Morbidity And Mortality Of Whipple Procedure

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Abstract: Background: To ascertain the rate and factors affecting morbidity and mortality in patients undergoing Whipple Procedure. KEY WORDS: Morbidity,Whipple procedure, post operative complications INTRODUCTION: Pancreaticoduodenectomy, also called the Whipple operation, is a common operation in major centers worldwide. It is done mostly for periampullary cancers and very rarely for benign diseases. Over the years the operation and its morbidity and mortality have been subject to much research. Starting from the initial days postoperative mortality rate has come down but morbidity rate still remains high. Material & Methods: A study of 12 cases of whipple procedure carried out in dept of general surgery, VS AND SVP hospital from January 2019 to June 2020 OBSERVATION AND Results: There were 12 patients and half of them developed morbidity. Surgical site infection was the most common complication (33.33%) followed by pulmonary complications (16.67%) and bile leak (8.33%). Half of the Mortality rate was due to pulmonary complication. Conclusion: Pancreatoduodenectomy was studied with regards to morbidity and mortality in our hospital. The morbidity rate is comparable to that of other centres. Pulmonary complications were the most common cause of mortality. Preoperative Hypo albuminemia is a significant predictor of postoperative morbidity. Surgical site infection was the most common morbidity. Whipple procedure is a complex procedure with comparatively less mortality, but more morbidity in our hospital. [Rabari M Natl J Integr Res Med, 2021; 12(2):51-56]

Key Words: Morbidity And Mortality Of Whipple Procedure

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Introduction: Pancreaticoduodenectomy, also called the Whipple's operation, is a common operation in major centers worldwide. It is done mostly for periampullary cancers and very rarely for benign diseases.

The first operation of pancreaticoduodenectomy was done as an improvisation, in 1935, after finding that it was not stomach malignancy for which the abdomen was opened but was a pancreatic cancer. Dr Whipple who did the operation took out the head portion of the pancreas, the duodenum, the pylorus, a portion of the bile duct and a portion of the jejunum[1]. Tumors occurring within region of 2 cm around the ampulla of Vater are called periampullary carcinoma[2]. Adenocarcinomas of the head of pancreas constitute a vast majority of them.

Other tumors are carcinomas of distal bile duct, the ampulla of Vater and adjoining portion of duodenum. The way of presentation is similar in all periampullary carcinomas[3]. Most of the cases present at old age. In many cases the prognosis is very poor. Whipple's procedure is considered to be the only potentially curative option for periampullary carcinoma[3]. Over the years the operation and its morbidity and mortality have been subject to much research. Starting from the initial days postoperative mortality rate has come down but morbidity rate still remains high[3].

Centers doing more than 10 cases of Whipple's procedure per year are classified as high volume centers. These high volume centers have less morbidity compared to low volume ones[4].

Material and Methods: A study of 12 cases of whipple procedure carried out in dept of general surgery, VS AND SVP hospital from January 2019 to June 2020. All patients were examined clinically and subjected to undergo necessary investigations which were required for confirming the diagnosis, staging the disease, preoperative planning and to decide the resectability of the disease.

Retrospective data was collected which included demographic data, clinical presentation, diagnostic workspace, treatment and outcome. Patients had complain of jaundice, abdominal pain, fever, anorexia and weight loss.

Patients underwent radiological investigations like Ultrasound Abdomen, CECT Abdomen, MRCP, Endoscopic Ultrasound and biopsy. Blood for surgery after explaining all the benefits and complications of the surgery.

Inclusion Criteria: Patients of periampullary carcinoma undergoing whipple procedure. Patients of distal cholangiocarcinoma undergoing Whipple procedure. Inoperable disease.

investigations were done for preoperative assessment of the patients. Patients were planned for surgery after taking written consent

Exclusion Criteria: Inoperable disease.

Results: In our study slight male predominance over females was seen in case of morbidities and mortalities. With males having 58.33 % while females having 41.67% cases. Mentioned in Table 1.

Table 1: Sex Distribution

	Sex	Total Cases =12	Cases With Morbidities =7	Cases With No Morbidities=5
1	Male	7 (58.33%)	4	3
2	Female	5 (41.67%)	3	2

Table 2: Age Distribution

Variables= Age Distribution			
Age Distribution	**Total Cases= 12**	**Cases With Morbidities=7**	**Cases With No Morbidities=5**
30-40 Years	2	0	2
40-50 Years	6	4	2
50-60 Years	2	1	1
>60 Years	2	2	0

Maximum no of patients were seen in age group 40-50 years in our study.

