Pancreaticoduodenectomy in a Government Medical College—Should We Proceed!!!

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Received: 22 August 2009 / Accepted: 12 March 2010 / Published online: 16 November 2010
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Abstract The value of standard Pancreaticoduodenectomy for Periapillary carcinomas has long been a matter of debate. Though the mortality has dramatically reduced in high volume centers with dedicated hepatobiliary surgery units, the rate is still high in peripheral institutes. In this study our aim was to access the overall post operative outcome associated with pancreaticoduodenectomy performed in a government medical college. A total of 44 patients who underwent pancreaticoduodenectomy for operable periampullary cancers were evaluated. The overall morbidity rate was 31.1%. A total of 13 (29.5%) died following the operation and of its complications though the rate has reduced drastically to 14.2% in 2008. The average length of hospital stay was 22 days. The mean survival was 15 months. Pancreaticoduodenectomy can safely be performed in government medical colleges with good results. In view of the majority of the patients in rural and suburban communities, not all patients need referral to higher centers.

Keywords Pancreaticoduodenectomy · Outcome · Government medical colleges

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Introduction

The value of standard Pancreaticoduodenectomy for Periapillary carcinomas has long been a matter of debate. The extensive surgical procedure was less popularised until 1980's because of its unacceptable levels of morbidity, mortality and quality of life. Initially Crile found that just performing palliative procedures for these diseases resulted in a longer survival than did attempted curative resections [1]. With advancement of surgical techniques and post operative care the mortality rate has dramatically reduced though the morbidity rate is still high. Overall survival rates of patients after pancreaticoduodenectomy is 63% after 1 year, 17% after 5 years with mean survival of 17 months [2]. Significant post operative complications include delayed gastric emptying, pancreatic fistula and wound infection [3]. The overall mortality ranges between 2–3% in specialised centres. Studies have shown that this low mortality is attributable to high volume centres with dedicated hepatobiliary surgery units, while the rate continues to be high in other hospitals [4–6]. Surgical skills and the experience of the surgeon has been found vital as it is directly linked with the overall mortality and post operative morbidity associated with this procedure [7–9]. In this study our aim was to access the morbidity, mortality and the quality of life associated with pancreaticoduodenectomy performed in a government medical college of eastern india.

Methods

A total of 44 patients who underwent pancreaticoduodenectomy for operable periampullary cancers in the department of general surgery, Institute of Post Graduate Medical Education & Research, Kolkata, between 2004 to 2008 were evaluated.

Preoperative data were collected in terms of patient symptomatology, clinical presentation and associated comorbidities. Pre-operative staging was done by radiological work up including USG, CECT whole abdomen, ERCP, MRCP etc. All the patients with resectable tumors underwent classical Whipples or pylorus preserving pancreaticoduodenectomy. Perioperative parameters regarding operating time, amount of blood loss, size and extent of the tumor, size of the pancreatic duct were noted. Post operatively all patients were shifted to general surgical wards. Complications were identified on serial clinical examination, routine laboratory investigations, drain fluid amylase content, ultrasonography and CT scan of abdomen in selected cases. Complications were addressed mostly by conservative means and operative management was considered where needed. Operative death was considered to be any patient dying following the procedure before the discharge from the hospital. Major complications were considered to be pancreatic fistula defined as any amount of drain fluid after third post operative day with amylase count more than 3 times serum value, delayed gastric emptying requiring nasogastric tube insertion for more than 10 days, wound infection with positive microbial culture and biliary fistula. All patients who get discharged were followed up initially at 3 month intervals for one year, biannually for next two years and annually thereafter. Long term complications were evaluated by routine laboratory investigations and serial USG whole abdomen. Long term quality of life was assessed in terms of symptom free survival, cost of the procedure and its impact on the family.

