I - Introduction

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

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.¹

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 ³

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.⁴

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.

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.

Images are essential in the evaluation of patients with cystic pancreatic lesions, being the CT the preferred imaging modality for the initial detection and the characterization of pancreatic cysts. The MRI with Cholangioresonance precisely shows the morphologic characteristics of the cysts and has the advantage to show the relationship of the cysts with the pancreatic duct.

The objective of this paper is to analyze cystic lesions of the pancreas diagnosed with CT, MRI and ultrasound, in order to determine its imaging characteristics, typification and classification, trying to identify signs which allow for the differentiation between benign and malign lesions, correlating the findings with the histopathology results of percutaneous puncture biopsy, surgery or clinical evolution.

**CT Technique**

The images were performed in a Phillip CT Twin® and a 64-channel Siemens Multislice CT® Scanner. All patients were studied using water as an oral contrast agent and had intravenous (IV) injections of 90 and 60 cc of iodine contrast agent, depending on the device used. There was a three-phase acquisition of images with axial cuts of 5.5 and 5 mm of thickness.

**MRI Technique**

MRI images were performed in a Philips Intera® 1,5 T, with sequences of 7 and 8 mm of thickness, weighing T1 (TR 140 TE 5), T2 (TR 1000 TE 82), T1 fat sat (TR 140 TE 244), T2 fat sat (TR 1300 TE 88) on axial plane, T2 (TR 1000 TE 82) on coronal plane and Cholangioresonance with slices of 0.8 mm of thickness and 3D reconstruction. In all cases, Gadolinium was used as IV contrast.

**Imaging Interpretation**

It is necessary to have order and methodology to describe the findings, as well as knowledge of their different ways of presentation and cysts classification in
order to arrive at a more probable diagnosis based on images. The images were interpreted by a radiologist specialized in abdominal diagnostic imaging, with 25 years of experience, who analyzed the CT and MRI images, including the sequences of Cholangioresonance. The images were described using the following morphologic classification, without taking into account the definitive result of the patient's histology or clinical evolution.

- 1- Unilocular lesion.
- 2- Microcystic lesion.
- 3- Macrocystic lesion.
- 4- Lesion with solid component.

A lesion is considered unilocular when the cyst does not present septa in its interior, central or peripheral calcifications, nor scars, whether it has a thin wall (less than 2 mm) or a thick wall (more than 2 mm). A microcystic lesion is a multilocular image with small cysts, generally more than six, smaller than 2 mm. A macrocystic lesion is the multilocular lesion with fewer compartments (less than 6) with cysts which are bigger than 2 mm. A lesion with solid component should be identified in those cysts with solid areas or solid lesions with cystic degeneration.

The following imaging characteristics must be taken into account:

- 1- Density by CT (liquid, semiliquid, solid o mixed) / Hyperintensity by MRI (in the different sequences: T1, T2, FAT SAT).
- 2- Thin or thick septa.
- 3- Central, septal or peripheral calcifications.
- 4- Central or peripheral scar.
- 5- Thin (less than 2 mm), thick (more than 2 mm) or lobular wall.
- 6- Enhancement of the wall after IV contrast in CT.
- 7- Location: head, isthmus, body, tail, or the entire pancreas.

- 8- Ectasia of the pancreatic duct, more than 3 mm in the head and more than 2 mm in the body and tail.
- 9- Number of cysts: only one, less than six, more than six.
When making a presumed diagnosis based on the images obtained, the following classification can be used:

- 1- Pseudocyst.
- 2- Serous Cystadenoma.
- 3- Mucinous Cystic Neoplasm.
- 4- Intraductal Papillary Mucinous Neoplasm (IPMN).
- 5- Cystic Tumor with Solid Component.
- 6- Simple Cyst.
- 7- Cystic Tumor of Islet Cells.

To carry out this paper, the findings were compared with the definitive histopathology diagnosis of those patients who underwent surgery or percutaneous biopsy.

The results were confirmed by surgery in some cases or by clinical pathology in cases where patients underwent percutaneous puncture biopsy, and/or by clinical follow-up of those patients who did not have a histopathology confirmation, leaving in this latter case the definitive diagnosis based on the result of the CT or MRI study.

**Imaging Interpretation**

38 images were analyzed, taken from about 37 CT studies and 7 MRI studies (many patients were examined by both studies); 20 were female patients and 18 were male patients.

