Evaluating the Frequency of Clinical and Paraclinical Findings in Patients with Pancreatic Tumors: A Retrospective Study

Shamimi K. MD[*], Jalali S. M. MD[**], Yazdani D. MD[***]

Etesam M. MD[****], Zeydani M.[*****]

Abstract:

Background and Objective: **Pancreatic cancer is one of the most deathly malignancies, which causes many deaths in Iran and the world every year. Despite advances and new information about cancers, pancreatic tumors can be diagnosed with different clinical and laboratory symptoms. Therefore, this study was conducted with the aim of investigating the clinical and paraclinical findings of patients with periampullary and pancreatic head tumors.**

Materials & Methods: **In this retrospective cross-sectional study, patients with mass in pancreatic head and periampullary region who underwent surgery at Imam Khomeini Hospital in Tehran between 2011 and 2016 were included in the study according to the inclusion and exclusion criteria. By using the patients' medical records, personal information including age, sex, history of alcohol consumption and presentation symptoms of the patients were recorded. Then laboratory and imaging findings (CT scan and ultrasound) as well as the histopathological types of resected tumor were collected based on the pathology report.**

Results: **This study included 65 patients; the frequency of men (67.6%) was higher than women (32.4%). The mean age of the patients was 60.6 years. No underlying disease was reported and there was a history of alcohol consumption in 18 patients (27.6%). Jaundice was the most common complaint in all patients and diarrhea was the least common symptom (12 patients). The mortality rate was 4.6%. The mean total bilirubin level was 13.4±3.3, and most of the patients (44 people) had higher than 8. The mean of direct bilirubin was 10.9±2.2, which was more than 8 in most patients (39 people). The mean of alkaline phosphatase, PT, AST and ALT were also increased and were higher than the normal range. Abdominal ultrasound was performed in all patients, which showed dilatation of intra- and extra-hepatic ducts. Other imaging findings included pancreatic head lesions, gallbladder enlargement, and hepatic metastases. CT scan, which was performed in 45 cases, showed similar findings with hypodense foci in the pancreas and hepatic metastases. The most common histopathology observed in the present study was adenocarcinoma (34 patients, 52.3%), while serous adenoma cyst was reported in only one patient (1.5%).**

Conclusion: **The findings of the present study showed that the prevalence of pancreatic cancer is higher in older and men patients. Also, jaundice and dilation of both intra- and extra-hepatic ducts were the most common clinical and paraclinical findings, respectively. Also, increased bilirubin and alkaline phosphatase are common laboratory symptoms in patients, and adenocarcinoma is the most reported pathology in pancreatic cancer patients.**

***Keywords:** Pancreatic cancer, gallbladder, jaundice, adenocarcinoma*

[*]Professor of General Surgery, Tehran University of Medical Sciences, Tehran Hospital
[**]General Surgeon, Tehran University of Medical Sciences
[***]Cardiovascular specialist
[****]General practitioner
[*****]Department of Nursing, School of Nursing and Midwifery, Ahvaz Jondishapur University of Medical Sciences, Ahvaz, Iran
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Corresponding Author: Dr. Korosh Shamimi
Tel: 88360247

E-mail: kshamimi@yahoo.com

Background and Objective

Pancreatic cancer is widely acknowledged as a highly fatal malignancy, exhibiting a staggering mortality-to-incidence ratio of 90%.[1] It ranks as the seventh leading cause of cancer-related deaths worldwide, characterized by an exceedingly poor prognosis and a five-year overall survival rate of a mere 10%.[2] The complexities of prevention are exacerbated by the absence of definitive risk factors and the typically late stage at which this cancer is diagnosed. This delay arises from the lack of distinctive clinical signs and reliable biological markers, compounded by the rapid proliferation of tumors.[3] Consequently, pancreatic tumors pose significant clinical challenges due to their aggressive nature and frequent late identification.[4] A comprehensive understanding of the prevalence of clinical and paraclinical findings related to these tumors is essential for accurate diagnosis, effective treatment planning, and optimal monitoring of patient outcomes.

