Original Research Article

A retrospective study of characterization of cystic lesions of pancreas by computer tomography scan

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Abstract

Introduction: Cystic lesions affecting the pancreas are a frequent finding in clinical practice. They pose differential diagnosis which should be known and interpreted by radiologists, determining doubts concerning their etiology in many cases. **Materials and Methods:** In this retrospective study was conducted in Department of Radiodiagnosis, AJ institute of Medical Sciences and Hospital, Kuntikana, Mangalore, Karnataka. All patients with proven cystic lesions of pancreas who underwent CT imaging using a 64 slice GE VCT from April 2020 to April 2021 at our institution were selected. All lesions were proven either by surgery or by endoscopy guided aspiration or follow up. **Results:** Out of the total 47 patients, 25 patients had pseudocysts and 22 patients had neoplastic cysts proven by histopathology or endoscopy guided aspiration. The neoplastic cysts include 6 benign IPMN, 8 serous cystadenoma, 4 mucinous cystadenoma, 2 SPEN and 2 mucinous cystadenocarcinomata. All the non-neoplastic cysts were pseudocysts and were predominantly seen in males than females with high prevalence between 41-50 yrs. All of them had association with acute or chronic pancreatitis. Most (58%- 11/19) of the benign neoplastic cysts were seen in females and all the 2 malignant cysts (mucinous cystadenocarcinomas) were seen in the males. All the SPEN were seen in females. About 75% (3/4) of the mucinous cystadenomas were female. **Conclusion:** CT scans helps us to diagnose various cystic lesions of pancreas based on different characteristic imaging features.

Key Words: Cystic lesions, cystadenoma, mucinous cystadenoma, SPEN.

Introduction

Cystic lesions affecting the pancreas are a frequent finding in clinical practice. They pose differential diagnosis which should be known and interpreted by radiologists, determining doubts concerning their etiology in many cases[1].

Pancreatic Pseudocysts are the most frequent cystic lesions of the pancreas. Other lesions, which include cystic pancreatic neoplasms are not frequent, they represent only the 10%-15% of all pancreatic cysts. The increase in the use of diagnostic imaging methods like Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) has increased the recognition of such lesions and with that, the number of resections[2].

Among lesions that are not Pseudocysts, Serous Cystadenoma, Mucinous Cystic Neoplasm and Intraductal Papillary Mucinous Neoplasm (IPMN) are the most frequent, representing the 90% of cystic pancreatic lesions. The initial evaluation must be oriented to exclude pancreatic Pseudocysts, which are found in patients with a history of acute or chronic pancreatitis or abdominal trauma. Cystic tumors do not have these antecedents[3]. Even though the morphology of the cystic lesions contributes to the interpretation of the images and the approximation to a diagnosis of the lesions, sometimes the precise characterization can be very difficult due to the great variety of cell types.

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Intraductal papillary mucinous neoplasm (IPMN) is classified into three types- Main duct, branch type, and mixed type. Main duct type presents as diffuse or segmental duct dilation and has the highest malignant potential. Branch type is mostly seen in head of pancreas and present as a unilocular or multifocal cysts communicating with the main pancreatic duct[4]. MRCP plays a vital role in demonstrating the communication between the cyst and duct. Imaging features concerning for malignancy are duct dilatation >5 mm, enhancing mural nodule >5 mm, cyst diameter >3 cm and thick enhancing wall. Solid pseudopapillary neoplasms are frequently seen in the female population with a mean age 25 years[5]. On imaging, they appear as well-defined mass with solid-cystic areas with necrosis and haemorrhagic debris. Solid pseudopapillary neoplasms are low-grade neoplasms with excellent prognosis noted in most patients. True epithelial cysts of the pancreas are very rare and are seen in syndromes like Von Hippel Lindau syndrome[6].

Materials and methods

Study design

A retrospective study

Study duration

April 2020 to April 2021 (1 year).

Study location

Department of Radiodiagnosis, AJ institute of Medical Sciences and Hospital, Kuntikana, Mangalore, Karnataka.

In this retrospective study, all patients with proven cystic lesions of pancreas who underwent CT imaging using a 64 slice GE VCT from

April 2020 to April 2021 at our institution were selected. All lesions were proven either by surgery or by endoscopy guided aspiration or follow up.