*The unilocular cystic lesions* were detected in 21 patients (Graphic 1).

The most frequent **location** of the lesions was in the cephalic region of the pancreas, affected in 20 patients (Graphic 2).

**According to the type of lesion, the distribution** was: Pseudocysts were located more frequently in the pancreatic head; Serous Cystadenomas in the head; Mucinous Cystic Neoplasm in the tail; IPMN in the entire pancreas; Cystic Tumors with Solid Component in the cephalic region; Simple Cysts distributed in various regions, but
being also more frequent in the head; and the only case of Cystic Tumor of Islet Cells was found in the head (Graphic 3).

Serous Simple Cysts and Pseudocysts

Simple cysts with serous content are generally found during an ultrasound (or CT) as an incidental finding. Generally, they do not cause symptomatology but require a confirmation of its nature with complex studies like CT or MRI to dismiss the presence of small calcifications or septa, contributing to making the differential diagnosis with Cystadenoma. They can appear at any age and they are described as a finding by studies requested for other purposes; they are generally small. They require periodic check-ups to evaluate growth. These epithelial pancreatic cysts are rare and it is important to always make a differential diagnosis with Pseudocysts, searching for history of acute pancreatitis.

Pancreatic Pseudocysts are a frequent complication of acute pancreatitis. They develop in more than 50% of patients. The liquid inside the cyst may correspond to the pancreatic juice, serous liquid or blood, and it can be caused due to a rupture of the pancreatic duct with enzyme or pancreatic juice liberation, or because the liquid exudates from the pancreatic surface. Much of this liquid is absorbed in 2 or 3 weeks, but if it persists, they form a capsule and it becomes a Pseudocyst between the fourth and the sixth week. However, it must be pointed out that Pseudocysts can appear during the initial attack in 1 to 3% of the patients, or in up to 12% in patients with acute pancreatitis due to alcoholism.\(^7\)

In Figures 1, 2 and 3 the characteristics of simple cysts are shown, located in different regions and its presentation in CT and MRI. They correspond to unilocular lesions, without septa, with a thin wall, low attenuation in CT, T1 hyposignal, homogeneous MRI hypersignal in the T2 sequence, without changes postcontrast agent. In Figure 1, the pancreatic cyst is associated with cysts in the liver allowing for a suspicion that all of them are surely serous cysts. In Figure 4, the presence of a unilocular cystic lesion, with thin wall and without enhancement postcontrast, having a
history of acute pancreatitis, allows for a Pseudocysts diagnosis, without the need of more invasive procedures.

Taking into account the **morphologic criteria** of the cystic lesions, all Pseudocysts (100%) were considered unilocular lesions, of the 13 Serous Cystadenomas, 9 (69%) were microcysts, 3 (23%) were unilocular and 1 (7%) was macrocyst. Of the 5 Mucinous Cystic Neoplasms, 3 (60%) were unilocular and 2 (40%) microcysts. Of the 3 IPMN, 2 (66%) were microcysts and 1 (33%) a unilocular lesion; all Cystic Tumors with Solid Component (100%) were classified as lesions with solid component. All simple cysts (100%) and the Cystic Tumor of Islet Cells (100%) were considered unilocular lesions. From all lesions analyzed, only Serous Cystadenomas presented calcifications, in 5 cases (38%).

**Serous Cystadenoma and Multiple Cysts**

Serous cystadenomas are benign cystic lesions which represent 1 to 2% of all pancreatic exocrine tumors. They appear more frequently in women who are an average of 57 years old and they are predominantly located in the cephalic region. 25 to 50% of patients are asymptomatic at the time of the diagnosis. The multiple serous cyst disease occurs when there are multiple cysts discovered only in the pancreas, but they can also appear as part of the Von Hippel-Lindau disease. They can be micro and macrocysts (or oligocystic), the microcyst being more frequent. The cysts measure between 2 and 5 mm and they can appear with a central scar, often calcified. Peripheral cysts can be bigger and measure more than 2 cm. Oligocysts can be unilocular or appear with few locules, often with hemorrhagic contents. When cysts are extremely small and there is a very thick fibrous component, the lesion can appear as solid, especially with ultrasound. The Multislice CT detects the calcifications of the central scar with higher precision and allows for an accurate diagnosis, however, these calcifications are present in 30% of the cases. MRI images are hypointense in T1 and present a hypersignal in T2, allowing for a differentiation of the liquid areas in the fibrous region. The Echoendoscopy is very useful to demonstrate the appearance of the "honeycomb" pattern in extremely small microcysts. The simple cyst and the Pseudocyst can be differentiated from the Oligocystic Serous Cystadenoma because of the lobular aspect in the edges of the Cystadenoma. (8)
In the series analyzed, the only cystic lesions which showed a central scar were the Serous Cystadenomas, which were seen in 2 patients (15%) (Graphic 7). In the Figures 5 and 6 there are two cases of Benign Serous Cystadenoma and their behavior in CT and MRI. They are lesions with septated multiple cysts, typically with central calcifications better identified with CT. The septa were thin and there was not an evident enhancement postcontrast.

