

OUTCOMES OF WHIPPLE PROCEDURE FOR PANCREATIC CANCER: INITIAL EXPERIENCE FROM A PUBLIC-SECTOR HOSPITAL OF PAKISTAN

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ABSTRACT

Objectives: The objective of this study was to review the outcomes of Whipple procedure at our institution.

Material and methods: From 1st January 2017 to 31st December 2019, patients who underwent Whipple procedure for pancreatic cancer at Dr. Ruth K.M. Pfau Civil Hospital Karachi complying with the criteria were chosen for this retrospective cross-sectional study utilizing convenient sampling. Ages, gender, site of the disease, histopathology, operative findings, pancreatic reconstruction techniques, postoperative complications including SSI, intra-abdominal collections, chyle leaks, anastomotic leaks, and their management and 30-day mortality were recorded and analyzed.

Results: The mean age of patients was 57 ± 13.62 years. The male-to-female ratio was 2.1:1. Jaundice was the most common symptom patients encountered. Surgical site infection (SSI) was the leading postoperative complication. Metastasis to distant sites or locoregional recurrence evolved in 32.7% of patients. The 30-day mortality after surgery was 17.07%. 27 patients (65.9%) of the patients are alive and disease free and 14 patients (34.1%) expired due to recurrence.

Conclusion: Pancreaticoduodenectomy is a complex procedure. However, with recent advancements, it has evolved into a safer procedure with significantly better surgical outcomes. Large-scale studies for identifying factors priming in poor outcomes along with stage-based and age-based comparisons are recommended.

Keywords: Whipple procedure, Pancreatogastrostomy, Pancreatojejunostomy, outcome, Survival

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INTRODUCTION

Among the leading malignant diseases causing deaths around the globe, pancreatic cancer stands at the 7th spot worldwide¹. There are two main types of pancreatic cancers i.e., adenocarcinoma and pancreatic endocrine tumors^{1,2}. The incidence of pancreatic cancer increases with advancing age and is slightly more common among the female gender³. The cause of pancreatic cancer is still unknown, however, some risk factors have been identified in the past few decades such as; age, gender, race, alcohol, smoking, obesity, family history, and diabetes⁴. It has dreadful prognostic statistics with a 5-year survival rate ranging from 2% to 9%⁵.

Surgery, alongside chemotherapeutic options, remains an elemental component of the management plan. Pancreaticoduodenectomy (Whipple procedure) is a com-

plex surgical undertaking and has a noteworthy morbidity rate associated with it. History credits Walter Kausch as the debutante for doing the initial Whipple procedure successfully, which he performed in stages. But the procedure secured its name as Whipple's procedure after Allan Oldfather Whipple publicized it for periampullary tumors in his publication in the year 1935. Back in Sir Whipple's days and as per his published case series, the postprocedural mortality was hefty, estimated to be 25 percent⁶. In recent times, high-volume centers have communicated a significant reduction in mortality rates, in some reports less than 5% crediting furtherance in surgical art, perioperative care, and intensive care facilities. Nonetheless, morbidity rates still peak at 40 to 50 percent calling for apt strategies⁷.

The indications of Whipple procedure include malignant pancreatic and periampullary tumors and some benign conditions including chronic pancreatitis and pancreatic trauma. Pancreatic head adenocarcinoma carries a dismal prognosis as compared to periampullary tumors. Most of the patients at presentation have advanced stages of the disease, and only 10% to 20% of them have operable tumors⁸.

Several authors from Pakistan have published their experience regarding the outcomes of Whipple pro-

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cedure from tertiary care centers but the numbers have been small⁹. The goal of this study was to examine the outcomes in terms of postoperative morbidity and 30-day mortality while additionally reviewing the clinical and pathological features of Whipple procedure at our institution. This will aid in scaling the exact statistical picture of the morbidity and mortality risk to the patients undergoing this complex procedure in local patients.

MATERIAL AND METHODS

From 1st January 2017 to 31st December 2019, patients who underwent Whipple procedure for pancreatic cancer at Dr. Ruth K.M. Pfau Civil Hospital Karachi were sought for this retrospective cross-sectional study employing convenient sampling. Patients having known metastatic disease at presentation and having celiac artery, superior mesenteric artery, or hepatic artery involved/invaded on scans done before the procedure were excluded. The investigators started data collection after procuring approval from the Institutional Review Board (IRB) of Dr. Ruth K.M. Pfau Civil Hospital.