Graph 1: Age Distribution

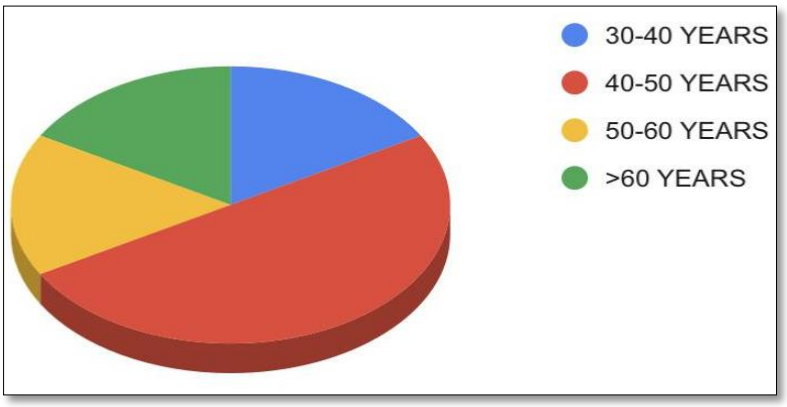

Table 3: Bilirubin Levels Distribution In Cases With And With-Out Morbidities

Bilirubin Levels Total Cases= 12	Cases With Morbidities=7	Cases With No Morbidities=5
16 mg/dl	16 mg/dl	2 mg/dl
2 mg/dl	24.11 mg/dl	4.3 mg/dl
24.11 mg/dl	13.49 mg/dl	5.6 mg/dl
13.49 mg/dl	2.8 mg/dl	3.2 mg/dl
4.3 mg/dl	5.1 mg/dl	10.4 mg/dl
5.6 mg/dl	7.3 mg/dl	
3.2 mg/dl	6.1 mg/dl	
6.1 mg/dl		
10.4 mg/dl		
2.8 mg/dl		
7.3 mg/dl		
5.1 mg/dl		

Table 4: Symptom Distribution

Symptoms	Total Cases = 12	Cases With Morbidities =7	Cases With No Morbidities=5
Jaundice	8(66.67%)	4	4
Abdominal Pain	3(25%)	2	1
Fever	1(8.33%)	1	0

Jaundice was seen in 66.67 cases, abdominal pain in 25% and fever in 8.33 % cases.

Graph 2: Symptoms Distribution

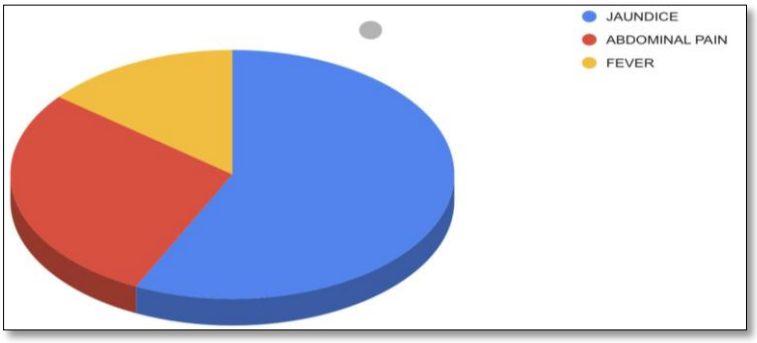

Table 5: CT SCAN Reports

	CT SCAN Reports
1	Periampullary Mass Lesion Of About 21x19 Mm Causing Abrupt Cut Off Of Distal Common Bile Duct And Main Pancreatic Duct Causing Proximal Dilatation Of Billiary Tree.
2	Chronic Pancreatitis With Mpd Calculi And Duodenal Stricture With Distended Stomach And Distal CBD Stricture With Obstructive Billiopathy.
3	Distal Cbd Stricture With Possibility Of Malignancy.
4	Distal Cholangiocarcinoma.
5	Periampullary Mass Lesion Of About 3x2.1 Cm Causing Cut Off Of Distal Common Bile Duct.
6	Periampullary Mass Lesion Of About 2.6x1.8 Cm Causing Abrupt Vut Off Of Distal Common Bile Duct.
7	Periampullary Lesion Of About 1.8x2 Cm Compressing Distal Common Bile Duct.
8	Periampullary Growth Measuring 2x1 Cm Compressing Distal Common Bile Duct Causing Proximal Dilatation Of Billiary Tree.
9	Periampullary Mass Lesion About 2.8x2 Cm With Obstructive Billiopathy.
10	Mass Lesion Compressing Distal Common Bile Duct P/O Periampullary Growth.
11	Periampullary Growth Measuring About 3x2 Cm Abrupting Distal Common Bile Duct.
12	Growth Abrupting Distal Cbd And Pancreatic Duct In Periampullary Region.

