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ABOUT COVER

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CASE REPORT

Hepatoid carcinoma of the pancreas: A case report and review of the literature

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Author contributions: Zeng SX and Tao J were the patient's gastroenterologists; Liang Q performed the pathological diagnosis and contributed to manuscript drafting; Zhao BL performed the radiological diagnosis and contributed to manuscript drafting; Zeng SX, Tan SW, Fong CJTH, Liu K and Guo JX reviewed the literature and contributed to manuscript drafting; Zeng SX, Tan SW, Fong CJTH and Tao J were responsible for the revision of the manuscript for important intellectual content; All authors issued final approval for the version to be submitted.

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Abstract

BACKGROUND

Hepatoid carcinoma (HC) is an extremely rare neoplasm that is morphologically similar to hepatocellular carcinoma. HC has been described in various organs; however, HC of the pancreas is extremely rare. To our knowledge, only 38 cases have been reported. We present a case of HC of the pancreas in a 36-year-old male patient.

CASE SUMMARY

A 36-year-old cachexic man with no significant past medical history was transferred to our hospital with a history of painless jaundice, elevated blood glucose and significant weight loss. Lab tests showed elevated serum transaminases, bilirubin and alpha-fetoprotein levels. Magnetic resonance imaging of the upper abdomen showed a diffusely enlarged pancreas, appearing "sausage-shaped". Magnetic resonance cholangiopancreatography showed upstream ductal dilation secondary to stricture of the main pancreatic duct and the common bile duct, which were not visible. Immunohistochemistry of biopsied tissue from a percutaneous pancreatic biopsy showed tumor cell positivity for HepPar1, polyclonal carcinoembryonic antigen and CK19, suggestive of HC of the pancreas. The characteristics of 39 patients with HC of the pancreas were reviewed.

CONCLUSION

HC of the pancreas is more prevalent in males, and patients have a median age of 57 years. It is most commonly asymptomatic or presents as abdominal back pain,

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and the pancreatic tail is the most common location. At the time of diagnosis, liver metastasis is often present.

Key words: Hepatoid carcinoma; Pancreas; Case report; Review

Core tip: Hepatoid carcinoma (HC) of the pancreas is an uncommon tumor with unknown characteristics. To date, there is a lack of definitive criteria for identification, and no defined treatment strategy for patients with HC of the pancreas. This study reviews 39 cases with an emphasis on diagnostic criteria and outcome management. The possibility of HC of the pancreas should be considered for diffuse lesions throughout the pancreas.

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INTRODUCTION

Hepatoid carcinoma (HC) is a primary rare tumor that grows outside the liver with similar serological, morphological and immunohistochemistry features to hepatocellular carcinoma (HCC). First described by Ishikura *et al*[1] in 1985 in the stomach, where it is most commonly found, HC may involve any part of the gastrointestinal tract[2-5], lungs[6], and genitourinary tract[7-10]. HC of the pancreas is extremely rare. The clinical features, diagnosis, management and prognosis of HC of the pancreas have yet to be clearly studied because of its rarity and the limited number of case reports in the literature. In this paper, we present a case of hepatoid carcinoma of the pancreas in a 36-year-old cachexic male patient with painless jaundice, elevated blood glucose and weight loss, as well as a review of the current literature focusing on clinical presentation, management and prognosis.

CASE PRESENTATION

Chief complaints

Painless jaundice and emaciation for the past 2 mo.

History of present illness

A 36-year-old man was transferred to the Third Affiliated Hospital of Sun Yat-Sen University with a recent history of painless jaundice, elevated blood glucose and a weight loss of approximately 10 kg for the past 2 mo with no complaints of diarrhea or vomiting.

History of past illnesses

The patient's past medical and surgical histories were nonsignificant. He was previously diagnosed with autoimmune pancreatitis in another institution and had no response to steroid treatment.

Personal and family history

He had a 10 pack-year history of smoking. He denied any other specific personal or family history of other diseases.

Physical examination upon admission

The patient appeared cachexic and was mildly jaundiced. A nontender epigastric mass of approximately 5 cm was palpable, with a soft nondistended abdomen and normal bowel sounds.

