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# Specific new mucinous benign pancreatic cysts: A new pathological unit

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## Abstract

**Introduction**: The cystic lesions of the pancreas consists of a range of pathologies which may be broadly divided into neoplastic, non- neo plastic cysts. Recently new non-neoplastic cystic lesions, called mucinous non-neoplastic cysts (MNCs), have been described.

**Materials and Methods**: The imaging methods (ultrasound and CT) were used as well as invasive imaging methods under image control with a view of the histological verification of the diagnosis. Included cases of pancreatic cystic lesions are described, accidentally detected by ultrasound and CT scan and other diagnostic methods were made for different purpose.

**Results and Discussion**: The finding usually was a cyst in the body of the pancreas, apparently communicating with the pancreatic duct. The Endoscopic Retrograde Cholangiopancreatography and laboratory tests of liver function, serum carcino embryonic antigen (CEA)and carbohydrate antigen C19 -9 were within normal limits. After the distal pancreatectomy in three of the patients the histological speciment showed a simple cyst, lined with mucinous epithelium.

**Conclusion**: We recommend that patients diagnosed with 'benign' mucinous neoplasm are closely monitored due to the inability to completely confirm the benign nature of the lesions. Moreover, the existence of the MNC, as a truly unique cystic lesion, remains controversial.

**Keywords:** Cystic Lesions; MNCs; Imaging methods

## 1. Introduction

Pancreatic cystic lesions consist of a variety of pathological nodules and can generally be classified into neoplastic and non- neoplastic cysts [1]. The following types of cystic neoplasms are predominant: Mucinous Cystic Tumors (MCT), Intrauterine Papillary Mucinous Tumors (IPMTs) and Solid Pseudopapillary Neoplasms (SPPNs) that are both premalignant and malignant [2]. Serous cystic lesions from another large group of cystic neoplasms that are predominantly benign [3]. On the other hand, non-neoplastic cystic tumors consist of congenital cysts, lymphoepithelial cysts, retentive cysts and endometrial cysts [3]. Recently, a new group of non-neoplastic cystic lesions, called Mucinous Non-neoplastic Cysts (MNC), has been described. We present of pancreatic cystic tumors with signs witch increased possibility of this diagnosis [4, 5].

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## 2. Material and methods

Eleven patients aged from 49-73 years old (6 women and 5 men) were scanned by US, computer-topographically (CT), ERCP and MRI. Cystic lesions of the pancreas ranged from 26 to 33 mm were detected. The major pancreatic canal is not dilated (Figure 1).

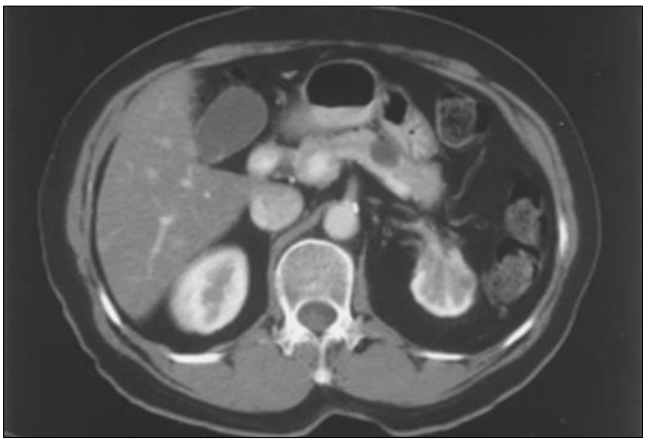

**Figure 1** CT image representing a cystic lesion in the pancreatic body (Non dilated pancreatic duct)

At a control US study 6 months later in five of the patients the finding was presented with an increase of the cystic lesion up to 38 mm (Figure 2).

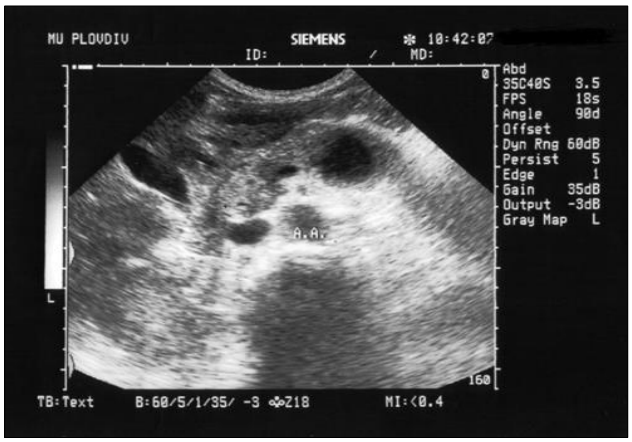


**Figure 2** Ultrasonic image of the cystic lesion at the pancreatic body with diameter of 38 mm

An MRI study was conducted of the same patients to better characterize the cystic lesions. The finding is a 38 mm cyst in the pancreas, seemingly communicating with the pancreas canal (Figure 3).

