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Case report

Mixed pancreatic hepatoid carcinoma: A surgical case report and literature review

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ABSTRACT

Background: Hepatoid carcinoma (HC) is a rare type of malignant tumor that shared similar features of morphology and immunohistochemistry with hepatocellular carcinoma (HCC). Pancreatic HC exists as either pure or mixed type. Mixed pancreatic HC is extremely rare, with only a few cases reported in the literature to date. Because of the rarity of mixed pancreatic HC, its clinical features including incidence, characteristics, and prognosis remain unclear. We herein report a case of a 49-year-old man who was diagnosed with mixed pancreatic HC with neuroendocrine differentiation and was treated with pancreaticoduodenectomy and adjuvant chemotherapy. We also review the existing case reports in literature.

Presentation: A 49-year-old man was admitted to our hospital after a chronic abdominal pain in the upper right quadrant. Abdominal ultrasound revealed only one low-density retroperitoneal mass measured at 20 × 48 mm in size in the pancreatic-duodenal junction, whereas contrast-enhanced computed tomography (CT) revealed three lymphatic neoplasms measured at 28 × 22 × 30 mm, 27 × 33 × 38 mm and 22 × 35 × 48 mm in size in the retroperitoneal pancreatic-duodenal junction. Ultrasound-guided tumor biopsy was performed. Pathological reading of tumor biopsy suspected of Paraganglioma/pheochromocytoma. Laparotomic retroperitoneal tumoral resection and lymphadenectomy was then performed. Histological reading was lymphatic metastasis of primary pancreatic hepatocellular carcinoma with neuroendocrine differentiation, which were immunohistochemically positive for CKAE1/AE3, Hepatocyte paraffin 1, Chromogranin. After three weeks of the first surgery, the patient was assigned with Positron Emission Tomography - Computed Tomography (PET-CT) before adjuvant chemotherapy, revealing a low-density high-metabolism mass, 26 × 28 mm in size within the parenchyma of pancreatic head. Laparotomic pancreaticoduodenectomy and standard lymphadenectomy was performed to resect one mass, which revealed the same immunohistology features with the first mass. The patient was followed up with FOLFIRINOX protocol, and after 12 cycles, there was no evidence of postoperative recurrence.

Discussion: There are few reported cases describing pancreatic hepatoid carcinoma, especially mixed form with other histological associated component. Neuroendocrine differentiation is the majority associated component with 62.5% of all cases of mixed – type form.

Conclusion: Primary pancreatic hepatocellular carcinoma with neuroendocrine differentiation was rare, biopsy and immunohistochemistry appeared with high diagnostic value in this case. The prognosis of pancreatic HC depends on the extent and tumor eradication, and in this case we recorded no postoperative complications and no recurrence in the 6-month follow-up period.

1. Introduction

Hepatoid carcinoma (HC) is a rare type of malignant tumor that shared similar features in morphology and immunohistochemistry with hepatocellular carcinoma (HCC). The first case of HC was reported by Ishikura et al. in 1985, that was of a primary gastric tumor [1]. Hepatoid

Abbreviations: AFP, Alpha-fetoprotein; CEA, Carcinoembryonic antigen; CT, Computed tomography; CK, Cytokeratin; EUS, Endoscopic ultrasound; HC, Hepatoid carcinoma; HepPar-1, Hepatocyte paraffin 1; IHC, Immunohistochemistry; SPN, Solid pseudopapillary neoplasm; PHC, Pancreatic hepatoid carcinoma.

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carcinoma is an extremely rare form of neoplasm which primarily developed in extra-hepatic organs such as the gastrointestinal tract, pancreas, lung, gallbladder, testicles, ovaries, and colon [2–4]. One of the most common sites of this malignancy was stomach [5,6].

Pancreas is a primary organ of HC rarely seen. The first case of primary pancreatic HC was reported by Yano et al. in 1999 [7]. There are two types of pancreatic HC, pure type and combined, or mixed type. Mixed pancreatic HC was frequently resided with areas of more common histological components such as neuroendocrine tumor, endocrine carcinoma, islet cell glucagonoma, or pancreatic ductal adenocarcinoma [8,9]. Because of the rarity of mixed pancreatic HC, few cases were reported to date in English, as well as unclarity of its clinical features including the incidence, characteristics, and prognosis.

Herein, we reported a case of mixed pancreatic HC with neuroendocrine differentiation and treated with double surgery. All our work has been reported in line with the SCARE criteria and guidelines [10].

