

## Original Research Article

# Whipple's pancreaticoduodenectomy: perioperative outcomes in a tertiary care hospital in Dhaka, Bangladesh

A. B. M. Bayezid Hossain<sup>1\*</sup>, Sadia Afroz<sup>2</sup>, M. Tasnimul Khair Shovon<sup>1</sup>,  
Nabila Anjuman<sup>1</sup>, Mitul Chackraborty<sup>1</sup>

<sup>1</sup>Department of Surgery, <sup>2</sup>Department of Microbiology, Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh

**Received:** 01 December 2020

**Accepted:** 06 January 2021

**\*Correspondence:**

Dr. A. B. M. Bayezid Hossain,

E-mail: bayezid28@yahoo.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

**Background:** Pancreaticoduodenectomy is one of the most complex surgery with significant mortality and morbidity. Though the mortality rate has steadily improved, morbidity continues to be high. The aim of this study was to demonstrate the perioperative outcome following this procedure at our hospital.

**Methods:** This retrospective study was conducted in the department of Surgery, Sir Salimullah medical college and Mitford hospital from July 2018 to December 2019. A total of 29 patients who undergone pancreaticoduodenectomy were included in the study. Preoperative, intra-operative and post-operative data were analyzed with emphasis on the morbidity and mortality rates. None of the operated patients received any types of neoadjuvant therapy.

**Results:** Out of 29 patients who underwent PD, 18 (62.1%) were male and 11 (37.9%) were female with a median age of 53.7 years. The most common (34.5%) age group of the patients were 51-60 years. Jaundice was the commonest (89.7%) presenting symptoms followed by anorexia (75.9%) and abdominal pain (48.3%). Overall complications occurred in 37.9% patients, including wound infections (31.0%) and post-operative pancreatic fistula (6.9%). The post-operative mortality rate was 6.9%.

**Conclusions:** PD still causes considerable morbidity and mortality. With careful patient selection, adequate preoperative preparation, surgical technique, excellent critical care management PD can be performed safely. At our center we have a reasonable volume and our data are comparable to literature data.

**Keywords:** Pancreaticoduodenectomy, Whipple's procedure, Outcome

### INTRODUCTION

Pancreaticoduodenectomy (PD) is one of the most complex, formidable surgery commonly performed for pancreatic head and periampullary tumors and occasionally for benign conditions like chronic pancreatitis and pancreato-duodenal trauma.<sup>1,2</sup> Carcinoma of the head of pancreas is the most common indication for PD. Recently with its improved safety profile PD is now also considered as a suitable treatment option for selected patients with chronic pancreatitis; which is now constituting the second most common indication for this operation.<sup>3</sup>

PD has its origin in the late 1800s. William Halsted performed the first transduodenal local excision of a tumor of the ampulla of Vater in 1898. Alessandro Codivilla, in that same year, was the pioneer to perform a pancreaticoduodenectomy in Italy. This procedure, in its modern form was initially described by Kausch in 1909 and popularized by Allen Whipple in 1935 and is now widely known as the "Whipple operation".<sup>4</sup>

Whipple's PD was being performed infrequently before 1980s due to concerns regarding the morbidity and mortality rates associated with this complex surgery.<sup>5</sup> This procedure have been associated with high morbidity

and mortality. Perioperative mortality rate from the original report of Whipple was 43% and remain in the range of 25% till 1970s.<sup>6,7</sup> Since the 1980s combined improvement in surgical, anaesthetic/critical care management and interventional radiological techniques resulted in a steady and consistent fall of perioperative mortality rates and currently reported rates are below 5% in high volume centers.<sup>2</sup> Despite dramatic decrease in mortality rates the post-operative morbidity continues to remain high, ranging from 30%-60%.<sup>1</sup> Major post operative complications of PD include, post-operative pancreatic fistulas (POPF), bile leakage, delayed gastric emptying (DGE), post pancreatectomy hemorrhage (PPH) and complications related to the surgical site: such as infection and wound dehiscence.<sup>2,8</sup>

PDs are being done in Mitford hospital and there is a need to look at the outcome of this surgery in our hospital. Unfortunately, there is limited clinicopathological data published in Bangladesh on Whipple's PD and predictive factor analysis remains scarce. These studies were based on the reports of centers of western countries, where there is a considerable difference between our center and those centers with respect to perioperative care.