Results

A total of 44 patients with operable periampullary carcinoma were evaluated under this study. Out of them 20 (45%)

patients had carcinoma head of pancreas, 10 (23%) patients had distal cholangiocarcinoma, 10 (23%) patients had ampullary tumor and rest 4(9%) patients had duodenal carcinoma. The mean age of presentation was 52 years ranging from 37 to 62 years with male to female ration as 3:2. Out of 44 patients 36 patients (82 %) presented with history of progressive jaundice, 30 patients(68%) with abdominal pain. 20 patients (45%) had significant weight loss i.e. >10 kg over a period of 6 months.

Major comorbidities included diabetes mellitus in 12 (27%) patients, anaemia in 12(27%) patients and previous history of heart disease in 8 (18%) patients. On clinical examination gall bladder was palpable in 32 (73%) patients. 10 (23%) patients had a palpable intra abdominal tumor mass. After preoperative evaluation, conjugated hyperbilirubinemia is noted in 36 (82%) patients, out of which 16 patients had bilirubin level >10 mg/dl. 6(14%) had coagulopathy with INR >1.5. 32(73%) patients had anaemia, 10(23%) patients had albumin level <3 mg/dl (Table 1).

Forty (91%) patients underwent classical pancreaticoduodenectomy, and pylorus preserving pancreaticoduodenectomy was performed in rest 4 cases. During operation the average tumor size was 3.2 cm ranging from 1.5 cm to 6 cm. Dilated pancreatic duct (>5 mm) was noted in 24 (54%) patients. CBD was dilated (>1 cm) in 24 patients also. End to side pancreaticojejunostomy with 4-0 prolene in double layers was done in all cases. Choledochojejunostomy was done with either polydioxone 3-0 or 3-0 polyglactin. Pancreatic duct stenting was done in 40 cases, out of which 28 were internal stents and 12 were placed externally. Feeding jejunostomy was done in all cases. Intraabdominal close drain was put routinely. The mean operating time was 4 ½ hrs ranging from 4 hrs to 6 hrs. The mean intraoperative blood loss was 750 ml (Table 2).

Table 1 Factors contributing to complications and mortality

Parameters		Total no	%	Morbidity	%	Mortality	%
Bilirubin	>10 mg/dl	16	36	10	63	10	63
	<10 mg/dl	28	64	08	28	03	11
ALP	>600 IU/L	28	63	14	50	10	36
	<600 IU/L	16	37	06	37	03	19
Coagulopathy	INR>1.5	06	14	04	66	05	83
	INR<1.5	38	86	15	39	08	21
Hb	>10 mg/dl	32	73	18	56	04	12
	<10 mg/dl	12	27	03	25	09	75
Albumin	>3 mg/dl	34	77	10	29	03	08
	<3 mg/dl	10	23	09	90	10	100
Palpable Gall bladder	yes	32	73	16	50	10	31
	no	12	27	03	25	03	25
Palpable mass	yes	10	23	07	70	08	80
	No	34	77	12	35	05	15

Table 2 Factors contributing to different complications and mortality, PF: pancreatic fistula, DGE: Delayed gastric emptying, BF: Biliary fistula, MPD: Main pancreatic duct, CBD: Common Bile duct

Parameters		Total no	PF	%	DGE	%	BF	%	Mortality	%
Tumor size	>4 cm	16	09	56	10	62	06	37	10	62
	<4 cm	28	09	32	10	62	09	32	03	11
MPD	>5 mm	24	05	20	11	46	06	25	03	13
	<5 mm	20	13	65	09	45	09	45	10	50
CBD	>1 cm	24	10	40	11	46	04	16	04	16
	<1 cm	20	08	40	09	45	11	55	09	45
Blood loss	>750 ml	24	12	50	12	50	10	40	09	37
	<750 ml	20	06	30	08	40	05	25	04	20
Operating time	>5 hrs	14	08	57	10	71	09	64	08	57
	<5 hrs	30	10	33	10	33	06	20	05	16