Patients diagnosed with pancreatic tumors often present with non-specific symptoms that may be easily overlooked or misattributed to benign conditions.[5,6] Among the symptoms reported, abdominal pain and jaundice are particularly noteworthy and prevalent;[7] however, their frequency and severity can vary considerably among individuals, complicating the diagnostic process. Identifying the prevalence and patterns of these symptoms is critical for healthcare providers as it can facilitate the early identification of potential red flags for diagnosis and intervention.[8,9]

Additionally, paraclinical findings play an integral role in the diagnosis and staging of pancreatic tumors. Imaging modalities such as computed tomography (CT) scans, magnetic resonance imaging (MRI), and endoscopic ultrasound are vital for evaluating tumor size, location, and the involvement of surrounding anatomical structures.[10] Furthermore, biopsy and histopathological analyses yield essential information for accurate tumor classification.[11]

By gaining insights into the prevalence of clinical and paraclinical findings, as well as treatment outcomes, evidence-based decision-making in the management of pancreatic tumors can be significantly enhanced. This accumulated knowledge not only informs personalized treatment strategies but also aids in developing interventions that are tailored to individual patient characteristics, thereby facilitating the identification of prognostic markers that optimize patient management.[12] In light of these considerations, the present study aims to investigate the prevalence of clinical symptoms and paraclinical findings in patients undergoing surgical intervention for pancreatic cancer at Imam Khomeini Hospital in Tehran from 2000 to 2004.

Materials and Methods

This retrospective cross-sectional study included patients diagnosed with pancreatic cancer who underwent surgical intervention at Imam Khomeini Hospital in Tehran between 2000 and 2004.

The inclusion criteria encompassed: 1. A definitive pathological diagnosis of pancreatic cancer located in the head and periampullary region. 2. Patients aged 18 years or older. 3. Patients' willingness to participate and provide informed consent. Exclusion criteria comprised: 1. Incomplete clinical records. 2. The presence of comorbid malignancies, such as gallbladder cancer.

Data collection involved documentation of individual patient characteristics—including age, gender, comorbidities, clinical symptoms, and alcohol consumption history—utilizing a custom-designed checklist based on patient medical records. Imaging findings from CT scans and ultrasounds, along with laboratory results (including total and direct bilirubin, alkaline phosphatase, aspartate aminotransferase [AST], alanine aminotransferase [ALT], and prothrombin time [PT]), were systematically recorded. Histopathological classification of tumors was obtained from available medical records. Data were subsequently analyzed

and reported as frequencies and percentages or as means and standard deviations.

Findings

Individual Characteristics

A total of 65 patients were included in this study, consisting of 44 men (67.6%) and 21 women (32.4%), with a mean age of 60.6 years (standard deviation: 15.8 years). The majority of patients (30 individuals, 46.1%) were aged between 60 and 80 years. No comorbidities were reported among the patients; however, a history of alcohol consumption was noted in 18 cases (27.6%).

Clinical Symptoms

As illustrated in Table 1, jaundice was identified as the most prevalent complaint, reported in 100% of patients, while diarrhea emerged as the least frequent clinical symptom, occurring in only 12 patients. The study documented a mortality rate of 4.6% (3 patients).

Table 1- Frequency of clinical symptoms in patients with pancreatic head mass

Clinical Symptoms	*Percentage*	*Frequency*
Jaundice	*100*	*65*
Anorexia & weight loss	*58.4*	*38*
Abdominal pain	*69.2*	*45*
Diarrhea	*18.4*	*12*
Itching	*89.2*	*58*
Nausea & vomiting	*36.9*	*24*
Hepatomegaly	*27.6*	*18*

Laboratory Findings

The mean total bilirubin level was noted to be 13.4 ± 3.3 (range: 0.15 to 41), with the majority of patients (44 individuals) exhibiting levels exceeding 8. The mean direct bilirubin was recorded at 10.9 ± 2.2 (range: 0.01 to 39.3), with 39 patients surpassing the threshold of 8. Other significant laboratory findings included a mean alkaline phosphatase level of 1224 ± 91.9 (range: 247 to 4384), a mean prothrombin time of 14 ± 3 (range: 9 to 20.5), a mean AST of 133.2 ± 18 (range: 16 to 989), and a mean ALT of 15 ± 91.9 (range: 13 to 583).