It is necessary to remember that there can be cases of multiple cysts in the entire gland. They correspond to multiple or multifocal Serous Cysts, with enhancement between the cysts after IV injection, corresponding to the enhancement of the healthy parenchyma between the cystic lesions, as was observed in a 70-year-old patient (Figure 7).

69% of Serous Cystadenomas had walls of regular edges, finding 4 cases (30%) with thin wall of less than 2 mm.

**Mucinous Cysts and Intraductal Papillary Mucinous Neoplasms**

Pancreatic mucinous cysts are potentially malign lesions, therefore, the terms mucinous cystadenoma and mucinous cystadenocarcinoma should not be used anymore. The term that is suggested is Mucinous Cystic Tumor (MCT). They are atypic cells which produce mucin in a stromal support, similar to the type of ovaries that are not connected to the pancreatic duct. They represent 2 to 6% of the pancreatic exocrine tumors. They are found almost exclusively in women in their fifties and located predominantly in the tail. The Multislice CT shows a unilocular image with thin septa visible postcontrast, and with laminar and peripheral calcifications, which differentiates the Mucinous from the Serous Cystadenoma. They are bright in MRI T2 sequence and in the T1 sequence they require Gadolinium to identify septa. They are also bright in this T1 sequence due to the mucinous content of the cyst. The Echoendoscopy can show small parietal nodules and differentiate the "honeycomb" from serous cysts. It is advisable to take samples by fine-needle aspiration biopsy in order to determine the mucinous nature of the cysts, based on its potential malignity. (8)

They were also called Ductectatic Mucinous Cystadenoma and Hypersecretory Intraductal Tumor, but since 1997 the name was changed to Intraductal Papillary
Mucinous Neoplasm (IPMN) due to a suggestion from AFIP (USA). To diagnose them, it is necessary to recognize (1) the diffuse or segmentary ectasia of the Wirsung or of secondary ducts, (2) the irregular aspect of the duct edges, and (3) the mucinous secretion from pancreatic duct studied by endoscopy. They can appear affecting two different parts: the principal duct or its branches. Malignity must be suspected in cases where elder diabetic patients, with lesions that affect the principal duct and measure more than 3 mm, when there is multiplicity, and when parietal nodules are identified. They are slightly less frequent in men. An injection of contrast is necessary in both Multislice CT and MRI in order to delimit and enhance the lesions. The connection between the cysts and the pancreatic ducts must be recognized to make a correct presumed diagnosis and differentiate them from other cysts. In the images, they appear as cysts, duct ectasia, and parietal nodules, with slight hypodensity in Multislice CT and MRI hyperintense signal on T1 and T2 sequences. The Endoscopic Retrograde Cholangiopancreatography (ERCP) is very useful for the definitive diagnosis because it allows for the identification of the mucinous secretion.

As regards the wall characteristics, in the series studied, 100% of the MCT had a thick wall of more than 2 mm. (Figures 8 y 9). Among the 3 cases of IPMN, 2 (66%) had a thin wall measuring less than 2 mm, and 1 (33%) a thick wall measuring more than 2 mm, while 100% of serous cysts had a thin wall measuring less than 2 mm. Among the cystic tumors with solid component, 66% presented a thick wall measuring more than 2 mm, and 33% presented a thin wall measuring less than 2 mm. In Figures 10 and 11 the characteristics of the Papillary Cystic and Solid Tumor are shown in 3 different patients. The only case of Cystic Tumor of Islet Cells (Figure 12) presented a thick wall measuring more than 2 mm.

