INTRODUCTION

The periampullary tumors (usually carcinomas) can arise from ampulla, terminal common bile duct (CBD), pancreatic duct, and adjacent duodenal mucosa and by definition these include tumors that are located within 1.0 cm of the papilla.\[^{1,2}\] The presenting symptoms of periampullary cancers include jaundice, pruritus, anorexia, nausea, vomiting, weight loss, abdominal pain, and diarrhea.\[^{3}\] In the absence of specific clinical symptoms, early diagnosis is delayed, and vague symptoms back like pain often leads to misdiagnosis.\[^{4}\]

Hyperbilirubinemia (conjugated type) and elevated alkaline phosphatase (ALP) may be present due to biliary obstruction, and tumor marker is neither sensitive nor specific enough to serve as reliable screening tool for this carcinoma. Abdominal ultrasound is the first-line radiological investigation in obstructive jaundice as it is accessible and cost effective, but its sensitivity is low both in the diagnosis and staging.\[^{5}\] Magnetic resonance imaging, magnetic resonance cholangiopancreatography (MRCP), positron emission tomography (PET), PET-computed tomography (CT) scan, multidetector, pancreatic protocol CT scan, and endoscopic ultrasonography (EUS) are used to evaluate the periampullary tumors and assess for their resectability. Treatment options depend on the stage of the disease.\[^{6}\] In operable fit patient, the treatment of choice is excision by pancreaticoduodenectomy.\[^{1,7-9}\]
PATIENTS AND METHODS

This is an observational cross-sectional, hospital-based study, conducted in Ibn Sina hospital in the period from December 2017 to December 2019, it included 79 patients who were diagnosed with periampullary cancer, and planned for pancreaticoduodenectomy during the study period. It included clinical parameters such as jaundice, pale stool, weight loss, epigastric pain, back pain, palpable mass or gallbladder, serum levels of hemoglobin, bilirubin, tumor markers and albumin, and recent onset diabetes, in addition to radiological parameters such as abdominal ultrasonography esophageogastroduodenoscopy, MRCP, pancreatic protocol CT scan, and EUS.

Convenience non-randomized sampling technique was used; statistical analyses were performed using statistical software (SPSS version 20). Frequencies and proportions were used to describe patient demographics. Non normally distributed variables such as age were described with mean, and non-parametric tests for differences. Tests for differences in proportions were performed using Chi-square or Fisher exact tests, and risk presented as an odds ratio with 95% confidence intervals where appropriate. Correlation was done with the Spearman rho, assuming a nonparametric distribution. All tests were two-tailed and statistical significant was considered as \( P < 0.05 \).

RESULTS

There were 79 patients, 51.9% \((n = 41)\) were males and 48.1% \((n = 38)\) were females, male to female ratio was 1:0.92. The majority of patients were in the age group of 40–60 years with mean age of 50 years \((SD \pm 6.54)\). Nearly 94% of the patients presented with the ordinary symptoms of obstructive jaundice (Jaundice, pale stools, dark urine, and itching). The majority of the patients had loss of weight (75%) and appetite (68%). Epigastric pain was present in 19 patients (24.1%) while abdominal discomfort was the presenting complains in three patients (3.8%) and vomiting in one patient (1.2%).

All patients with back pain were inoperable and had palliative management and 25% of the patients with palpable epigastric mass underwent palliative management, in addition to high bilirubin (more than 10 mg/dl) was statistically correlated with palliative surgery [Table 1]. Those 19 patients with epigastric pain, six patients (31.57%) had palliative management.

Triphasic CT abdomen with pancreatic protocol was the most modality of investigation used for pre-operative prediction (74.7%). In 46 patients (78%), triphasic CT abdomen with pancreatic protocol was used alone and in 25 patients (42.3%) [Table 2]. The majority of cancers were located at the pancreatic head 59.5% \((n = 47)\), followed by ampulla 21.5% \((n = 17)\), distal CBD 12.7% \((n = 10)\), and the duodenum 6.3% \((n = 5)\). There were 25 patients who had regional lymphadenopathy, 21.5% of patients \((n = 17)\) had vascular involvement.

DISCUSSION

Periampullary cancers represent 0.2% of all gastrointestinal tumors.\(^{[10]}\) The majority of periampullary tumors present with biliary obstruction due to the tumor location, often this obstruction will lead to features such as abdominal discomfort, jaundice, nausea, and pruritus.\(^{[11]}\) Many patients may require either endoscopic measures to relieve the obstruction, either temporarily in resectable tumors or permanently those unresectable.\(^{[12]}\) Surgical resection (for operable tumors) gives the best chance for cure. Management depends on the pre-operative operability measures.

Periampullary cancer is rising in our local population. Its incidence increases with age and has a high mortality and morbidity rate. Nuzzo reported that the mean age was 67.4 years\(^{[13]}\) while Kim \textit{et al.} found the average age to be 61.5 years.\(^{[14]}\) On the other hand, Mersin \textit{et al.} reported the median age as 53 years\(^{[15]}\) and also Temel reported, the mean age was 63.7 years and all results are nearly equal to our study which was 50 years.\(^{[16]}\)

Periampullary cancer is considered more common in men, Kim \textit{et al.} reported male/female ratio was 1.5 and Temel reported that male/female ratio was found to be 1.2, and in our study the male was little prominent.\(^{[14,16]}\)

All patients with back pain (100%) have had palliative surgery, this should raise attention for the importance of back pain as a predictive factor in operability. To the best of our knowledge, we did not find a study using back pain as single independent predictive factor in operability of periampullary cancer.

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<thead>
<tr>
<th>Table 1: Demonstrates the correlation between high bilirubin and palliative surgery</th>
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<td>Bypass/Bilirubin correlation</td>
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\(*Correlation is significant at the 0.05 level (two-tailed)*
Kau et al. stated that CA 19-9 was a significant prognostic factor in both resectable and unresectable periampullary cancers, carcinoembryonic antigen (CEA) was significant only in the resectable group\(^\text{[17]}\) but in our study, both CA19-9 and CEA showed no predictive significance.

On the other hand, bilirubin level more than 10 mg/dl is associated with increased rate of palliative surgery. A study by Samaali et al. reported that serum level ALP was identified as an independent factor of unresectability in malignant obstructive jaundice.\(^\text{[18]}\) ALP is statistically not significance in predicting periampullary cancer operability. CT scanning remains the initial investigation of choice in the diagnosis and staging of periampullary tumors,\(^\text{[5]}\) but EUS might be superior for overall detection of lesions, especially those smaller than 2 cm.\(^\text{[19]}\) Although CT remains the investigation of choice, it is essential that EUS is performed by experienced operators and used when the clinical suspicion is high and CT fails to demonstrate a mass. Abdominal ultrasonography, MRCP, OGD, EUS, and CT scan when used in combined can give excellent pre-operative prediction results even in cases of anatomical variation.\(^\text{[20]}\) This could increase the number of early lesions detection and improve the overall prognosis which is similar to our study.

**CONCLUSION**

Back pain could help in prediction of unresectability of periampullary cancers, and bilirubin level more than 10 mg/dl is significant for pre-operative unresectability of periampullary cancers. Triphasic CT Abdomen, MRCP, EUS, ABD US, and OGD provide excellent preoperative prediction of operability of periampullary cancer.

**REFERENCES**

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