This study aims to determine outcome of Whipple's surgery that had been done by our surgical team in a single tertiary care hospital in Bangladesh and furthermore to compare the outcomes with other literatures despite of the significant differences in perioperative and critical care management system

## METHODS

Current study was a retrospective review of prospectively maintained medical records of 29 patients who underwent elective PD for various indications at Sir Salimullah medical college and Mitford hospital between July 2018 to December 2019. All patients with resectable pancreatic disease who underwent PD were included in the study. Patients with primary tumour in body and tail of the pancreas, those with metastatic disease detected in preoperative evaluation and patients who did not give consent were excluded from the study.

The review included, basic demographic characteristics (age and gender), surgical data (type of resection, duration of surgery), pathological diagnosis, presence of co morbidity, post-operative complications including causes of relaparotomy and death. The post-operative hospital stay was calculated and morbidity and mortality were assessed. Follow up data were obtained through medical record review and direct patient contact.

### *Preoperative work up*

All patients who were candidate for PD underwent clinical examination, routine laboratory tests, chest radiography as a preoperative workup for anesthesia

fitness. Diagnosis and resectability were assessed with serum level of tumor markers CA 19-9, plain X-ray abdomen, endoscopic ultrasound (EUS), contrast enhanced computed tomography scan (CECT) and magnetic resonance pancreaticocholangiography (MRCP).

### *Surgical technique*

All patients were explored using a bilateral subcostal incision under general anesthesia and epidural anesthesia. After dissemination or unresectability was ruled out by visual inspection and palpation, the surgery proceeded to a PD. All patients underwent a standard Whipple's PD. Reconstruction was done by pancreaticojejunostomy (PJ). This was followed by hepaticojejunostomy (HJ) and finally an antecolic gastrojejunostomy. Distal to this anastomosis a feeding jejunostomy (FJ) was done in some patients.

### *Post-operative analysis*

All patients were monitored in the post-operative ward for at least seventy-two hours. We considered the morbidities like post-operative complications that required medical or surgical intervention. Perioperative mortality was defined as all deaths within thirty days of surgery or in the same admission, irrespective of cause.<sup>9</sup>

### *Data analysis*

Statistical analysis was performed using SPSS (trial version 22) program. The qualitative variables were expressed by number and percentage. Whereas the continuous data were expressed by mean, median and standard deviation (SD). Chi square test was used to find associations between variables,  $p < 0.05$  was considered as a statistically significant value.

## RESULTS

A total of 29 patients underwent Whipple's procedure during the study period. The median age of all patients was 53.7 years (range 16-70 years), with 18 (62.1%) male and 11 (37.9%) female patients. Among the presenting complaints, jaundice was the commonest symptom (89.7%) followed by anorexia and weight loss (75.9%), while least common (6.9%) presenting symptom was gastric outlet obstruction (Table 1).

Age distribution of patients shows that, the most common age group of our patients was 51-60 years (34.5%) followed by, 27.6% patients in the age group 41-50 years (Figure 1).

Histopathological diagnosis of resected tumors shows that, majority (86.2%) of patients had malignant aetiology; with periampullary carcinoma being the commonest (48.3%) followed by cholangiocarcinoma (20.7%), while 13.8% had benign aetiology (Figure 2).

