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EARLY EXPERIENCE WITH THE WHIPPLE PROCEDURE IN A NEWLY ESTABLISHED HEPATOBILIARY UNIT: A RETROSPECTIVE COHORT STUDY

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Abstract

Objective:
To determine the early clinical outcome, postoperative morbidity and mortality of pancreaticoduodenectomy (Whipple procedure) in a newly established hepatobiliary unit.

Study Design: *Retrospective cohort study.*

Place and Duration of Study:
The study was done in the Department of General Surgery, Unit-I, Ward-3, Jinnah Postgraduate medical Centre(JPMC), Karachi, between January 2023 and February 2026.

Methodology:
Retrospectively, medical records of patients who underwent pancreaticoduodenectomy were reviewed within the study period. The demographics, clinical presentation, operative, ICU stay, postoperative complications and mortality were data collected. All procedure was done with open method by the classical Whipple technique.

Results:
A total of 29 patients were included, with 24 (82.8%) males and 5 (17.2%) females. The mean age was 55 ± 10 years. Obstructive jaundice was the most common presenting symptom, and periampullary carcinoma was the most frequent indication (55.2%). All patients required ICU admission postoperatively, with a mean ICU stay of 2–3 days. Postoperative complications occurred in 7 patients (24.1%), including hepaticojejunostomy leak in 2 (6.9%), gastrojejunostomy leak in 1 (3.4%), and surgical site infection in 4 (13.8%). The overall postoperative mortality rate was 13.8% (n = 4).

Conclusion:
Pancreaticoduodenectomy is safely performed in new hepatobiliary units with an acceptable morbidity and mortality, when there is proper surgical expertise and postoperative care are available.

Introduction

The pancreaticoduodenectomy also known as the Whipple procedure has remained the surgical gold standard treatment of malignant and selected benign lesions of the pancreatic head, the distal bile duct, ampulla of Vater and the duodenum. Although it is one of the most complicated abdominal procedures, it provides the only potentially curative procedure to resectable periampullary and pancreatic head malignancies. The advancement of surgery and perioperative care has greatly contributed to better postoperative results in the last few decades. [1]

Pancreatic cancer belongs to the group of most aggressive gastrointestinal cancer and is a leading cause of cancer-associated death globally. Recent statistics on cancer worldwide show that pancreatic cancer is on the increase and it is forecasted that in the next few decades, it will be one of the major causes of cancer related mortalities. Surgical resection is the mainstay of treatment of patients with localized disease, with only a minority of patients being able to receive curative-surgery at the diagnosis.[2]

The procedure of pancreaticoduodenectomy is technically complicated because of the presence of a complicated hepatopancreatobiliary anatomy and the ecessity of several gastrointestinal anastomoses. Postoperative complications like pancreatic fistula, delayed emptying of the stomach, and postoperative bleeding are also major causes of postoperative morbidity. Thus, to

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achieve successful results, it is essential to select patients carefully, use a high-quality surgical procedure, and provide them with specific perioperative treatment.[3]

Traditionally the Whipple procedure was characterized by a very high mortality rate of over 20 30%. But as anesthesia and perioperative critical care and surgical expertise were developed, the high-volume center mortality rate has dropped to under 5%. However, morbidity is also relatively high and the reported complication rates vary between 30 and 50% in most series.[4] A number of studies have shown that institutional surgical volume and experience have a major effect on outcomes following pancreaticoduodenectomy. The high-volume hepatopancreatobiliary centers have always reported improved perioperative results, reduced hospital stays and mortality rates than the low volume hepatopancreatobiliary centers.[5]

The recent advances in the surgical practice such as the minimally invasive pancreaticoduodenectomy technique and the improved recovery regimes are meant to further improve the postoperative outcomes and minimize the postoperative complications. Nevertheless, open pancreaticoduodenectomy is the most common operation done in most of the institutions, especially in developing nations.[6] Although the world is gaining more experience on pancreaticoduodenectomy, the data in newly formed hepatobiliary units of the developing healthcare system is limited.[7] The analysis of early institutional experience is significant to estimate the feasibility, outline complications, and enhance the outcomes of surgery.

The results of early outcome investigations are useful in understanding the safety of the operations, incidences of operative complications, and mortality rates which can be translated to the enhancement of surgical education, procedures, and preoperative selection techniques.[8]Moreover, the knowledge of the initial institutional outcomes means comparison with international standards and the identification of whether there is an acceptable standard of care delivery in newly established hepatobiliary units.[9]

Thus, the current research was aimed to assess early experience, postoperative outcomes, as well as complications that are related to pancreaticoduodenectomy during a newly developed hepatobiliary unit.

