Egyptian Journal of Surgery Vol 25, No 4, Oct., 2006

ORIGINAL ARTICLE

EARLY ORAL FEEDING VERSUS DELAYED ORAL FEEDING IN PATIENTS UNDERGOING INTESTINAL RESECTION

By
Tito Metwally, Ayman Elnkeib, Ameer Fekry, Saleh Elawady, Mohamed Farid
Department of General Surgery, Mansoura University Hospital, Mansoura Faculty of Medicine, Mansoura, Egypt.

Correspondence to: Tito Metwally, Email: titomet2001@yahoo.com

Aim: *This study was conducted to evaluate early oral feeding versus delayed feeding after intestinal resection.*
Methods: *In the period from June 2005 to September 2006 this study included 240 patients who underwent intestinal resection either elective or emergency, they were randomized into two groups. Group (A) included 120 patients with early oral feeding and group (B) with delayed oral feeding.*
Patients were followed up for a period of 3-12 months.
Results: *Twenty four (20%) patients in group (A) had leakage versus 28 (23.3%) in (B), (p=0.531). Sixteen (13.3%) patients were explored in group (A) versus 18 (15%) in (B), (p= 0.711). In group (A) 15 (12.5%) patients had local complications versus 14 (11.3%) in (B), this was not of statistical significance. Hospital stay was significantly shorter in group A than (B) with mean stay of (2.5 + 1.7) versus (9.93 + 2.60) days respectively. General complications were less frequent in group (A) versus (B) with more patient satisfaction and early return to work, but readmissions were more frequent among group (A) (5 versus 2). Regarding mortality 9 (7.5%) patients died in group (A) versus 8 (6.6%) in (B), (p= 0.333).*
Conclusion: *Early oral feeding after intestinal resection is well tolerated and safe with better outcome.*

Keywords: *Enteral nutrition, Intestinal fistula, Ileus.*

INTRODUCTION

Early oral feeding is an essential part of fast track surgery which has evolved as a result of co-ordinated effort to combine recent evidence-based advances in the modem care of surgical patients.[1] Fast-track rehabilitation or enhanced recovery after surgery (ERAS) is a multimodal comprehensive programme aimed at enhancing postoperative recovery and outcome.[2,3] Kehlet and colleagues popularised this concept and have demonstrated planned discharge after 48 h in patients undergoing elective open colonic surgery for malignant and benign diseases.[4,5] Subsequently, several groups around the world confirmed the benefits of this combined anaesthetic and surgical approach for perioperative care and demonstrated reduced hospitalization, potential complications and cost.[6-9] Two prospective, randomised, controlled trials[6,8] and several single-institute case series reports have confirmed the effectiveness and safety of this approach.[7,9,10] Similar results have been demonstrated in patients with significant co-morbidity undergoing more complex surgery.[7] Although most outcome data have been studied in context to elective colorectal surgery, a number of published series have reported the benefits of early oral feeding as a part of fast track program, in other specialities.[3]

Various stress-reduction methods incorporated into fast-track surgery include pre-operative patient education and optimization, improved anaesthesia and epidural analgesia, adoption of modern surgical principles, optimised dynamic pain relief, and enforced early ambulation and early oral feeding.[2,11]

It is important to understand that discharge criteria with fast-track surgery are the same as those of delayed oral feeding, but achieved sooner under the fast-track system.[1] Postoperative pain control, ambulation and complete recovery of gut and urinary bladder functions are essential prerequisites in planning discharge from hospital. These goals can be achieved early with the application of fast-track surgery principles to combat the profound changes in endocrine, metabolic, and pulmonary function seen in surgical illness.[2,11]

New, short-acting anaesthetic agents that allow quick recovery of vital organ functions and provide stress-reducing effects to prevent organ dysfunction after major operations have contributed to the success of the fast-track surgery programme.[2]

Therefore, implementation of balanced analgesic protocols including continuous low-dose epidural block postoperatively and integration of an acute pain team service are prerequisites for the effective pain treatment to hasten recovery in fast-track surgery.[12]

On the other hand, the surgeon has an important role to play in reducing stress to enhance recovery in surgical illness.[2] This begins in the out-patient clinic with extensive pre-operative teaching detailing projected length of stay and return of bowel function.[9] Patient and procedure selections have a significant impact on reducing postoperative morbidity and improving outcome.[2] Routine bowel preparation in elective colorectal surgery does not influence anastomotic leak rates or reduce septic complications and has been associated with increased morbidity and cost.[13] The choice of incisions could have implications for postoperative pain and organ function. Abdominal transverse incisions including only a few nerve segments result in reduced pain and pulmonary dysfunction compared with longitudinal incisions.[14]

The aim of this study is to evaluate the outcome of early oral feeding which is an integral part of fast track rehabilitation program versus delayed oral feeding in patients undergoing intestinal resection.

PATIENTS AND METHODS

Patient population: The study population included all patients referred to Mansoura Emergency and University Hospital during the period from June 2005 to September 2006.

Exclusion criteria: All patients aged more than 70 years or had chronic liver or renal diseases were excluded from the study, in addition to non motivated and malnourished patients.

Clinical and diagnostic workup:

Emergency cases: All patients were subjected to careful history taking and proper clinical evaluation. They were also assessed radiologically by plain x-ray abdomen, pelvis and chest plus abdominal ultrasound, C.T or sometimes gastrografin enemas.

Elective cases: They underwent the same procedures plus barium enema, meal and follow through, in addition to colonoscopy and biopsy for certain cases.

Laboratory investigations: Blood samples were withdrawn for routine evaluation of organ functions, CBC, serum electrolytes, Coagulation profile and blood gases for all cases either emergency or elective, in addition to tumor markers for cancer cases. This was used for initial and follow up assessment.

Preoperative preparation and anaesthesia consultation:

Emergency cases: All patients were properly prepared by correction of acidosis, hypoxia, dehydration and electrolytes imbalance. Blood was transfused is certain cases and antibioties were prescribed.

Elective cases: They underwent the same preparation plus chemical and mechanical bowel preparation. All patients in the study underwent small intestinal and colonic resection either emergency or elective under general anaesthesia.

Patients were randomized into two groups:
Group A: Included 120 patients for whom we adopted early oral feeding. We started sips of oral clear fluids at the morning of first postoperative day then free oral fluids at the second day followed by soft diet at third day then normal diet at fourth day and lastly planned discharge at the fifth day.
Group B: Included 120 patients for whom we adopted the delayed oral feeding. We started oral fluids after return of peristalsis or recovery from postoperative ileus and patients were planned to be discharged after about ten to fourteen days. All patients were followed up weekly at surgical outpatient clinic for one month for any postoperative complications or the need for hospital readmission and then monthly for 3-12 months (mean: 6.52 + 1.9 months).

During follow up we asked all patients about their life style, regarding their physical and mental activities and also if they were happy or not, to assess their satisfaction and their ability to return to work.

Follow up was in the form of clinical, laboratory, radiological and sometimes endoscopic evaluation.

Statistical analysis: Pearson chi-square test and relative risk were used for qualitative variables. Mann- Whitney test was used for quantitative variables.

RESULTS

Patient demographics: This study included a total number of 240 patients who were classified into two groups. Group (A) or early oral feeding group, which included 120 patients their mean age was 37.72 years + 13.28 years and the majority of them were males (52.5%). Sixty eight (56.66%) patients underwent emergency small intestinal resection and 12 (10%) patients underwent colonic resection, while seven (5.83%) cases underwent elective small bowel resection and 33(27.5%) had colonic resection as shown in Table 1. Group (B) or delayed oral feeding group, included 120 patients their mean (+SD) age was (38.72 years + 11.95 years) and most of them were females representing (50.83%) of the patient population. Sixty six (55%) patients underwent emergency small bowel resection and 14 (11.66%) patients had colonic resection while 9 (7.5%) patients underwent elective small bowel resection and 31 (25.83%) had elective colonic resection as shown in Table 1.

Operative characteristics: Elective resection has been undertaken in 80 (33.33%) patients most of them were colonic 64(80%) patients. Emergency resection has been done in 160 (66.67%) patients most of them were small bowel 134 (83.75%). Small bowel resection has been done in 150 (62.5%) patients, the majority of them 66 (44%) patients were due to mesenteric occlusion, followed by strangulation obstruction in 34 (22.66%) patients then 6 (4%) patients due to Crohn's disease. Colonic resection has been done in 90 (37.48%) patients most of the cases were left hemicolectomy 36 (40%) cases followed by 20(22.22%) cases low anterior resection.

Leakage and fistula formation: Twenty four (20%) patients in group (A) had leakage and fistula versus 28(23.3%) patients in group (B), most of the cases were small bowel as shown in details in Table 2.

Exploration: In group (A), 16(13.3%) patients were explored versus 18(15%) patients in group (B). Exploration was done due to leakage and peritonitis with burst abdomen or due to intraabdominal collection or failure of conservation policy. Fistulas were small intestinal in most of cases 13 (10.8%) in group (A) and 14 (11.7%) in group (B). (p = 0.838). Eight (6.66%) cases in group (A) versus 10(8.5%) in group (B) were managed conservatively as shown is details in Table 2, this was not statistically significant (p= 0.711).

Burst abdomen: Four (3.3%) patients had burst abdomen in group (A) which necessitated exploration versus 5(4.2%) patients in group (B) (p = 0.734).

Seroma and wound collection: In group (A), eleven (9.2) patients had seromas which were successfully managed by repeated aspiration but 5 patients were readmitted for follow up. In group (B), nine (7%) patients had seromas which were aspirated but two cases were readmitted (p= 0.228).

Hospital stay: The majority 96 (80%) of patients were discharged at the 5th postoperative day in group (A) with mean length of stay 2.5 days + 1.7 days while in group (B), most of the cases were discharged after 6-14 days with mean length of stay 9.93 + 2.60 and this was of statistical significance (p= 0.001). On the other hand , 3(2.5%) patients stayed in hospital for 22-31 days with mean length of stay 26.66 days + 4.50 in group A versus 9 (7.5%) patients in group B with mean length of stay 26.66 + 3.90 days which was significant (p= 0.001) as shown in details in Table 2.

Blood chemistry and serum electrolytes: In group (A), 17 (14.5%) patients had abnormal blood chemistry versus 37 (30.8%) patients in group (B), 21 (17.5%) patients had abnormal serum electrolytes in group (A) versus 43 (35.8%) patients in group (B).(p = 0.001).

Patient satisfaction: Nine (7.5%) patients were not satisfied in group (A) versus 14 (11.7%) patients in group (B).

Pulmonary complication: Five (4.1%) patients had pulmonary complication in group (A) versus 9 (7.5%) patients in group (B) as shown in details in Table 2.

Deep venous thrombosis (D.V.T): Four (3.3%) patients developed D.V.T in group (A) versus 7(5.8%) patients in group (B), they were successfully managed conservatively. Thrombosis was attributed to prolonged hospital stay and lack of mobilization as shown in Table 2.

Period for return to normal activity: In early oral feeding group the majority 96 (80%) of patients returned to their normal activity after 3-6 weeks with mean period of 4.5 + 1.12 weeks. On the other hand , most of the patients 77 (64.2%) in delayed oral feeding group returned to their activity after 7-9 weeks with mean period of (7.98 + 0.81 weeks), only 3 (2.5%) patients only returned to their activity after 10-12 weeks with mean period of 11 + 1 week in group (A) versus 9 (7.5%) patients in group (B) who returned to their activity after a mean period of 11 + 0.86 weeks and this was significant (p=0.01) as shown in details in Table 2.

Mortality: Seventeen (14.1%) patients died, 9 (7.5%) in group (A) versus 8 (6.6%) in group (B), five (4.1%) patients died immediately postoperative, 2 in group (A) versus 3 in group (B). On the other hand 12 (10%) patients died during the first year of follow up 7 patients in group (A) versus 5 patients in group (B) as shown in Table 2. This was not significant statistically (p= 0.333).

Readmission: Five (4.16%) cases were readmitted in group (A) versus two (1.6%) cases in group (B). The readmission was due to seroma formation and wound collection.

Table 1. Patients demographics (240 patients).

Item	Early oral feeding group (A)	Total number of patients 120 (%)	Delayed oral feeding group (B)	Total number of patients 120 (%)
Age (mean + SD)	37.72 + 13.28 years		38.72 + 11.95 years	
Sex:				
Male	52.5%		49.17%	
Female	47.5%		50.83%	
Timing of resection				
Emergency	small bowel resection	68 (56.66)	small bowel resection	66 (55)
	colonic resection	12 (10)	colonic resection	14 (11.66)
Elective	small bowel resection	7 (5.83)	small bowel resection	9 (7.5)
	colonic resection	33 (27.5)	colonic resection	31 (25.83)

Table 2. Patients outcome (240 patients).