2. Case presentation

A 49-year-old male patient was referred from a local clinic to our hospital because of chronic upper – right – quadrant abdominal pain. He had complained of chronic pain for 4 months. He had no past medical history of type 2 diabetes, hyperlipidemia, smoking or surgical history, and no family history of cancer. The patient denied experiencing weight loss, nausea, dyspepsia, jaundice, fever and other symptoms. Laboratory tests revealed normal levels of carcinoembryonic antigen (CEA) and carbohydrate antigen 19–9, and alpha-fetoprotein (AFP) was 2,42 ng/ml. Abdominal ultrasound a low-density retroperitoneal mass measuring 20 × 48 mm in size in the pancreatic-duodenal junction. Contrast-enhanced computed tomography (CT) revealed three lymphatic neoplasms measuring approximately 28 × 22 × 30 mm, 27 × 33 × 38 mm and 22 × 35 × 48 mm in size in the pancreatic-duodenal junction and retroperitoneal para-aortic. The unenhanced CT images showed that the tumors were isodense compared with the surrounding pancreatic parenchyma, with heterogeneous mild enhancement in the arterial phase

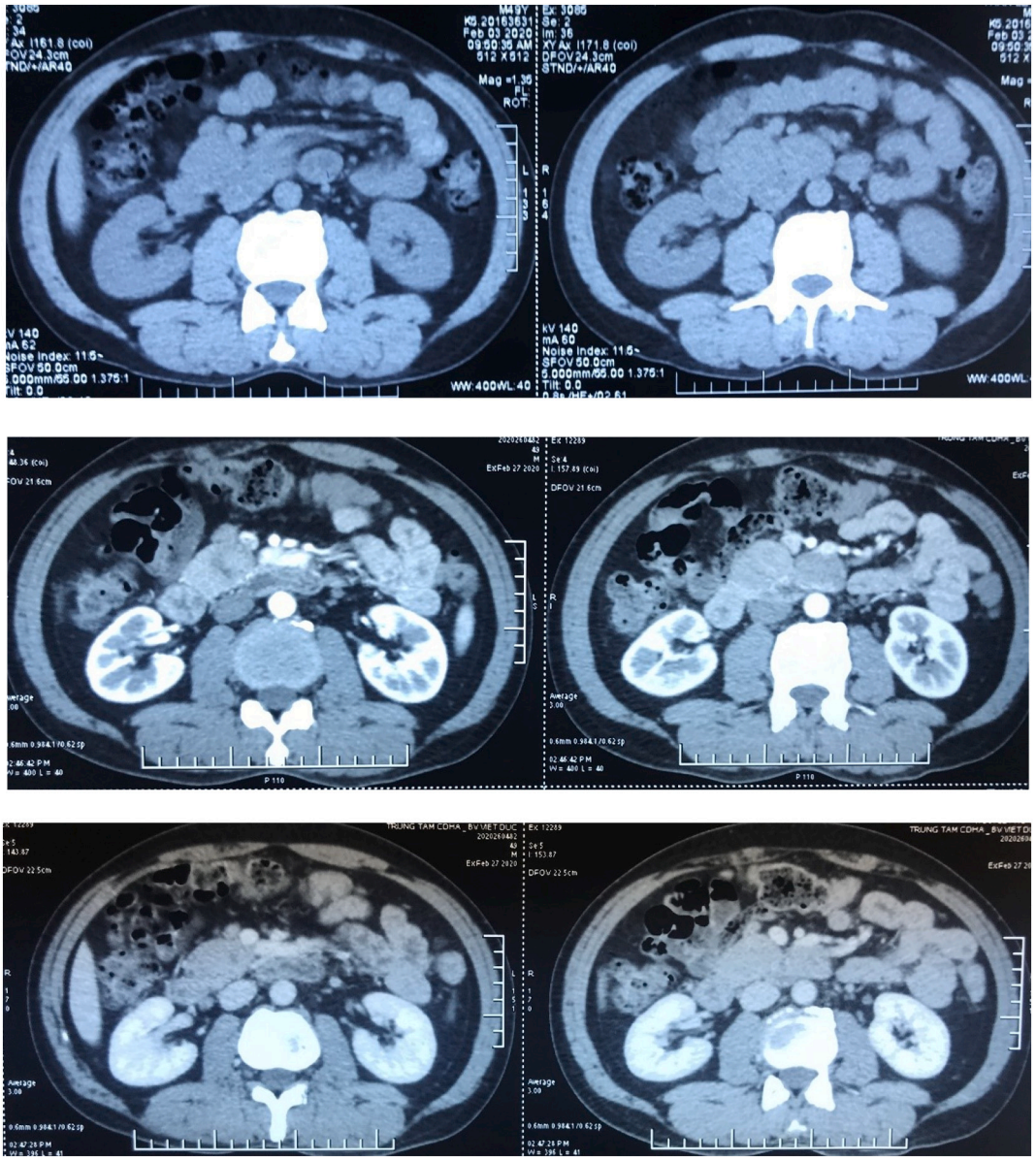

Fig. 1. Computed tomography findings. Contrast-enhanced computed tomography (CT) revealed three lymphatic neoplasms measuring approximately 28 × 22 × 30 mm, 27 × 33 × 38 mm and 22 × 35 × 48 mm in size in the pancreatic-duodenal junction and retroperitoneal para-aortic. a. The non-contract phase. b. The arterial phase. c. The portal phase.

and the tumors were enhanced persistently in the portal phase. (Fig. 1a–c).