Imaging Findings

All patients underwent abdominal ultrasound, which consistently revealed dilation of intrahepatic and extrahepatic bile ducts. Additional findings included a mass in the head of the pancreas in 28 patients (43%), a mass in the head of the pancreas accompanied by an enlarged gallbladder containing sludge in 10 patients (15.3%), and a mass in the head of the pancreas with gallbladder hydrops in 9 patients (13.8%). Gallstones were observed in 14 patients (21.5%), and a mass in the head of the pancreas with gallbladder dilation and multiple hepatic metastases was recorded in 4 patients (6.1%).

Among the 65 patients studied, CT scans were conducted on 45 individuals. In addition to the dilation of intrahepatic and extrahepatic bile ducts, hypodense lesions in the head of the pancreas were reported in 16 patients (35.5%), while 10 patients (22.2%) exhibited hypodense lesions in the head of the pancreas along with an enlarged gallbladder. Other findings included pancreatic atrophy with an enlarged gallbladder and biliary obstruction in 8 patients (17.8%), hypodense lesions in the head with liver metastases in 5 patients (11.1%), and hypodense lesions in the head with a normal gallbladder in 6 patients (13.4%).

Histopathological Findings

As depicted in Figure 1, adenocarcinoma was identified as the most prevalent histopathological diagnosis, affecting 34 patients (52.3%), while serous adenomas were reported in a single patient (1.5%).

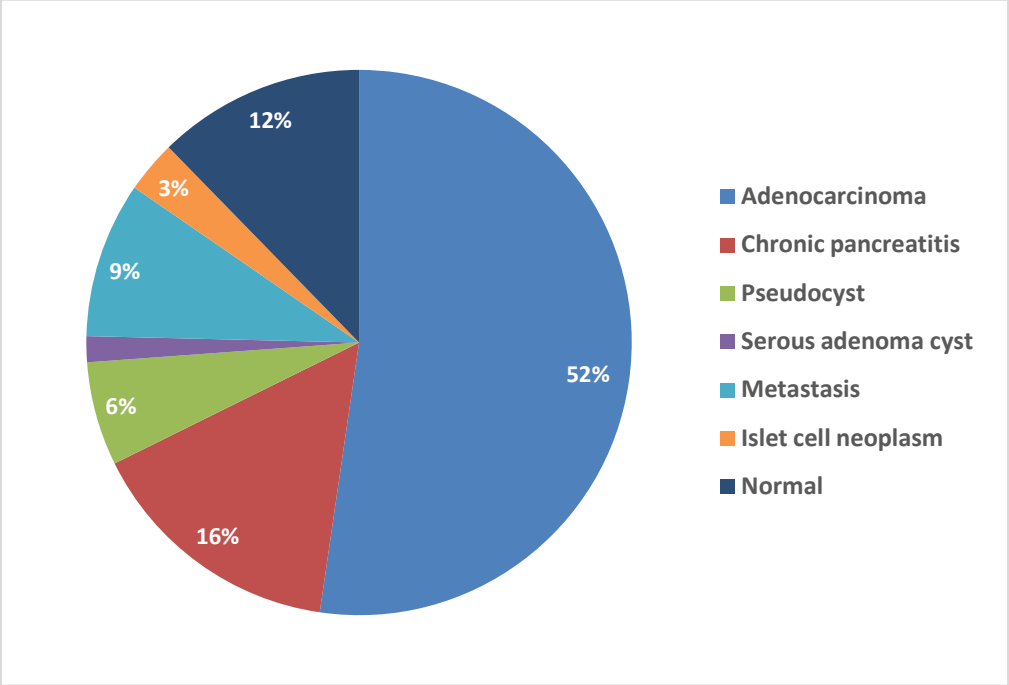

Diagram 1 - Histopathological frequency of pancreatic masses

Discussion and Conclusion

The present study observed an average age of 60.6 years among patients diagnosed with pancreatic cancer, which is consistent with prior research[13] indicating a higher incidence of pancreatic tumors among older populations. Nonetheless, it is noteworthy that this average age is lower compared to findings reported in other studies; for instance, Ramia-Angel et al. documented a mean age of 69.2 years.[14] Additionally, findings from Primavesi et al.[13] indicated that less than 10% of pancreatic cancer cases occur in individuals under the age of 44. The male-to-female ratio observed in our study indicated that men were nearly twice as likely to receive a diagnosis of pancreatic cancer compared to women, a trend that is generally supported by earlier research.[15] This observation contrasts with analyses by Ferlay et al.,[16] which suggested a more balanced distribution of pancreatic tumors across genders.