As regards the postcontrast enhancement, Pseudocysts and Simple Cysts did not present an enhancement of the wall after IV contrast injection, 62% of Serous Cystadenomas presented wall enhancement after IV contrast, 60% of Mucinous Cystic Neoplasms presented enhancement, while IPMN and tumors with solid component, only 33% presented wall enhancement, and the Cystic Tumor of Islet Cells also presented wall enhancement (Graphic 9).
**Graphic 1: Morphological classification of cysts**

<table>
<thead>
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<th>MORPHOLOGY</th>
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<td>Unilocular</td>
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<tr>
<td>Microcyst</td>
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</tr>
<tr>
<td>Macrocyst</td>
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</tr>
<tr>
<td>With solid component</td>
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<tr>
<td><strong>Total</strong></td>
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**Graphic 2: Classification according to location**

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<tr>
<td>Isthmus</td>
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<td>Body</td>
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</tr>
<tr>
<td>Tail</td>
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</tr>
<tr>
<td>Diffuse</td>
<td>4</td>
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<tr>
<td><strong>Total</strong></td>
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</table>

**Graphic 3: Distribution of the pathology in different pancreatic regions**

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<th>Body</th>
<th>Tail</th>
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<tr>
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<td></td>
<td>4</td>
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<td>5</td>
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<tr>
<td>Intraductal Papillary Mucinous Neoplasm (IPMN)</td>
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<td>2</td>
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<td>3</td>
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<tr>
<td>Cystic/Solid Tumor</td>
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<td></td>
<td>1</td>
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<tr>
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<td>Cystic Tumor of Islet Cells</td>
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<td></td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td><strong>3</strong></td>
<td><strong>4</strong></td>
<td><strong>7</strong></td>
<td><strong>4</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>
Figure 1: Abdominal CT after IV contrast injection. 86-year-old female patient. (a) Simple cyst in pancreatic isthmus (arrow). (b) Presence of simple cysts in liver as well (arrowhead).

Figure 2: Abdominal CT after IV contrast injection. Unilocular Simple Cyst (arrow) in the body of the pancreas in a 36-year-old male patient with thin wall (measuring less than 2 mm) without enhancement.
Figure 3: Simple cyst in MRI in 56-year-old female patient. (a) MRI: T2 Fat-Sat axial image shows an image of a hyperintense unilocular Simple Cyst (arrow) in the pancreatic tail. (b) MRI: T1 image after IV contrast injection showing the same hypointense unilocular Simple Cyst (arrow), without enhancement.

Figure 4: Abdominal CT without IV contrast injection. 60-year-old male patient with a history of acute pancreatitis. (a) Image of a unilocular Simple Cyst (arrowhead) in the pancreatic tail, compatible with Pseudocyst. Presence of thick wall without enhancement after the IV contrast injection. There is evidence of peripancreatic tissue edema.
Figure 5: Abdominal CT after IV contrast injection. 40-year-old female patient. (a) Presence of a multilocular microcystic lesion with more than 6 cysts located in the isthmus. There is evidence of septal calcification (arrow) and lobular wall which is not enhanced after IV contrast. (b) Cystic lesion with a violet surface with multisepta after surgery. Benign Serous Cystadeno.
**Figure 6:** Abdominal CT and MRI. 85-year-old female patient. (a) CT with IV contrast: multilocular microcystic lesion in the pancreatic head, corresponding to a Benign Serous Cystadenoma. Presence of more than 6 cysts, with central scars (arrow), central calcifications (arrowhead) and lobular walls enhanced after IV contrast. (b) MRI: T2 fat-sat axial image shows the same hyperintense lesion with central scar (arrow). (c) MRI: T2 axial image showing the same hyperintense lesion, with central scar. It also showed a primary neoplastic lesion in right kidney (asterisk). (d) MRI: T2 coronal image. Cystic lesion on another plane without evidence of pancreatic duct ectasia.