Laboratory examinations

Laboratory tests showed a normal white blood cell count (9.32 × 10E^9 cells/L), mild anemia (118 g/L) and an elevated platelet count (476 × 10E^9 cells/L). Liver function tests showed elevated transaminases (ALT 97 U/L and AST 46 U/L), alkaline phosphatase (377 U/L), gamma-GT (337 U/L), total bilirubin (107.6 μmol/L), direct bilirubin (77.64 μmol/L), indirect bilirubin (30.2 μmol/L) and a mild decrease in albumin (31.8 g/L). Autoimmune antibodies such as ANA and rheumatoid factor were negative, and IgG4 (0.333 g/L), amylase and lipase levels were normal; the tumor marker panel showed elevated levels of alpha-fetoprotein (AFP) (475.6 ng/mL) and carbohydrate antigen 125 (77.1 U/mL) but normal serum levels of carcinoembryonic antigen (CEA) (2.2 μg/L) and carbohydrate antigen 19-9 (15.94 U/mL). Markers for hepatitis B and C and human immunodeficiency virus serology were negative.

Imaging examinations

Magnetic resonance imaging of the upper abdomen showed a diffusely enlarged pancreas, appearing "sausage-shaped", with loss of pancreatic lobular structure; the lesion was isointense to hypointense on the T1-weighted image, isointense to hyperintense on the T2-weighted image, and had a mixed signal on DWI, with central necrosis. In addition, there was a distinct hyperintense rim surrounding the mass, which demonstrated delayed enhancement and a capsule appearance. Magnetic resonance cholangiopancreatography showed upstream ductal dilation secondary to strictures of the main pancreatic duct and common bile duct, which were not visible (Figure 1).

Further diagnostic work-up

A percutaneous pancreatic biopsy was performed under ultrasound guidance.

Pathological examination

Histopathological analysis revealed heteromorphic neoplastic cells arranged in glandular, nested or striped patterns. Immunohistochemistry showed tumor cell positivity for HepPar1 (a hepatocyte-specific antigen), polyclonal CEA and CK19 (Figure 2). The morphological and immunohistochemistry features were suggestive of hepatoid carcinoma of the pancreas.

FINAL DIAGNOSIS

The final diagnosis of the presented case was hepatoid carcinoma of the pancreas.

TREATMENT

The patient finally underwent exploratory laparotomy, during which a large mass of the whole pancreas, approximately 6 cm × 7 cm, was found invading the coeliac trunk, the root of the transverse mesocolon, and the upper mesojejunum. Therefore, no radical surgery was performed, and palliative jejunostomy and cholecystostomy were performed.

OUTCOME AND FOLLOW-UP

At 4 mo after diagnosis and refusing palliative chemotherapy, the patient died of the disease.

DISCUSSION

HC was first described in 1987 by Hruban *et al*[11], and we report the 39th case of hepatoid carcinoma of the pancreas diagnosed based on morphological and immunohistochemical features. The demographics and clinical presentation of the 39 cases are summarized in Table 1[11-45]. From the review, we can establish a clear male predominance (69.3%). The ages of patients range from 21 years to 83 years, with a median age of 57 years. The sizes of tumors range from 1 cm to 12 cm, with a median size of 6 cm. HC of the pancreas can be divided into either pure HCC-like (61.54%) or mixed (38.46%) forms with other histological findings, such as neuroendocrine tumors (n = 9), pancreatic ductal adenocarcinoma (n = 3), acinar cell carcinoma (n = 1) and microcytic cystadenoma (n = 2).

