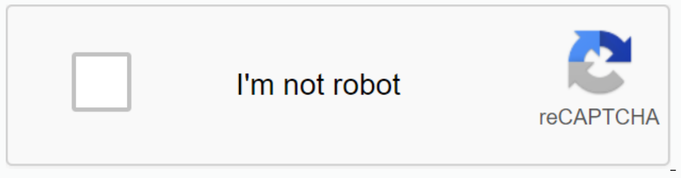

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Hypodense lesion pancreas

Cystic lesions of the pancreas are a diverse group of lesions that range from benign processes to invasive malignant tumors and can often be morphologically differentiated to CT and MRI based on characteristic features. This is important because an accurate diagnosis determines the treatment and surgical approach. Pancreatic cysts can be morphologically divided into four categories: unilular cysts (cysts without septation or a solid component) – pancreatic pseudocyst, intraductive papillary mucin neoplasm (IPMN) and mucinous cystadenom. Pseudocyst and IPMN are the two most common entities in this category, but there are other options, such as oligocystic serous cystocesoma, lymphoepithelial cyst, and cystic isletcell neoplasm. Microcystic lesions (collection of microcysts) – serous cystadenom. Macrocystic lesions (multiloculular cysts with fewer commutations, each > 2 cm) – mucinous cystadenom, IPMN and lymphoepithelial cyst. Cysts with solid components, i.e. mucinous cystic neoplasm (mucinous cystadenom and mucinous cystadenocarcinoma) – IPMN, solid and papillarous epithelial neoplasm and solid neoplasms that can show cystic degeneration (adenocarcinoma and isletcell cell tumors). The demographics and distinguishing characteristics of the most common cystic tumors of the pancreas are given in Table 1. In general, cystic lesions are hypodense to unreinforced CT, unless there are hemorrhagic, protein-containing or mucinous components when density is determined by the relative amounts of the various components. With contrast-reinforced CT, the improvement properties also vary depending on the type of lesion. In an uncomplicated case, the cystic components are hypotight and do not improve. If bleeding is present, the lesion may be hyperdense, isodichte or hypodensity depending on the type of blood products. Similarly, uncomplicated cystic lesions on MRI show a low signal intensity compared to normal pancreatic saving chyma on unenhanced T1-weighted sequences and a high signal intensity on T2-weighted images, although this may also vary if there are hemorrhagic, proteinaceous, or mucinous components within these lesions. With contrast-enhanced MRI values, the improvement properties also vary depending on the type of lesion. The most common cystic lesions of the pancreas seen in imaging are pseudocysts, serous cystadenom, mucin-containing lesions (IPMN, Mucinous cystadenom or cystadenocarcinoma) and a solid papillary epithelial neoplasm. Other rare cystic lesions of the pancreas include real epithelial cysts, cystic isletal cell tumors and adenocarcinoma with cystic degeneration. Overall, pseudocysts are the most common cystic lesions of the pancreas. A pancreatic pseudocyst a sharply rimulated uniloculular or multi-loculular liquid-filled structure, which is often best delimited after high-contrast administration. These collections of pancreatics or peripancreas are encapsulated by fibrous tissue and usually form after inflammation, necrosis or bleeding associated with or trauma. There are no vascularized or improving soft tissue elements within uncomplicated pseudocysts. In acute pancreatitis there are usually associated mesenteric edema and peripancreatic stranding, while in chronic pancreatitis, it may be associated with pancreatic parenchymal calcifications. Older cysts tend to have thicker walls that can contain calcium. The primary facial expression of a pseudocyst is mucinous cystadenom, and there can be significant overlapping of imaging characteristics between these two entities. In such cases, the patient history can be helpful. If not, then serial follow-up imaging is useful because pancreatic pseudocysts often develop at short intervals, while the mucinous cysadenoma often persists without significant interval change. These cysts can be found anywhere in the pancreas, but mainly affect the body or tail of the organ. Larger version TABLE 1: Imaging and demographic characteristics of the most common pancreatic cyst tumors Unenhanced CT usually shows a pancreatic pseudocyst as a round or oval hypotight lesion. If the pseudocyst contains bleeding, it appears as areas of increased attenuation within the lesion. With contrast-reinforced CT, the wall of a pseudocyst strengthens, but not the liquid that is affable in it (Fig. 1). Due to its ability to map the entire body, CT can show pseudocysts that have been dissected superior to the mediastinum or other ectopic areas, such as the lumbar or groin region. A pseudocyst appears hyperintensive lyses on T2-weighted sequences and has a homogeneous bright internal signal intensity, a characteristic feature that confirms that the lesion is a