Patient was assigned abdominal ultrasound-guided biopsy to make a definitive diagnosis in a local clinic. Biopsy result is large-cell carcinoma. Immunohistochemistry was performed to accurate diagnosis. The tumor cells were positive for chromogranin, CD56, CKAE1/AE3 and were negative for HMB45, Calretinin, CK5/6, CK7. The result was suspected to be a Paraganglioma/pheochromocytoma. Laboratory findings were tested before surgery and the results were normal fractionated metanephrines and/or catecholamines in plasma and a 24-h urine sample. Laparotomy retroperitoneal tumoral resection and lymphadenectomy was performed. Macroscopically, two hyper-vascular well-circumscribed dark – purple solid masses, measuring 3 × 4 cm in size each other, was found in front of the uncinate process of pancreas and inferior duodenal flexure (Fig. 2a) and one nodule – like whitish – yellow mass with 15 × 25 mm size in the pancreatic-duodenal junction (Fig. 2b). Histologically, polygonal tumor cells with round nuclei and abundant acidophilic cytoplasm formed thick trabeculae. Some areas of the tumor were composed of small monotonous and round shaped neuroendocrine cells and were rich in sinusoids (Fig. 3a–b). Immunohistochemically, the tumor cells were positive for Chromogranin, Hepatocyte paraffin 1, CKAE1/AE3, Anti – trypsin, Anti-Chymotrypsin and negative for Melan A, Inhibin, Glypical 3, Pax – 8, SALL4, Napsin A, Glutamine synthetase, CEA and AFP. HC is characteristically hepatocyte paraffin 1 (HepPar1)-positive. The focal neuroendocrine areas were diffusely positive for chromogranin (CHG) stain (Fig. 4a–c). Finally, a diagnosis of primary pancreatic HC with neuroendocrine differentiation, staging pTxN2 (unknown primary tumor) according to the 8th AJCC Staging, was made. Laboratory tests revealed normal levels of alpha-fetoprotein (AFP) postoperatively (2.99 ng/ml).

After three weeks of the first surgery, the patient was assigned with Positron Emission Tomography - Computed Tomography (PET-CT) to restage before adjuvant – chemotherapy. The result showed a low-density high- metabolism (SUV 15.0) mass measuring 26 × 28 mm in size within the parenchymal of pancreatic head without involvement of the adjacent organs (duodenum, common bile duct, stomach, …) or the wall of large vessels (celiac axis or the superior mesenteric artery) (pT2) (Fig. 5). Laparotomy pancreaticoduodenectomy was performed. Macroscopically, a well-circumscribed whitish – yellow solid mass, measuring 38 mm in the greatest dimension, was found in the pancreatic-duodenal junction (Fig. 6). Immunohistochemically, the result was similar with the previous one and the final diagnosis of primary pancreatic HC with neuroendocrine differentiation, staging pT2N2M0 according to the 8th AJCC Staging, was made. The patient's postoperative course was uneventful, and he was discharged in good health 7 days after the second operation. The patient was followed up with FOLFIRINOX chemotherapy, and after 12 cycles, there was no evidence of recurrence postoperatively. And after totally 8 months follow-up, our patient has no evidence of malignant recurrence.

3. Discussion

The pathogenesis of pancreatic HC remains to be unexplored. However, there are three hypotheses: The ectopic hepatic tissue hypothesis – HC may originate from ectopic hepatic tissue in pancreas [11,12]; the pancreas-to-hepatic transdifferentiating hypothesis – pancreatic cells can transdifferentiate into hepatocytes [13,14]; and the pancreatic multipotent/stem cell hypothesis – the liver and pancreas have the same embryonic origin – the foregut endoderm – as well as activated genes controlling hepatocytic differentiation during carcinogenesis [15].

