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Original Article

Whipple's pancreaticoduodenectomy: Outcomes at a tertiary care hospital

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ABSTRACT

Background: Pancreaticoduodenectomy is a formidable surgery and was associated with high morbidity and mortality. Though the mortality rates have steadily improved, morbidity continues to be high. There is lack of published data on outcomes following pancreaticoduodenectomy in Armed Forces hospitals. The aim of this study was to analyze the short term outcomes at our center and to compare it with the published literature.

Methods: A retrospective review of prospectively maintained data base was done. Preoperative, intraoperative and postoperative data was analyzed with emphasis on the morbidity and mortality rates. Follow up data was analyzed to look at disease recurrence.

Results: Between Jan 2008 and March 2014, 69 patients underwent Whipple's pancreaticoduodenectomy with a median age of 64 years. All had a malignant etiology with periampullary carcinoma being the commonest (42%). Overall, intra-abdominal complications occurred in 46% of patients which included postoperative pancreatic fistula (20%) and delayed gastric emptying (24%). The mortality rate for the whole was 11% which reduced to 8% in the second half of the study.

Conclusion: The short term outcomes at our center were comparable to those in published literature. The mortality rates showed a decreasing trend with time.

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Introduction

Pancreaticoduodenectomy (PD) is a formidable surgery, commonly performed for pancreatic head and periampullary tumors and occasionally for benign conditions like chronic pancreatitis and pancreato-duodenal trauma. Before 1980s, this was being performed infrequently due to concerns regarding the morbidity and mortality rates associated with this complex surgery. In the series of 12 cases published by

Whipple himself, the mortality rate was 43% and remained in the region of 25% till 1970s.^{1,2} Since the 1980s, experience with this surgery increased and high volume centers were established. This along with improvements in perioperative and critical care management resulted in a steady and consistent fall in mortality rates and currently reported rates are below 5% in high volume centers.³

The morbidity, though, has not fallen significantly and reported rates in literature vary between 22 and 57%.^{4,5} The

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bulk of this morbidity consists of post operative pancreatic fistulas (POPF), delayed gastric emptying (DGE) and post pancreatectomy hemorrhage (PPH).

PDs are being done in hospitals of Armed Forces Medical Services for a long time now and there is a need to look at the outcomes of this surgery in our hospitals. However, there is lack of published data from our centers in this regard. The aim of this article was a surgical audit of all PDs done at our center with primary objectives being the morbidity and mortality rates and secondary objectives was to compare the outcomes with the available literature.

Material and methods

This was a retrospective review of prospectively maintained database of patients undergoing PD at our center between Jan 2008 to March 2014. Follow up of these patients was done and data incorporated in to database. Patients who had not reported were contacted by telephone calls where ever it was possible. Those reporting for review underwent detailed evaluation directed at detection of recurrence.

Preoperative work up: A detailed history was taken and clinical examination done for all patients. Diagnosis and resectability was assessed with ultrasound, contrast enhanced computed tomography scan (CECT) and side viewing endoscopy as indicated.

Preoperative fitness was evaluated with complete blood count, liver function test, renal function test, serum electrolytes, prothrombin time, electrocardiogram, chest radiographs and pulmonary function tests. The patient's condition was then optimized with regard to pulmonary function and other comorbid conditions. Preoperative biliary drainage was done if the serum bilirubin at the time of presentation was more than 20 mg/dl or if the patient had cholangitis.

Operating technique: All patients were explored using a bilateral subcostal incision. Once dissemination/unresectability was ruled out by visual inspection and palpation, the operation proceeded to a PD. All patients underwent a standard Whipple's PD. Reconstruction was be done by either a pancreaticojejunostomy (PJ) or pancreaticogastrostomy (PG). This was followed by hepaticojejunostomy (HJ) and finally an antecolic Gastrojejunostomy. Distal to this anastomosis a feeding jejunostomy (FJ) was routinely done.

Adjuvant therapy: All operated patients, irrespective of their pathological stage were referred for adjuvant chemotherapy.

Data collection

1. **Preoperative data:** This included age, sex, hemoglobin, liver function tests, serum albumin, weight loss, presence of jaundice, occurrence of cholangitis in recent past, preoperative biliary drainage, comorbid conditions, imaging, indication for surgery – benign or malignant and biopsy report if any.
2. **Operative data:** This included operative findings particularly duct size, pancreatic texture (as determined by the operating surgeon), total operation time, blood loss, blood transfusions.

3. **Postoperative clinical data:** The morbidity and mortality, if any was recorded. The length of hospital stay was noted. The need for re-exploration and readmission were also noted.

Definitions

1. **Morbidity:** Procedure or non-procedure related complication requiring medical/surgical intervention.
2. **Perioperative mortality:** All deaths within 30 days of surgery or in the same admission, irrespective of cause.
3. **Postoperative pancreatic fistula:** Defined according to the definition of the International Study Group of Pancreatic Fistula that included three grades (grades A, B, and C).⁶

| Criteria | No fistula | Grade A | Grade B | Grade C |
|-------------------------------------|------------|----------|-------------------|----------|
| Drain amylase: Normal serum amylase | <3 times | >3 times | >3 times | >3 times |
| Clinical condition | Well | Well | Often well | Ill |
| Specific treatment | No | No | Yes/no | Yes |
| US/CT if obtained | Negative | Negative | Negative/positive | Positive |
| Persistent drainage (>3 weeks) | No | No | Usually yes | Yes |
| Signs of infection | No | No | Yes | Yes |
| Readmission | No | No | Yes/no | Yes/no |
| Sepsis | No | No | No | Yes |
| Reoperation | No | No | No | Yes |
| Death related to fistula | No | No | No | Yes |

4. **Delayed Gastric Emptying:** As proposed by the International Study Group for Pancreatic Surgery (ISGPS), DGE was classified into three grades based on their clinical impact.⁷
 - Grade A: need for intubation of NGT for 4 days or reinsertion of the NGT after postoperative day (POD) 3, or inability to tolerate a solid diet by POD 7.
 - Grade B: need for intubation of NGT for 8 days or reinsertion of the NGT after postoperative day (POD) 7, or inability to tolerate a solid diet by POD 14.
 - Grade C: need for intubation of NGT for 15 days or reinsertion of the NGT after postoperative day (POD) 14, or inability to tolerate a solid diet by POD 21.
5. **Postpancreatectomy hemorrhage:** Bleeding in the form of fresh blood in the NGT and/or melena necessitating treatment such as transfusion of blood, embolization or re-laparotomy. This definition corresponded to the definition of grade B or C post pancreatectomy hemorrhage that was proposed by the ISGPS.⁸

Results

During this period, 224 patients were evaluated for a PD. Of these 69 patients were found to be resectable and underwent a PD.

Patient characteristics and preoperative factors: The median age of all patients was 64 years (Range 42–78 years) with

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