Approximately one-third of the patients in our investigation reported a history of alcohol consumption, while none disclosed any history of smoking. The absence of a smoking history is particularly notable, considering that smoking is recognized as one of the primary risk factors for pancreatic cancer, with smokers being approximately twice as likely to develop the disease compared to non-smokers.[17,18]

The relationship between alcohol consumption and pancreatic cancer remains contentious; numerous studies suggest that the effects of alcohol often occur in conjunction with other risk factors, primarily smoking.[19] However, it is well established that chronic alcohol consumption can lead to chronic pancreatitis, which is itself acknowledged as a significant risk factor for the development of pancreatic cancer.[20]

Common symptoms reported by patients with pancreatic cancer include abdominal pain, jaundice, and weight loss.[21] Specifically, tumors localized in the head of the pancreas typically elicit symptoms such as jaundice, weight loss, and steatorrhea early in the disease process.[22] The early onset of jaundice

in such cases serves both clinical and prognostic functions; patients presenting with jaundice in conjunction with abdominal pain typically have a poorer prognosis than those who present with jaundice alone.

In our investigation, jaundice emerged as the predominant clinical complaint, followed closely by symptoms such as weight loss, abdominal pain, and digestive disturbances. The high incidence of jaundice is consistent with the obstructive nature of pancreatic tumors, which frequently lead to bile duct obstruction.[23] Furthermore, while diarrhea was among the less common symptoms, it can be attributed to exocrine pancreatic insufficiency.[24] The overall mortality rate observed in this study was 4.6%, reflective of the generally poor prognosis associated with pancreatic tumors.

Laboratory analyses revealed elevated bilirubin levels as the most prevalent finding, indicating liver dysfunction likely resulting from bile duct obstruction secondary to the pancreatic tumor. Elevated levels of alkaline phosphatase, PT, AST, and ALT further corroborate the involvement of intrahepatic bile ducts and underscore the severity of the disease process.[26] These laboratory findings are congruent with the characteristic clinical manifestations of pancreatic tumors and are pivotal for diagnosis, monitoring, and evaluating disease progression.

Ultrasound and CT imaging consistently revealed dilation of both intrahepatic and extrahepatic bile ducts, confirming the presence of bile duct obstruction. These findings emphasize the critical role of imaging studies in the assessment and management of patients with pancreatic tumors,[28] facilitating timely interventions and potentially improving patient outcomes. Overall, our findings contribute to the existing body of knowledge pertaining to pancreatic cancer, underscoring the necessity for increased awareness of its clinical manifestations and the importance of early detection strategies.[29]

Adenocarcinoma has been identified as the predominant pathology in this study, reflecting its established high incidence among pancreatic tumors. Characterized by its aggressive behavior, adenocarcinoma poses significant treatment challenges and is frequently associated with unfavorable patient outcomes.[30] In contrast, the comparatively lower incidence of serous cystadenoma, which demonstrates a more favorable prognosis than adenocarcinoma, underscores this differentiation.[31] Accurate histopathological diagnosis is essential for the effective management of pancreatic tumors and the application of targeted therapeutic approaches.

This study faced several limitations, particularly a small sample size, which may restrict the generalizability of the findings. Furthermore, the single-center nature of the study may introduce potential biases and limit the diversity of the patient population. The retrospective design may also be subject to inherent biases and could result in incomplete patient record information.

Notwithstanding these limitations, the study effectively elucidated the clinical, laboratory, imaging, and histopathological characteristics of patients with pancreatic tumors. The findings are consistent with existing literature and underscore the urgent need for the accurate recognition of specific symptoms, precise interpretation of laboratory results, and the use of appropriate imaging modalities in the diagnosis and management of these neoplasms. To further advance this research, it is imperative that future studies encompass larger sample sizes and engage in multi-center collaborations, thereby strengthening the robustness of the evidence base and enhancing the generalizability of the results.

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