A detailed history of selected patients planned to undergo Whipple procedure, obtained and recorded in the database and relevant investigation results namely liver functions, coagulation profile, CA 19-9, and endoscopic retrograde cholangiopancreatography were sought. Staging workup of the selected patients included triphasic CT scan abdomen and contrast-enhanced CT chest (CECT).

Data was collected through the database of Dr. Ruth K.M. Pfau Civil Hospital Karachi. Recording of variables concerning the demographic qualities and clinical variables like histopathology if done before definitive operations, clinical stages, per operative findings, the type of pancreatic anastomosis constructed, complications that developed after surgeries including SSI, abdominal collections, anastomotic leaks, chyle leaks, recurrence, was done. The specific anastomosis that developed leaks, the site of recurrence, whether anastomotic or far-site organ, and early mortality occurring within 30 days of procedure were also taken into the record. The management measures are taken, and outcome weighed in terms of survival were recorded.

Statistical Package for the Social Sciences (SPSS 20) software was put to use to explore and analyze the collected data. Statistical derivation of means, standard deviations of ages of the patients, median survival, and descriptive details of qualitative variables was conducted using the aforementioned software.

RESULTS

In our setup 41 patients had Whipple procedure from 1st January 2017 to 31st December 2019, of which twenty-eight patients were males whereas female patients were thirteen in number. The median age in our institu-

tion was 57 (30-78) years. None of the patients received neoadjuvant chemotherapy. Jaundice was the most common symptom patients encountered in 83% of patients followed by abdominal pain in 12%. Table 1 further details the demographics and oncological statuses, stage, choice of pancreatic anastomotic reconstruction, and early mortality of the patients.

Surgical site infection (SSI) was developed in 15 patients, whereby the Southampton wound scoring system was employed to identify superficial and deep SSI. Grades 2, 3 & 4 were labeled superficial SSI on the other hand wounds complying with Southampton Grade 5 were accounted for Deep SSI (Table 2)

8 patients had PG leak, 2 had PJ leak and 1 had hepaticojejunostomy (HJ) leak. Re-look laparotomy was performed in 11 patients for anastomotic leak management. 5 patients with PG leak were managed by taking down the anastomosis and constructing a PJ after debriding the distal stump of the pancreas while doing anastomosis was precluded by extensive inflammation and edema in the rest of the 3 cases, requiring ligation of the pancreatic stump. One PJ leak was negotiated by debriding the pancreatic stump, refreshing the jejunal margins, and fashioning an invaginating pancreatic anastomosis while the other PJ leak required distal pancreatectomy owing to extensive pancreatic inflammation and necrosis. The patient with HJ leak only required oversewing of the minor leak and drain placement. Intra-abdominal drain placement was performed in 6 patients (Table 2).

Distant metastases or locoregional recurrence evolved in 32.7 % of the patients (Table 2). Some of the patients had both local recurrences as well as metastasis after treatment. 27 patients (65.9%) are alive and disease free and 14 patients (34.1%) died. Median overall survival is 28 ± 14.5 months (Figure 1).

DISCUSSION

Whipple's Whipple procedure is still an overly onerous surgical undertaking requiring high dexterity and carries a significantly high rate of postprocedural complication and mortality¹⁰. Advancement has improved the outcomes, but morbidity and mortality remain beyond 50% and 2% respectively¹¹. However, with improved and comparably early diagnosis, betterment in operative techniques, and biomedical and intensive care facilities furtherance, the world is seeing more Whipple procedures performed for both benign and malignant diseases in recent times.

This retrospective study showed that the mean age of patients was 57 years, ranging from 30-78 years which is lower than other published literature^{12,13}. The majority of the patients were males comprising sixty-eight percent.

Surgery is the most important component in the

Table 1: Demographics and Oncological Characteristics.

VARIABLES	Frequency (%)
Gender	
Male	28 (68.3%)
Female	13 (31.7%)
Age (years)	
Pathology	
Well-differentiated adenocarcinoma	3 (7.3%)
Moderately differentiated adenocarcinoma	33 (80.5%)
Poorly differentiated carcinoma	5 (12.2%)
Stage of disease	
Stage 1	18 (43.9%)
Stage 2	14 (34.1%)
Stage 3	9 (22.0%)
Site of Disease	
Pancreatic head	26 (63.4%)
Ampullary	14 (34.1%)
Uncinate process	1 (2.4%)
Reconstruction technique	
Pancreatojejunostomy	7 (17.1%)
Pancreaticogastrostomy	34 (82.9%)
30-day Mortality	7 (17.07%)
Median overall survival (months)	28±14.5

Table 2: Complications.