According morphological and immunohistochemical features, pancreatic HC can be categorized as either pure type or mixed type. Mixed pancreatic HC presents in association with other components such as ductal adenocarcinoma, acinar cell carcinoma, serous cystadenoma or neuroendocrine tumors [16,17]. The first mixed pancreatic HC that we found in literature was a case of pancreatic neoplasm with hepatoid differentiation and acinar – cell carcinoma components reported by Hruban et al. in 1987 [18]. Since then, we found 39 cases of pancreatic HC totally and 15 mixed pancreatic HC cases in the English literature using the PubMed search engine. Recently, Zeng SX et al. previews all 39 cases of pancreatic HC as well as all 21 cases of pure pancreatic HC in English literature were reported by Tomino et al. [9,17] So that, in this report, we present a case and review all 15 reported cases of mixed pancreatic HC, which are summarized in Table 1 [8,16,17,19].

These 16 cases including ours can be further divided into 3 histological subtypes: HC with neuroendocrine differentiation ($n = 10$), HC with serous cystadenoma ($n = 2$) and HC with acinar cell or ductal carcinoma differentiation ($n = 4$). The clinical features summary of reported cases of mixed pancreatic HC following associated component are summarized in Tables 2 and 3. The median age of patients was 47.7 years (range 21–70), and male/female ratio was 5:3, and no significant difference identified regarding the mean age between two sexes (student's t-test using SPSS 22.0). Seven cases (43.75%) had tumors located in the head of the pancreas, whereas approximately 60–70% of all pancreatic adenocarcinomas occurred in the head of the pancreas [28]. The tumor sizes in greatest dimension ranged from 0.5 to 9 cm, with an average of 5.2 cm and no significant difference identified regarding metastasis status (student's *t*-test using SPSS 22.0). Clinically, four patients were asymptomatic, nine patients showed non-specific symptoms such as epigastric pain, nausea, diarrhea, jaundice, and weight loss; and half of patients had gastrointestinal symptoms:

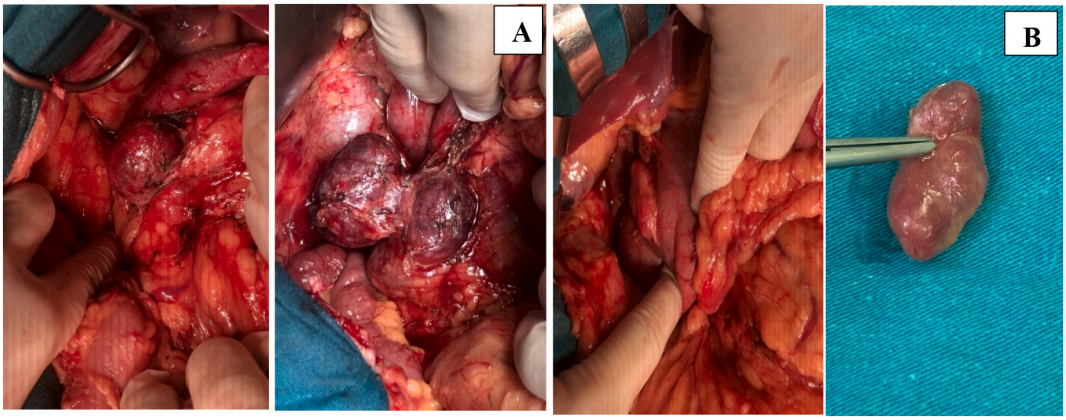

Fig. 2. Macroscopic findings of the resected specimen. a. Two hyper-vascular well-circumscribed dark – purple solid masses, measuring 3 × 4 cm in size each other, was found in front of the uncinate process of pancreas and inferior duodenal flexure. b. A nodule – like whitish – yellow mass with 15 × 25 mm size within the parenchymal of pancreatic head.

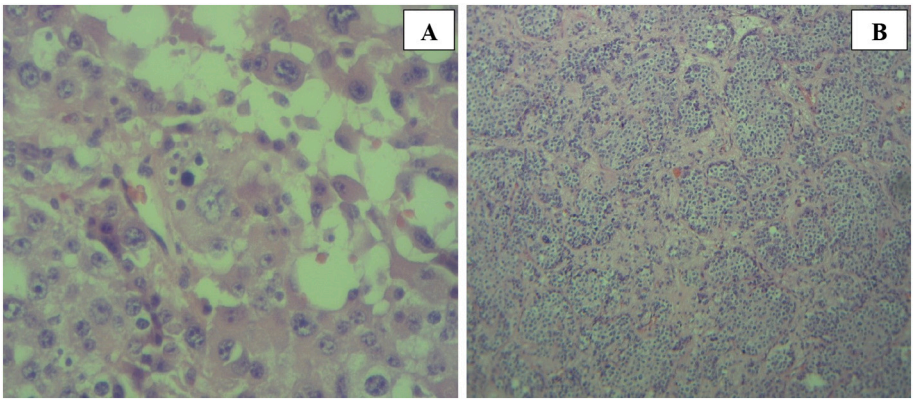

Fig. 3. Hematoxylin and eosin staining findings. a. Polygonal tumor cells with round nuclei and abundant eosinophilic cytoplasm formed thick trabeculae. b. Some areas of the tumor were composed of small monotonous and round shaped neuroendocrine cells and were rich in sinusoids.