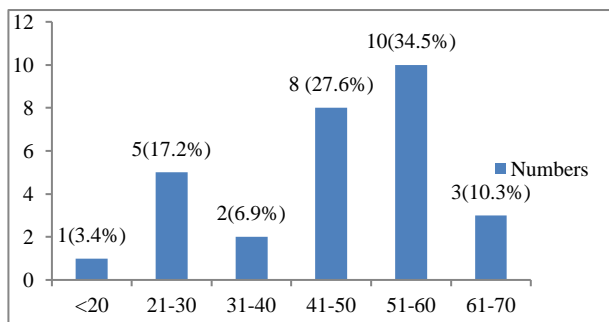
Regarding postoperative complications and outcome, the most frequent complication was wound infection (31.03%) followed by pancreatic fistula (6.9%). Reexploration was done for 2 (6.9%) patients and 2 (6.9%) patients died perioperatively, one due to pancreatic fistula and other due to sudden cardiac arrest (Table 2).

**Table 1: Patients demography and symptoms, (n=29).**

Variables	Values N (%)
<b>Age (years)</b>	53.7 (range; 16-70)
<b>Sex</b>	
Male	18 (62.1)
Female	11 (37.9)
<b>Symptoms</b>	
Jaundice	26 (89.7)
Anorexia and weight loss	22 (75.9)
Abdominal pain	14 (48.3)
Gastric outlet obstruction	2 (6.9)

**Table 2: Complications and outcome following PD (n=29).**

Complications and outcomes	N	%
Wound infection	9	31.03
Pancreatic fistula	2	6.9
Cardiac arrest	1	3.4
Reoperation	2	6.9
Perioperative death	2	6.9

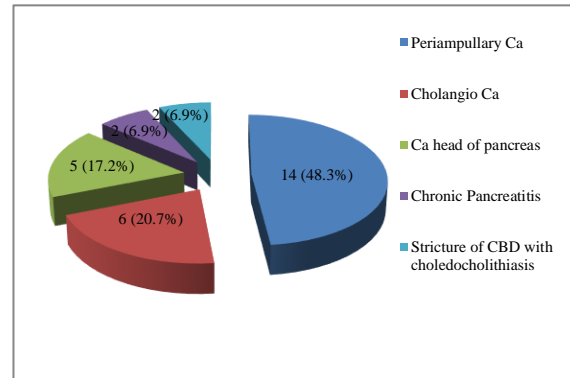


**Figure 1: Distribution of patients according to age group (n=29).**

**DISCUSSION**

Pancreaticoduodenectomy or the Whipple’s procedure is one of the most complex, high risk surgical procedure with a high complication rate.<sup>10</sup> As a consequence it continues to be a formidable endeavour for both; patient and surgeon. Despite the fact that the morbidity and mortality rate have improved in the recent years, it still remains a perilous procedure. There is a dramatic reduction in perioperative mortality due to complex mixture of improvements in surgical techniques,

intensive care managements and interventional radiology but the postoperative morbidities are still high.<sup>11,12</sup>



**Figure 2: Histopathological diagnosis of resected tumors (n=29).**

In Bangladesh this procedure is performed in very few centers, because it is a complex, time consuming, hazardous procedure with poor long-term outcomes and requiring the presence of an advanced critical care management for its success. Our center is a tertiary level hospital, where we performed Whipple’s procedure despite many stumbling blocks and observed a progressive improvement in its outcome over recent years.

In current study, age of patients ranged from 16-70 years with the mean age being 53.7 years. Almost similar observation was reported by Karim et al, who showed a mean age of 55.9 years in his study.<sup>1</sup> However, in contrast to this study lower age has been reported in other studies.<sup>2,5,13</sup> This may be due to the fact that, those studies included only malignant pancreatic tumors, which is common in elderly population, but our study has included both benign and malignant tumors. In the present study, jaundice was the commonest presenting symptoms (89.7%), associated with anorexia and weight loss. Few patients presented with gastric outlet obstruction (6.9%). This observation closely correlates with previous other studies.<sup>1,2,13</sup> Periampullary carcinoma was the commonest histologically diagnosed tumor in the current study. This finding is consistent with other studies.<sup>1,2,14</sup> However contrasting finding has been shown by Pal et al and Gracia et al, who reported pancreatic head carcinoma as the most common tumor in their study.<sup>15,16</sup> These observations are quite justifiable because, PD is the surgical procedure of choice for periampullary carcinoma and pancreatic head carcinoma but only when the tumor location and size is acceptable.<sup>16</sup>