**Figure 7:** Abdominal Multislice CT. 70-year-old male patient. (a) Axial image without IV contrast injection: Multifocal Serous Cystadenoma (arrowheads) affecting the entire pancreatic parenchyma. Presence of multiple unilocular cysts. (b) Axial image with contrast injection showing the enhancement of the parenchyma intercystic spaces, after Gadolinium injection. (c) Coronal image which shows the multiple pancreatic cysts in the region of the tail (arrow).
Figure 8: Intraductal Papillary Mucinous Neoplasm in 68-year-old male patient. (a) CT with IV contrast: multilocular macrocystic lesion corresponding to an Intraductal Papillary Mucinous Neoplasm (arrow) in the pancreatic head, with thick wall (measuring more than 2 mm) enhanced after contrast injection. (b) CholangioMRI: an ectasia of the principal pancreatic duct can be seen (arrows). Cystic lesions correspond to accessory duct ectasia. (c) and (d): Images of the surgical specimen showing the mucinous content and the pancreatic duct ectasia.

Figure 9: Abdominal CT after IV contrast injection. (a) and (b): Multilocular macrocystic lesion (arrows in a and b) in the pancreatic tail, with thin septa, no ectasia of the pancreatic duct, and thin wall (measuring less than 2 mm), heterogeneous, with more density in the distal area (arrowhead) not enhanced after contrast injection. It probably corresponds to a Mucinous Cystic Neoplasm.
**Figure 10:** Abdominal CT without IV contrast injection. 41-year-old female patient. Cystic tumor with solid component in the pancreatic tail (thick arrow). 55-year-old female patient. Presence of hepatic metastases (thin arrows). Probable Papillary Cystic and Solid Tumor.

**Figure 11:** Abdominal MRI without IV contrast injection. (a) T1 Fat-Sat sequence: Tumor with semisolid signal intensity (arrow). (b) T2 Fat-Sat sequence: small intratumoral cystic formations (arrows). Surgical specimen in (c) yellow-colored tumor, where internal small cysts can be seen (arrow), and histopathology specimen in (d) (Hematoxilina-Eosina, 400x) where a proliferation in a nest shape and small solid lobules, with round nucleous and scarce cytoplasm can be observed. Papillary Cystic and Solid Tumor (also called Frantz Tumor) in 34-year-old female patient.
Figure 12: Abdominal CT after IV contrast injection. 45-year-old female patient with known MEN type 1 syndrome. (a) Unilocular cystic lesion in the pancreatic head, with thick wall (measuring more than 2 mm) (arrow). (b) The wall is enhanced after the IV contrast injection (arrow). The lesion was classified as probable Cystic Tumor of Islet Cells.

IV - Discussion:

Although there is a limitation for not having the histopathology results, specially of the lesions considered benign in the images, based on the bibliographic knowledge and specialists' experience, it is possible to correctly categorize the lesions according to the characteristic signs mentioned by the different authors of international literature. Given that the supposedly benign lesions are not treated surgically, this difficulty in the accurate histopathology diagnosis is also shared by the consulted authors.

Using a similar approach to the morphologic classification of Bosniak on renal cysts, which has proved to be a reasonable method to evaluate the malignancy criteria (9), Sahani et al. (10) suggest a Pancreatic Cysts Classification Scheme, based on the morphologic characteristics, grouping four subtypes: Unilocular Cysts, Microcystic Lesion, Macrocystic Lesion and Cyst with Solid Component. This morphologic classification is well differentiated and easy to analyze for the purposes of this investigation.

A unilocular cyst in a patient with a history of acute pancreatitis is a Pseudocyst, without doubt. The diagnosis is reinforced if there is pancreatitis, atrophy, calcification in the parenchyma, ectasia or stones in the pancreatic duct. On the other hand, the
connection between a unilocular cyst with the pancreatic duct can be seen in IPMN. When there is a unilocular cyst with a lobular edge localized in the pancreatic head it must be considered as a unilocular Macrocystic Serous Cystadenoma.\(^{(11)}\)

Multiple unilocular cysts in a patient with a history of acute pancreatitis are often Pseudocysts. Another cause of multiple unilocular cysts is the Von Hippel-Lindau disease, generally associated to renal and hepatic cysts, as well as vascular lesions in the central nervous system.\(^{(12)}\)

Chandralekha et al.\(^{(13)}\), published two cases of Serous Cystadenomas, one was unifocal in the body of the pancreas and the other one, multifocal and diffuse. Diffuse Serous Cystadenomas (1 case in our patients) are rare and, also they present different degrees of disease evolution which contribute to understanding their histogenesis. The histopathology showed the entire pancreatic parenchyma replaced by separated cysts due to hyalinized stroma, without the loss of acinus, in different stages. Peripancreatic fat showed areas of necrosis, which was probably the consequence of cysts rupture. Von Hippel Lindau disease was excluded in both cases, because there were not other cystic lesions outside the pancreas.

