



# Extensive lymphadenopathy leading to cancerous pericardial effusion and tamponade in a T1 pancreatic head adenocarcinoma: a case report

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**Abstract:** In 2019, Pancreatic cancer became the third leading cause of cancer related mortality in the United States of America. Pancreatic cancer is a fatal malignancy that is predominantly seen in men with advanced age with aggressive course. Ninety percent of cases are adenocarcinoma. Pancreatic adenocarcinoma is very difficult to detect as is usually asymptomatic with no early signs. At least 80% of tumors are unresectable by the time of diagnosis. Despite substantial improvement in the survival rates for other major cancer forms, pancreatic cancer survival rates have remained relatively unchanged since 1960s. Multidisciplinary therapy with a combination of chemotherapy, radiation and surgery performed at high volume centers remains the best chance for cure. We report a rare case of a small T1 pancreatic head carcinoma with underlying chronic pancreatitis presenting with cancerous pericardial effusion and tamponade. Despite the small size of the primary tumor, the extensive pattern of lymphatic occlusion can lead to mesenteric and mediastinal lymphatic spread to the pericardium. US guided emergent pericardiocentesis was performed with removal of 750 cc of serosanguinous fluid. Cytopathological examination of the fluid revealed poorly differentiated pancreatic adenocarcinoma. A Port-A-Cath was placed, and he was referred to the oncology department to start chemotherapy.

**Keywords:** Pancreatic adenocarcinoma; pericardial metastasis; cardiac tamponade; lymphadenopathy; case report

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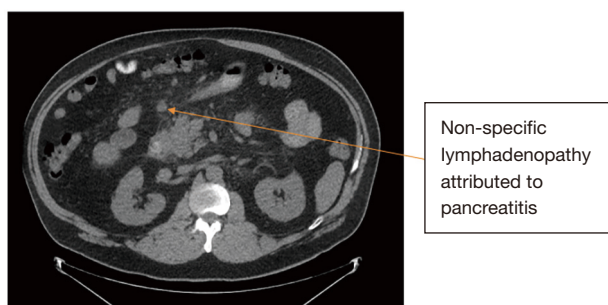
## Introduction

Adenocarcinoma is the most common malignant pancreatic tumor, affecting the head of the pancreas in 60–70% of cases (1). Pancreatic adenocarcinoma currently is the 3rd leading cause of cancer related mortality in the USA (2). By the time of diagnosis, at least 80% of tumors are unresectable (3). The etiology of pancreatic cancer is complex and multifactorial. In addition to cigarette smoking and family history, chronic pancreatitis is a well-known non modifiable risk factor (4). Pancreatic cancer is an extremely

challenging disease with surgery offering the only chance for cure.

Surgery followed by adjuvant chemotherapy is the standard of care for resectable pancreatic cancer (5). Preoperative axial imaging with high resolution computed tomography (CT), magnetic resonance imaging (MRI), and endoscopic ultrasonography (EUS) are essential for tumor staging, and assessment of resectability. Tumors that encase the superior mesenteric artery (SMA) or the presence of extensive lymphadenopathy outside the field

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**Figure 1** CT abdomen demonstrating pancreatic lesion, with nonspecific lymphadenopathy. CT, computed tomography.

of resection are signs of locally advanced and unresectable disease (3). Lymph nodes greater than 1 cm in diameter are generally considered metastatic especially in the setting of large tumors (6). Most small tumors with no evidence of lymphadenopathy can be treated surgically with a Whipple pancreaticoduodenectomy (5). Kanda *et al.* (7) reported a higher chance of distant lymph node metastasis with larger primary tumors (T3, T4). However, small T1 or T2 tumors had only regional lymph nodes metastasis.

Hereby, we report a case of a small T1 pancreatic head adenocarcinoma with no clear evidence of metastatic lymphadenopathy on preoperative CT or EUS. Intraoperatively, extensive mesenteric lymphadenopathy outside the field of surgery and lymphatic occlusion was identified causing the resection to be aborted. Within a month, the patient presented with cancerous pericardial effusion leading to tamponade. We present the following case in accordance with the CARE reporting checklist (available at <https://gs.amegroups.com/article/view/10.21037/ggs-21-670/rc>).