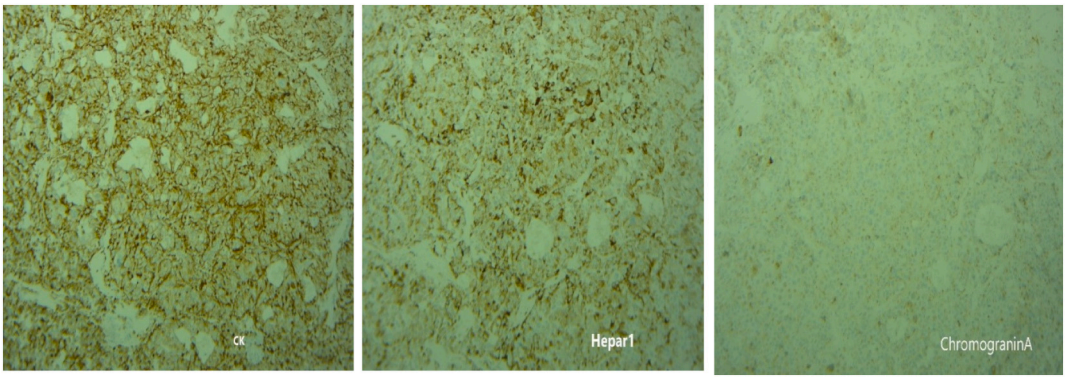

Fig. 4. Immunohistochemical staining findings. a. The tumor cells were positive for CK AE1/AE3. b. The tumor cells were positive for hepatocyte paraffin 1. c. The tumor cells were positive for Chromogranin A.

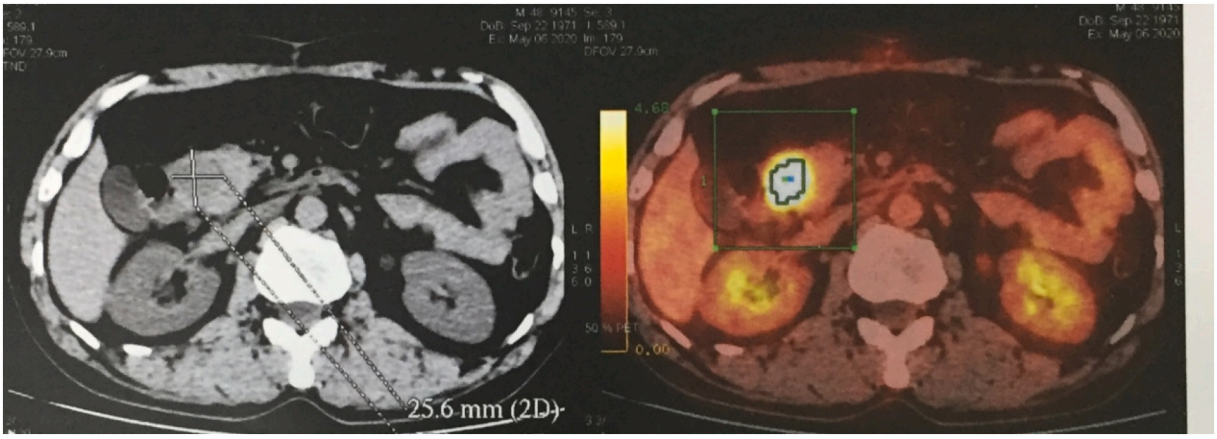

Fig. 5. Macroscopic PET – CT findings. a low-density high- metabolism (SUV 15.0) mass measuring 26 × 28 mm in size in the parenchymal of pancreatic head.

vomiting, diarrhea, anorexia, and dyspepsia. Meanwhile, three patients showed specific symptoms associated with the certain proteins secreted by the tumor, these are subcutaneous nodules for lipase [18], dermatosis and diabetes mellitus for glucagon [21], hypoglycemia and nocturnal sweating for insulin [19].