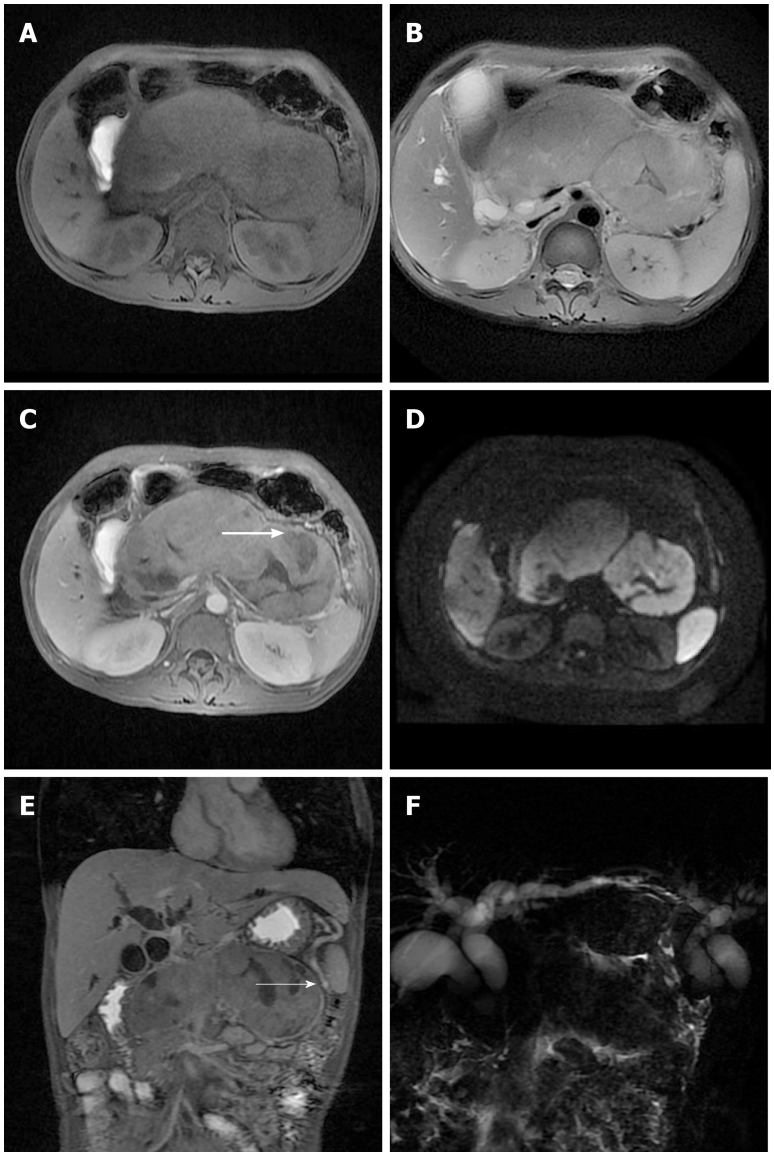

Figure 1 Magnetic resonance imaging of the patient. Magnetic resonance imaging of the upper abdomen shows a diffusely enlarged pancreas, appearing "sausage-shaped", with loss of pancreatic lobular structure. A: The lesion was isointense to hypointense in the fat-suppressed T1-weighted image; B: The lesion was isointense to hyperintense in the fat-suppressed T2-weighted image; C and D: Central necrosis (see thick arrow) was seen during the contrast-enhanced delayed phase and mixed signal intensity on DWI; E: In addition, there is a distinct hyperintense rim (see the thin arrow) that demonstrated delayed enhancement and a capsule appearance; F: Magnetic resonance cholangiopancreatography showed upstream dilation of the proximal common bile duct and intrahepatic biliary ducts secondary to strictures of the main pancreatic duct and distal common duct.

Table 2 outlines the main clinical features of HC of the pancreas in the reported literature, with the most common tumor site being the pancreatic tail, accounting for most of the patients who are asymptomatic or complain of abdominal/back pain.

The pathogenesis of hepatoid carcinoma of the pancreas remains to be elucidated. Three theories have been proposed: The ectopic liver tissue theory, in which HC may originate from ectopic pancreatic liver tissue[21,22,46]; the pancreas-to-liver transdifferentiation theory, in which pancreatic cells can transdifferentiate into hepatocytes[47,48]; and the pancreatic multipotent/stem cell theory, in which the liver and pancreas share the same embryonic derivation - the foregut endoderm - and genes controlling hepatocytic differentiation that are normally suppressed in the pancreas may be activated during carcinogenesis[12,35].

There are currently no standard criteria to establish a diagnosis of hepatoid carcinoma of the pancreas. The differential diagnosis of HC of the pancreas includes HCC or combined hepatocellular-cholangiocarcinoma, metastatic hepatoid carcinoma and other primary pancreatic tumors with eosinophilic cell cytoplasms. Its diagnosis relies on typical morphological features and immunohistochemical staining. Histopathologically, HC consists of medium to large cords of polygonal cells with