Postoperatively all patients were put on general surgical wards. Enteral feeding through jejunostomy tube was started from 3rd postoperative day. 18 (41%) patients developed pancreatic fistula of which 12 patients responded to conservative management with octreotide. 4 patients required relaparotomy in which drainage was done in 2 cases, repair of site of leakage was done in 1 case, and total pancreatectomy in the rest 1 case. Biliary fistula was noted in 15 (34%) cases out of which 6 had combined pancreatic and biliary fistula. 2 (4%) patients had post operative hemorrhage and died in the immediate postoperative period. 4 (9%) patients had significant upper GI hemorrhage. After endoscopic evaluation 2 pts were seen having stomal hemorrhage which resolved after conservative management. The remaining two patients possibly having pseudoaneurysm did not respond and died. Other significant complications included delayed gastric emptying in 20 (45%) cases and wound infection in 17 (38%) cases. Intraabdominal abscesses complicating pancreatic fistula occurred in 13 (29%) cases. Among medical complications postoperative MI occurred in 3 patients, renal failure in 4 patients and pneumonia in 3 cases. Details of the complications are depicted in Table 3. Year wise

Table 3 Different complications following Pancreaticoduodenectomy

Complications	Total no	%	% of Mortality
Pancreatic fistula	18	41	76
Biliary fistula	15	34	52
Combined fistula	06	14	100
Delayed gastric emptying	20	45	22
Wound infection	15	34	20
Wound dehiscence	02	04	100
Generalised peritonitis	05	11	100
Localised abscess	08	18	48
Intraabdominal hemorrhage	02	04	100
Gastrointestinal hemorrhage	04	09	32
Others (MI, Renal Failure etc)	12	28	58

trend of various complications identified are shown in Table 4.

A total of 13 (29.5%) patients died following the operation and of its complications. The mortality and morbidity from site specific tumors are depicted in Table 5. When year wise data were compared mortality rates were 14 % in 2008 while it was 30% in 2007, 33% in 2006, 37% in 2005 and 50% in 2004 (Graph 1).

The average length of in hospital stay was 22 days ranging from 14 days to 40 days. Long term complications included cholangitis in 6 patients, pancreatic insufficiency in 4 patients and post operative diabetes mellitus in 4 patients. Tumor recurrence was seen in 5 patients.

Out of 31 patients who got discharged 20 (64%) patients were alive by 1 year, 6 (19%) patients by 3 years. The overall mean survival was 15 months. The average cost during hospital stay was Rs.32000 ranging from Rs.18,000 to Rs.86,000.

Discussion

Periampullary cancers are a unique set of tumors as they exhibit a distinct clinical behaviour owing to their site specific origin. Majority of the periampullary carcinomas arise from the pancreatic head, followed by ampulla of Vater, distal CBD and less commonly from duodenum [10]. The incidence of periampullary carcinoma increases with age and the majority of patients present in or beyond their sixth decade of life [11]. There is a slight male preponderance.

Features of obstructive jaundice is the most common presentation [11]. Patients with tumors arising from pancreas often experience pain as a part of their symptoms. Pain arising from pancreatic cancer may be due to the tumor itself or associated pancreatitis. Patients with biliary obstruction may present with features of cholangitis. Long term biliary obstruction may lead to coagulopathy. Tumors invading duodenum may present as gastric outlet obstruc-

Table 4 Year wise complication and mortality rates. PF: pancreatic Fistula, DGE: Delayed Gastric Emptying, WI: Wound Infection

Years	No. Cases	PF	%	DGE	%	WI	%	Mortality	%
2004	06	04	66.6	04	66.6	03	50.0	03	50.0
2005	08	04	50.0	04	50.0	03	37.5	03	37.5
2006	06	03	50.0	03	50.0	02	33.3	02	33.3
2007	10	04	40.0	04	40.0	04	40.0	03	30.0
2008	14	03	21.4	05	35.7	03	21.4	02	14.2
Total	44	18	41.0	20	45.0	15	34.0	13	29.5

tion which indicates locally advanced disease, though in our series we didn't find any.

Preoperative factors significantly affecting overall outcome are hyperbilirubinemia, anemia, coagulopathy, hypoalbuminemia. Associated comorbidities which increase the surgical complications and mortality are uncontrolled diabetes mellitus, COPD and heart disease. The major operative factors that affects outcome are operating time, amount of blood loss and the requirement of blood transfusion.

The major complication following pancreaticoduodenectomy is delayed gastric emptying [12]. Though it doesn't usually lead to grave consequences but it adds a major morbidity and longer hospital stay to the patients. All the patients with delayed gastric emptying in our series responded well to conservative management. Oral erythromycin was beneficial to some patients [13].

Pancreatic fistula nearly as common as DGE but is associated with a greater risk to the patient. In the great majority of cases pancreatic fistula responds well to conservative management with octreotide but high output fistulas and cases not responding to conservative management may require operative intervention [14]. Operative options available for pancreatic fistula are relaparotomy and drainage, repair of anastomotic leakage site or completion pancreatectomy [15–17]. But relaparotomy in these patients adds a greater risk and usually have a poorer prognosis. In our series all the patients undergoing relaparotomy died out of complications. Pancreatic fistula has no bearing to the operative technique employed but it is influenced by the texture of the pancreas and the duct size. A soft pancreas with a nondilated duct leads to increased incidence of fistula [18]. In our series 65% of patients having main pancreatic duct diameter <5 mm had had pancreatic fistula comparing to only 20% in patients with dilated duct.

Pancreatic fistula is also an important cause of secondary complications like intra abdominal abscess, sepsis and massive haemorrhage owing to formation of pseudoaneurysms adjacent to fistula site.

Post operative haemorrhage can occur following pancreaticoduodenectomy in a delayed fashion (>24 hours after index operation) usually in association with a leak in pancreatic anastomosis and subsequent erosion of vessels or within the early post operative period (<24 hours of the operation) most likely caused by a technical failure of haemostasis during the initial operation [19]. Other causes of post operative bleeding may include anastomotic bleeding in the early postoperative period or stress ulcers following the operation.

Other significant complications includes biliary fistula which usually is more common in biliary anastomosis in a nondilated duct, intraabdominal sepsis in the form of either generalised peritonitis or localised abscess following pancreatic or biliary fistula. Wound infection is also a common complication following this major operation.

The major cause of the mortality was the pancreatic fistula and its complications followed by post operative haemorrhage and other medical complications like myocardial infarction and renal failure. The comparative analysis of group morbidity and mortality rate differences which is based on groups selected by the single factors in the history, physical findings, laboratory data, pathology findings or techniques employed in the procedure has been made with realisation that many factors go into make each group that might independently affect the outcome.

While comparing the result with the worldwide data, the operative morbidity and mortality associated with this procedure performed in our institute is much higher than the high volume centers with specialised units. What we lack in our institute are sophisticated operative equipments,

Table 5 Complications and mortality according to site of tumor

Site of tumor	Total no	%	Complications	%	Mortality	%
Head of pancreas	20	45	10	50	09	45
Ampulla of vater	10	23	04	40	02	20
Distal CBD	10	23	05	50	02	20
Duodenum	04	09	01	25	00	00

Graph 1 Mortality rates in different years

post operative intensive care units and interventional radiological support for management of early complications. When we look into the year wise statistics the overall outcome and survival are definitely in an improving trend and the current status is well comparable to specialised centers. What we think we have gained over years, is the better approach of the disease with increase in experience over technical expertise and management of complications. Considering the cost of treatment in higher centers and the inter hospital transit time that many a times convert a potentially resectable disease to inoperable one, it is prudent to perform curative surgeries in peripheral institutes with acceptable complications.

Conclusion

Pancreaticoduodenectomy is a major surgical procedure now has become the treatment of choice for Periapillary carcinomas. With advancement of surgical techniques, postoperative care and better understanding of the disease the complication rate has dramatically reduced. Reports suggest that operative outcome is better and should be performed in high volume centers only. With changing trends and experience of the surgeons along with better anticipation and management of complications this operation can safely be performed with good results in large medical college affiliated teaching public hospitals. In view of the cost of treatment and the living standards of the majority of patients in rural and suburban communities, not all patients need referral to higher centers.

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