Hemangioma of pancreas: a rare tumor of adulthood

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Cystic tumors of the pancreas are uncommon lesions, comprising 2%–10% of all pancreatic neoplasms [1]. The differential diagnosis of cystic pancreatic lesions includes both reactive processes and neoplasms [2]. Most cystic lesions are pseudocysts of inflammatory nature, appearing usually after an episode of acute pancreatitis and accounting for 5%–90% of the lesions in different studies. Vascular tumors on the other hand are rare lesions and their exact incidence is not known. They are more common in childhood [3-4], with only a handful of cases occurring in adults. These tumors are usually readily diagnosed by imaging such as computed tomography, angiography, ultrasound or magnetic resonance [3]. Although these neoplasms are not strictly cystic, imaging may demonstrate the fluid component which would lead to their diagnosis.

We report the case of a hemangioma of the pancreas that was initially diagnosed as a cystic tumor with solid areas based on radiological findings, and review the literature.

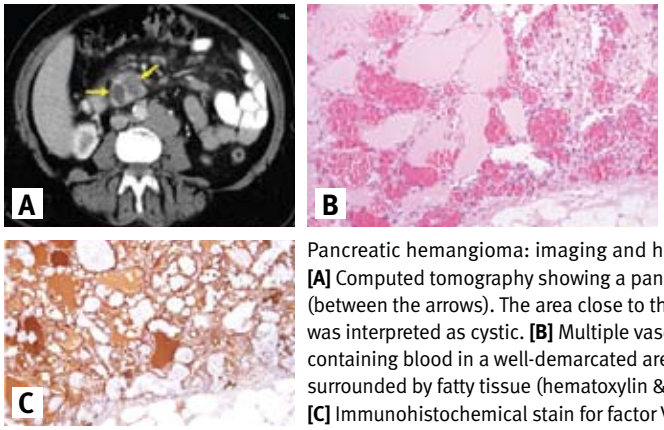
PATIENT DESCRIPTION

A 73 year old woman presented with abdominal pain radiating to the left flank, not related to meals, and accompanied by nausea. Her physical examination did not reveal any abnormality that would explain her symptoms. Eight years previously she had suffered from recurrent episodes of a similar pain that lasted a year. Her pain was investigated and at the time abdominal CT demonstrated a small cystic lesion in the uncinate process of the pancreatic head. Since her pain subsided, no medical intervention was undertaken other than follow-up.

Due to recurrence of the abdominal complaints 8 years later, CT imaging was repeated. A tumor measuring 5 cm with microcalcifications was found, larger than the lesion imaged on the first CT 8 years earlier [Figure A]. It contained hypodense lobular areas that showed enhancement after injection of contrast material in the arterial phase and peripheral irregular enhancement in the portal phase. The findings were interpreted as a cystic lesion with possible solid component and the mass was resected using the Whipple procedure. The postoperative period was uneventful.

Gross pathological examination of the tumor revealed a mass composed of cystic spaces containing gray gelatinous material and partially solid areas. The tumor size was 5.5 x 4 x 3 cm and did not involve the surgical margin or the duodenal walls.

Microscopically the mass consisted of multiple vascular spaces of variable size, from capillary to cavernous [Figure B]. Some of the spaces contained blood and all were lined by a single layer of uniform flattened cells. Areas of hemorrhage, cholesterol clefts and foreign body-type giant cells were found adjacent. The nearby pancreas showed focal fibrosis and atrophy. All the resection margins were free of tumor. The adjacent adipose tissue contained 14 reactive lymph nodes negative for tumor. On immunostaining the lining cells of the cystic spaces were positive for CD31, CD34 and factor VIII and negative for D2-40 and MNF-116 [Figure C]. The mass was diagnosed as a pancreatic hemangioma.



Pancreatic hemangioma: imaging and histology. **[A]** Computed tomography showing a pancreatic mass (between the arrows). The area close to the left arrow was interpreted as cystic. **[B]** Multiple vascular spaces containing blood in a well-demarcated area and surrounded by fatty tissue (hematoxylin & eosin, x 40). **[C]** Immunohistochemical stain for factor VIII showing positive staining of the vascular wall lining and lumen (x 40).

COMMENT

Pancreatic hemangiomas are rare tumors accounting for 0.1% of all pancreatic neoplasms [4]. They are more common in childhood, with a possible association with Kasabach-Merritt syndrome [4]. In children they usually proliferate and later regress. Fewer than 10 cases of pancreatic hemangioma occurring in adults have been reported. Most of these hemangiomas were reported in females (6/9), were symptomatic (6/9 abdominal pain, 1/9 gastrointestinal bleeding, 1/9 nausea vs. 1/9 incidental finding at autopsy) and were located in the pancreatic head (66% vs. body/tail in 33%). Patient age at presentation ranged from 30 to 79 years. Only in two of the reported cases was immunostaining for factor VIII, CD31 or CD34 performed to confirm the diagnosis [4].

Clinically, hemangiomas may cause an obstructive jaundice when the tumor is located in the head of the pancreas; they may be associated with non-specific symptoms or they could be asymptomatic [4]. Whether clinically suspected or not, they are usually demonstrated by different methods of imaging. They typically appear on CT as a cystic lesion with contrast enhancing in the arterial phase. However, there could be diminished enhancing due to arteriovenous shunting with slow flow [3].

Microscopically, hemangiomas are composed of an increased number of blood-filled spaces covered by flat endothelium and separated by scant fibrous connective tissue stroma [5]. The cystic spaces can be small-sized (capillary hemangioma) or dilated (cavernous hemangioma), and can be associated with thrombosis and hemorrhage [5].