The main pancreatic canal and its lateral branches are not dilated in all of our patients. Laboratory tests for liver function tests, serum carcinoembrionic antigen and carbohydrate antigen C 19-9 are within the normal range. Whipple's resection was performed in 6 patients. Due to an unspecified diagnosis of cystic neoplasm of the pancreas in three patients were performed distal pancreatectomy and in two cases central pancreatectomy. The histological preparation showed a simple cyst with a mucosal epithelium (Figure 4).

There is no abnormal presence of atypia and dysplasia of the epithelium as well as communication with the pancreatic duct. The pancreatic tissue was not histologically presented with significant changes. Within 2 year follow-up with US and CT investigation, no signs of tumor recurrence were found.

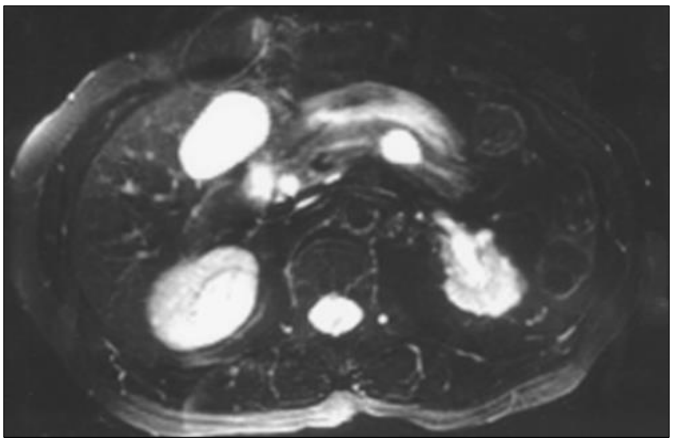

**Figure 3** MRI image of a cystic lesion of the pancreatic body that is suspected of communicating with the pancreas canal

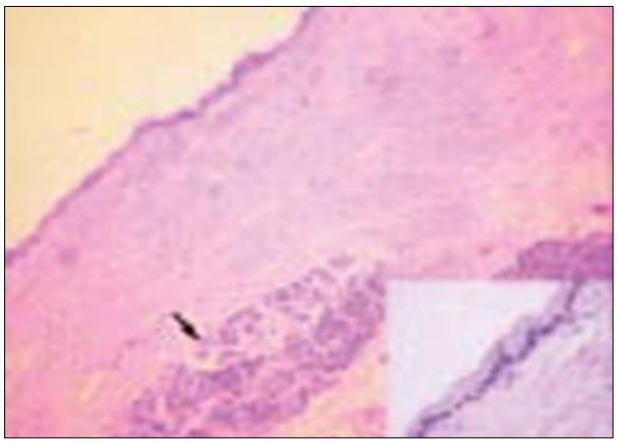

**Figure 4** Histological preparation stained with HE. A cystic wall with a cuboidal epithelium is seen, delimited by a fibro-collagen stroma without signs of atypical. Visible pancreatic acnes

## 3. Results and discussion

Kamal et al., describe a new cystic pancreatic change in five patients for whom the term Mucinous Non-neoplastic Cyst (MNC) is introduced [1]. The same group subsequently reported 4 cases (of 9 patients) presented this new group of cystic pancreatic changes in a retrospective review of 418 cases of cystic tumors [2].

The pancreatic cysts of our study demonstrate histological features susceptible to MNCs, including single-cell cyst-plated cytoplasmic cell cytoplasmic mucin cells, lack of cell proliferation or atypical without pathologically demonstrated communication with the pancreatic duct and fine sciatic support stroma. An argument against this diagnosis is the presence of communication with the major pancreatic duct presented on preoperative MRI, which makes retention cyst and IPMT difficult.

MNCs are characterized pathologically with mutant epithelial differentiation, lack of cellular atypical or increased proliferation, a fine layer of cellular stroma, and lack of communication with the pancreatic channel [1]..

Abnormal MNCs should be differentiated from other cystic neoplasms of the pancreas, which are covered with mucosal epithelium, such as Mucinous Cystic Tumors (MCTs), Intrauterine Papillary Mucinous Tumors (IPMTs) and retention cysts.

The images of MNCs upon MRI may be indistinguishable from that of MCNs, especially if the cysts are large and have thick walls. FNA cytology of the epithelium of MNCs shares that of retention cysts. Retention cysts can be excluded based on the absence of potential causes or evidence of ductal obstructions; however, this is not always possible. Nevertheless,

although EUS-FNA could not distinguish MNCs from retention cysts, treatment and prognosis will not be affected owing to the benign nature of both diseases (Figure 5).