fluid-filled structure (Fig. 2A). In unimproved T1-weighted MR images, the lesion is hypointense unless it contains hemorrhagic elements that are hyperintense. For contrast-reinforced T1-weighted images, the fibrous capsule may have a contrast improvement (Fig. 2B). Serous cysendenomas are benign cystic neoplasms of the pancreas, which are common in older women. They consist of numerous small cysts, typically < 1 cm, which are connected in a honeycomb-like pattern. The cysts are lined with glycogen-rich epithelium and separated by fibrous septa that radiate from a central scar that can be calcified. These lesions have a slight dominance for the pancreatic head and are often diagnosed on the side. These lesions, instead of penetrating surrounding structures, usually displace neighboring organs. Atrophy of the pancreatic tissue and enlargement of the pancreatic and bile ducts proximal to the lesion are rare. Serous cysadenomas are common in von-Hippel-Lindau disease. At CT, a serous often a lobular form and appears hypodense due to its watertight nature on unreinforced scans (Figs. 3A and 3B). The fibrous part of the lesion strengthens after high-contrast administration. Calcified areas usually appear hypertight and are usually arranged in a characteristic stellar pattern in the middle of the lesion (Figs. 4A and 4B). that the sponge-like or irregular honeycomb image can only be observed in 20% of cases. In general, the occurrence of a serous microcystic adenoma depends on the number of fibrous septa and their degree of improvement. Tumors with less fibrous septatation may continue to have a damping similar to the liquid-like even after contrast administration. The presence of a large number of microcysts can produce a solid appearance with increased contrast improvement on CT, but the discovery of a cluster of small liquid cysts in MRI is usually diagnostic. Larger version (189K) Fig. 1 —

CT of the pancreatic pseudocyst. Axial contrast-reinforced CT image of the abdomen shows homogeneously low density non-reinforcing cystic collection (arrows) in pancreatic tail in patients with previous episode of acute pancreatitis. Larger version (163K) Fig. 2A – Show MRI of the pancreatic pseudocyst. A, Axial T2-weighted HASTE image shows homogeneously hyperintensive cystic lesion (arrows) in the pancreatic tail. Larger version (155K) Fig. 2B - Show MRI of the pancreatic pseudocyst. B, Dynamic T1-weighted contrast-enhanced liver uptake with volume acceleration (LAVA) (GE Healthcare) Image shows non-enhancing homogeneous hypointense lesion (arrows) in the pancreatic tail, in line with uncomplicated pancreatic pseudocyst. Larger version (144K) Show Fig. 3A - CT of the serous cystadenom. A and B, axial (A) and coronal (B) contrasted CT images show serous cystadenom (arrow, B) at the crossbetween of the head and body of the pancreas with a classic appearance of praised contour, fine internal septation, lack of vascular sheathing and central scar (best shown on coronal images). Larger version (175K) Fig. 3B - Ct of the serous cystadenom show. A and B, axial (A) and coronal (B) contrasted CT images show serous cystadenom (arrow, B) at the crossbetween of the head and body of the pancreas with a classic appearance of praised contour, fine internal septation, lack of vascular sheathing and central scar (best shown on coronal images). Larger version (210K) Fig. 4A - Ct of the serous cystadenom show. A and B, axial (A) and coronal (B) contrasted CT images show serous cysadenoma in the pancreatic head with a classic appearance of praised contour, fine internal septication, lack of vascular sheathing and calcification in central scar (arrows). Larger version (188K) Fig. 4B - Ct of the serous cystadenom show. A and B, axial (A) and coronal (B) contrasted CT images show serous cysadenoma in the pancreatic head with a classic appearance of praised contour, fine internal septication, lack of vascular sheathing and calcification in central scar (arrows). Larger version (171K) Fig. 5 - Show MRI of the serous cystadenoma. Heavily T2-weighted coronary thick plate MRCP image shows high-signal intensity lesion (arrows) at the intersection of the head and body of the pancreas (cluster of small cysts). The internal septation is best represented on the MRCP image (including incidental liver cysts). Larger version (180K) Fig. 5B - Show MRI of the serous cystadenoma. B, Dynamic delayed Reconstruction image after gadolinium injection shows that the lesion (arrow) has a homogeneous low signal with rim reinforcement and contains finely improving internal septations. In DER MRI, a serous cystadenom appears as a cluster of small cysts on T2-weighted images. The cystic components of a serous cystadenoma are hyperintense, and the fibrous elements are