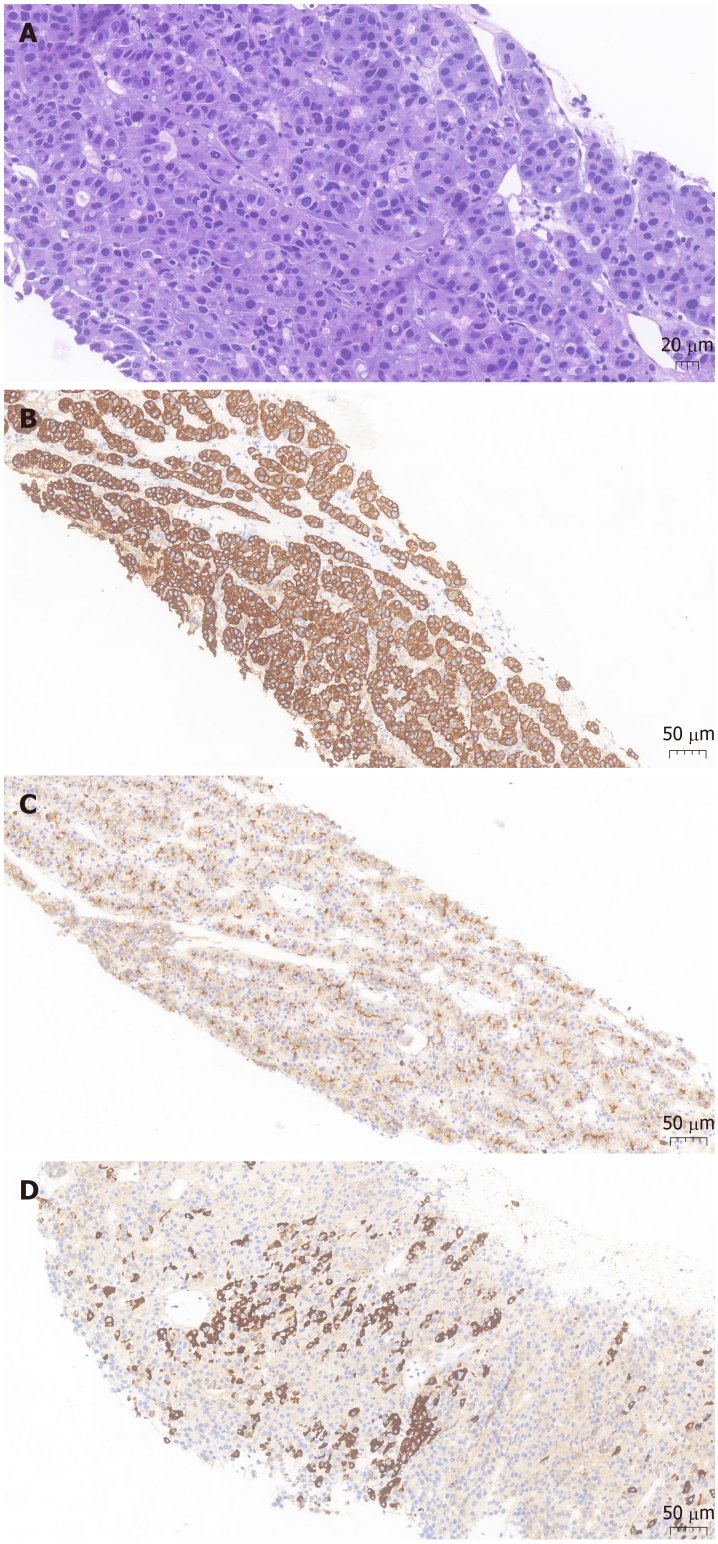

Figure 2 Pathological presentation of the patient. A: Hematoxylin-eosin staining revealed heteromorphic neoplastic cells arranged in glandular, nested or striped patterns (magnification: × 200; scale bar: 20 μm); B: Immunohistochemistry showed tumor cell positivity for CK19 (magnification: × 100; scale bar: 50 μm); C: Immunohistochemistry showed tumor cell positivity for polyclonal carcinoembryonic antigen (magnification: × 100; scale bar: 50 μm); D: Immunohistochemistry showed tumor cell positivity for HepPar1 (magnification: × 200; scale bar: 50 μm).

abundant eosinophilic or clear cytoplasms with centrally located and vesicular nuclei in the sheet-like or trabecular portions. The presence of bile production is a more conclusive finding and is strong evidence of hepatocyte lineage differentiation[14,49]. For immunohistochemistry findings, the hepatoid carcinoma cells show positive staining for immunoreactivity with polyclonal antibodies against AFP, CEA,

Table 1 Summary of clinical features of hepatoid carcinomas of the pancreas reported in the English language literature

