



Original research

Feasibility of implementing fast-track surgery in pancreaticoduodenectomy with pancreaticogastrostomy for reconstruction – A prospective cohort study with historical control



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HIGHLIGHTS

- This study evaluates the feasibility of implementing fast-track surgery in pancreaticoduodenectomy with pancreaticogastrostomy.
- The study is a prospective study with historical control.
- There are very few studies on fast-track surgery in pancreatic resections.
- The few studies published are from centres which perform pancreaticojejunostomy for reconstruction.

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ABSTRACT

Introduction: Fast track programmes have been introduced in pancreatic surgery, but the data are sparse. The aim of this prospective study was to analyse the feasibility of implementing fast track rehabilitation protocol in PD with pancreaticogastrostomy, using historical control for comparison.

Materials and methods: Between April 2012 and December 2012, twenty patients who underwent PD (with pancreaticogastrostomy) were managed by a fast-track rehabilitation protocol. These patients were compared with an equal number of historical controls treated according to the traditional protocol.

Results: Patients in the fast track group were able to tolerate liquid ($p = 0.0005$) and solid diet ($p = 0.0001$) earlier, and they passed stools earlier ($p = 0.02$). Delayed gastric emptying (DGE) was significantly reduced in the fast track group ($p = 0.02$). There was no difference in the rates of pancreatic fistula (PF), post pancreatectomy haemorrhage (PPH) and mortality between the two groups. Length of hospital stay was reduced in the fast track group (median 14 vs 18.5, $p = 0.007$).

Conclusion: Fast track programme appears to be feasible in PD, even with pancreatico-gastric anastomosis. It is associated with early recovery, reduced DGE and reduced hospital stay.

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1. Introduction

Malignancies of the head of pancreas and the periampullary region are managed surgically by pancreaticoduodenectomy (PD). Few decades back PD was associated with a very high morbidity and mortality. With recent advancements in surgical and anaesthetic techniques and improvement in peri-operative care, PD has

evolved into a procedure with acceptable morbidity and mortality. Today PD is associated with a mortality of less than 5%, in high volume tertiary care centres [1–7]. But the morbidity rate almost remains the same (between 30% and 60%), requiring high level peri-operative care and prolonged hospital stay [8].

The multimodal concept of fast-track surgery was first introduced in colonic surgery. Several studies have demonstrated the effectiveness of this programme in colonic resection [9–17]. Recently, fast-track surgery has been attempted in pancreatic surgery with encouraging results, but such data are sparse [8,18,19]. There has been no previous attempt at implementing fast-track surgery in PD with pancreaticogastrostomy as part of reconstruction.

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The aim of this study was to evaluate the feasibility of implementing fast track rehabilitation protocol following pancreaticoduodenectomy with pancreaticogastrostomy and to see if it is associated with improved recovery, reduced morbidity and reduced length of hospital stay. This is a pilot study with 20 patients in each arm before planning a randomized controlled trial.

2. Materials and methods

Fast-track rehabilitation protocol for PD was introduced in the Department of Surgical Gastroenterology and Liver Transplantation, Stanley Medical College, Chennai, in April 2012. Twenty one patients underwent PD between April 2012 and December 2012, out of which 20 patients were included in the study. These 20 patients were managed according to the fast-track protocol. These patients were compared with a similar number of consecutive historical patients who underwent PD and were managed according to the traditional pathway.

All patients underwent classical pancreaticoduodenectomy. Reconstruction included anastomosis in the form of end to side pancreaticogastrostomy. One or more intra-abdominal drain tubes were placed during surgery. A naso-gastric tube was left in situ. The operations were performed by team of 5 surgeons.

All patients received the same post-operative care and rehabilitation according to a newly adapted "fast-track rehabilitation protocol" (fast-track group) (Table 1). Patients were extubated in the operating room or in the post-operative ward, on the day of surgery. Epidural analgesia was provided for all the patients. NSAIDs or opioids were given if epidural analgesia was ineffective or as rescue analgesia. Prophylactic antibiotics were given for all the patients. All patients received metoclopramide (30–60 mg) on the 1st post-operative day (POD) to reduce nausea and vomiting. The drain tube amylase levels were checked on the 3rd POD, 7th POD and subsequently each week if the drain tube was retained. All patients were initially nursed in a post-operative high dependency unit and later shifted to the routine ward when fit and appropriate: when patients were free of nausea or vomiting, reasonably pain free, able to sit comfortably, adequately ambulant and able to walk to the toilets. Patients were ambulated at the earliest and oral feeds were started as and when the patient tolerated.