hypointense (Fig. 5A). There is no visible communication between the cysts and the pancreatic canal. In unreinforced T1-weighted images, the cystic parts of the tumor are hypointense, although previous bleeding within the lesion can make it appear hyperintense. The fibrous components are hypointense on all unreinforced sequences. After contrast administration, an improvement in fibrous elements can be demonstrated in early and late imaging, with a sustained improvement in the central scar with delayed dynamic imaging (Fig. 5B). Calcification appears hypointense in both T1 and T2-weighted sequences. The high sensitivity of MRI in the detection of fluid ends this modality in the diagnosis of tumors with small microcysts of particular importance. The visualization of four of the following five CT and MRI features is intended to help diagnose serous cysadenoma: pancreatic head position, wall thickness < 2 mm, praised contour, lack of communication with the pancreatic canal and minimal wall improvement. Mucinous cysadenoma is rare, consisting of 2.5% of the exocrintumors of the pancreas. They vary from benign slow-growing cystic adenomas (67%) aggressive and invasive mucinous cysadenocarcinomas (33%). These cystic lesions often have thickened walls lined with mucin-producing column epithelium. similar to gallbladder seamenmen. Unlike IPMNs, mucinous cysadenomas do not communicate with the pancreatic duct system. Since benign tumors can turn into invasive carcinomas at any time, all mucinous cystic tumors are considered surgical lesions. Most (> 95%) Mucinous cystadinomas have been found in women and usually include the body and tail of the pancreas. They are often clinically mute and can therefore reach sizes of more than 10 cm before they become tangible. In CT, mucinous cysdenomas are clearly defined smooth lesions that are hypodense to surrounding pancreatic sparencosms (Fig. 6). The cystic contents have liquid density. Contrast-enhanced scans show an improvement of the cyst wall and accentuate all septations and mural nodules. The presence of mural nodules or septal thickening and calcification strongly indicates a malignant lesion. Distal to the tumor, the pancreas can show such changes in chronic pancreatitis such as atrophy, canal dilation, coarse calcification, and areas decreased improvement, although such changes are not specific to mucinous neoplasms. It is important to look for evidence of a local invasion of surrounding organs. In MRI, a mucinous cystadenom cystadenom manifests itself as unilular or minimally septic cystic lesion. Although the cyst fluid is typically mucin filled, the most common MRI properties are those of simple liquid, with homogeneous high signal intensity on T2-weighted images (Fig. 7A) and homogeneous low signal intensity on non-reinforced T1-weighted images (Fig. 7B). After contrast administration, the cyst wall, septate and nonodularity areas can become visible (Fig. 7C). Although no concrete finding; Concomitant obstructive pancreatitis may show atrophic changes in the gland, with compensatory ductoral dilation and areas with reduced signal intensity on fat-saturated, non-improved T1-weighted images showing a heterogeneous improvement on delayed contrast-enhanced images. The calcification, if present, appears hypointense in all sequences. As with CT, the presence of mural nodules or septal thickening and calcification strongly indicates malignant lesion. If invasive or improving nodular components are present in a mucinous cyst with a surrounding ovarian stroma, the lesion is mucinous cystadenocarcinoma (Fig. 8A, 8B and 8C). Wall tubers and septa are better represented with MRI, while calcification is better represented with CT. Look at larger version (205K) Fig. 6 —CT of the mucinous cystadenoma. Axial contrast-reinforced CT image shows well-described, non-reinforcing lesion with low density (arrows) in the distal body tail of the pancreas. IPMN is a mucin-producing tumor of the pancreas that clinically and histopathologically distinguishes from mucinous cystadenom. These are most commonly seen in men (mean age, 60 years) and are characterized by a mucinous transformation of the pancreatic ductal epithelium. IPMNs can be classified according to whether the disease process includes the main pancreatic canal, isolated side branches, or a combination of both. They can also be characterized by whether they produce a diffuse pattern of ductal dilation or a segmental cystic appearance. The location of the tumor is very important for the prognosis. Main channel IPMNs are most likely to have a malignant transformation (70%), while about 15-20% of side branchles show a focus of malignancy according to surgical literature. Although diffuse ductal dilation is also observed in advanced