Ref.	Age	Sex	Clinical presentation	Serum AFP levels at diagnosis	Serum CEA levels at diagnosis	Location	Tumor size in cm	Associated component	Site of metastasis	Treatment	Clinical follow-up in mo
Hruban *et al*[11], 1987	53	F	Subcutaneous fat necrosis and polyarthritis	Normal	Not available	Tail	1	Acinar cell carcinoma	Liver	Chemotherapy (5-FU, Adriamycin)	Died of disease (2.75)
Tanno *et al*[12], 1999	65	F	Epigastric and back pain, anorexia, and weight loss	Elevated	Elevated	Body-tail	6 × 5	Ductal adenocarcinoma	Liver, right supraclavicular, and para-aortic lymph node	Palliative care	Died of disease (6)
Yano *et al*[13], 1999	57	M	Jaundice, epigastric pain, vomiting and fever	Elevated	Elevated	Head	9 × 7 ×5	Ductal adenocarcinoma	No	Surgery (pancreatoduodenectomy)	Died of disease (3)
Paner *et al*[14], 2000	28	M	Severe abdominal and back pain	Elevated	Elevated	Multifocal	8 × 8 × 6	Ductal adenocarcinoma	Widespread (gastric, ileal, and colonic mucosa)	Debulking of the tumor plus chemotherapy	Died of disease (14)
Paner *et al*[14], 2000	57	M	Vomiting, diarrhea, weight loss, diffuse skin rashes and diabetes mellitus	Elevated	Elevated	Tail	6 × 4 × 3.5	Neuroendocrine neoplasms (glucagonoma)	Liver	Surgery (distal pancreatectomy with splenectomy) plus chemotherapy	Died of disease (102)
Lam *et al*[15], 2001	64	F	Hypoglycemia and recurrent nocturnal sweating	Elevated	Not available	Tail	7 × 4 × 4	Insulinoma	Liver	Distal pancreatectomy with splenectomy plus regional embolization and systemic chemotherapy	Died of disease (22)
Cuilliere *et al*[16], 2002	70	M	Incidental (asymptomatic)	Normal	Normal	Body	3	Serous microcystic adenoma	No	Distal pancreatectomy with splenectomy	Alive with no evidence of recurrence (12)
Hughes *et al*[17], 2004	51	M	Incidental finding	Normal	Normal	Tail	6 × 5.5 × 5.5	No	No	Total pancreatectomy	Alive with no evidence of recurrence (14)
Matsueda *et al*[18], 2006	49	F	Weight loss	Elevated	Normal	Widespread	Not available	No	Liver (detected after 12 mo)	Surgery (total pancreatectomy), chemotherapy (gemcitabine) and liver lobectomy	Alive with no evidence of recurrence (48)
Shih *et al*[19], 2006	32	M	Incidental (asymptomatic)	Normal	Elevated	Tail	7	No	No	Surgery (distal pancreatectomy with splenectomy)	Alive with no evidence of recurrence (18)

Oh *et al*[20], 2006	21	M	Incidental (asymptomatic)	Elevated	Not available	Head	3 × 3 × 3	Neuroendocrine neoplasm	No	Surgery (pancreatoduodenectomy)	Alive with no evidence of recurrence (7)
Cardona *et al*[21], 2007	58	M	Back and flank pain	Normal	Not available	Body	3.3 × 2.5 × 2.5	No	No	Surgery (distal pancreatectomy with splenectomy)	Alive with no evidence of recurrence (15)
Kubota *et al*[22], 2007	56	M	Diabetes	Not available	Not available	Tail	6.3 × 6.2	No	No	Surgery (distal pancreatectomy with splenectomy)	Alive with no evidence of recurrence (36)
Hameed *et al*[23], 2007	41	F	Gastroesophageal reflux, jaundice, and abdominal pain	Elevated	Elevated	Head	4.5 × 4 × 3	Neuroendocrine neoplasm	Liver	Pancreaticoduodenectomy plus Chemotherapy with cisplatin and irinotecan	Died of disease (27)
Liu *et al*[24], 2007	80	M	Nausea, diarrhea weight loss and epigastric palpable mass	Normal	Not available	Head	5 × 5 × 6	No	Transverse colon	Simple tumorectomy and partial transverse colon resection	Alive with no evidence of recurrence (8)
Zhang *et al*[25], 2007	37	F	Upper abdominal pain, anorexia, and emaciation	Elevated	Not available	Widespread	9	Neuroendocrine neoplasm	No	Surgery (pancreatoduodenectomy)	Died of disease (3)
Jung *et al*[26], 2010	46	M	Dyspepsia and epigastric palpable mass	Elevated	Elevated	Head	8 × 9	Neuroendocrine neoplasm	No	Radical pancreatoduodenectomy	Alive with no evidence of recurrence (4)
Petrelli *et al*[27], 2012	37	F	Epigastric abdominal mass	Not available	Normal	Body	11	No	Liver, mediastinal lymph nodes, and lungs	Chemotherapy with sorafenib	Died of disease (12)
Kelly *et al*[28], 2012	53	F	Severe epigastric pain	Elevated	Not available	Body-tail	Not available	No	Liver	Distal pancreatectomy and adjuvant chemotherapy (carboplatin and gemcitabine)	Alive with no evidence of recurrence (22)
Kai *et al*[29], 2012	79	F	Incidental (asymptomatic)	Elevated	Elevated	Tail	7	No	Stomach, left adrenal gland, and liver	Distal pancreatectomy with splenectomy, combined with resection of the left adrenal gland and total gastrectomy	Died of disease (2)