Methodology

Study Design:

This retrospective cohort study was conducted to assess the initial outcomes of pancreaticoduodenectomy (Whipple procedure) done in a newly developed hepatobiliary unit.

Place and Duration of Study:

This research was conducted in the Department of General Surgery, Unit-I, Ward-3, Jinnah Postgraduate Medical Centre (JPMC), Karachi, under the period of January 2023 to February 2026.

Inclusion Criteria:

The study included all patients who had pancreaticoduodenectomy done within the study period because of periampullary lesions or pancreatic head lesions.

Exclusion Criteria:

Patients with unresectable disease or distant metastasis, or medically unfit to undergo major surgery were not included. Incomplete medical records and patients who had pancreatic surgeries other than pancreaticoduodenectomy were also not included.

Data Collection Procedure:

The patient data were to be gathered retrospectively based on the hospital records, operative notes, and discharge summaries through a structured data collection proforma. Demographic factors (age and gender), clinical presentation, comorbid conditions, operative details, mandate to be admitted to intensive care unit (ICU), duration of stay in ICU, postoperative hospital stay, postoperative complications, and mortality were variables noted. All procedures were done in an open-surgical method in a classical Whipple technique.

Data Analysis:

Statistical Package of Social Sciences (SPSS) version 25 was used to input and analyze the data. Continuous variables were reported in terms of mean and standard deviation and categorical variables were reported in terms of frequencies and percentages.

Ethical Consideration:

The institutional ethical review committee of Jinnah Postgraduate Medical Centre, Karachi approved the study. The study ensured patient confidentiality and no personal identifiers were revealed.

Results

A total of 29 patients who underwent pancreaticoduodenectomy (Whipple procedure) were included in the study from January 2023 to February 2026. Most patients were men 24(82.8%), and the number of female patients was 5 (17. 2%).The average age of patients was 55 ± 10 years. (Table1).

Obstructive jaundice was the most frequent presenting symptom followed by abdominal pain and weight loss. Periampullary carcinoma was the most common indication of surgery, followed by pancreatic head carcinoma and distal cholangiocarcinoma (Table 11).

The quantity of procedures steadily expanded throughout the period of the study. In 2023, 2024, 2025 and 2026, 6, 9, 12 and 2 procedures were carried out respectively (Figure 1). All the procedures have been done using the classical

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Whipple technique in an open surgical approach. Intraoperative abandonment of one procedure was caused by unresectable disease and two anatomically variant pancreatic ducts were observed in one patient.

In the postoperative period, all patients (100%) had to be admitted into the intensive care unit, where the mean stay in the ICU was 2-3 days, and all patients were directly transported to the surgical ward after extubation. The average length of stay at the hospital after surgery was 12 ±3 days. Seven patients (24.1%) experienced postoperative complications. These included two cases of hepaticojejunostomy leak (6.9%), one case of gastrojejunostomy leak (3.4%), and four cases of surgical site infection (13.8%). All patients were managed conservatively with antibiotics and wound care (Table IV). The overall postoperative mortality rate was 13.8% (n = 4).

Table I: Demographic and Clinical Characteristics of Patients (n = 29).

Variable	Number (%)
Gender	
Male	24 (82.8%)
Female	5 (17.2%)
Mean age (years)	55 ± 10
Presenting symptoms	
Obstructive jaundice	22 (75.9%)
Abdominal pain	18 (62.1%)
Weight loss	14 (48.3%)

Table II: Pancreaticoduodenectomy Indications.

Diagnosis	Number (%)
Periampullary carcinoma	16(55.2%)
Pancreatic head carcinoma	8 (27.6%)
Distal cholangiocarcinoma	4 (13.8%)
Duodenal carcinoma	1(3.4%)

Figure 1: Year-wise distribution of pancreaticoduodenectomy procedures from 2023 to 2026.