In this series of 21 cases with lesions analyzed, which according to the morphological criteria were compatible with unilocular cysts, 5 (24%) were Pseudocysts, 3 (14%) were Serous Cystadenomas, 3 (14%) were Mucinous Cystic Neoplasm, 1 was (5%) IPMN, 1 was (5%) Cystic Tumor of Islet Cells and 8 (38%) were Simple Cysts. All lesions which were Pseudocysts had inflammatory changes in the peripancreatic fat and in some cases there was a history of acute pancreatitis. Most were located in the pancreatic head, with thin wall measuring less than 2 mm, which was not enhanced after the IV contrast injection, as well as all Simple Cysts that were located in the entire pancreas. Of the unilocular lesions which were Serous Cystadenomas, 2 (66%) were located in the head and one case (33%) had a diffuse multifocal presentation in the entire pancreas; they all had a lobular wall, without central scar and without calcifications; two (66%) of these cases were enhanced after the IV contrast injection. Of the unilocular lesions which were Mucinous Cystic Neoplasms, two (66%) were located in the tail and one (33%) in the head: They all had a thick wall measuring more than 2 mm which was enhanced after IV contrast injection; none had scars, calcifications nor ectasia of the pancreatic duct or connection to it,
different from the case diagnosed as IPMN which had pancreatic duct ectasia, thin wall measuring less than 2 mm, without enhancement after IV contrast and ductal communication. The only case diagnosed as Cystic Tumor of Islet Cells was unilocular, located in the pancreatic head, without scars, calcifications, nor ectasia of the pancreatic duct with thick wall measuring more than 2 mm which was enhanced after contrast injection. It was a female patient with a history of Multiple Endocrine Neoplasia (MEN type 1), disease characterized by endocrine tumors in parathyroids, hypophysis and pancreas (the most frequent being insulinomas and gastrinomas).

According to Sahani et al.\textsuperscript{(10)}, the only lesion included within the microcystic lesion category is the Serous Cystadenoma. In 70\% of the cases, these benign tumors show a multicystic pattern, generally with more than six cysts, measuring from a few millimeters to 2 cm. The lobular edge is a common characteristic. 30\% of Serous Cystadenomas present a fibrous central scar with or without star pattern and with central calcifications. These findings, although not very frequent, are highly specific, considered practically pathognomonic of this tumor. 20\% of these tumors are composed of microcysts with "honeycomb" pattern and "sponge" appearance. In the MRI, microcysts can be seen as several bright spots in T2 sequences. In our study of 38 cases, 9 were classified as microcystic lesions, all corresponding to Serous Cystadenomas and the majority was located in the pancreatic head, with only one case in the body and another one in the isthmus; 6 (66\%) had walls with lobular edges and 3 (33\%) had a thin wall measuring less than 2 mm. All cases with lobular wall showed enhancement after contrast injection, while those which had thin wall were not enhanced; 2 (22\%) cases had a central scar, 55\% of Microcystic Serous Cystadenomas had calcifications, the septal being the more frequent. Only one case was confirmed by aspirated needle percutaneous biopsy due to its serous content.

The macrocystic or oligocystic variant of this tumors is not very frequent, appearing in less than 10\% of the cases, and it is very difficult to differentiate them from a Mucinous Cystadenomas or from a Pseudocyst. This differentiation is very important since it changes the prognosis and the treatment of the lesion.