Huang *et al*[30], 2012	52	M	Jaundice, anorexia and epigastric pain	Not available	Elevated	Head	0.5 nodule	Neuroendocrine tumor	No	Pancreaticoduodenectomy plus chemotherapy with sunitinib	Alive with no evidence of recurrence (16)
Majumder *et al*[31], 2013	69	M	Left upper quadrant pain, jaundice and nausea	Normal	Not available	Head	5.8 × 6.0	No	Liver	Biliary drainage plus chemotherapy with gemcitabine	Died of disease (3)
Steen *et al*[32], 2013	61	F	Incidental (asymptomatic)	Normal	Not available	Tail	5.3 × 3.5	No	No	Distal pancreatectomy with splenectomy	Alive with no evidence of recurrence (60)
Xin *et al*[33], 2014	33	F	Incidental (asymptomatic)	Elevated	Normal	Head	2 × 1.4 × 1.8	Neuroendocrine neoplasm	No	Pancreaticoduodenectomy plus chemotherapy with gemcitabine	Alive with no evidence of recurrence (46)
Vanoli *et al*[34], 2015	57	F	Jaundice	Elevated	Elevated	Head	3.5 × 3 × 3	No	No	Pancreatoduodenectomy and adjuvant chemotherapy (gemcitabine)	Alive with no evidence of recurrence (10)
Soofi *et al*[35], 2015	69	M	Atypical chest pain	Elevated	Normal	Body and tail	5.9	No	No	Distal pancreatectomy with splenectomy	Alive with no evidence of recurrence (4)
Antonini *et al*[36], 2015	59	M	Weight loss and abdominal discomfort	Normal	Normal	Body	6 × 5	No	No	Chemotherapy with sorafenib	Died of disease (4)
Kuo *et al*[37], 2015	67	M	Incidental (asymptomatic)	Normal	Normal	Tail	2 × 2	No	No	Distal pancreatectomy with spleen preservation	Alive with no evidence of recurrence (6)
Veerankutty *et al*[38], 2015	47	M	Incidental	Not available	Normal	Tail	3.1 × 2.9 × 2.6	Serous cystadenoma	No	Distal pancreatectomy with splenectomy (laparoscopic)	Alive with no evidence of recurrence (8)
Williams *et al*[39], 2015	71	M	Pancreatitis and melena (oozing ulcer at the ampulla)	Normal	Normal	Head	5	No	Duodenal muscularis propria	Pancreaticoduodenectomy and cholecystectomy	Not available
Stamatova *et al*[40], 2016	78	M	Incidental (asymptomatic)	Normal	Normal	Head	8 × 6	No	No	Pancreaticoduodenectomy	No evidence of recurrence but died of heart attack (2)
Chang *et al*[41], 2016	61	M	Incidental (asymptomatic)	Not available	Not available	Body and tail	1.3	No	No	Distal pancreatectomy	Alive with no evidence of recurrence (6)

Akimoto *et al*[42], 2016	59	M	Incidental (asymptomatic)	Normal	Normal	Body	5.0 × 3.5	No	No	Middle pancreatectomy	Alive with no evidence of recurrence (12)
Pellini Ferreira *et al*[43], 2017	43	M	Jaundice, epigastric pain, and watery diarrhea	Normal	Normal	Tail	9.0	Neuroendocrine neoplasm	Spleen and liver	Chemotherapy with capecitabine and temozolomide	Alive with no evidence of recurrence (16)
Ma *et al*[44], 2017	75	M	Weight loss	Elevated	Elevated	Tail	7.8	No	Liver	Chemotherapy with mFOLFIRINOX (oxaliplatin + leucovorin + irinotecan + 5-fluorouracil) plus surgery (distal pancreatectomy with splenectomy and wedge resection of the liver)	Alive with no evidence of recurrence (10)
Yang *et al*[45], 2018	83	M	Abdominal pain	Not available	Not available	Body	2.7 × 2.5 × 1.5	No	No	Laparoscopic distal pancreatectomy and splenectomy	Alive with no evidence of recurrence (107)
Yang *et al*[45], 2018	72	M	Severe back pain	Not available	Not available	Tail	12.0 × 10.5 × 4.5	No	No	Distal pancreatectomy with splenectomy	Died of pulmonary embolism (1)
Yang *et al*[45], 2018	54	M	Incidental (asymptomatic)	Elevated	Normal	Body and tail	10.0 × 9.0 × 9.0	No	Adjacent transverse colon	Distal pancreatectomy along with splenectomy and left hemicolectomy	Died of disease (29)
Our case	36	M	Progressive jaundice, weight loss and epigastric palpable mass	Elevated	Normal	Widespread	6.0 × 7.0	No	Celiac trunk, root of transverse mesocolon, and upper mesojejunum	Palliative care	Died of disease (4)

AFP: Alpha-fetoprotein; CEA: Carcinoembryonic antigen; F: Female; M: Male.