Out of total 12 patients majority (66.67%) of patients had tumor size <3 cm while 33.33% patients had tumor size >3 cm.Post operative morbidity was seen more in patients with a smaller tumor size, in our study being < 3 cm.

Table 6: Tumour Size

Variable= Tumour Size			
Tumour Size	**Total Cases=12**	**Cases With Morbidities =7**	**Cases With No Morbidities=5**
< 3 Cm	8 (66.67%)	3	5
> 3 Cm	4 (33.33%)	4	0

Table 7: Lymph Node Status

Lymph Nodes	Total Cases= 12	Cases With Morbidities=7	Cases With No Morbidities=5
Positive	4(33.34%)	3	1
Negative	8 (66.66%)	4	4

Majority of tumors(75%) were moderately differentiated and 77.78% of those were patients with morbidities post surgery.

Table 8: Tumour Differentiation

Variables= Differentiation			
Differentiation	**Total Cases=12**	**Cases With Morbidities=7**	**Cases With No Morbidities=5**
Well	2	0	2
Moderate	9	7	2
Poor	1	0	1

Graph 3: Tumour Differentiation

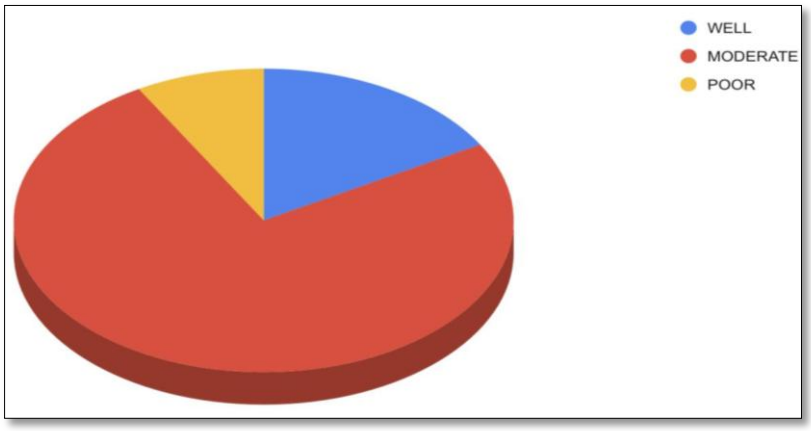

Table 9: Mortality

Variable = Mortality			
Mortality	**Total Cases =12**	**Cases With Morbidities= 7**	**Cases With No Morbidities = 5**
	4(66.67%)	3 (42.85%)	1 (20%)

Table 10: Complications

Variable = Cause Of Death			
Cause Of Death	**Total Cases = 12**	**Cases With Morbidities =7**	**Cases With No Morbidities= 5**
Pulmonary	3	2	1
Bile Sepsis	1	1	0
Pancreatic Leak	0	0	0

Altogether 12 cases were included in the study. The age range was 33-68 years with a median of 43 years. There were 7(58.33%) males and 5(41.66%) females. The predominant presenting symptom was jaundice in 8(66.6%) cases. The other presenting symptoms were abdominal pain in 3(25%), and fever in 1(8.3%) cases. Only 5 patients had pre-existing comorbidities. The highest serum bilirubin value was 24.11 mg/dl.
The higher billirubin level was associated with morbidity. The tumour size at pathological examination was less than 3 cm in 8(25%) cases

and more than 3 cm in the remaining. Lymph node positivity for malignancy at histopathological examination was present only in 4(33.3%) patients. Well differentiated tumours were seen in 2(16.6%) cases, moderately differentiated ones were seen in 9(75%) and poorly differentiated ones in 1(8.33%).

Discussion: This study was done to assess morbidity following Whipple's procedure in patients with periampullary carcinoma in a tertiary care.The operation, after being done for the first time in 1935, is the only curative option for periampullary cancers.During the 1960s and 1970s the morbidity and mortality rates were so high that Whipple's procedure was nearly considered for abandonment. In the current study, details were extracted from patient records and histopathology records. Being a retrospective study there were no omission of cases.