### Case presentation

A 48-year-old male with a history of diabetes, hypertension, and chronic pancreatitis presented to our hospital with upper abdominal pain radiating to his back with greasy meals and 60 lbs. weight loss over a 3-month period. CT demonstrated a hypo-attenuating lesion in the pancreatic head measuring 1.6 cm × 1.5 cm, and nonspecific mesenteric lymphadenopathy (*Figure 1*). Triphasic abdominal CT noted mild peripancreatic edema, with hypo-enhancing abnormal pancreatic head lesion and small peripancreatic lymph nodes, with no enhancing liver lesion, no biliary dilation. EUS did not show suspicious lymph nodes and the biopsy of the primary pancreatic lesion demonstrated

adenocarcinoma. At time of diagnosis, the CA 19-9 was 394 units/mL, alpha-fetoprotein was 3.4 ng/mL.

The enlarged lymph nodes at the root of the mesentery were considered reactive secondary to pancreatitis especially that the primary tumor was small and there were no biliary or pancreas ductal dilation. The case was discussed at our Multidisciplinary Tumor Board, and the plan was to proceed with a Whipple procedure.

A diagnostic laparoscopy ruled out carcinomatosis, then converted to laparotomy to assess resectability. We identified a lesion in the left lateral section of the liver that was biopsied and revealed a benign bile duct hamartoma. During the dissection, we identified bulky lymph nodes at the neck of the pancreas surrounding the superior mesenteric vein (SMV) and SMA. The lymphadenopathy extended across the root of the mesentery to the inferior mesenteric vein (IMV) at the ligament of Treitz. The jejunum appeared milky with prominent chylous channels suggesting lymphatic obstruction. The lymphadenopathy involved the ileocolic pedicle as well the inferior mesenteric artery (IMA) distribution towards the sigmoid colon. The common hepatic artery station 8 lymph node was resected, and pathology reported metastatic poorly differentiated adenocarcinoma. Therefore, the Whipple was aborted. Prophylactic gastro-jejunostomy bypass was done for anticipated gastric outlet obstruction.

Two weeks later, the patient returned to the emergency department with worsening nausea, vomiting, and shortness of breath. He was tachycardic and had muffled heart sounds. The following differential diagnoses were considered; pericardial effusion with developing tamponade, or pulmonary embolism given the history of pancreatic tumor. CT chest with contrast noted a large pericardial effusion (*Figure 2*). Shortly after, he developed hypotension and a diagnosis of pericardial tamponade was established. Therefore, an US guided emergent pericardiocentesis was performed with removal of 750 cc of serosanguinous fluid. Cytopathological examination of the fluid revealed poorly differentiated pancreatic adenocarcinoma (*Figure 3*). A Port-A-Cath was placed, and he was started on chemotherapy.

All procedures detailed in this case report were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the

editorial office of this journal.

## Discussion

Pancreatic adenocarcinoma is an aggressive malignancy with a high propensity for metastasis (3). Surgery combined with chemotherapy, and radiation are the only potentially curative treatment but must be integrated into a complete multidisciplinary treatment sequence to optimize its effectiveness (5).

The peripancreatic regional lymph nodes are frequently involved by disease (8). Larger tumor size (T stage) is widely acknowledged to be associated with increased lymph node metastasis (7,9). Resectable pancreatic cancers are typically in the earliest stages of the disease (stage 1A, 1B or 2A) and any nodal involvement outside the field of disease indicates unresectable disease (6).

Preoperative CT for staging of pancreatic cancer



**Figure 2** CT chest with contrast indicating a pericardial effusion. CT, computed tomography.

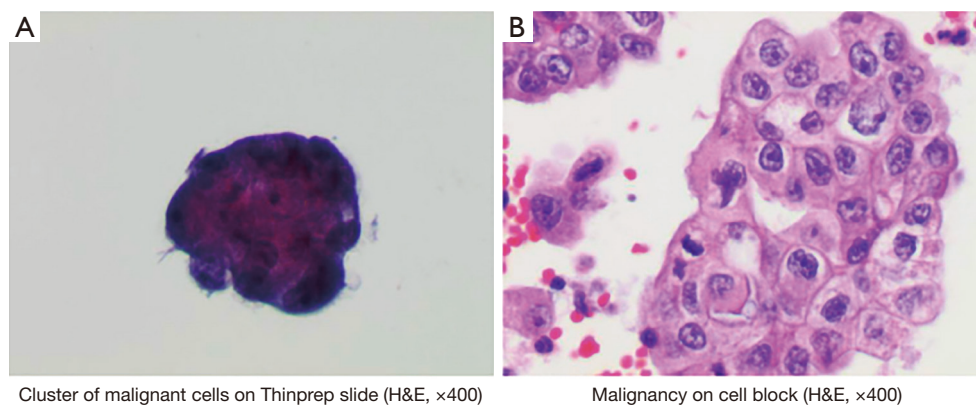
identifies metastatic lymph nodes based on the nodal size >1 cm (6). However, Prenzel *et al.* (10) reported that nodal maximal diameter does not correlate with metastatic potential demonstrating that 67% of cytopathologically proven metastatic nodes measured less than 5 mm.