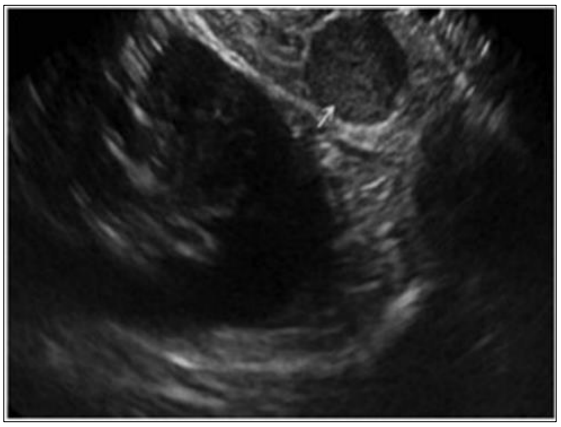

**Figure 5** EUS image showed a small homogeneous hypo echoic lesion in pancreas tail on endoscopic ultrasound

MCTs are large, well-differentiated cystic pancreatic tumors that are usually presented as single or multifocal pancreatic cysts in middle-aged women [7, 8-11]. These tumors, like MNCs, are covered with a mucosal epithelium, demonstrating a periodic positive acid-Schiff and Alcian blue reaction as well as positivity of cytokeratin's 7, 8, 18, 19 and 20, 7, 8.

IPMT is a clearly defined clinic pathological unit described and demarcated by MCTs by the World Health Organization in 1996 and by the Institute of Pathology of the Armed Forces in 1997 [12]. As well as retention cysts and MCTs, the walls of this tumor are covered with mucosal epithelium. This tumor is characterized by cystic dilation of the main pancreatic duct or its branches due to a large amount of produced and excreted mucin via a pathologically changed papillary aperture in elderly males [12]. IPMT is ohen associated with chronic pancreatitis, communication between cyst and pancreas and pancreas dilation [13]. These tumors have a high, colonic, mucin-containing epithelium, ohen with papillary proliferation and extensive involvement of the pancreatic duct [14]. IPMT epithelial cells, as well as MCT, are usually presented with varying degrees of atypia and dysplasia with high malignant potential.

### 3.1. Cytology and cyst fluid CEA analysis

Seven MNCs had an endoscopic ultrasound-guided fine- needle aspiration (EUS-FNA) prior to surgical resection. The FNA specimens were analyzed for: background (mucinous or necrotic), cellularity (hyper cellular or scant cellular), architecture (honeycombed flat sheets or papillary clusters), nuclear features (membrane, chromatin, pleomorphic, nucleoli) and fibrotic stroma. These features were reported as either present or absent. In addition, cyst fluid Carcinoembryonic Antigen (CEA) concentrations in 5 MNC were measured by a specific immunoassay.

Sometimes the ductal communication is not presented to the US, CT or ERCP, but can be seen on the MRI or pathological study and vice versa [15]. In the seven subjects presented, none of them were tested with MPTs and only one with ERCP, which does not prove communication with the duct [1]. The remaining four patients were studied with CT, which is not particularly reliable in portraying communication. The communications can be demonstrated in some of the patients if MRCP or ERCP is performed.

Multiple cystic fluid pathological parameters can be used to categorize the lesions, including fluid amylase, lipase, Carcinoembryonic Antigen (CEA), cancer antigen (CA)-125, mucin content, cytology, DNA content, and detection of genetic mutations. To date, CEA is the most reliable pathological marker in discriminating between mucinous and non-mucinous PCLs.

## 4. Conclusion

Diagnosis of MNC can be significantly hampered by the overlapping of many clinical-pathological signs with retention cyst, MCTs and IPMTs.

We recommend that a patient with a diagnosis of "benign" MNC be closely monitored by US, CT or ERCP investigation, because of the inability to absolutely confirming the benign nature of the lesion-well defined, without penetration in

surrounding tissues and no metastasis. Moreover, the existence of the MNC, as a truly unique cystic lesion, remains controversial because the reported cases of this neuralgia may simply represent a variant of an existing pancreatic pathology that overlaps the underlying pathological features of pancreatic cystic tumours plagued with mucosal epithelium. All imaging diagnosticians, surgeons, and pathologists need to share their experience in order to increase diagnostic possibilities for this particular pathology.

## Compliance with ethical standards

### *Disclosure of conflict of interest*

Noone of the authors haven't conflict of interests.

### *Statement of ethical approval*

The authors have appropriate ethical approval from the Medical university-Plovdiv.

### *Statement of informed consent*

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

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