

Case Report

Pancreatic lipomatous hamartoma mimicking other pancreatic tumor: a case report and literature review

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Abstract: Pancreatic lipomatous hamartoma (PLH) is an extremely rare benign entity that forms a mass-like lesion. PLH lacks distinct features, and can be preoperatively misdiagnosed as a pancreatic tumor with lipomatous components, including pancreatic lipomatosis, lipoma, liposarcoma, and malignant tumors with fatty degeneration. Here, we report a case study of PLH in a 73-year-old male who presented with abdominal pain. Abdominal-enhanced computed tomography and magnetic resonance imaging revealed a 4.3×4-cm solid mass with a lipomatous component in the pancreatic head, and the mass displayed a centripetal pattern of contrast enhancement. The patient was preoperatively diagnosed with pancreatic liposarcoma, and subsequently underwent a pancreatoduodenectomy. The postoperative pathology and immunohistochemical analyses confirmed the diagnosis of PLH, which primarily contained mature adipocytes, small ducts, and a few well-preserved pancreatic acini. Although this disease is rare, we suggest that PLH should be considered during the differential diagnosis of pancreatic lesions with lipomatous components. Consideration of the potential for PLH disease might reduce the number of unnecessary resections.

Keywords: Pancreatic hamartoma, lipomatous, liposarcoma, surgery

Introduction

Hamartomas are rare, benign, tumor-like growths containing a disorganized mixture of cells and tissues at the affected site [1]. The lung is the most common site of hamartomas, although they can arise from almost any system in the body, and are most often asymptomatic. Pancreatic hamartoma is extremely rare, accounting for < 1% of all hamartomas, and for 10% of primary mesenchymal tumors of the pancreas [2].

Pancreatic lipomatous hamartoma (PLH) is a distinct variant of pancreatic hamartoma first reported by Tanaka [3]. PLH primarily contains mature adipocytes without atypia, and displays typical features such as well-preserved acini and small ducts [3]. It is difficult to distinguish between PLH and other lipomatous lesions of the pancreas, including lipoma, pancreatic lipomatosis, and perivascular epithelioid cell tumor (PEComa), liposarcoma, and malignant tumors with lipomatous components [3]. Thus,

the diagnosis of PLH is often confirmed by pathology and immunohistochemical assessments after surgical resection [4]. To the best of our knowledge, only three PLH cases have been reported in the English literature. Here, we report a case of PLH preoperatively misdiagnosed as pancreatic liposarcoma, and provide a comprehensive review of the literature.

Case presentation

A 73-year old man with abdominal pain was admitted to our hospital. He had no history of pancreatitis, systemic diseases or previous surgeries. He was not an alcoholic. Physical examination was unremarkable. Laboratory findings including tumor markers (carbohydrate antigen 19-9, carcinoembryonic antigen and alfa-fetoprotein), lipase and amylase were within the normal range. Furthermore, the examination of routine blood work, prothrombin time, hepatorenal function, and glucose were also within normal ranges.

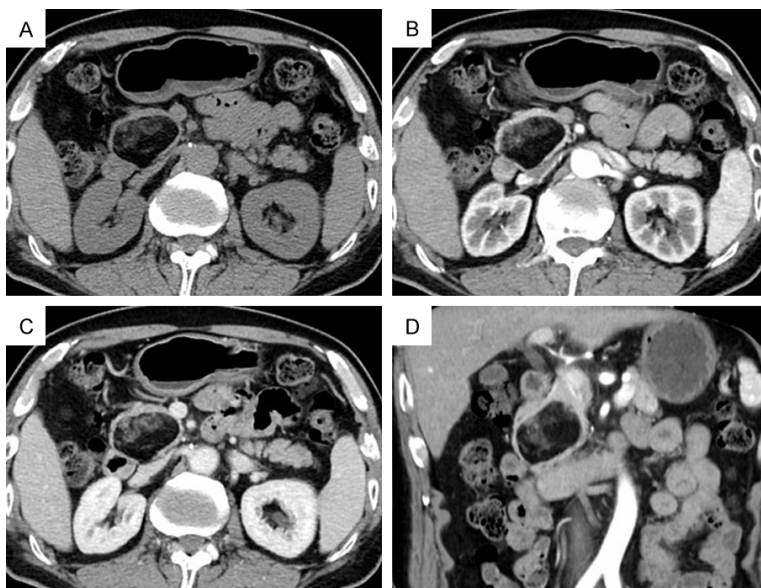


Figure 1. Computed tomography (CT) scan of the mass before surgery. (A) The abdominal CT scan confirmed a heterogenous, low-density mass, measuring 4.3×4-cm (arrows) in the head of the pancreas. The mass exhibited centripetal pattern of contrast enhancement in the following scans: arterial phase (B), portal venous phase (C), and coronal position (D).