Variables	Frequency (%)
Superficial SSI	11 (26.82%)
Deep SSI	4 (9.75%)
Anastomotic leak	11 (26.82%)
Intra-abdominal collection	11 (26.82%)
Chyle leak	3 (7.3%)
Recurrence	
Liver	4 (9.75%)
Lungs	2 (4.88%)
Loco-regional	4 (9.75%)
Anastomotic site recurrence	1 (2.43%)

management of pancreatic cancer. However, due to the advanced nature of the disease and lack of advanced facilities in the country, most of the patients presented with the late disease either Stage III or IV disease.

There is a perennial discourse amongst professionals regarding the technique for reconstructing the pancreatoenteric continuity, where in the literature some surgeons communicated PG as the better of the two while others found no difference with PJ statistically in terms of outcome¹⁴⁻¹⁶. 8 (23.5%) PG/anastomotic leaks developed in 34 patients who were reconstructed with pancreatogas-

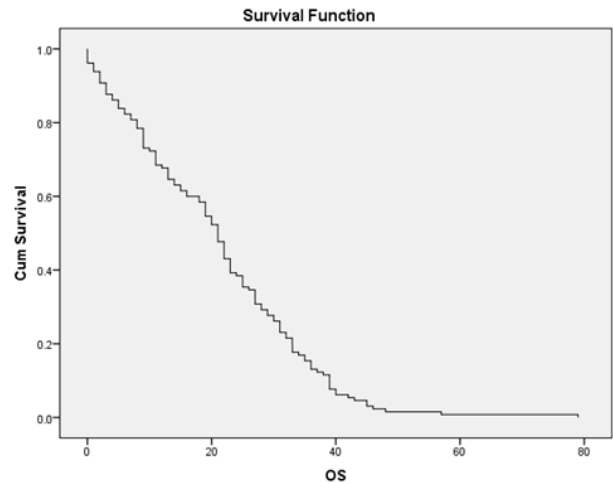


Fig 1: Over-all survival of patients undergone Whipple procedure for pancreatic cancer

tric anastomosis while 2 of the 7 PJ reconstructions developed anastomotic leaks in our institute during the selected study period.

The rate of SSI in this research was comparable to other published literature which was 36.5%. Literature from the USA, the reported rate of SSI ranged from 15 to 27%¹⁷⁻¹⁹. A study from Iraq reported a higher rate of SSI (23.5%)²⁰.

In our study, twenty-six percent of patients developed intra-abdominal collection following surgery which is comparable^{19, 21, 22}. However, none of the patients needed re-exploration for the above-mentioned complications, six patients had drain placement with help of interventional radiology.

The rate of anastomotic leak in our study was 26.82% which is comparable to others. The risk factors of anastomotic leak after Whipple procedure are the same as that of other anastomoses. Pancreatic texture and technique of anastomosis are determining factors of the risk of Postoperative pancreatic Fistula (POPF) development. The risk of POPF is elevated in patients having a small diameter/nondilated main pancreatic duct and soft pancreas^{23, 24}.

The 30-day mortality following Whipple procedure in our patients was 17.07%. The reported mortality in literature is less than five percent^{10, 22, 25-27}. However, the recurrence was seen in 32% of the patients. Liver and lymph node involvement were the commonest sites of recurrence.

Although this study gives insight into the clinical details, stage distribution, post-surgical complications, and early mortality of local patients who underwent Whipple procedure in a public sector tertiary care Centre, the retrospective nature of this study is the limitation of the study. The study did not compare the outcomes of dif-

ferent surgical techniques. A comparison of stage and age-related outcomes of Whipple procedure was also not performed.

CONCLUSION

Pancreaticoduodenectomy is a complex procedure. However, with recent advancements, it has evolved into a safer procedure with significantly better surgical outcomes. Authors recommend consistent publishing of data from all surgical facilities performing Whipple's Whipple procedure for identification of complications, collective learning, and furtherance for better outcomes.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Haider SA:** Conceiving and designing the study, collection, analysis, interpretation of data, Manuscript writing, Approval of Final draft
- Jabeen W:** Conceiving and designing the study, collection of data, drafting, Approval of Final draft
- Haider R:** Collection of data, analysis, interpretation of data, drafting
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Authors agree to be 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.



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