Preoperative diagnosis is often challenging due to the non-specific imaging features of HC. Abdomen HC often reveals as an isodense mass in unenhanced CT images and a heterogeneous mass with irregular enhancement in a contrast enhanced CT scan [29,30]. Serum AFP level is found to be elevated in 9 over 16 cases (56.25%) (however, for 2 cases, levels were not reported or assessed) and some studies showed it can be used to assess completeness of resection, response to adjuvant chemotherapy, and recurrence of the tumor during post-operational surveillance [6,8]. However, serum AFP level can also be elevated in other types of pancreatic neoplasms like acinar cell and ductal carcinoma, neuroendocrine tumors and pancreatoblastomas [31–33].

The characteristic cytological features are polygonal cells with eosinophilic to clear cytoplasm and vesicular or round nuclei with prominent nucleoli growing in the sheet-like or trabecular portions, along with the demonstrated presence of bile canaliculi formation

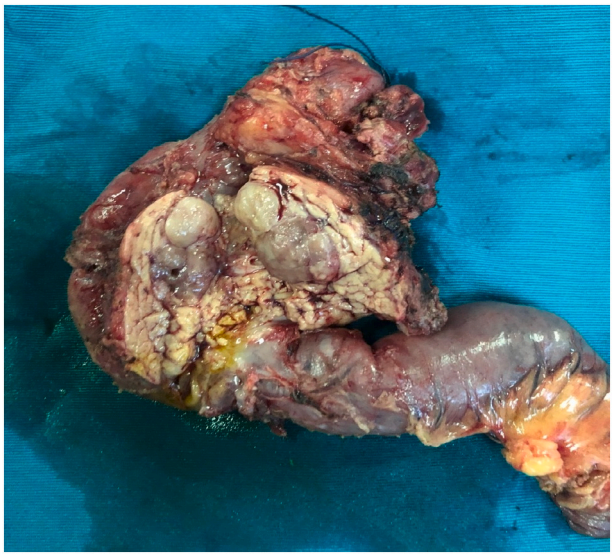

Fig. 6. Macroscopic findings of the resected specimen. A well-circumscribed whitish – yellow solid mass, measuring 38 mm in the greatest dimension, was found in the pancreatic head.

[9,34]. However, cytology results were misdiagnosed as other pancreatic cancers such as Solid pseudopapillary tumors of the pancreas - SPN[9]. Biopsy and immunohistochemical (IHC) result could provide a more accurate diagnosis than cytology. The main differential diagnosis of primary pancreatic HC would be metastatic hepatocellular carcinoma (HCC). Immunohistochemical (IHC) profiling with cytokeratin (CK) can be helpful in differentiating hepatoid tumors from HCC. IHC markers used for diagnosis include immunoreactivity with polyclonal antibodies against AFP, CEA, and more specific markers like hepatocyte-specific Hep-Par1 antibody and albumin mRNA detected by in situ hybridization [21,24]. Hepatoid tumors are most often positive for pancytokeratin marker AE1/AE3 (92%), CK 19 (94–100%) glypican-3 (78%), and arginase-1 (75%), CK20 (25–47%) and CK18, and negative for CK7 [4,35]. HCC very rarely showed positive CK19 and 20 expression [35,36]. Pancreatic HC with acinar differentiation should be tested with arginase-1 to distinguish with acinar cell carcinoma, which has also AFP elevation [17]. In our present case, preoperative IHC result precluded correct diagnosis because of the small amount of the tissue and the under-recognition of this tumor. In our presented case, after the first surgery without finding origin of the malignancy, we suspected that tumor raised from pancreas, so that we take some pancreatic IHC makers and the tumor cells were positive for Anti – trypsin, Anti-Chymotrypsin. The tumor's immunohistochemical profile were consistent with a primary pancreatic HC with neuroendocrine differentiation.

Complete surgical resection is warranted mainstay of treatment whenever possible. Owing to its aggressive nature and tendency for early liver metastasis, some authors have advocated non-adjuvant as well as adjuvant chemotherapy, but the effect is still unclear [27,37]. Several chemotherapeutic agents have been described as possible treatments including: 5-FU, cisplatin, carboplatin, gemcitabine, Adriamycin, irinotecan, …; CapTem (capecitabine combined with temozolomide) and Octreotide can be an active and well - tolerated treatment of pancreatic HC with neuroendocrine differentiation; and partial response to chemotherapy and sorafenib – a multitarget tyrosine kinase inhibitor, was reported in some studies with locally unresectable, metastatic or recurrent diseases [27,38]. Ferreira et al. reported a case of metastatic pancreatic HC (mainly to the spleen and liver) in a 43-year-old male treated with CapTem regimen. It provided disease control for 16 months, and treatment was discontinued due to persistent cytopenias [27]. In 2012, Petrelli et al. reported an disease control of 8 months in a 37-year-old male patient with metastatic pancreatic HC (mainly to the liver, lymph nodes, and lungs) treated with the multi-target tyrosine kinase inhibitor sorafenib (400 mg BD) [38]. In 2012, Lucas et al. reported a 44-year-old female patient hepatoid adenocarcinoma of peritoneal cavity (which was closely related to colon) treated with surgery followed by FOLFOX (5-fluorouracil, leucovorin and oxaliplatin), and no evidence of disease recurrence in imaging and biochemical data after more than 3 years [39]. In our presented case, we chose the FOLFIRINOX regimen for adjuvant chemotherapy because FOLFIRINOX was still considered as the first – line treatment option for patients with metastatic pancreatic adenocarcinoma and also had more favorable ECOG performance status compared with single-agent gemcitabine [28,40].

Because of the rarity and possible heterogeneity, the prognosis of pancreatic HC is unclear. Generally, pancreatic HC usually has aggressive clinical course as well as an poor prognosis since liver metastasis is often already present, indicating advanced stage at the time of diagnosis [34,36,41]. A recent report by Yang et al. showed the prognosis of pancreatic HC by divided pancreatic HC into four histological subtypes of pancreatic HC, namely, with (1) pure HCC-like morphology, (2) neuroendocrine differentiation, (2) true glandular differentiation, and (4) acinar cell differentiation [4]. Mixed pancreatic HC was associated with poorer prognosis than pure pancreatic HC. The five-year disease-specific survival rate of pancreatic HC with neuroendocrine differentiation was 37.5% and that of pancreatic HC with acinar cell or glandular differentiation was 0%, whereas that of pure pancreatic HC was 77.3%. Survival was poor in patients treated with systemic therapy or palliative care compared to those treated with radical surgery with/without adjuvant chemotherapy: 3 out of 4 patients treated with systemic therapy or palliative care died of disease (after 2.75–14 months), while 5 out of 12 patients treated with radical surgery with/without adjuvant chemotherapy died of disease (after 3–102 months). The poor survival of the patients with unresectable neoplasms indicates that the stage of the disease and the completeness of resection are important prognostic factors.

4. Conclusions

We present a case of mixed pancreatic HC with neuroendocrine differentiation with mimicking diagnosis with paraganglioma/pheochromocytoma and treated with two surgeries and adjuvant chemotherapy treatment. Current clinical guidelines recommend biopsy as opposed to cytology or preoperative imaging studies for the preoperative diagnosis of mixed pancreatic HC. While the natural history and prognosis of this subtype of pancreatic HC may not be accurately predicted with these limited data, the prognosis of mixed pancreatic HC depends on the extent of the disease and the completeness of resection.

Consent to participate

The patients have consented to the submission of the case report for submission to the journal.

Consent to publication

Not applicable.

Availability of data and material

Data is available upon reasonable request and with permission of Viet Duc Hospital.

Ethics approval

The study was approved by the Research Ethics Committee of Hanoi Medical University. The procedures used in this study adhere to the tenets of the Declarations of Helsinki.

Table 1
Clinical features summary of reported cases of mixed pancreatic hepatoid carcinoma in the English literature.