The limitation was that the number of pancreatoduodenectomies fell marginally short of being characterized as high-volume. In all, there were 12 patients in this study. Over the years the definition of high volume centre for pancreatoduodenectomies have changed.[5]

More than half of the patients developed morbidity.The median age in which morbidity occurred was 43 years. There were 5 females in the study and 3(60%) of them developed some form of postoperative morbidity while out of the 7 males, 4(57.14%) developed morbidity.[5]

Surgical site infection accounted for morbidity in 4(57.14%) while pulmonary complications was the next frequent morbidity occurring in 2(28.57%). The frequency of other complication was bile leak 1(14.28%).In a study conducted in 2017 Nagale et al, has reported a very high mortality owing to pneumonia.[5]

Hypoalbuminemia is a significant predictor of morbidity. Normal value of serum albumin is 3.4 to 5.4 g/dL . Levels less than 3.4 g/dl are significant in causing morbidity. While 3(42.85%) patients with tumour size less than 3 cm developed morbidity, 4(57.14%) patients with tumour size more than 3 cm developed one or other form of morbidity. Among those who developed morbidity, 3(75%) were positive for lymph nodes. 9(75%) patients with moderately differentiated tumours developed morbidity.

Only 4(33.33%) patients who developed morbidity died.The proportion of patients becoming morbid among those with well differentiated tumour was 34%. The same was 77% and 70% respectively for those with moderately differentiated and poorly differentiated tumours.[5]

Pulmonary complications was the leading cause of death after Whipple's procedure 3(42.9%). Half of the patients who developed pulmonary complications died. However, the most common complication of surgical site infection and a frequent complication of bile leak did not lead to death. In a study conducted in 2017 Nagale et al, has reported a very high mortality owing to pneumonia.[5]

Grobmeyer et al, in their study in 2007 obtained only 11 % infection rate and a pancreatic anastomotic leak of 12%. The rate of pancreatic leak was 10.6% in a study by Fathy et al.

Pancreatic leak is a severe complication and is associated with high morbidity and mortality rates. Sepsis and surgical site infection were the most common complications in the postoperative period in Whipple's procedure. In the same study respiratory complications constituted 9.5%. The same in our study was 12.5%, which is comparable.[6]

The rate of pancreatic leak was10.6%in a study by Fathy et al. Pancreatic leak is a severe complication and is associated with high morbidity and mortality rates.In the study conducted by us there was no pancreatic leak.[7]

Conclusion: Pancreatoduodenectomy was studied with regards to morbidity in our hospital. The morbidity rate is comparable to that of other centres. Pulmonary complications were the most frequent cause of mortality. Preoperative Hypoalbuminemia is a significant predictor of postoperative morbidity. Surgical site infection was the most common morbidity. Whipple procedure is a complex procedure with comparatively less mortality, but more morbidity in our hospital.

Postoperative Morbidity Can Be Reduced By Taking Following Measures: By taking proper aseptic precaution preoperatively and postoperatively to reduce surgical site infection. By taking poper postoperative icu care and chest physiotherapy to prevent pulmonary complication. By taking care of preoperative nutritional status. By identifying high risk patients in the preoperative phase and planning the perioperative management.

References:

1. Cameron JL, Riall TS, Coleman J, Belcher KA. One thousand consecutive pancreaticoduodenectomies. Ann Surg. 2006;244:10–15.
2. Achille A, Biasi O M, Zamboni G. Cancer of the Papilla of Vater: Mutator Phenotype is associated with good prognosis. Clin Cancer Res. (1997);3:1841–1847.
3. Kimura W, Ohtsubo K. Incidence, sites of origin, and immunohistochemical and histochemical characteristics of atypical epithelium and minute carcinoma of the papilla of Vater. Cancer. 1988;61:1394–1402.
4. Catalano MF, Linder JD, Chak A, Sivak MV, Raijman I, Geenen JE, Howell DA. Endoscopic management of adenoma of the major duodenal papilla. Gastrointest Endosc. 2004;59:225–232.
5. NagleRT,LeibyBE,LavuH,RosatoEL,YeoCJ,WinterJM.Pneumoniais associated with a high risk of

mortality after pancreaticoduodenectomy. Surgery. 2017 Apr 1;161(4):959-67.
6. Sepsis and surgical site infection were the most common complications in the postoperative period in Whipple's procedure.14 In the same study respiratory complications constituted 9.5%. The same in our study was 12.5%, which is comparable.
7. Fathy O, Wahab MA, Elghwalby N, Sultan A, ElEbidy G, Hak NG, et al. 216 cases of pancreaticoduodenectomy: risk factors for postoperative complications. Hepato Gastroenterol. 2008;55(84):1093-8.

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