A computed tomography (CT) scan revealed a 4.3×4-cm nodule in the head of the pancreas. The mass displayed a heterogenous low-density and centripetal pattern of contrast enhancement (**Figure 1**). Magnetic resonance imaging (MRI) revealed a relatively well-demarcated lesion in the pancreatic head without dilation of the main pancreatic duct. The lesion was hypointense on T1-weighted image (T1WI), T2-weighted image (T2WI), and the diffusion-weighted image (DWI). Dynamic enhancement analysis detected a centripetal enhancement of the lesion with high signal intensity, whereas the surrounding pancreatic parenchyma revealed complete fat suppression on the T1-fat saturation (FAT-SAT) image (**Figure 2**). Abdominal ultrasound revealed a well-defined, mixed-echo mass in the head of the pancreas (**Figure 3**). The mass displayed centripetal enhancement with an uneven enhancement range in the contrast-enhanced ultrasound, and ring-shaped high echoes were detected in the tumor periphery (**Figure 4**). The patient underwent pancreatoduodenectomy because of the possibility of pancreatic liposarcoma.

Macroscopic analysis identified a well-demarcated, soft and solid, homogeneously yellow-white globular-like lesion measuring 4×3.5-cm

in the pancreas head (**Figure 5A, 5B**). Histological analysis determined that the mass contained fibroepithelial elements and lipofibrous elements, and was well-demarcated, and surrounded by the fibrous capsule. Many pancreatic lobule-like structures, predominantly consisting of aggregates of distorted small ducts, were observed in the fibroepithelial elements (**Figure 5C**). A few normal pancreatic acini were observed to be scattered at the mass periphery. The adipose component contained mature adipocytes without atypia or lipoblast (**Figure 5D**). No islets of Langerhans or peripheral nerves were observed in the tumor. Lymphocytes and plasma cells were observed within the fibrous stroma. The lesion

was well-demarcated from the surrounding normal pancreatic parenchyma without characteristics of chronic pancreatitis. Immunohistochemical staining indicated that the ductal cells were immunoreactive for cytokeratin 7 and cytokeratin 19. The adipocyte was immunoreactive for S-100 protein, but was negative for HMB45 and Melan-A (**Figure 6**). Based on these combined results, the mass was finally diagnosed as a PLH.

The patient made a good recovery, and he was discharged on postoperative day 20. There was no sign of local recurrence during the 3 months of follow-up.

Discussion

Pancreatic hamartoma is an extremely rare, non-neoplastic, tumor-forming lesion of the pancreas. Advances in imaging technologies are improving the detection rate and diagnosis of this rare pancreatic disease [5]. Pancreatic hamartoma was first reported in 1977 [6], and was clinically diagnosed using the following criteria: (1) appears as a well-defined mass, (2) consists of well-differentiated acini and small ducts, and (3) lacks islets [7-9]. The tumor may occur at any age range from neonates to the

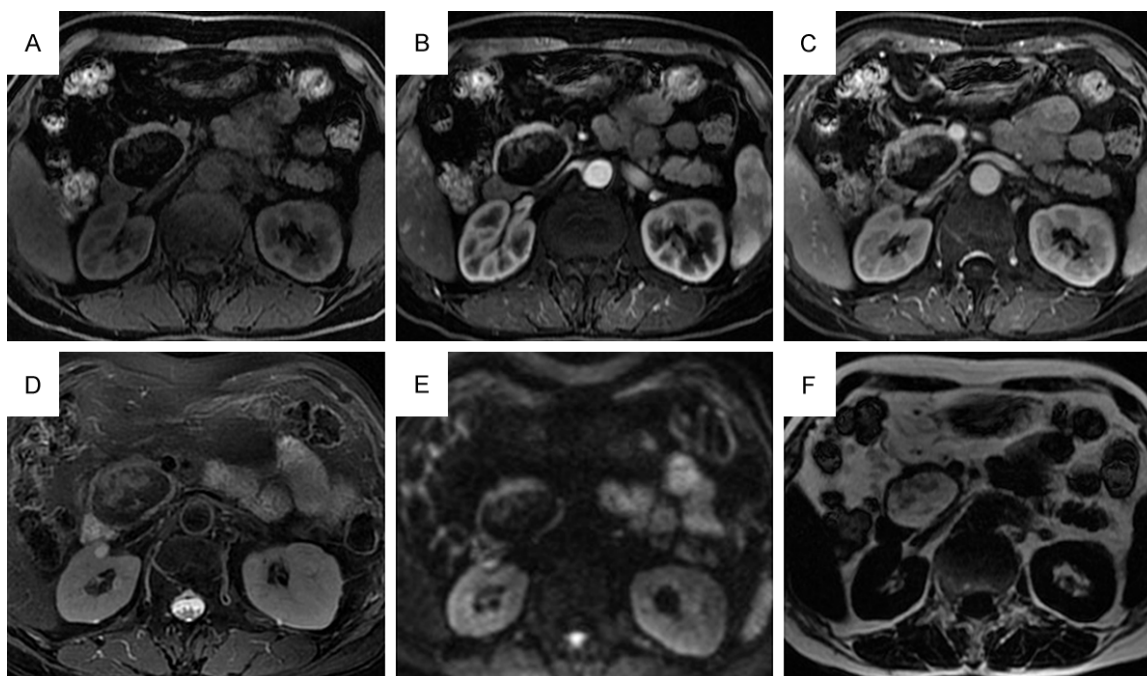


Figure 2. Magnetic resonance imaging (MRI) assessment of the mass before surgery. The abdominal MRI revealed a relatively well-defined mass with a lipomatous component in the pancreatic head. The lesion was hypointense on T1WI (A), T2WI (D), and DWI (E). Dynamic enhancement analysis revealed that the lesion had centripetal enhancement during the arterial phase (B) and portal venous phase (C). MRI identified a high-intensity lesion, whereas the surrounding pancreatic parenchyma displayed complete fat suppression in T1-FAT-SAT images (F).

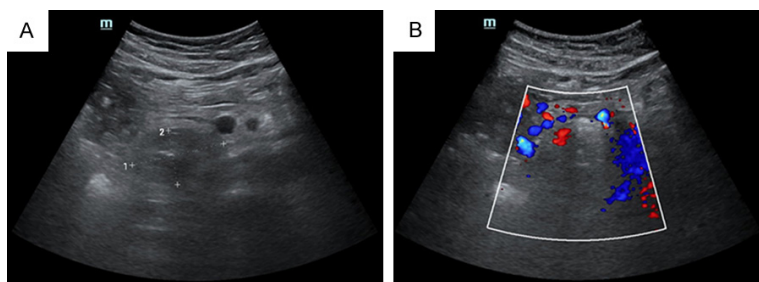


Figure 3. Abdominal ultrasound assessment of the mass before surgery. The B-mode ultrasound revealed a well-defined, mixed-echo mass in the pancreatic head (A), and indicated poor blood supply in the color Doppler ultrasound (B).

elderly, and is not specifically associated with gender [10].

To the best of our knowledge, only 39 cases of pancreatic hamartoma have been reported in the English literature. Most of these patients were asymptomatic, although several patients had non-typical symptoms including abdominal pain, back discomfort, and weight loss [11-14]. The average size of the tumor was 3.1-cm (range: 0.9-19-cm). Pancreatic hamartoma tumors were most commonly located in the

head of the pancreas (approximately 64%), but obstructive jaundice was rare [15]. However, it is very challenging to differentiate between pancreatic hamartoma, pancreatic malignancies, and other benign tumors. Most of these cases underwent surgery because of the possibility of malignancy. There are two histopathological subgroups of pancreatic hamartoma: (1) solid and cystic lesion, and (2)

solid lesion without significant differences of prevalence (18/21). Three studies reported that several tumors included the proliferation of other components except endocrine and exocrine pancreatic tissue, such as lipomatous components, smooth muscle cells, and myo-epithelial cells [3, 16, 17]. However, these cases were very rare.

PLH was a distinct variant of pancreatic hamartoma with lipomatous components [3]. Only four cases, including the present case, have

Pancreatic lipomatous hamartoma

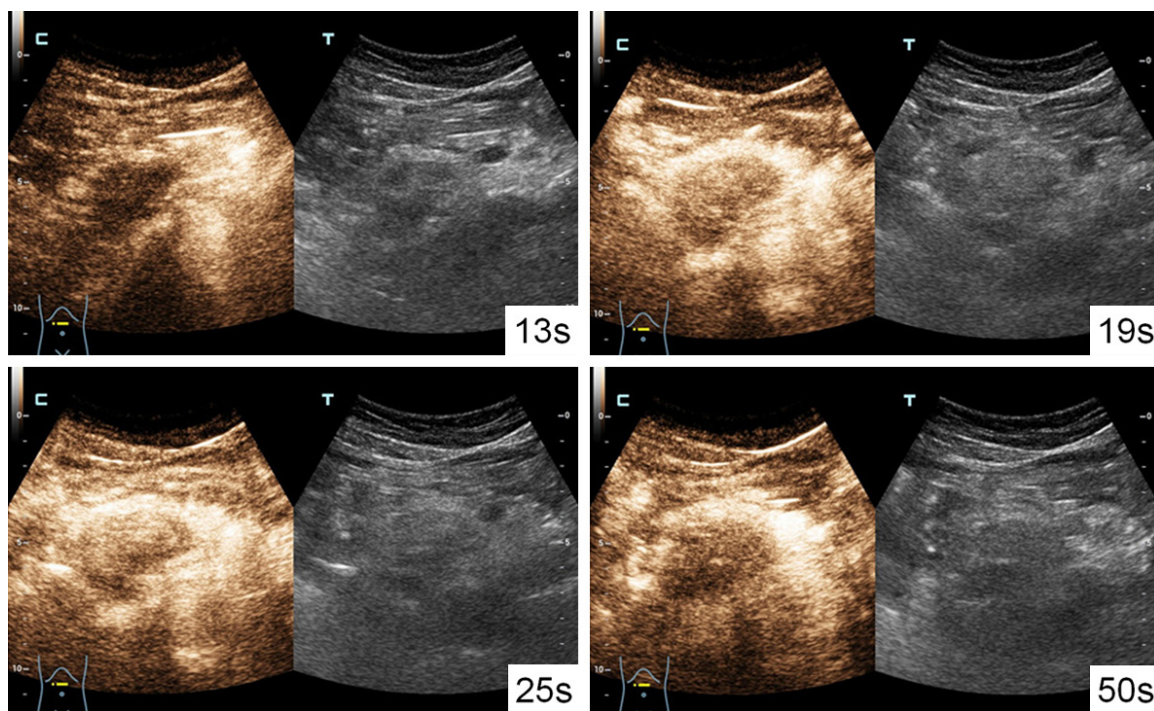


Figure 4. Contrast-enhanced ultrasound assessment of the mass before surgery demonstrated different times (13, 19, 25, and 50 s) of blood perfusion. As time progressed, the mass showed centripetal enhancement with an uneven enhancement range.

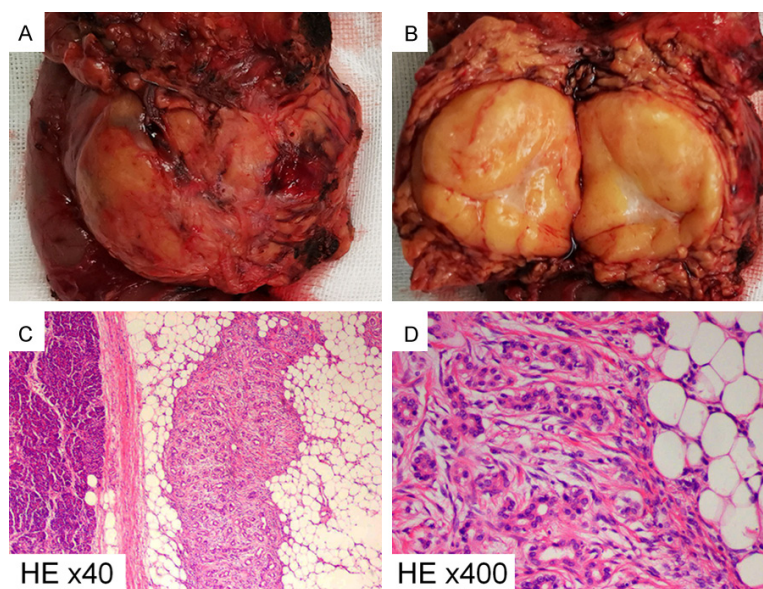


Figure 5. Macroscopic and histopathological findings of the PLH mass after surgery. A well-demarcated, soft and solid, yellow-white globular-like lesion measuring 4×3.5-cm was identified in the pancreas head (A and B), and was surrounded by the fibrous capsule. The mass primarily contained mature adipocytes and small ducts, and the remnant acinar structure was observed partially adjacent to the capsule (C and D).

patients was 67 years (range: 54-74 years). Two cases (50%) were located in the head of pancreas, whereas the other two cases were located in the tail. Three of the four cases (75%) were incidentally detected. The average tumor size was 4.8-cm (range: 3.6-6.5-cm). None of the four cases was diagnosed as PLH before surgery (pancreatoduodenectomy or distal pancreatectomy). On macroscopic appearance, all cases revealed a well-defined lipomatous mass containing small ducts and a well-differentiated acinar structure [3]. Neither islets nor peripheral nerves were observed.

Findings of PLH on cross-sectional imaging are non-specific. Moreover, CT and MRI can assist in the diagnosis of PLH.

been reported in the English literature (Table 1). All cases were male. The mean age of the

The typical features observed on CT images included a well-circumscribed, low-density

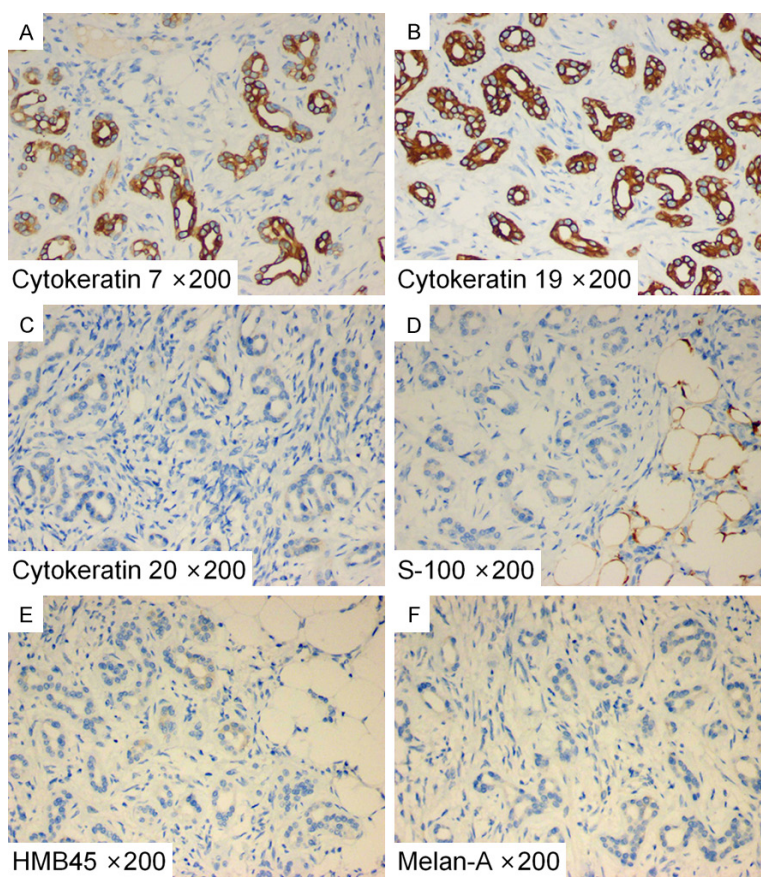


Figure 6. Immunohistochemical analysis of the PLH mass after surgery. The ductal cells were immunoreactive for epithelial markers (cytokeratin 7 and cytokeratin 19) (A and B), but were negative for cytokeratin 20 (C). The adipocyte was immunoreactive for S-100 protein (D), but was negative for HMB45 and Melan-A (E and F).

mass (compared with the surrounding pancreas), and a centripetal pattern of contrast enhancement [3]. MRI images revealed a relatively well-defined, low-intensity, nodular mass on T1- and T2-weighted images, and a high-intensity mass on T1-fat saturation images. Although various imaging examinations provide valuable information, PLH is often initially diagnosed as a lipoma, pancreatic lipomatosis, pancreatic liposarcoma, PEComa, or malignant tumor with fatty degeneration.

None of the 4 PLH cases were preoperatively diagnosed. Fine-needle aspirate (FNA) biopsy is seldom helpful because it is difficult to distinguish the mature elements of PLH from the lipoma (mature adipocytes) or from normal pancreatic tissue, particularly in small endoscopic ultrasound FNA samples [13, 14]. The process may be related to tumor cell seeding

due to the possibility of malignancy. Pathologists and clinicians are still unfamiliar with this rare pancreatic disease of PLH.

The precise pathogenesis of pancreatic hamartoma is still unclear. Thus, pancreatic hamartoma should only be considered in patients with no sign of chronic pancreatitis, such as our case. Chronic pancreatitis characterized by acinar cell atrophy and adipose replacement can mimic hamartomas without acinar cells [18]. Although surgical resection may not be necessary, considering the benign and indolent nature of pancreatic hamartoma or PLH, a reliable diagnosis of this rare disease can only be achieved after surgery [19]. No recurrence has been reported after complete resection.

Conclusion

PLH is a rare disease that should be considered in the differential diagnosis of pancreatic lesions with lipoma-

tous components. For patients with an indefinite diagnosis or symptoms, a complete resection is recommended.

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Disclosure of conflict of interest

None.

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Pancreatic lipomatous hamartoma

Table 1. Clinicopathologic features of pancreatic lipomatous hamartoma

Author, year	Sex/Age	Complaint	Location	Size (cm)	Pancreatitis	CT imaging	Surgery	Macroscopic appearance	Fibroepithelial elements: Lipofibrous elements	Acini	Ducts	Islets
Tanaka M et al., 2018	M/54	No	Tail	3.6	NA	A heterogenous low-density mass with a low-density component exhibited poor contrast enhancement and a capsule-like structure. The central lesion of the mass showed contrast enhancement.	DP	Well-demarcated solid lipomatous	2:3	+	+	-
	M/74	No	Head	5	NA	A fat-dense mass of 5.0-cm diameter tumor, with contrast enhancement at the upper portion of the mass.	PD	Well-demarcated solid lipomatous	1:9	+	+	-
	M/67	No	Tail	6.5	NA	The size of the mass had increased gradually to 5.0-cm in diameter.	DP	Well-demarcated solid lipomatous	1:9	+	+	-
Our case	M/73	Abdominal pain	Head	4	No	A 4.3×4-cm nodule in the head of the pancreas showed heterogenous low-density and centripetal pattern of contrast enhancement.	PD	Well-demarcated solid lipomatous	1:8	+	+	-

CT, computed tomography; PD, pancreatoduodenectomy; DP, distal pancreatectomy; M, male; NA, not available.

References

- [1] Nagata S, Yamaguchi K, Inoue T, Yamaguchi H, Ito T, Gibo J, Tanaka M and Tsuneyoshi M. Solid pancreatic hamartoma. *Pathol Int* 2007; 57: 276-80.
- [2] Volkan Adsay N. Cystic lesions of the pancreas. *Mod Pathol* 2007; 20: S71-93.
- [3] Tanaka M, Ushiku T, Ikemura M, Takazawa Y, Igari T, Shimizu M, Yamaguchi H, Fukushima N, Sakuma K, Arita J, Sakamoto Y, Hasegawa K, Watadani T, Nakai Y, Koike K and Fukayama M. Pancreatic lipomatous hamartoma: a hitherto unrecognized variant. *Am J Surg Pathol* 2018; 42: 891-897.
- [4] Sueyoshi R, Okazaki T, Lane GJ, Arakawa A, Yao T and Yamataka A. Multicystic adenomatoid pancreatic hamartoma in a child: case report and literature review. *Int J Surg Case Rep* 2013; 4: 98-100.
- [5] Han YE, Park BJ, Sung DJ, Kim MJ, Han NY, Sim KC, Cho SB and Kim JY. Computed tomography and magnetic resonance imaging findings of pancreatic hamartoma: a case report and literature review. *Clin Imaging* 2018; 52: 32-35.
- [6] Anthony PP, Faber RG and Russell RC. Pseudotumours of the pancreas. *Br Med J* 1977; 1: 814.
- [7] Yamaguchi H, Aishima S, Oda Y, Mizukami H, Tajiri T, Yamada S, Tasaki T, Yamakita K, Imai K, Kawakami F, Hara S, Hanada K, Iiboshi T, Fukuda T, Imai H, Inoue H, Nagakawa T, Muraoka S, Furukawa T and Shimizu M. Distinctive histopathologic findings of pancreatic hamartomas suggesting their "hamartomatous" nature: a study of 9 cases. *Am J Surg Pathol* 2013; 37: 1006-13.
- [8] Pauser U, Kosmahl M, Kruslin B, Klimstra DS and Klöppel G. Pancreatic solid and cystic hamartoma in adults: characterization of a new tumorous lesion. *Am J Surg Pathol* 2005; 29: 797-800.
- [9] Pauser U, da Silva MT, Placke J, Klimstra DS and Klöppel G. Cellular hamartoma resembling gastrointestinal stromal tumor: a solid tumor of the pancreas expressing c-kit (CD117). *Mod Pathol* 2005; 18: 1211-6.
- [10] Kim HH, Cho CK, Hur YH, Koh YS, Kim JC, Kim HJ, Kim JW, Kim Y and Lee JH. Pancreatic hamartoma diagnosed after surgical resection. *J Korean Surg Soc* 2012; 83: 330-4.
- [11] Zhang J, Wang H, Tang X, Jiang Q and Wang C. Pancreatic hamartoma, a rare benign disease of the pancreas: a case report. *Oncol Lett* 2016; 11: 3925-3928.
- [12] Kawakami F, Shimizu M, Yamaguchi H, Hara S, Matsumoto I, Ku Y and Itoh T. Multiple solid pancreatic hamartomas: a case report and review of the literature. *World J Gastrointest Oncol* 2012; 4: 202-6.
- [13] Nahm CB, Najdawi F, Reagh J, Kaufman A, Mittal A, Gill AJ and Samra JS. Pancreatic hamartoma: a sheep in wolf's clothing. *ANZ J Surg* 2019; 89: E265-E267.
- [14] Addeo P, Tudor G, Oussoultzoglou E, Averous G and Bachellier P. Pancreatic hamartoma. *Surgery* 2014; 156: 1284-5.
- [15] Nagano H, Nakajo M, Fukukura Y, Kajiya Y, Tani A, Tanaka S, Toyota M, Niihara T, Kitazono M, Suenaga T and Yoshiura T. A small pancreatic hamartoma with an obstruction of the main pancreatic duct and avid FDG uptake mimicking a malignant pancreatic tumor: a systematic case review. *BMC Gastroenterol* 2017; 17: 146.
- [16] Matsushita D, Kurahara H, Mataka Y, Maemura K, Higashi M, Iino S, Sakoda M, Shintchi H, Ueno S and Natsugoe S. Pancreatic hamartoma: a case report and literature review. *BMC Gastroenterol* 2016; 16: 3.
- [17] McFaul CD, Vitone LJ, Campbell F, Azadeh B, Hughes ML, Garvey CJ, Ghaneh P and Neoptolemos JP. Pancreatic hamartoma. *Pancreatology* 2004; 4: 533-7.
- [18] Durczynski A, Wiszniewski M, Olejniczak W, Polkowski M, Sporny S and Strzelczyk J. Asymptomatic solid pancreatic hamartoma. *Arch Med Sci* 2011; 7: 1082-4.
- [19] Shin DH, Rho SY, Hwang HK, Lee WJ and Kang CM. A case of pancreatic hamartoma pathologically confirmed after robot-assisted pancreaticoduodenectomy. *Ann Hepatobiliary Pancreat Surg* 2019; 23: 286-290.