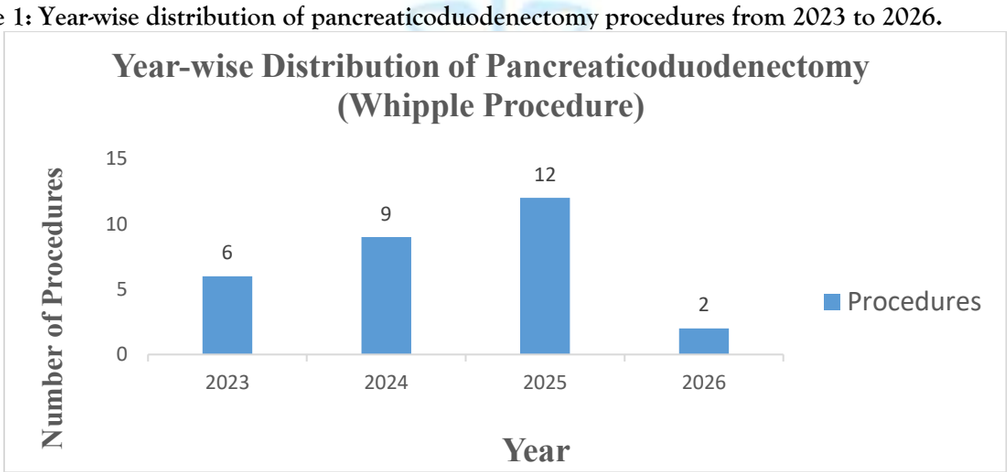

Table IV: Operative Characteristics and Postoperative Results.

Variable	Number (%)
Classical Whipple procedure	28 (96.6%)
Abandoned procedure	1 (3.4%)
Anatomical variation (two pancreatic ducts)	1 (3.4%)
ICU admission	29 (100%)
Mean ICU stay (days)	2-3
Gastrojejunostomy leak	1 (3.4%)
Hepaticojejunostomy leak	2 (6.8%)
Surgical site infection	4(13.8%)
Total complications	7(24.1%)
Mortality	4 (13,8%)
Mean hospital stay (days)	12 ± 3

Discussion

Pancreaticoduodenectomy (Whipple procedure) still represents the most effective treatment of malignant and selected benign tumors of the pancreatic head, distal bile duct, ampulla of Vater, and duodenum.[10] Although there has been an improvement in surgical procedures and perioperative management, it remains one of the

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most technically challenging operations involving the abdomen and has been linked to high postoperative morbidity.[11] The rising global incidence of pancreatic malignancies only further reinforces the need to have effective surgery in patients with resectable disease.

In the current study, most of the patients were men with the average age of 55 years. Our cohort also reported similar demographic patterns of previous studies where pancreatic and periampullary malignancies show higher incidences of presenting with obstructive jaundice and in patients older than 50 years. [13] Periampullary carcinoma was also most frequently the indication to surgery and this is consistent with other prior surgical series that reported jaundice being the most common clinical manifestation of periampullary and pancreatic head tumours. [14-15]

In our study, 24.1% of the patients had postoperative complications. Surgical site infections and anastomotic leakage are still some of the most frequent reported complications in the post-pancreaticoduodenectomy and are major causes of postoperative morbidity. [16] Postoperative observation is also crucial after the major hepatopancreatobiliary operations. [17] All our patients in the series needed postoperative intensive care observation with an average 2-3-days ICU stay, which is similar to the results reported in other literature that evaluated perioperative management after pancreatic surgery. [18] The overall postoperative mortality in our study was 13.8%. During the last decades, the high mortality rate following pancreaticoduodenectomy was decreased significantly by advances in anesthesia, surgical methods, and perioperative care in comparison with the previous reports when mortality rates were higher than 20%. [19] It has also been established by several studies that the results of surgical interventions after pancreaticoduodenectomy are highly dependent on the experience and volume of the surgical operation at the hospital in terms of outcomes, with better outcomes reported at high-volume hepatopancreatobiliary institutions.[20]

Nevertheless, despite the growing popularity of minimally invasive pancreaticoduodenectomy in the recent years, open pancreaticoduodenectomy is the most common procedure conducted across the globe, especially in the developing healthcare facilities.[21] Early institutional experience studies are therefore important for evaluating operative safety and identifying challenges associated with establishing hepatopancreatobiliary surgical programs.[22] Complication reporting has also been standardized to enhance the assessment of post-operative outcomes following pancreatic surgery.[23] The same results have also been documented in hepatobiliary centers in Pakistan, where pancreaticoduodenectomy has been conducted with satisfactory morbidity and mortality.[24]

Limitations

This research has some limitations. It was a retrospective study that was carried out in one tertiary care center but used a relatively small sample that might restrict the generalizability of the results. Moreover, survival analysis and long-term oncological outcomes were not studied. Future prospective cohort studies with increased sample sizes and extended follow-up are needed to further evaluate the outcome of pancreaticoduodenectomy in newly developed hepatobiliary units.

Conclusion

Pancreaticoduodenectomy is a relatively safe procedure that can be conducted with a reasonably low morbidity and mortality rate in a newly formed hepatobiliary unit. Selecting patients carefully, maintaining a high level of surgical excellence, and organizing the perioperative care are all important factors in obtaining desirable results. Multidisciplinary care and continued institutional experience will most likely benefit surgical outcomes in patients with pancreaticoduodenectomy.

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