Cohen et al.\textsuperscript{(11)} analyzed the tomographic characteristics which help differentiate a Unilocular Macrocystic Serous Cystadenoma from a Mucinous Neoplasm or a Pseudocyst. They studied 33 patients (12 with Macrocystic Serous Cystadenomas, 11
with Mucinous Cystadenomas and 10 with Pseudocysts). This study showed the significant differences in the location of the cysts, with a specificity of 90% for the location of the Macrocystic Serous Cystadenoma in the pancreatic head. The lobular edge was found in Macrocystic Serous Cystadenomas, while the round edge was found in Mucinous Tumors (specificity of 100% for the diagnosis of the Macrocystic Serous Cystadenoma). The walls of the cysts were thin measuring less than 2 mm, 10 of 12 patients had Macrocystic Serous Cystadenoma, 5 of 11 had Mucinous Tumor, and 5 of 10 had Pseudocysts, showing specificity for these criteria of 52% in the diagnosis of Macrocystic Serous Cystadenoma. The wall did not show enhancement in 9 patients with Macrocystic Serous Cystadenoma, in 1 with Mucinous Tumor and in 4 with Pseudocysts (specificity of 76% for the diagnosis of the Macrocystic Serous Cystadenoma) showing significant differences when compared to Mucinous Tumors and not significant differences when compared with Pseudocysts. In 2 Macrocystic Serous Cystadenomas there were mural nodules, which according to the histology, were coalescent cysts measuring a few millimeters. They only showed pancreatic and peripancreatic anomalies in patients with Pseudocysts. Other criteria, like the homogeneity of the lesion, the presence of septa and the ectasia of the pancreatic duct did not help in the characterization of these lesions. The results of the study suggest that the location in the pancreatic head, thin wall, lack of enhancement of the wall and lobular edge are independent specific criteria for the diagnosis of the Macrocystic Serous Cystadenoma. When two of these four criteria were combined, 10 of 12 patients (83%) presented Unilocular Macrocystic Serous Cystadenomas but only 3 of 21 patients (14%) presented Mucinous Cystadenomas and Pseudocyst. When there were three or four of these criteria combined, a specificity of 100% was obtained. In our series, we found a macrocystic case with a presumed diagnosis of Serous Cystadenoma, which was located in the head, with lobular wall and without enhancement after contrast injection; it did not present a central scar, calcifications nor ectasia of the pancreatic duct.

According to Sahani et al.\(^{(10)}\), the macrocystic lesions include multilocular cysts with less than 6 compartments measuring more than 2 cm. Cystic tumors within this category are mucinous cystic neoplasms and IPMN. The mucinous cystic neoplasm is located mainly in the pancreatic body and tail, and although it is not connected to the pancreatic duct it can cause partial obstruction. In the transversal images, these cysts
appear as macrocystic multilocular lesions, with content of detritus cells or hemorrhage. In spite of the peripheral calcification in "egg shell" is highly suggestive of mucinous tumor and malignity, it is not very frequently seen in CT. These tumors are 75% asymptomatic, and when the symptoms are present, they are the consequence of critical mass due to their big size. Because mucinous tumors have malignity potential, there is an indication of surgical resection, with good prognosis and survival in the long term. The identification of a septated cyst which connects to the principal pancreatic duct is highly suggestive of IPMN. Nowadays, the Cholangioresonance is the choice to demonstrate the morphologic characteristics of these cysts, evaluating the connection with the Wirsung and its degree of ectasia. In our patients we have found 5 lesions with morphologic criteria of macrocysts, of those 2 were considered Mucinous Cystic Neoplasms, 2 PIMN and one Serous Cystadenoma; the PIMN showed ectasia of the principal pancreatic duct, unlike Mucinous Cystic Neoplasms, from which only one case presents ectasia of the duct, and all had thick wall, measuring more than 2 mm, located in the pancreatic tail.

According to the author (10), cysts with solid component can be unilocular or multilocular lesions. Under this category, there are true cystic tumors with solid component, like mucinous cystic neoplasm and IPMN or solid pancreatic neoplasms with cystic degeneration. Among solid tumors with cystic component there are tumors of islet cells, solid pseudopapillary tumor, pancreatic adenocarcinoma and metastases. All tumors under this category had malignity potential and, therefore, there is an indication of surgical resection. The MRI with Cholangioresonance is better than CT in the detection of small mural nodules, which have low intensity in T2 sequences and show enhancement after contrast injection. In our patients, we found 3 cystic lesions with solid component, 2 of which were located in the head and one in the tail. One of them presented pancreatic duct ectasia and enhancement of the wall after contrast injection, but we do not have the results of the histopathology.
V – Conclusion

Images by CT and MRI are excellent modalities in the initial detection for the characterization of cystic pancreatic lesions. The classification of the cystic lesions based in morphological criteria simplifies the differential diagnosis and is very useful for the treatment. Taking into account these morphology, density and behavior criteria with the contrast injection, can avoid in many cases more invasive diagnostic procedures and contributes to adopting a more expectant conduct with more security and confidence in certain cases and a more invasive or surgical attitude in others, depending on the imaging appearance of the cystic pancreatic alterations.

Bibliography:


