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REVIEW ARTICLE

Fast-track programmes for hepatopancreatic resections: where do we stand?

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Abstract

Background: Fast-track (FT) programmes represent a series of multimodal concepts that may reduce surgical stress and speed up convalescence after surgery. The aim of this systematic review was to evaluate FT programmes for patients undergoing hepatopancreatic surgery.

Methods: PubMed, Embase and the Cochrane Library databases were searched for studies of FT vs. conventional recovery strategies for liver and pancreatic resections.

Results: For liver surgery, three cohort studies were included. Primary hospital stay was significantly reduced after FT care in two of the three studies. There were no significant differences in rates of readmission, morbidity and mortality. For pancreatic surgery, three cohort studies and one case-control study were included. Primary hospital stay was significantly shorter after FT care in three out of the four studies. One study reported a significantly decreased readmission rate (7% vs. 25%; $P = 0.027$), and another study showed lower morbidity (47.2% vs. 58.7%; $P < 0.01$) in favour of the FT group. There was no difference in mortality between the FT and control groups.

Conclusions: FT rehabilitation for liver and pancreatic surgical patients is feasible. Future investigation should focus on optimizing individual elements of the FT programme within the context of liver and pancreatic surgery.

Keywords

liver, pancreas, resection, fast track, enhanced recovery, safety, effectiveness

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Introduction

'Enhanced recovery' or 'fast-track' (FT) programmes are structured interdisciplinary strategies that have been introduced to optimize peri-operative care and accelerate post-operative recovery. The main aim of the FT protocol is to reduce the metabolic and inflammatory response to surgical stress and preserve vital functions.[1] First developed by Kehlet *et al*,[2–4] these protocols presently include key elements such as pre-operative counselling, the limited use of drains and nasogastric tubes, optimal pain relief, early nutrition and enhanced patient mobilization.[5] Apart from elective colorectal surgery, FT programmes have been proposed in other surgical fields, such as gastro-oesophageal,[6] musculoskeletal[7] and aortic[8] surgery. To date, however, the principles of enhanced recovery have rarely been applied to liver and pancreatic surgery.[9,10]

Hepatopancreatic resections represent major abdominal operations with high risks, carried out with increasing frequency, and most often for malignant conditions.[11–13] Nonetheless, both morbidity and mortality associated with these procedures have decreased over the years.[12,14] The aim of this systematic review was to assess the evidence for FT peri-operative care in patients undergoing hepatopancreatic resections.

Methods

Search strategy

Pubmed, Embase and the Cochrane Library databases were searched on 31 May 2011 by the first author, using the following search string for titles and abstracts: [('fast track' OR 'enhanced recovery' OR 'eras' OR 'early discharge' OR 'clinical pathways' OR 'clinical pathway' OR 'critical pathways' OR 'critical pathway')

AND ('liver' OR 'hepatic' OR 'hepatectomy' OR 'pancreas' OR 'pancreatic' OR 'pancreatectomy' OR 'pancreaticoduodenectomy' OR 'whipple')]. Titles and abstracts were reviewed and relevant papers identified. Reference lists of retrieved articles were used to complete the search.

Inclusion and exclusion criteria

Studies were included if they fulfilled all of the following criteria: (i) adult patients undergoing elective liver or pancreatic resection for benign or malignant disease, (ii) comparison of a FT multimodal strategy with conventional care, (iii) reporting at least four FT items and (iv) reporting at least one of the following outcome measures: length of stay, readmission, morbidity and mortality. Trials investigating transplantation were excluded. Only clinical studies published in English, German or French were included. No unpublished data or conference abstracts were included. If studies proved to have an overlap in patient population, only the largest publication was included. To date, there are 20 recognized protocol elements that make up the FT programme.[5] In this review, a total of 18 FT items were scored, as two items, i.e. writing an audit (applicable to all included studies) and the use of suprapubic catheters for pelvic surgery, were considered not relevant.

Outcomes of interest

Primary outcome parameters were length of hospital stay, readmission rate, morbidity and mortality. Secondary outcomes included bowel function, cost-effectiveness and quality of life. The level of evidence was rated according to the Oxford Centre for Evidence-based Medicine Levels of Evidence.[15]

Results

A total of 518 publications were identified, of which 18 were relevant. Five studies[16–19,21] lacked a traditional care group (control). Four studies[20,22–24] were excluded because of failure to apply a minimum of four FT elements, and one trial[25] did not describe details of the FT protocol. Furthermore, one study[26] was excluded because part of the data had been used in another publication. Finally, seven trials comparing FT peri-operative care with traditional care were identified (Fig. 1).

Three articles described outcomes for patients who underwent liver resection for primary or secondary tumours,[10,27,28] whereas four studies described patients who underwent pancreatic surgery[9,29–31] (Table 1). Included trials were published between 2006 and 2011. Median population size in the FT group was 61 (range 12–252) patients. All trials used a prospective intervention group and a retrospective control group. They had evidence level 2b or 3b on the Oxford Level of Evidence scale.

Fast-track items

There was some clinical heterogeneity regarding specific FT interventions used in the studies. The number of included FT items ranged from 5 to 18 with a median of 7. Post-operative nutritional care and early mobilization were the commonest FT interventions, whereas laparoscopic surgery and minimal incisions were reported infrequently (Table 2).

Liver resection

Primary outcome measures were reported in all studies. Primary hospital stay was significantly reduced after FT care in two out of the three studies.[10,27] In one study, median hospital stay was 6 days in the FT group compared with 8 days in the control group ($P < 0.001$).[10] In the other study, primary hospital stay was reduced from 11 days to 7 days ($P < 0.01$).[27] There were no significant differences in rates of readmission, morbidity and mortality between FT and control groups (Table 1).

Gastrointestinal function was reported in two studies.[10,28] One trial found a significantly shorter time to successful resumption of a normal diet in the FT group (1 post-operative day for FT patients vs. 3 days for the control group).[10] In the only study that reported on cost-effectiveness data, the mean charges per hospital stay were Renminbi (RMB) 26 626 for the control group and RMB 21 004 for the FT group ($P < 0.05$).[27]

Pancreatic resection

All four studies reported on primary hospital stay and this was significantly shorter after FT care in three out of the four studies.[9,29,30] Readmission rates were reported in three studies. In one study, the readmission rate was reduced in favour of the FT patients (7% vs. 25%; $P = 0.027$).[29] However, the effect on readmission must be interpreted with caution. The control group was operated before the recruitment of a team focused on pancreatic surgery. The team was encouraged to increase the case load but were not given additional bed days. Furthermore, the surgical volume increased from an average of 1.2 cases per month pre-FT to 3.2 cases per month post-FT, as a result of, e.g. tertiary referrals. Morbidity rates were reported in all studies. In one study, management within an FT pathway led to significantly fewer post-operative complications (47.2% vs. 58.7%; $P < 0.01$).[9] Mortality was reported in three of the studies and was not significantly different between the FT and control groups (Table 1).

Two studies assessed gastrointestinal function.[9,31] In one study, the FT group had earlier oral intake and first bowel movement post-operatively as compared with the control group.[31] In the other study, patients undergoing a pancreaticoduodenectomy and managed with a FT pathway had a reduced incidence of delayed gastric emptying (13.9% vs. 24.6%; $P = 0.004$).[9] The cost-effectiveness of FT protocols was reported in two trials.[29,30] In one study, the mean total hospital charges were significantly decreased for FT patients, from \$240 242 ± \$32 490 to \$126 566 ± 4883 ($P \leq 0.0001$).[30]

Discussion

The principles of enhanced recovery have been proven to be safe and effective in several surgical settings.[7,8,32] This systematic review