The differential diagnosis of cystic pancreatic lesions includes pseudocysts, serous cystic neoplasms, mucinous cystic neoplasms, intraductal papillary mucinous neoplasms, solid pseudopapillary neoplasms, cystic change of solid tumors, lymphoepithelial cysts and vascular tumors [2].

Unlike hemangiomas, pseudocysts lack any kind of lining cells and are characterized histologically by a fibrous capsule and chronic inflammatory infiltrate. Serous cystic neoplasms occur mostly in females in their sixties, are relatively large tumors and are usually located in the body or tail. They typically contain a central fibrous scar and show multiple cysts lined by glycogen-rich epithelial cells that are positive for periodic acid Schiff and express cytokeratins, epithelial membrane antigen, inhibin and MART-1 [2].

Mucinous cystic neoplasms occur most commonly in women in the fifth to sixth decade of life, are usually larger than 10 cm and are located in the body or tail. Classically they are single multilocular cysts that do not communicate with the ductal system. They are lined by columnar mucin-producing epithelial cells set within an ovarian-like stroma and express keratin, carcinoembryonic antigen and CA19-9, while CK20 and CDX2 (markers of intestinal differentiation) are negative. Importantly, the grade of epithelial dysplasia should be evaluated [2].

IPMNs usually occur in the seventh to eighth decades of life, mostly in the head, and affect both genders equally. They are characterized by an intraductal proliferation of mucinous cells usually showing papillary projections. IPMNs are subclassified according to the specific type of cells as intestinal, gastric foveolar, or pancreatobiliary. Similar to mucinous neoplasms, IPMNs should be extensively examined to determine the grade of dysplasia and the presence of an invasive component. The epithelium of IPMNs expresses keratins, CEA and CA19-9, with variable expression of MUC (the intestinal type is positive for MUC2, the pancreatobiliary is positive for MUC1, and the gastric foveolar is negative for both) [2]. Intraductal oncocytic papillary neoplasms share clinical and pathological features with IPMNs and some regard them as oncocytic variants [2].

IPMN = intraductal papillary mucinous neoplasm
CEA = carcinoembryonic antigen

Solid pseudopapillary neoplasms are more frequent in young women in the pancreatic tail and on average are larger than 10 cm. They are solid tumors rich in blood vessels that due to degenerative changes show pseudopapillae and pseudocysts [2]. The tumor cells stain for vimentin and beta-catenin with partial reactivity to keratin. Although CD56 and synaptophysin stains may be positive, chromogranin stain is always negative [2].

Cystic change may occur in typically solid tumors such as ductal adenocarcinoma, acinar cell neoplasms (benign and malignant) and pancreatic endocrine neoplasms. Recognition of adjacent carcinoma is the key to correct diagnosis of ductal adenocarcinoma. Acinar cell neoplasms and pancreatic endocrine neoplasms may share architectural features of solid and nested growth pattern but have a distinct immunoprofile since positive staining for chromogranin and synaptophysin is characteristic for endocrine neoplasms [2].

Finally, lymphoepithelial cysts may be found mostly in men in the fifth to sixth decade, usually in the body or tail. They are lined by squamous epithelium and surrounded by dense lymphoid tissue, possibly showing germinal centers.

Pancreatic vascular neoplasms include rare reports of lymphangiomas and hemangiomas. In cystic lesions suspected to be hemangiomas, immunostaining can confirm the endothelial origin. The vascular markers CD31, CD34 and factor VIII are positive in endothelial cells, while cytokeratins marking epithelium and the lymphatic marker D2-40 are negative [4], as observed in the present case of pancreatic hemangioma. Of note, benign vascular tumors may be diagnosed only after their complete resection due to occasional difficulties in preoperative CT imaging and non-specific findings seen in intraoperative frozen sections (hemorrhages, hypocellularity and artifactual changes).

The therapeutic approach to hemangiomas is variable. In children, where they usually regress, no treatment is advocated

other than follow-up [4]. Unlike pediatric vascular tumors, there are no definitive protocols for treatment of pancreatic hemangiomas in adults. Yet, due to their permanent nature, the risk of sudden hemorrhage and the possible differential diagnosis with epithelial tumors, surgical resection is usually recommended.

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References

1. Warshaw AL, Compton CC, Lewandrowsky K, Cardenosa G, Mueller PR. Cystic tumors of the pancreas: new clinical, radiologic, and pathologic observations in 67 patients. *Ann Surg* 1990; 212 (4): 432-43.
2. Kalimstra DS, Adsay NV. Tumors of the pancreas and ampulla of Vater. In: Odze RD, Goldblum JR, eds. Surgical Pathology of the GI Tract, Liver, Biliary Tract and Pancreas. 2nd edn. Philadelphia: Saunders Elsevier, 2008: 923-36.
3. Kobayashi H, Itoh T, Murata R, Tanabe M. Pancreatic cavernous hemangioma: CT, MRI, US and angiography characteristics. *Gastrointest Radiol* 1991; 16 (1): 307-10.
4. Mundinger GS, Gust S, Micchelli ST, Fishman EK, Hruban RH, Wolfgang CL. Adult pancreatic hemangioma: case report and literature review. *Gastroenterol Res Pract* 2009; 2009: 839730. http://www.ncbi.nlm.nih.gov/pubmed?term=mundinger%20gs%20pancreatic%20hemangioma
5. Mitchel RN, Shoen FJ. Blood vessels. In: Kumar V, Abbas A, Fausto N, Aster J, eds. Robbins and Cotran Pathologic Basis of Disease. 8th edn. Philadelphia: Saunders Elsevier, 2010: 520-1.