glypican-3, and HepPar1 (a hepatocyte-specific antigen), as well as albumin mRNA detection by in situ hybridization[14,20]. Cytokeratin 19 positivity plays an important role in differentiating hepatoid tumors from HCC[27]. HC of the pancreas with acinar differentiation should be tested with arginase-1 to exclude acinar cell carcinoma of the pancreas, which also presents with AFP elevation. As seen in our review, serum AFP is often elevated at the time of diagnosis of HC of the pancreas (41.15%), and can be used to monitor therapeutic response and recurrence[13,15,18,24]. Serum protein induced by vitamin K absence or antagonist II, a specific marker used for early diagnosis of HCC, was elevated in some cases, aiding in early diagnosis and indicative of better prognoses[18]. Serum CEA, which was elevated in 28.21% of cases, is a less sensitive

Table 2 Outline of main features characterizing presentation of the 39 cases of hepatoid carcinoma of the pancreas

Variable	*n* (%) or median (IQR)
Sex	
Female	12 (30.77)
Male	27 (69.23)
Age in yr	
Median (range)	57 (21-83)
Symptoms	
Asymptomatic	13 (33.33)
Pain: Abdominal/back	13 (33.33)
Gastrointestinal symptoms: Vomiting, diarrhea, and dyspepsia	9 (23.08)
Weight loss	8 (20.51)
Jaundice	7 (17.95)
Epigastric mass	3 (7.69)
Location	
Tail	13 (33.33)
Head	11 (28.21)
Body	6 (15.38)
Body and tail	5 (12.82)
Diffuse or multifocal	4 (10.26)
Size of longest diameter in cm	
Median (range)	6 (1-12)
Metastasis	17 (43.59)
Liver metastasis	12 (30.77)
Associated component: Mixed form	15 (38.46)
Elevated AFP	18 (46.15)
Elevated CEA	11 (28.21)

AFP: Alpha-fetoprotein; CEA: Carcinoembryonic antigen; IQR: Interquartile range.

diagnostic marker for hepatoid carcinoma of the pancreas.

Due to its rarity, there is currently no standardized treatment for HC of the pancreas. Owing to its aggressive nature and tendency for early liver metastasis, HC of the pancreas warrants surgical resection, if possible. The effect of adjuvant therapy after surgery resection, advocated because of the metastatic potential of the tumor, is still unclear[43,44]. Survival was poor in patients treated with only chemotherapy compared to those treated with surgery and chemotherapy: 5 out of 6 patients treated with chemotherapy succumbed to the disease (after 2.75-14 mo), while 3 out of 9 patients treated with chemotherapy and surgery succumbed to the disease (after 22-102 mo). Variable survival rates of 3 locally unresectable, metastatic or recurrent cases treated with surgery and adjuvant chemotherapy with mFOLFIRINOX, di-amino triazeno-imidazol carboxamide or gemcitabine have been reported in the literature, with one patient dying of the disease at 102 mo and two patients alive at 10 mo and 48 mo[14,18,44].

The prognosis of hepatoid carcinoma of the pancreas is unclear due to its rarity and possible heterogeneity. HCs of the gastrointestinal tract are associated with an unfavorable prognosis[50] since at the time of diagnosis, liver metastasis is often already present, indicating advanced stage[37]. Survival outcomes mainly depend upon the extent of the disease and the completeness of resection, with greater survival rates after resection and adjuvant chemotherapy, as depicted in Figure 3, with the longest disease-free interval being 107 mo[45]. Owing to the limited data, further studies with long-term follow-up are needed to standardize the treatment and to predict the natural history and prognosis of HC of the pancreas compared to those of the relatively more common gastric hepatoid carcinoma.

Our case was highly challenging due to the clinical presentation of the patient that was inconsistent with the imaging that suggested autoimmune pancreatitis (AIP). AIP commonly presents with obstructive jaundice, abdominal pain, vomiting and weight loss. Type 1 AIP is associated with high serum levels of IgG4 (> 140 mg/dL), IgG4-

