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Cystic tumors of the pancreas: diagnosis with computed tomography examination

Cystic tumors of the pancreas are less frequent then other tumors in neoplastic pancreatic pathology, but in recent years the literature has reported an increasing number (7). They are often regarded as representing 10% of all pancreatic cysts (5). They are divided into microcystic adenomas (or serous cystadenomas) and macrocystic adenomas / adenocarcinomas (or mucinous cystic neoplasms / tumors). Microcystic adenomas are always benign and mucinous cystic neoplasms are potentially or overtly malignant (2).

The aim of the study is evaluation the CT findings in cystic pancreatic tumors.

MATERIAL AND METHOD

A review of the CT files disclose five cases of microcystic adenoma of the pancreas and nine cases of mucinous cystic neoplasm, selected from a group of 283 patients who had the CT examination performed with the suspicious of the pancreatic disease, in the 2nd Department of Radiology Medical Academy of Lublin, during the years 1995–2004. Computed tomography was performed with Siemens Somatom ART CT scanner before and after bolus injection of 80–100 ml contrast agent. The surgical resection was achieved in all cases and there was the histopathological examination of the resected material.

RESULTS

Microcystic adenomas. Tumors ranged in diameter from 5 to 11 cm (mean 7cm) and were located in the head of the pancreas (four cases) and in the tail (one case). The masses were lobulated or round on cross-sectional imaging. On unenhanced CT scans all tumors were hypodense with density of water or slightly higher. The masses were composed of small cysts with hypervascularized septa after contrast bolus injection. In four cases there were calcified foci in the center of the tumor and the central scar (Fig. 1). One case, with very small cysts and no calcifications appear as homogenous mass (Fig. 2).

Mucinous cystic neoplasms. The lesions were located in the body and tail of the pancreas (eight cases) and in the head (two cases). The diameter ranged from 4 to 15 cm (mean 9 cm). The masses consisted of large cysts, larger than 2 cm, and solid, hypervascular components (Fig. 3). The wall of the cysts were partly thickened in four cases and in two cases there were calcifications in the wall.

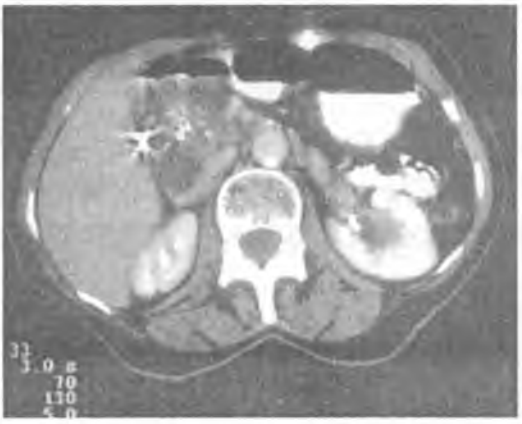

Fig. 1. Microcystic adenoma of the head of pancreas. Conglomerate of small cysts with honeycomb appearance and central scar with calcified foci

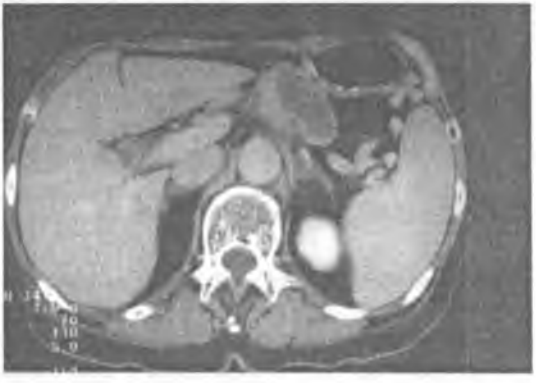

Fig. 2. Microcystic adenoma of the tail of pancreas. Homogeneous tumor with innumerable tiny cysts