Table 1
Protocol for fast-track after pancreaticoduodenectomy.

Preoperative	Preoperative information given to patient, including daily milestones
Intra-operative	Thoracic epidural inserted for analgesia
Post-operative	
Day 0	Epidural analgesia ± Opioids/NSAIDs
Day 1	Removal of naso-gastric tube if <300 ml Mobilisation out of bed for >1 h Trickle feeding through feeding jejunostomy
Day 2	Enhanced mobilization for >2 h Urinary catheters removed
Day 3	Clear oral liquids Removal of drainage tubes if no pancreatic/biliary fistula and <200 ml Mobilisation for >4 h
Day 4	Soft solid diet
Day 5	Dietary increase on daily basis Epidural catheter removal
Pharmacological support	Metoclopramide 60 mg/day iv – used to prevent nausea and vomiting
Discharge criteria	Absence of fever for >48 h Adequate pain control with oral analgesics Able to take solid food Passage of normal stools Adequate mobilisation Acceptance of discharge by the patient

The demographic profile, preoperative parameters, intra-operative parameters, post-operative recovery, complications, morbidity and mortality of the patients in the fast-track group were compared with those of the patients treated by the conventional pathway (control group). The conventional pathway included nasogastric decompression until post-operative day 5, oral liquids from day 6 and soft solid diet from day 7; no specific action on mobilisation was defined.

All data were collected prospectively and analysed in the fast-track group. Post-operative complications were defined as those occurring while the patient was in-hospital and within 30 days of discharge. Mortality was defined as in-hospital death, irrespective of duration of stay, or death occurring within 30 days of discharge. Delayed gastric emptying (DGE), pancreatic fistula (PF) and post pancreatectomy haemorrhage (PPH) were defined according to the definitions of the International Study Group for Pancreatic Surgery (ISGPS) [20–22]. Details of readmission were collected from the follow up data.

3. Statistical analysis

All patients operated after introduction of the fast-track rehabilitation protocol were considered to belong to the fast-track group even if they did not accomplish all aspects of the protocol (intent-to-treat analysis). An equal number of patients treated by the conventional protocol, before the fast-track programme was introduced were included in the control (Conventional) group. Categorical variables were compared with the Fisher exact test, quantitative variables with Student's *t* test and nonparametric continuous variables with Mann–Whitney *U* test. A *p* value of <0.05 was considered significant. Data analysis was performed with SPSS version 17.0 (SPSS, Chicago, Illinois, USA). All values are presented as mean with standard deviation (SD), median with range or percentages.

4. Results

4.1. Demographic and intra-operative variables

The two groups were similar in regards to demographic profile and clinical factors (Table 2). There was a higher incidence of co-morbidities (7 vs 2; *p* = 0.12) in the conventional group, but it was not statistically significant. The indication for PD was also comparable between the two groups; periampullary carcinoma being the most common indication, accounting for about half of the cases in both the groups.

The duration of surgery was longer in the conventional group, but was not significant (mean ± standard deviation 386 ± 73.51 vs 422.25 ± 58.99 ml; *p* = 0.09). The blood loss during surgery and the

Table 2
Demographic and perioperative parameters in patients treated according to fast track and conventional pathway.

	Fast track (n = 20)	Conventional (n = 20)	<i>p</i>
Age	44.2 ± 15.9	47.6 ± 12.0	0.45 ^a
Sex (M:F)	9:11	10:10	1 ^b
Co-morbidities	2	7	0.12 ^b
Preoperative bilirubin	8.02 ± 8.09	5.98 ± 6.30	0.37 ^a
Preoperative albumin	3.81 ± 0.41	3.57 ± 0.42	0.07 ^a
Duration of surgery (min)	386 ± 73.51	422.25 ± 58.99	0.09 ^a
Blood loss (ml)	357.5 ± 160.4	403.25 ± 159.77	0.37 ^a
No. of patients transfused	6	8	0.74 ^b
Intra-operative fluids (ml)	2852.5 ± 788.14	3600 ± 596.48	0.001 ^a

^a Student's *t* test.

^b Fisher exact test.

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