Our patient's preoperative CT scan noted enlarged lymph nodes. However, given the patient's age and functional status, the small size of the primary lesion (T1) and his history of pancreatitis, these were considered likely reactive. We elected to proceed with curative resection to improve his chances of survival. Prenzel *et al.* (10) reported that 70% of the larger size lymph node were cytopathologically tumor free.

Lymph node metastasis may lead to lymphatic obstruction and impaired drainage. We believe the patient's abdominal pain with fatty meals was secondary to lymphatic obstruction rather than biliary/pancreatic ductal occlusion or perineural involvement as supported by preoperative imaging.

Tumors that are most likely to involve the heart and pericardium include cancers of the lung and breast, melanoma, and lymphoma. Pericardial effusion secondary to metastatic spread can be facilitated by different mechanisms: elevated hydrostatic pressure secondary to lymphatic and venous obstruction, the detrimental impact of cachexia and subsequent hypoalbuminemia leading to low oncotic pressure, or pericardial irritation and over production of exudative fluid secondary to tumor cells implantation potentially leading to tamponade (11).

Multiple studies reported metastatic pericardial effusion secondary to primary gastrointestinal tumors through direct, hematological, and lymphatic spread. Retrograde



**Figure 3** Pericardial fluids with pancreatic adenocarcinoma on H&E. (A) Cluster of malignant cells on ThinPrep slide; (B) malignancy on cell block. Staining method: H&E. Magnification: x400.

lymphatic spread to the pericardium secondary to colon and gastric primary tumors has been previously reported (11-13). Kiryu *et al.* (14) reported the first case of pancreatic head cancer presenting with cancerous pericardial effusion and tamponade. Their report indicated lymphatic and vascular invasion on autopsy. However, their patient had a large tumor with multiple organ metastases. Our patient has a 1.6-cm tumor with significant mesenteric adenopathy and cancerous pericardial effusion. These findings suggest lymphatic spread to the pericardium.

Bergquist *et al.* (15) reported that elevated CA 19-9 is associated with decreased stage-specific survival compared to non-secretors and those with normal CA 19-9 levels. The authors also reported that neoadjuvant therapy then curative intent surgery best mitigates the increased mortality hazard. However, the NCC guidelines version 2.2021 for pancreatic adenocarcinoma treatment as well as American Society of Clinical Oncology Clinical Practice Guideline Update stated that the standard treatment for resectable pancreatic adenocarcinoma currently remains upfront surgery followed by adjuvant chemotherapy (16,17). Furthermore, no clinical trials suggested such findings, and the guidelines are yet to endorse these recommendations.

The NCC guidelines also recommended laparotomy *vs.* minimally invasive procedure for surgical management. We started with laparoscopy to rule out carcinomatosis, then proceeded with laparotomy to assess resectability. When deemed unresectable, we did the gastric bypass to avoid gastric outlet obstruction. Croome *et al.* (18) reported that total laparoscopic pancreaticoduodenectomy is associated with shorter hospital stay, shorter interval to start post-operative chemotherapy. However, our patient recovered in a timely manner. Furthermore, the patient developed the cancerous pericardial effusion only 2 weeks following the operation. We believe that having minimally invasive approach could not have altered the patient outcomes in this case.

## Conclusions

Our case report demonstrates that pancreatic cancer, even when the primary tumor is small, can present with significant lymphadenopathy, lymphatic obstruction and spread to the pericardium with subsequent cancerous pericardial effusion. In a patient with early pancreatic head adenocarcinomas, mesenteric lymph node metastasis represents an uncommon, but clinically significant finding that can lead to drastic changes in the treatment plan, and

outcomes.

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## Footnote

*Reporting Checklist:* The authors have completed the CARE reporting checklist. Available at <https://gs.amegroups.com/article/view/10.21037/gc-21-670/rc>

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*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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