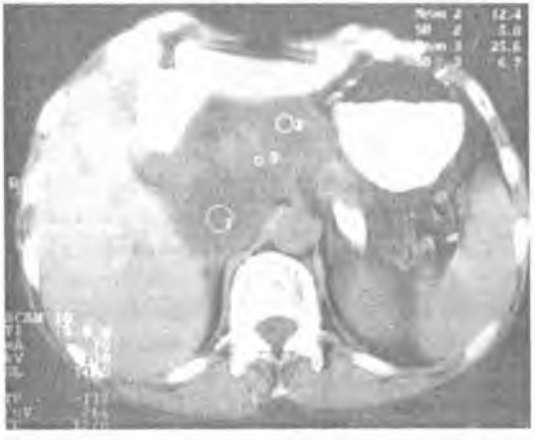

Fig. 3. Mucinous cystadenocarcinoma of the body of pancreas. The mass with large cysts and solid components

DISCUSSION

Pathological findings in cystic neoplasms of the pancreas have been well described. Most of the serous cystic tumors are asymptomatic and detected incidentally by radiological investigation. They appear as an unenhanced, homogeneous mass with density slightly superior to water. When calcifications are present, their location is almost always central, and they are punctate or globular, as opposed to the lamellar calcifications seen in mucinous cystic tumors (6). Usually a central fibrous scar is visible in the larger masses since it forms later on. The presence of central calcification in correspondence with scars or septa definitively characterizes a cystic mass as serous cystadenoma (7). The tumor has round and lobulated contour and is composed of innumerable cysts varying from <1 to 20mm with a tendency for larger cysts to be located near the periphery (Fig. 1). Rarely, tumors contain a few cysts measuring up to 8 cm (2). Macrocystic patterns of the cysts are indistinguishable from other macrocystic masses of the pancreas, such as mucinous cystic neoplasm. On the other hand, when cysts are minute, the tumor appears as solid, homogeneously enhanced mass on dynamic CT and is also difficult to differentiate from other tumors (Fig. 2).

Microcystic adenoma was formerly classified as serous cystadenoma, develops preferentially in men and woman over the age of sixty. When discovered, it is usually around 5 cm in size, but can become much larger. Malignancy of these neoplasms has not been reported (8). According to the tissue composition of the microcystic adenoma, the conglomerate of small cysts may display a honeycomb appearance or may have a more solid appearance if the cysts are beyond the limits of resolution. Radial calcification with central area of cicatrization is frequently observed (8).

The differential diagnosis is extensive because of the wide variation in appearance of microcystic adenoma. For microcystic adenomas with large cysts and a small amount of connective tissue, differential consideration includes mucinous cystic neoplasm of the pancreas, solid and papillary epithelial neoplasm of the pancreas (1), pancreatic cysts and pseudocysts including secondary cysts induced by adenocarcinoma of the pancreas (3). For microcystic adenomas with minute cysts, islet cell tumors, metastatic pancreatic tumor, pancreatic adenocarcinoma and hypervascular tumor arising in the peripancreatic organs must be included in the differential diagnosis.

Mucinous cystic tumors, also known as macrocystic adenoma, occur primarily in women between the ages of 40 and 60. The mucinous cystic tumor is considered to be the most frequent among pancreatic cystic neoplasms (5). They are located almost exclusively in the pancreatic tail or body and have usually already become large masses when they are discovered. In contrast to the microcystc adenoma, these tumors may transform into malignant onese and should be surgically removed (8). They appear on plain scans as a large, multilocular cyst or conglomerate of cysts (Fig. 3). The cyst wall is thick (0.1–2mm) and occasionally associated with mural calcifications (2). The septa of macrocystic adenoma are normally thicker than the septa of microcystic adenoma (8). Papillary excrescences and long, thin septa are frequently noted. If they are unilocular and the septal signs are absent, the macrocystic adenoma may mimic a pseudocyst.

Malignant tumors have a relatively large solid component (2). Upon macroscopic examination, its appearance resembles that of its benign variant, the macrocystic adenoma. The malignancy of the cystadenocarcinoma manifests via the formation of metastases and infiltration of the surrounding tissue (4). Regional lymph node enlargement must be found to confirm the diagnosis of malignancy. On contrast-enhanced scans they demonstrate hypervascularized septa and hypovascularized tumor sections (8). Cysts with thick walls and calcifications present in the wall or septa show the highest risk of malignancy. In this case surgery is mandatory, with no need of fine needle aspiration biopsy (5).