A total of 47 patients with proven diagnosis were selected. CT protocol for imaging pancreas includes triphasic scan which is an non-contrast study, arterial phase, a late arterial phase and a venous phase imaging. Triphasic CT protocol paves way for selective visualization of main arterial, venous structures, hence allowing assessment of vascular invasion by the tumour. Non-contrast study is done using 5 mm slice thickness with 2.5 mm reconstruction starting from the liver dome up to the iliac crests. Arterial phase is done with 2.5 mm slice thickness along with 1.25 mm reconstructions from top to bottom of liver at 20 sec delay to obtain excellent hepatic arterial opacification with minimal contrast in portal vein. Immediately after arterial phase, at 40 sec delay, pancreatic parenchymal phase/Late arterial phase is done. Portal venous phase is done using 5 mm slice thickness at 70 sec delay with 2.5 mm reconstructions. Incidence of various cystic lesions based on the histopathological findings, age and sex were analysed. The features of cystic lesions in the pancreas were studied like the overall size of the lesion, location, thickness of septation, nature of calcification, pancreatic duct dilatation if any, size of the largest cyst within the lesion, approximate number of cysts, presence of any solid component, nature of enhancement, presence of the wall and contour of the lesion were studied.

Statistical Analysis

Descriptive statistics like percentage was used for analysis.
Microsoft office 2007 was used.

Results

Out of the total 47 patients, 25 patients had pseudocysts and 22 patients had neoplastic cysts proven by histopathology or endoscopy guided aspiration. The neoplastic cysts include 6 benign IPMN, 8 serous cystadenoma, 4 mucinous cystadenoma, 2 SPEN and 2 mucinous cystadenocarcinomata. All the non-neoplastic cysts were pseudocysts and were predominantly seen in males than females with high prevalence between 41-50 yrs. All of them had association with acute or chronic pancreatitis. Most (58%- 11/19) of the benign neoplastic cysts were seen in females and all the 2 malignant cysts (mucinous cystadenocarcinomas) were seen in the males. All the SPEN were seen in females. About 75% (3/4) of the mucinous cystadenomas were female. All patients with mucinous cystadenoma were below 52 years and all the IPMN patients were above 54 years. Serous cystadenoma had even age distribution. All the SPEN were diagnosed before 30 years. All the IPMN were seen in the head and body of the pancreas. 75% (3/4) mucinous cystadenomas were seen in the tail of pancreas. 88% (7/8) serous cystadenomas were seen in the head and tail of the pancreas. All the SPEN were seen in the tail of the pancreas.

Out of the total 4 unilocular cysts without any septations, 3 had no visible wall and were finally diagnosed as IPMN and the remaining 1 had thin visible wall and were diagnosed as mucinous cystadenomas. 1 patient had peripheral calcification, and both were diagnosed as mucinous

cystadenomas. 3 patients had central chunky calcification and were diagnosed as serouscystadenomas 3 patients had diffuse mild dilatation of the main pancreatic duct and all were diagnosed as IPMN. 2 of these patients showed communication of the cyst with the dilated duct. One patient showed bulging major papillae. 3 patients had obstruction of the MPD with mild upstream dilatation, all of them were mucinous cystadenoma.

Table 1: Gender Distribution of Various Benign and Malignant Cystic Lesions of Pancreas

Sex distribution	Pseudo cysts	Serous cystadenoma	Benign IPMN	Mucinous cystadenoma	SPEN	Mucinous cystadeno-carcinoma
Male	17	3	4	1	0	2
Female	8	5	2	3	2	0

Table 2: Incidence of Cystic Lesions in Different Age Groups

Age	Pseudo-cysts	Serous Cysta-denoma	Benign IPMN	Mucinous Cysta-denoma	SPEN	Mucinous Cystadeno-carcinoma
Less than 20 years	5	0	0	1	1	0
20-50 years	15	3	0	3	1	1
More than 50 years	5	5	6	0	0	1

Table 3: Distribution of Lesions within the Pancreas

Location within Pancreas	Pseudocysts	Serous Cystadenoma	Benign IPMN	Mucinous Cystadenoma	SPEN	Mucinous Cystadenocarcinoma
Head	9	3	2	0	0	0
Body	8	2	3	1	1	0
Tail	8	3	1	3	1	2

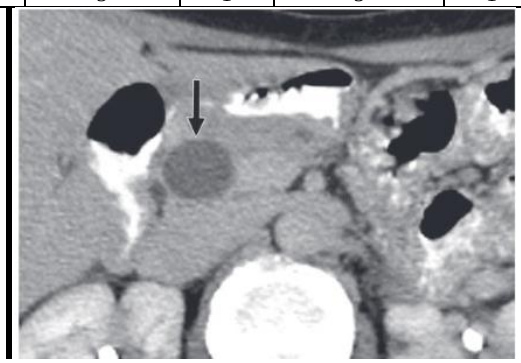

Figure 1: Pseudocyst. (a) Contrast material enhanced CT scan shows a well-defined unilocular cyst (arrow) in the head of the pancreas.