In the present study, the overall postoperative morbidity rate was 37.9%, which is in agreement with the range of 36%-40% in experienced centers.<sup>4,14</sup> Perioperative complications occurred in all age group, which is supported by previous studies showing that age did not significantly influence the overall complication rate or any type of complications by severity.<sup>17</sup>

In our study, the most frequent (31.03%) complications were wound infections including superficial, deep infections and dehiscence. The rate is higher than reports of published data of other studies.<sup>1,2,14</sup> This high rate might be partly explained by theatre design of our hospital and unhygienic environment in hospital wards which considerably favors contamination of wound leading to infection. Also, under nutritional status of the patient may be a contributing factor.

The vulnerable point of all PDs is the pancreatic anastomosis. In our study the rate of pancreatic fistula was 6.9%. The POPF rates reported in literature is 6%-25%.<sup>18</sup> POPF directly or indirectly contributes to the other morbidities including DGE, PPH, sepsis and consequently is the commonest cause of mortality. Several methods have been advocated to prevent pancreatic fistula, but none are perfect.<sup>19</sup> In our center we used pancreatic duct cannula with end to side anastomosis. Pancreatic duct was stitched with jejunal mucosa end to side over 6 or 7 size feeding tube, then the end of the tube was taken out side. The end of the pancreas was anastomosed with side of jejunum with 3-0 vicryl. Furthermore, we used harmonic scalpel to control hemorrhage, that's why preoperative bleeding was minimum.

The reexploration rate in current study was 6.9%, the reason being POPF. The rates of reexploration in the range of 4%-11% have been reported in different studies.<sup>1,2,20</sup> The overall perioperative mortality rate was 6.9% in the present study, which is close to the rates reported by other studies.<sup>1,21,22</sup> With our increasing experience, we believe that improved preoperative assessment, strict patient selection and upgraded critical care management will lead to further reduction of perioperative morbidity and mortality.

## CONCLUSION

Pancreaticoduodenectomy is a complex procedure and associated with a considerable risk of morbidity and mortality. The most important postoperative complication is post-operative pancreatic fistula that is responsible for other surgical or medical complications and death. We have higher rate of wound infection, which has to be assessed carefully and improved further. Our surgical team has a reliable volume of patients and desirable outcome and our data are comparable to literature.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Karim SAM, Abdulla KS, Abdulkarim QH, Rahim FH. The outcomes and complications of