The macrocystic multilocular pattern is considered typical but not pathognomonic. Oligocystic serous

custadenoma, cystic variant of solid pseudopapillary tumor and cystic endocrine tumor have an identical appearance. In these cases clinical history and laboratory data are essential for diagnosis. Oligocystic serous cystadenoma is almost never differentiated preoperatively from benign mucinous cystic tumor. Pseudocysts make the diagnosis difficult mainly where there is a macrocystic unilocular pattern. If the clinical history is silent, mucinous cystic tumor should be suspected (7).

CONCLUSIONS

Computed tomography is useful for confirming the presence of a pancreatic cyst and for distinguishing the microcystic subgroup of cystadenoma. The main aim of this analysis is the evaluation which preoperative CT findings are the best predictors of the malignancy. Early diagnosis of malignant transformation of the mucinous cystic tumor is essential, since the prognosis is the same as ductal adenocarcinoma, while in the in situ forms, surgery could be curative. The mucinous cystic neoplasm is, at best, a premalignant lesion, and, therefore, it is important to distinguish it from other cystic lesions of the pancreas.

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SUMMARY

The aim of the study is evaluation the CT findings in cystic pancreatic tumors. A review of the CT files disclose five cases of microcystic adenoma of the pancreas and nine cases of mucinous cystic neoplasm selected from a group of 283 patients who had the CT examination performed with the suspicious of the pancreatic disease. Computed tomography was performed with Siemens Somatom ART CT scanner before and after bolus injection of 80–100 ml contrast agent. The surgical resection was achieved in all cases and there was the histopatological examination of the resected material. Microcystic adenomas were located in the head of the pancreas and in the tail. On unenhanced CT scans tumors were hypodense with density of water or slightly higher. The masses were composed of small cysts with hypervascularized septa after contrast bolus injection. There were calcified foci in the center of the tumor and the central scar. Tumor with very small cysts and no calcifications appeared as

homogenous mass. In mucinous cystic neoplasms the lesions were located in the body and tail of the pancreas and in the head. The masses consisted of large cysts and solid, hypervascular components. The walls of the cysts were partly thickened and there were calcifications in the wall. Computed tomography is useful for confirming the presence of a pancreatic cyst and for distinguishing the microcystic subgroup of cystadenoma. The mucinous cystic neoplasm is a premalignant lesion, and therefore it is important to distinguish it from other cystic lesions of the pancreas. Early diagnosis of malignant transformation of the mucinous cystic tumor is essential, since the prognosis is the same as ductal adenocarcinoma.

Guzy torbielowate trzustki w obrazie tomografii komputerowej.

Celem pracy jest ocena zmian w guzach torbielowatych trzustki, stwierdzonych w badaniu tomografii komputerowej. Materiał stanowi pięć przypadków gruczolaka mikrotorbielowatego trzustki i dziewięć przypadków torbielowatych guzów śluzowych trzustki, stwierdzonych w grupie 283 chorych, badanych przy pomocy tomografii komputerowej z powodu podejrzenia zmian trzustkowych. Badania były wykonywane aparatem Siemens Somatom ART przed i po dożylnym podaniu 80–100 ml środka kontrastowego. Wszyscy chorzy zostali poddani operacji z histopatologicznym badaniem resekowanego materiału. Gruczolaki mikrotorbielowate były zlokalizowane w głowie i ogonie trzustki. Niska densyjność guzów zbliżona była do densyjności wody lub nieco wyższa. Masy złożone były z licznych małych torbieli, z przegrodami. W centrum zmian znajdowały się zwapnienia i centralna blizna. Guz z bardzo małymi torbielami, bez zwapnień, przedstawiał się jako jednorodna masa. W torbielowatych guzach śluzowych zmiany stwierdzono w obrębie trzonu i ogona trzustki. Składały się one z dużych torbieli i części litej. Ściany torbieli były odcinkowo pogrubiałe i zawierały zwapnienia. Tomografia komputerowa jest użyteczna w stwierdzaniu obecności torbieli trzustki i w odróżnianiu gruczolaków mikrotorbielowatych. Śluzowe nowotwory trzustki są zmianami przedrakowymi i dlatego ważne jest ich odróżnienie od innych zmian torbielowatych trzustki. Wczesne rozpoznanie przemiany złośliwej w guzach śluzowych jest ważne, gdyż mają one złe rokowanie, podobnie jak gruczolakorak trzustki.