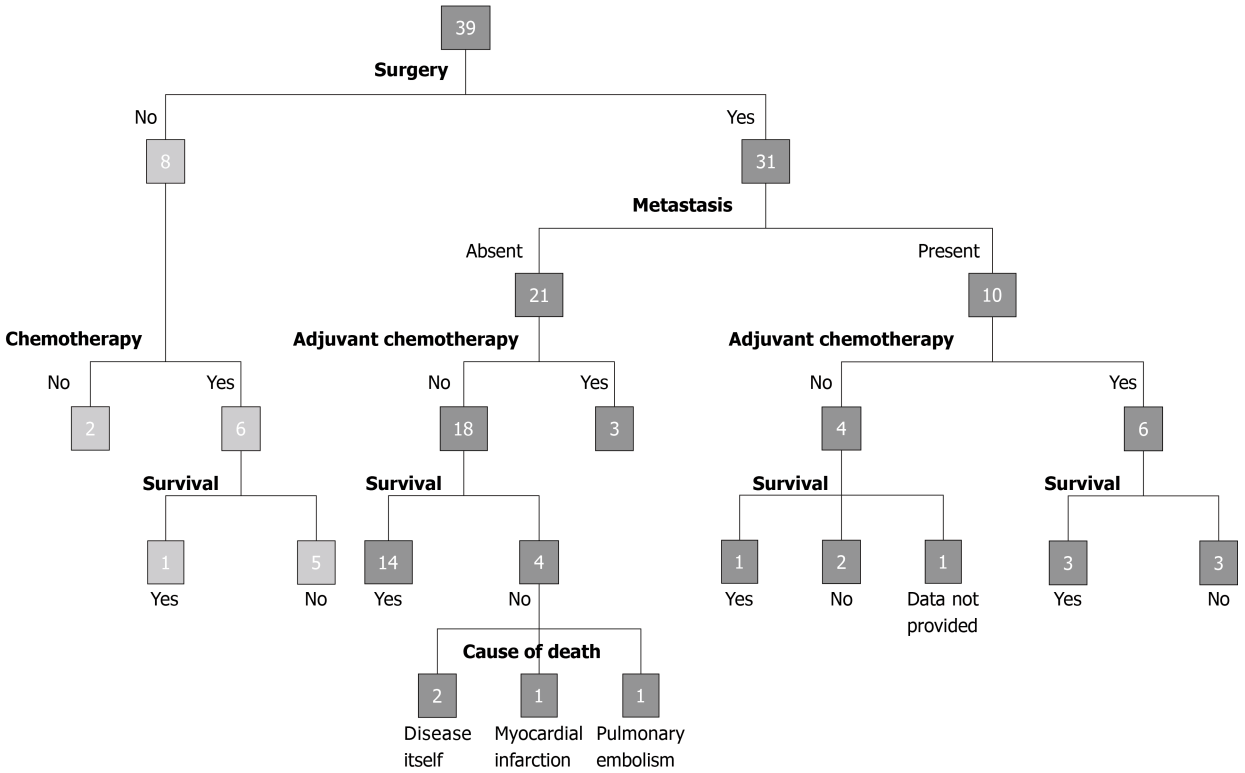

Figure 3 Outcomes of the 39 patients with hepatoid carcinoma of the pancreas reported in the literature.

positive plasma cell infiltration, and sclerosis, while type 2 AIP is often associated with inflammatory bowel disease[51]. The patient may have been previously diagnosed with AIP due to the "sausage-shaped" appearance of the diffusely enlarged pancreas, the presence of a capsule-like rim and ductal stricture on imaging, and the lack of biopsy. Differentiating between AIP and pancreatic malignancy has become a diagnostic challenge for modern gastroenterologists because they often share overlapping clinical and imaging features. The poor response to steroid treatment prior to admission prompted reassessment of the diagnosis. The patient was cachexic, with recent onset of diabetes mellitus (DM), no sign of systemic involvement, negative autoantibodies, and non-elevated amylase and lipase, indicating malignancy. Type 3C DM, as reported in the literature, is difficult to control, requiring at least 1 IU/kg body weight of insulin[52]. The prevalence of DM in patients with pancreatic cancer has been reported to be 40%, with half developing DM within 2 years[53]. Interestingly, DM was reported in only 6 previously reported cases (two of which had an associated neuroendocrine component and increased glucagon levels; the length of DM history was not reported in the remaining 4 cases). In our case, it was attributed to pancreatic islet destruction resulting from advanced-stage hepatoid carcinoma with the absence of a neuroendocrine component on pathology.

CONCLUSION

In summary, this review attempts to summarize the clinical characteristics, diagnostic methods, treatment and prognosis of HC based on the current literature. HC of the pancreas is an extremely rare neoplasm that resembles HCC in terms of morphology and immunohistochemistry findings. Diagnosis is mainly based on histopathological and immunohistochemical features. Elevation of serum AFP and protein induced by vitamin K absence or antagonist II may be a clue leading to the diagnosis of this tumor. Surgical resection is the mainstay of therapy and is more likely to result in long-term survival. Adjuvant chemotherapy has a role in recurrent, residual, unresectable and metastatic disease. Survival outcomes mainly depend upon the extent of the disease at diagnosis. The possibility of hepatoid carcinoma of the pancreas should be considered for diffuse lesions throughout the pancreas.

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