chronic pancreatitis, there are almost always associated pancreatic parenchymal changes, i.e. atrophy, loss of lobulated contour and loss of the inherent T1 hyperintensity of the pancreatic sparchyma or delayed uptake of contrast agents due to fibrosis. IPMN varies from a slow-growing localized lesion to an invasive and metastatic tumor. It usually occurs at patients and is more common in men. Larger version (149K) Fig. 7A—Show MRI of the mucine cystadenoma. An axially grease-suppressed T2-weight image shows well-described hyperintense lesion (arrows) in the distal body tail of the pancreas, which shows no communication with pancreatic canal. View larger version (226K) Fig. 7B —MRI by mucinous mucinous B and C, ground (arrows) has a low signal intensity on unenhanced T1-weighted image (B) and shows no internal complexity or improvement after contrast management (C). On contrast-reinforced image there is a subtle delayed improvement of the surrounding wall. Larger version (200K) Fig. 7C — Show MRI of the mucine cystadenoma. B and C, ground (arrows) has a low signal intensity on unenhanced T1-weighted image (B) and shows no internal complexity or improvement after contrast management (C). On contrast-reinforced image there is a subtle delayed improvement of the surrounding wall. Larger version (155K) Fig. 8 — Display MRI of mucinous cystadenocarcinoma. An axial fat suppressed T2-weight image shows a well-described hyperintense mass in the distal body tail of the pancreas, which shows no communication with the pancreas canal. Mass has a subtle range with low signal intensity (arrow). B and C show mass homogeneous low signal intensity (arrow, B) on unenhanced T1-weighted image (B) and improvement of the nodule (arrow, C) after contrast administration (C). The imaging diagnosis of IPMN depends on the identification of the ratio of the lesion to the pancreatic duct, especially for side branch types. These tumors dilute the affected side branch with mucin and produce the appearance of a pleomorphic cystic pancreatic mass that communicates with the main channel. This communication is a key feature in the diagnosis of IPMN on radiological imaging, as other neoplastic cystic lesions (mucinous cysadenoma and serous cystadenom) may have an otherwise similar appearance. In CT, a side branch of IPMN usually appears as a hypodense non-reinforcing pleomorphic lesion. It is classically in the non-tinted process and closely related to a non-dilated main pancreatic canal. Multiplanar reformatted images show the communication between the lesion and the channel, which may not be well visualized on axial images. Main disc channel lesions can be classified depending on whether they produce diffuse or segmental channel dilation. Contrast-enhanced CT scans can also show internal improvement elements. MRCP has proven to be a non-invasive technique for providing multiplanar perspectives of the pancreatic ductal system as a significant promise (Fig. 9). Main pancreatic channel IPMN generates an extension of the entire channel without discrete intraukal entanglement. Page dissimilars have a pleomorphic appearance and are hyperintense on T2-weighted sequences and hypointense on unenhanced T1-weighted images. The overall relationship between a side branch IPMN and the main pancreatic channel is best visualized on MRCP; The nodular components and the degree of wall thickening are best applied to contrast-reinforced estimated (Fig. 10). View larger version (113K) Fig. 9 —Intraductal papillary mucinous neoplasm. Strong T2-weighted MRCP image shows countless cystic lesions (arrows) within the pancreatic secretion chyma connected to an otherwise inconspicuous main pancreatic channel. View larger (156K) Fig. 10 —Side branching intraductive papillary mucinous neoplasm. Axial HASTE image shows the pancreatic tail lesion (arrows) as unilcululular cysts in communication with thought-spukals. Larger version (155K) Fig. 11 —Show solid and papilla epithelial neoplasm. Axial contrast-reinforced CT image shows 10 cm hypovascular, well-described mass in the body and tail of the pancreas (arrow) with internally branched papillae (arrow head). The findings, which are of concern for malignancy in an IPMN, include the improvement of solid components, the inclusion of the main pancreatic canal, the main expansion of the pancreatic canal of more than 10 mm, a size of more than 3.5 cm and an extension beyond the gland. Solids and papilla epithelial neoplasm is a rare tumor that usually occurs in the tail of the pancreas. It occurs exclusively in young women (middle age, 35 years) and especially in African and Asian descent. Solid and papillary epithelial neoplasm is usually a benign or low-grade malignant tumor with a slow growth pattern; it is usually