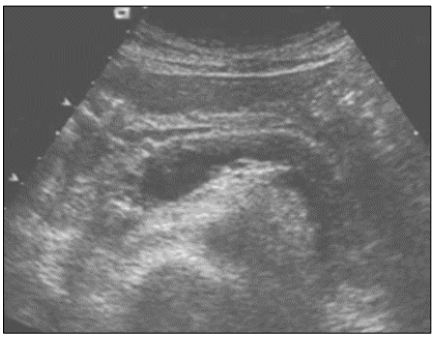

Figure 1 The ultrasound examination showed no expansive formations in the pancreatic area

A subsequent computed tomography (CT) investigation in the arterial phase reveal images resembling hypervascularized expansive formations (Fig2).

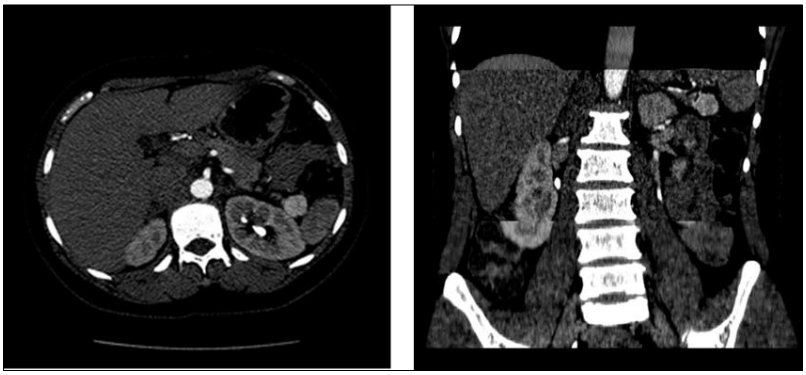

Figure 2 A subsequent computed tomography (CT) investigation in the arterial phase reveal images resembling hypervascularized expansive formations on left side

A CT scan of the upper abdomen was requested. Helical CT of the upper abdomen was performed. Water was used as an oral contrast medium, to detect any tumor in the walls of the upper gastro-intestinal tract, which can be missed if radio-opaque contrast is used orally. All of the data are then transferred to our 3D workstation for VR. Figure 3.

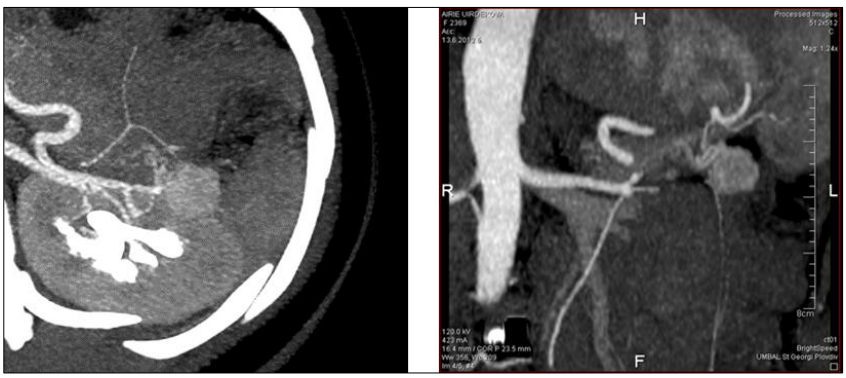

Figure 3 Helical CT of the upper abdomen

All images are reviewed with multiplanar reformation as well as interactive 3D VR. The brightness, opacity, and window width and level can be adjusted in real time to accentuate the wall of the gastrointestinal tract and optimize the visualization of abnormalities. In the evaluation of the mesenteric vessels, VR is the main algorithm used.

Arterial phase contrast- enhanced CT scan demonstrates a solitary 1.3 x 1.4cm enhancing mass in the pancreatic tail (Figure 2). The tumor was homogenous, without calcification or necrosis and the peripancreatic fat was well preserved. The rest of the pancreas, adjacent stomach, duodenum and abdominal viscera were also normal. There was no adjacent lymphadenopathy (Figure 3].

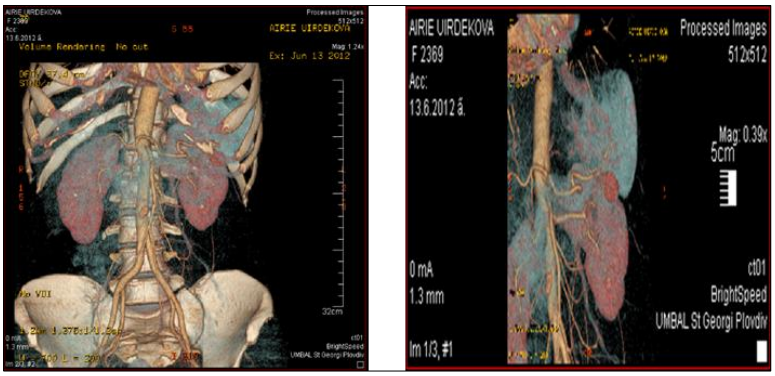

Figure 4 Imaging transferred to our 3D workstation for VR

A 1.5-cm insulinoma was resected at surgery. The lesion had low malignant potential owing to its low mitotic rate, and there was no evidence of invasion of the surrounding tissues.

4. Discussion

Insulinomas are the commonest islet cell tumors of the pancreas, followed by gastrinomas. Glucagonomas are the least common islet cell tumors.

Some researchers insist that preoperative localization diagnosis is necessary and valuable for surgery [1, 2] Preoperative localization is very helpful in planning the operation: it allows the sur-geon to determine whether simple tumor resection or partial pancreatectomy is likely to be required.

The diagnosis is usually made on the described as Whipple's triad. The triad consists of:

- Spontaneous hypoglycemia followed by central nervous system and vasomotor symptoms.
- Repeated blood glucose levels <50 mg/dl.
- Relief of symptoms by glucose administration.

Most insulinomas are under two cm in size. In 90% of cases, these are solitary and benign. Eight percent are multiple and these may present as diffuse hyperplasia or micro adenomatosis in 2% of cases. [2]. Insulinomas are predominantly found in the pancreatic substance, whereas gastrinomas in 28-44% of cases may be extra-pancreatic in the stomach, duodenum and lymph nodes [3].

Extra pancreatic tumors are usually small and located in the duodenal wall and are least likely to be detected pre-operatively [4]. The role of imaging is in the localization of the tumors pre-operatively. However, upto 27% of islet cell tumors are not detected pre-operatively [4].

The imaging algorithm usually starts with US, followed by helical CT. Angiography and portal venous sampling may be useful in cases where CT is negative. Endoscopic US is also a newer and sensitive modality for pre-operative localization [3],[5]. Intra-operative ultrasound may be used in those cases where pre-operative localization has not been successful. [6]. It is the study of choice for localization of insulinomas and is more effective than any other pre-operative diagnostic imaging study, with a sensitivity of 90%.[1].

5. Conclusion

On CT, insulinomas and other islet cell tumors, are characteristically isodense on the plain scans and show intense enhancement following contrast administration. The enhancement is usually uniform or may be target like [2]. Unusual findings include calcification, cystic tumors and low-density tumors.

Compliance with ethical standards

Acknowledgments

All authors are Employees at the Department of Diagnostic Imaging of Faculty of Medicine at the Medical University-Plovdiv, Bulgaria.

Disclosure of conflict of interest

There isn't conflict of interest of none of the authors.

Statement of informed consent

The Informed consent was obtained from all individual participants included in the study.

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