Case	Sex	Age	Clinical symptoms	AFP levels (ng/ml)	Site	Size (max dis.) (cm)	Histological associated component	Metastasis	Treatment	Outcome
Hruban [18], 1987	F	53	Subcutaneous fat necrosis and polyarthritis	10	Tail	1	Acinar cell carcinoma	Liver	Chemotherapy	Died of disease (2.75)
Tanno [20], 1999	F	65	Epigastric and back pain, anorexia, and weight loss	16,170	Body-tail	6	Ductal adenocarcinoma	Liver, right supraclavicular, and para-aortic lymph node	Palliative care	Died of disease (6)
Yano [20], 1999	M	57	Jaundice, epigastric pain, vomiting and fever	177.6	Head	9	Ductal adenocarcinoma	No	Surgery (pancreatoduodenectomy)	Died of disease (3)
Paner [21], 2000	M	28	Severe abdominal and back pain	Elevated	Multifocal	8	Ductal adenocarcinoma	Widespread (gastric, ileal, and colonic mucosa)	Debulking of the tumor plus chemotherapy	Died of disease (14)
Paner [21], 2000	M	57	Vomiting, diarrhea, weight loss, diffuse skin rashes and diabetes mellitus	Elevated	Tail	6	Neuroendocrine neoplasms (glucagonoma)	Liver	Surgery (distal pancreatectomy with splenectomy) plus chemotherapy	Died of disease (102)
Lam [19], 2001	F	64	Hypoglycemia and recurrent nocturnal sweating	1694	Tail	7	Neuroendocrine neoplasms (insulinoma)	Liver	Distal pancreatectomy with splenectomy plus regional embolization and systemic chemotherapy	Died of disease (22)
Cuilliere [22], 2002	M	70	Incidental	2.4	Body	3	Serous cystadenoma	No	Distal pancreatectomy with splenectomy	Alive with no recurrence (12)
Oh [23], 2006	M	21	Incidental	Elevated	Head	3	Neuroendocrine neoplasm	No	Surgery (pancreatoduodenectomy)	Alive with no recurrence (7)
Hameed [24], 2007	F	41	Gastroesophageal reflux, jaundice, and abdominal pain	2714	Head	4.5	Neuroendocrine neoplasm	Liver	Pancreaticoduodenectomy plus chemotherapy	Died of disease (27)
Zhang [25], 2007	F	37	Upper abdominal pain, anorexia, and emaciation	2,65	Widespread	9	Neuroendocrine neoplasm	No	Surgery (pancreatoduodenectomy)	Died of disease (3)
Jung [6], 2010	M	46	Dyspepsia and epigastric palpable mass	317.6	Head	9	Neuroendocrine neoplasm	No	Radical pancreatoduodenectomy	Alive with no recurrence (4)
Huang [26], 2012	M	52	Jaundice, anorexia and epigastric pain	Not listed	Head	0.5	Neuroendocrine tumor	No	Pancreaticoduodenectomy plus chemotherapy with sunitinib	Alive with no recurrence (16)
Xin [8], 2014	F	33	Incidental	300	Head	2	Neuroendocrine neoplasm	No	Pancreaticoduodenectomy plus chemotherapy	Alive with no recurrence (46)
Veerankutty [16], 2015	M	47	Incidental	Not listed	Tail	3.1	Serous cystadenoma	No	Distal pancreatectomy with splenectomy (laparoscopic)	Alive with no recurrence (8)
Pellini Ferreira [27], 2017	M	43	Jaundice, epigastri pain, and watery diarrhea	2.9	Tail	9	Neuroendocrine neoplasm	Spleen and liver	Chemotherapy	Alive with no recurrence (16)
Son T.H. et al.,2020	M	49	Upper – right – quadrant abdominal pain	2.42	Head	3.8	Neuroendocrine neoplasm	Para-aortic lymph node	Pancreaticoduodenectomy plus chemotherapy	Alive with no recurrence (6)

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Author's contributions

Hong Son TRINH: the main doctor conceived the original idea and operated the patients, revised manuscript.

Tuan Hiep LUONG: followed up, wrote manuscript.

Thanh Tung LAI: assessed the protocol, summed up, revised manuscript.

Thanh Khiem NGUYEN: assessed the protocol, summed up, revised manuscript.

All authors contributed to the interpretation of the results, discussed

Table 2
Clinical and subclinical features summary of reported cases of mixed pancreatic HC following associated component.

Associated component	Gender (M: F)		Age (years)	Clinical symptoms (n, %)	AFP levels (ng/ml)	Size (cm)	Location			Metastasis (n, %)
	M	F					H	B&T	W	
Neuroendocrine neoplasm (n = 10)	6	4	44.3	7 (70%)	719.1	5.38	6	3	1	3 (30%)
Serous cystadenoma (n = 2)	2	0	58.5	0 (0%)	5452.5	3.05	1	1	0	0 (0%)
Acinar cell or ductal carcinoma (*n* = 4)	1	3	50.8	4 (100%)	2.4	6	0	3	1	3 (75%)

M: male, F: female, H: head, B&T: body and tail, W: widespread or multifocal.

Table 3
Main features characterizing presentation of the 16 cases of mixed pancreatic HC.

Variable		n (%) or median (IQR)
Sex	Male	10 (62.5%)
	Female	6 (37.5%)
Age (years)		47.7 (21–70)
Symptoms	Asymptomatic	4 (25%)
	Pain: Abdominal/back	6 (37.5%)
	Gastrointestinal symptoms: Vomiting, diarrhea, and dyspepsia	8 (50%)
	Weight loss	3 (18.75%)
	Jaundice	4 (25%)
	Epigastric mass	1 (6.25%)
	Specific symptoms	3 (18.75%)
Location	Head	7 (43.75%)
	Body-tail	7 (43.75%)
	Diffuse or multifocal	2 (12.5%)
Size of longest diameter in cm		5.2 (0.5–9)
Metastasis	Liver	6 (37.5%)
	Other organs	3 (18.75%)
Elevated AFP		9 (56.25%)
Treatment	Radical surgery	12 (75%)
	Systemic therapy or Palliative care	4 (25%)

the results. All authors read and approved the final manuscript to submit.

Declaration of competing interest

The authors declare that they have no conflicts of interests.

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