asymptomatic and can be diagnosed as a random finding. As the lesion progresses, it can create a mass effect on the surrounding structures, but not penetrate into them. In CT, the epithelial neoplasm of solids and papillae appears as a large encapsulated mass with cystic and solid components. Cystic components are secondary to tumor degeneration. The solid tissue elements are peripheral, with central areas of bleeding and cystic degeneration with internal branched papillae (Fig. 11). The solid components and the capsule improve after the contrast administration. THE MRI shows a solid and papillaric epithelium neoplasm as a clearly defined mass, which most often has a heterogeneous appearance due to bleeding and necrosis in T1 and T2 weighted sequences. Areas of intratumoral bleeding are hyperintensive on unenhanced T1-weighted images and hypointense on T2-weighted scans. An important diagnostic feature of the solid and papillary epithelial neoplasm is the presence of a hypointense fiber capsule, which most likely develops in response to the expansive tumor. The improvement pattern shows a gradual accumulation of contrast agents within the tumor, which distinguishes it from neuroendocrine tumors that show early arterial improvement. A real epithelial cyst of the pancreas appears on CT as a single small liquid-filled structure with an imperceptible wall. The cyst contains no internal septa and shows no contrast improvement. There is a strong association between real epithelial cysts of the pancreas and that of Hippel-Lindau disease, in which several uniloculular cysts are present in healthy pancreas are scattered on contrast-enhanced CT scans. MRI shows an unilular lesion that is hyperintensive in T2-weighted sequences (Fig. 12), hypointense on T1-weighted sequences and shows no internal complexity or improvement. The lesion is without internal septations and does not communicate with the pancreatic duct. Cystic neuroendocrine tumors are an unusual neuroendocrine neoplasm. They are most common in adults and have no sexual preference. Benign cystic degeneration is rare in neuroendocrine neoplasms; most cyst formation within these lesions is secondary to tumor degeneration (Fig. 13A and 13B). Identifying a cystic neuroendocrine tumor is a challenge and is based on the identification of highly vascularized soft tissue components. Correlation with clinical history is important as these neoplasms are more common in patients with multiple endocrine neoplasia syndrome. On CT and MRI, the diagnosis of the cystic neuroendocrine tumor can be suggested by a rim of high-gradvascular tissue that shows an aviante improvement in the early arterial phase, a trait that correlates with the histological findings of neoplastic neuroendocrine cells lining the periphery of the cysts (Fig. 13C and 13D). Larger version (134K) Fig. 12 —Show epithelial cyst. Axial HASTE image shows well-described lesion (circle) in the body of the pancreas, which appears hyperintensive without internal complexity and does not communicate with the pancreatic canal. Ductal adenocarcinoma is the most feared cancer of the pancreas, with high morbidity and mortality. Depending on the location, this tumor represents an infiltrative lesion with the resulting obstruction of the pancreatic duct (Fig. 14A, 14B and 14C), a common bile duct or both. The ductal carcinoma can also penetrate into the surrounding vascular (Fig. 14A). The tumor is predominantly solid, but cystic degeneration is a rare imaging representation (Fig. 14B). In CT and MRI, pancreatic ductal adenocarcinoma appears as hypovascular infiltrative soft tissue mass (Fig. 14C). Complex cystic areas representing internal tumor necrosis or lateral ductal obstruction can be seen. The tumor usually causes vascular invasion and pancreas ductal obstruction at an early stage and is thus well represented on cross-sectional image. Other pancreatic neoplasms can manifest as cysts containing a solid component, solid tumors associated with a cystic component, or cystic degeneration. These include metastases, cystic teratomas, sarcoma, hemangioma, lymphangioma and paragangliom. Larger version (154K) Fig. 13A —Show MRI of the cystic isletcell cell tumor. A and B, Axial T2-weighted image (A) and strongly T2-weighted, thickly polished MRCP image (B) show well-described hyperintensive lesion (arrows) in the body of the pancreas, which shows no communication with the pancreas channel. Larger version (99K) Fig. 13B —Show MRI of the cystic isletcell cell tumor. A and B, Axial T2-weighted image (A) and strong T2-weighted, thickly polished MRCP image (B) show well-described hyperintensive images (arrows) in the body of the pancreas, which shows no communication with the pancreas canal. Larger version (153K) Fig. 13C —Show