- Pancreaticoduodenectomy (Whipple procedure): Cross sectional study. *Int J Surg* 2015;21:568-571.
2. Jakhmola CK, Kumar A. Whipple's Pancreaticoduodenectomy: Outcomes at a tertiary care hospital. *MJAFI*. 2014;70:321-6.
3. Neoptolemos JP, Russell RC, Bramhall S, Theis B. Low mortality following resection for pancreatic and periampullary tumours in 1026 patients: UK survey of specialist pancreatic units. *UK Pancreatic Cancer Group. Br J Surg*. 1997;84:1370-6.
4. Wipassakornwarawut S. Seven years experience of pancreaticoduodenectomy at sawanpracharak hospital. *J Med Assoc Thai*. 2008;91(7):1043-50.
5. Leichte SW, Kaoutzanis C, Mouawad NJ, Welch KB, Lampman R, Hoshal VI, et al. Classic Whipple versus pylorus preserving pancreaticoduodenectomy in the ACS NSQIP. *JSR*. 2013;183:170-6.
6. Whipple AO. Present-day surgery of the pancreas. *N Eng J Med*. 1942;226:515-26.
7. Cameron JI, Rial TS, Coleman J, Belcher KA. One thousand consecutive Pancreaticoduodenectomies. *Ann Surg*. 2006;244(1):10-5.
8. Lai ECH, Yang GPC, Tang CN. Robot assisted laparoscopic pancreaticoduodenectomy versus open pancreaticoduodenectomy- a comparative study. *Int J Surg*. 2012;10:475-9.
9. Bassi C, Dervenis C, Butturini G. Postoperative pancreatic fistula: an International Study Group (ISGPF) definition. *Surgery*. 2005;138:8-13.
10. Nussbaum DP, Penne K, Stinnett SS, Speicher PJ, Cocieru A, Blazer DG, et al. A standardized care plan is associated with shorter hospital length of stay in patients undergoing pancreaticoduodenectomy. *JSR*. 2015;193:237-45.
11. Casado MCM, Sanchez FP, Sastre FR, Cruchaga PM, Francisco J, Cienfuegos A. Experience of cephalic pancreaticoduodenectomy fast track program. *GIR ESP*. 2010;87(6):378-84.
12. Conzo G, Gambardella C, Tartaglia E, Sciascia V, Mauriello C, Napolitano S. Pancreatic fistula following pancreaticoduodenectomy. Evaluation of different surgical approaches in the management of pancreatic stump. *Int J Surg*. 2015;21:S4-9.
13. Romano G, Agrusa A, Galia M. Whipple's pancreaticoduodenectomy: Surgical technique and perioperative clinical outcomes in a single center. *Int J Surg*. 2015;21:568-71.
14. Cameron JL, Rial TS, Coleman J, Belcher KA. One thousand consecutive Pancreaticoduodenectomies. *Ann Surg*. 2006;244:10-15.
15. Pal KMI, Bari H, Nasim S. Pancreaticoduodenectomy: A developing country perspective. *J Pak Med Assoc*. 2011;61:232-5.
16. Gracia SH, Reyes JEB, Escamilla LMM. Whipple surgery learning curve for tumors resection of the duodenal bilio-pancreatic complex in a tertiary care hospital. *MOJ Tumor Res*. 2018;1(3):104-7.
17. DeOliveira ML, Winter JM, Schafer M, Cunningham SC, Cameron JL, Yeo CJ, et al. Assessment of complications after pancreatic

- surgery: a novel grading system applied to 633 patients undergoing Pancreaticoduodenectomy. *Ann Surg.* 2006;244:931-7.
18. Lin J, Cameron JL, Yeo CJ, Riall TS, Lillemore KD. Risk factors and outcomes in postpancreaticoduodenectomy pancreaticocutaneous fistula. *J Gastrointest Surg.* 2004;8: 951-9.
  19. Peng S, Mou Y, Cai X, Peng C. Binding pancreaticojejunostomy is a new technique to minimize leakage. *Am J Surg.* 2002;183:283-5.
  20. Gouma DJ, Van Geenen RCI, Van Gulik TM. Rates of complications and death after postpancreaticoduodenectomy: risk factors and the impact of hospital volume. *Ann Surg.* 2000;232: 786-95.
  21. Jagannath P, Dhir V, Shrikhande S, Shah RC, Mullerpatan P, Mohandas KM. Effect of preoperative biliary stenting on immediate outcome after pancreaticoduodenectomy. *Br J Surg.* 2005;92: 356-61.
  22. Mistry JH, Mehta N, Varma V, Kapoors S, Kumaran V, Nandy S. Pancreatic fistula following Whipple's procedure predictors and outcomes. *HPB Surg.* 2012;33(3):63.

**Cite this article as:** Hossain ABMB, Afroz S, Shovon MTK, Anjuman N, Chackraborty M. Whipple's pancreaticoduodenectomy: perioperative outcomes in a tertiary care hospital in Dhaka, Bangladesh. *Int J Res Med Sci* 2021;9:696-700.