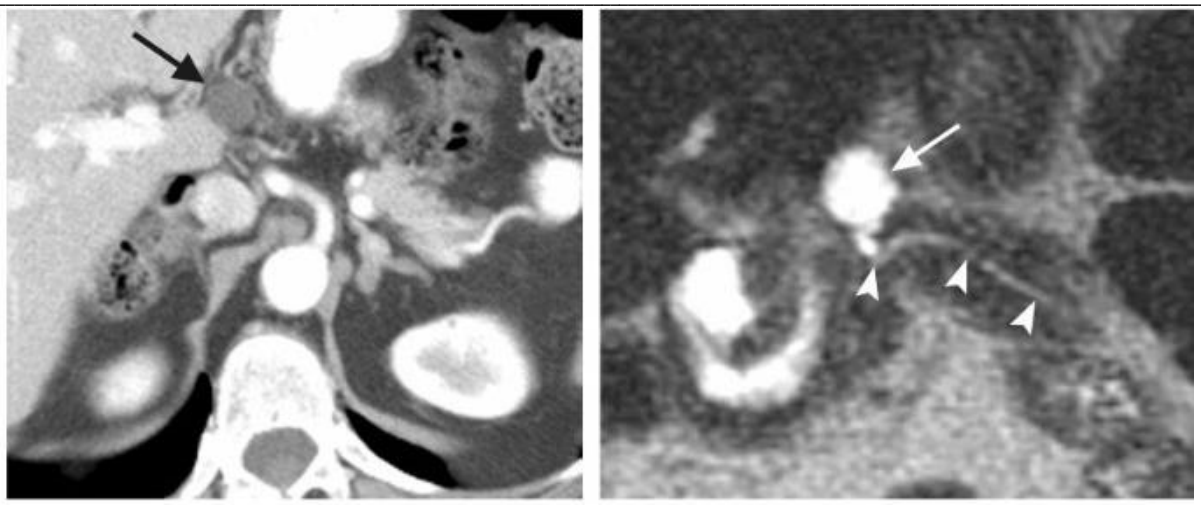

Figure 2: Side-branch IPMN manifesting as a unilocular cyst. (a) Contrast-enhanced CT scan demonstrates a small cyst (arrow) in the head of the pancreas. (b) Coronal oblique single-shot fast spin-echo MR cholangiopancreatogram shows communication of the cyst (arrow) with the main pancreatic duct (arrowheads), a finding that helped establish the diagnosis

Discussion

In our study IPMN and pseudocysts are common in males. Karoumpalis et al reported SPEN is seen at 20-40 years, mucinous cystadenoma between 40-50 years, and serous cystadenoma between 50-70 years and IPMN between 60-70 years. They further reported that IPMN is mainly seen in head and mucinous cystadenoma mainly in body and tail. No difference in distribution of the rest of the lesions within the pancreas[6].

PMT is commonly seen in head (50%), body (39%), tail (7%) and uncinated process (4%). Young reported 76.9% of mucinous cystadenomas and 54% of serous cystadenomas are seen in body and tail. In our study most of mucinous cystadenoma are seen in the tail and the serous cystadenomas were equally distributed in head and tail of pancreas[7]. IPMN is commonly smaller than 3 cms whereas mucinous and serous cystic neoplasm, SPEN and pseudocyst are commonly >3 cms. 73% of mucinous cystadenomas were round and 80% serous cystadenomas were lobulated and irregular. Pseudocysts are usually unilocular. But they can be rarely multiple in 10% of cases and sometimes also irregular and multilocular. Pseudocysts in acute pancreatitis is seen in 5-16% whereas in chronic pancreatitis it is seen higher in about 20-40%[8].

Mucinous cystic neoplasm shows macrocystic lesion with few septations. Serous cystadenomas are microcystic with honeycomb appearance. Rarely 7% are oligocystic or macrocystic. Sun et al showed honeycomb pattern is seen in serous cystadenoma and side branch IPMN whereas none of the mucinous cystadenoma showed honeycomb pattern[9]. Honeycomb appearance is seen in serous cystadenomas and side branch IPMN but rarely has been reported in mucinous cystadenoma. Mucinous cystadenomas have thick (>3 mm) wall and serous cystadenomas have thin wall (<3 mm). 78.9% of serous cystadenoma show thin septations and 57% of mucinous cystadenomas show thick septations. Serous cystadenomas show >2 septae in 40% and mucinous cystadenomas show <=2 septae in 73%. Mucinous cystadenoma, IPMN, SPEN have malignant potential in descending order. Serous cystadenoma has very low malignant potential[10].

Conclusion

Pseudocysts are associated with pancreatitis. Pseudocysts are the most common cysts of the pancreas followed by serous cystadenomas. Serous cystadenomas show a lobulated contour with an imperceptible wall containing smaller and multiple cysts and central chunky calcifications. Mucinous cystadenomas show a smooth contour, visible wall with peripheral rim calcifications and fewer bigger cysts. Malignant cysts show enhancing solid components. IPMN show duct dilatation with ductal communication, bulging papillae and are mostly unilocular without any visible wall. SPEN is seen in young females with solid areas, necrosis and haemorrhage. Hence, CT features help in characterizing the different cystic lesions of the pancreas.

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