MRI of the cystic isletcell cell tumor. C and D, Lesion has low signal intensity on unreinforced T1-weightimage (C) and shows a aviated rim gain (arrow) in the early arterial phase image (D). View larger version (139K) Fig. 13D —MRI by cystic Islet Islet Tumor. C and D, Lesion has low signal intensity on unreinforced T1-weightimage (C) and shows a aviated rim gain (arrow) in the early arterial phase image (D). Larger version (167K) Fig. 14A - CT of adenocarcinoma with cystic degeneration show. An axially contrast-reinforced CT image shows an infiltrative lesion in the head of the pancreas (arrows) with superior mesenteric artery and superior mesenteric vein. There is also a blocked pancreatic canal (arrow head). Larger version (151K) Fig. 14B - Ct of adenocarcinoma with cystic degeneration show. B and C, axial T2 weighted (B) and contrast-reinforced T1-weighted (C) images show infiltrative hypoenhancing mass (arrows) with internal cystic components that are T2 hyperintensive. Arrowhead shows disabled-dilated pancreatic canal. Larger version (158K) Fig. 14C - CT of adenocarcinoma with cystic degeneration show. B and C, axial T2 weighted (B) and contrast-reinforced T1-weighted (C) images show infiltrative hypoenhancing mass (arrows) with internal cystic components that are T2 hyperintensive. Arrowhead shows disabled-dilated pancreatic canal. Cystic pancreatic lesions include a wide range of benign and malignant pathological entities; many of them have specific features that are well visualized by cross-sectional images. Both CT and MRI allow an optimal assessment of the internal architecture and improvement properties of these lesions. The decision to follow a pancreatic lesion instead of following it again is a matter of clinical assessment based on the age of the patient, comorbidities and the assessment of the risk of cancer in the lesion. Ideally, the imaging modality at the baseline and after the end should provide adequate information about the size of the lesion and the main pancreatic canal, as well as the presence of intramural nodules. These criteria can be satisfactorily assessed by non-invasive imaging studies such as CT or MRI or by invasive tests such as endoscopic ultrasound. The treatment of benign and low-grade malignant tumors (serous cystadenom or fixed or papillary epithelial neoplasm) depends on the clinical symptoms. In the case of random examination in an asymptomatic patient, the lesion with imaging can be tracked at intervals that vary according to institutional protocol. If the lesion is symptomatic or the diagnosis is called into question, surgical resection is performed. Mucinous lesions (mucinous cystadenom and IPMN) have malignant potential. According to international guidelines, the estimated risk of prevalence of invasive cancer in the symptomatic secondary department of IPMN is 30% and for asymptomatic lesions 0-5%. On the basis of available data from several studies appears to be at low risk of short-term progression to invasive cancer in asymptomatic cystic lesions without main channel dilation (> 6 mm) and without wall nodules and such < 30 mm. The interval between post-examinations for these lesions has yet to be determined. Until final studies studies In order to answer this question, it seems reasonable to track annually if the lesion is < 10 mm; 6- or 12-month follow-up period for lesions between 10 and 20 mm; and 3- or 6-month follow-up careable for lesions > 20 mm. In follow-up studies, indications for resection are the development of symptoms due to the cyst (e.g. pancreatitis), the presence of intramural nodules, the cyst size > 30 mm and the expansion of the main pancreatic canal (> 6 mm). After 2 years of stability, the follow-up interval can be extended. Patients with branch channel IPMN who are symptomatic should be treated with resection, not only to alleviate symptoms, but also because of a higher likelihood of malignancy. It is important to stress that the choice of treatment should be individualised on the basis of patient preference and willingness to undergo follow-up studies. Unless there are contraindications for surgery, all mucinous cystic lesions should be resected. WEB This is an exclusive web article. 1. Arakawa A, Yamashita Y, Namimoto T, et al. Intraductal papillary tumors of the pancreas: histopathological correlation of MR-cholangiopancreatography findings. Acta Radiol 2000; 41:343–347 [Google Scholar]2. Buetow PC, Parrino TV, Buck JL, et al. Islet cell tumors of the pancreas: pathological-imaging correlation between size, necrosis and cysts, calcification, malignant behavior and functional status. AJR 1995; 165:1175-1179 [Abstract] [Google Scholar]3. Cantisani V, Mortele KJ, Levy A, et al. 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