Item	Early oral feeding group (A) No. of patients 120 (%)	Delayed oral feeding group (B) No. of patients 120 (%)	P value
Leakage			
* yes	24 (20)	28 (23.3)	0.531
* no	96 (80)	92 (76.7)	
* small bowel	18 (15)	21 (17.5)	0.600
* large bowel	6 (5)	7 (5.8)	0.776
Exploration	16 (13.3)	18 (15)	0.711
* small bowel	13 (10.8)	14 (11.7)	0.383
* large bowel	3 (2.5)	4 (3.3)	0.701
Seroma and wound collection	11 (9.2)	9 (7.1)	0.228
Burst abdomen	4 (3.3)	5 (4.2)	0.734
Hospital stay (days)			
0 – 5	96 (80)	0	0.001
6 – 14	0	92 (76.7)	0.001
15 – 21	21 (17.5)	19 (15.8)	0.001
22 – 31	3 (2.5)	9 (7.5)	0.001
Abnormal blood chemistry	17 (14.5)	37 (30.8)	0.001
Abnormal serum electrolytes	21 (17.5)	43 (35.8)	0.001
Patient satisfaction	9 (7.5)	14 (11.7)	0.273
Pulmonary complication			
Bronchopneumonia	3 (2.5)	6 (5)	0.01
patchy atelectasis	1 (0.8)	2 (1.6)	0.561
pleural effusion	1 (0.8)	1 (0.8)	1
Deep venous thrombosis	4 (3.3)	7 (5.8)	0.571
Period for return to normal activity			
3 -6 weeks	96 (80)	44 (36.7)	0.01
7 – 9 weeks	21 (17.5)	77 (64.2)	0.01
10 – 12 weeks	3 (2.5)	9 (7.5)	0.01
Mortality	9 (7.5)	8 (6.6)	0.333
Readmission	5 (4.16)	2 (1.6)	0.273

DISCUSSION

Basse et al.[15] demonstrated an early normalisation of gastrointestinal motility after open colonic resection with a multimodal rehabilitation programme involving epidural analgesia, early oral feeding and mobilization and laxative.

Early oral feeding within 24 h after gastrointestinal surgery is well-tolerated, safe and plays an important role to enhance recovery and outcome.[16]

Our study has been condueted to evaluate the concept of early oral feeding compared to delayed oral feeding in terms of primary outcome parameter as hospital stay and surgery related immediate postoperative complications and secondary outcome parameters as patient satisfaction and readmission rate. Because the feasibility of fast track rehabilitation in patients undergoing small bowel and colonic resection has not been demonstrated yet, we demonstrate our initial results after adoption of this concept. until today, fast track rehabilitation was evaluated most thoroughly in elective colonic surgery as mentioned by Schwenk & Muller (2005);[17] they also reported that fast track decreased general complications from 20-30% to below 10% ; while post operative hospital stay was reduced from 10-15 days to 2-5 days. Moreover, Wichmann et al. (2006)[18] adopted fast track rehabilitation in elective pancreatic cancer surgery and they mentioned that the clinical course of patients with fast track was faster with shorter length of hospital stay and early resumption of normal activities . Schwenk et al (2004)[19] supported this concept by reporting that hospital stay was reduced to a median of 4 days , local complications to 7% in 74 patients underwent fast track colonic resection. On the other hand Proske et al (2005)[20] found in their series (132 patients) that surgical complications occurred in 15 patients (11%) ; 4 patients had anastmotic leakage (3%), general complications occurred in 11 patients (8%), the mortality was 1%, the hospital stay was 4 days and 14 patients had to be readmitted.

Raue et al (2004)[21] said that fast track patients were discharged on day 4, the range was (3-6) days and conventional care patients discharged at day 7 , range was (4-14) days. Moreover Walter et al (2006),[22] reported median length of hospital stay 5 days (range, 4-7) days versus 7 days (rang, 6-8) in non fast track patients. Hjort et al. (2004)[23] had the same results of median hospital stay of 2 days versus 8 days in fast track versus conventional care with less cost and more patient satisfaction with also earlier resumption of normal activities, but they reported more frequent readmissions. 5 patients in fast track versus one patient in conventional care. In our series, we reported leakage in 24 (20%) patients who underwent early oral feeding versus 28 (23.3%) patients with delayed oral feeding, most of the cases were small bowel fistulas 18 (15%) patients in group (A) versus 21 (17.5%) in group (B), while there was no statistical difference regarding the incidence of colonic leakage among both groups, this means that incidence of leakage was higher in both groups among patients with small bowel resection but at the same time , the incidence was nearly the same in both groups. These results not only support early oral feeding in colonic and rectal resection as confirmed by Hjort et al. (2004)[23] and Schwenk et al. (2004);[19] but also, in small bowel resection which was considered to be anew concept adopted by us.

On the other hand, our study revealed that, length of hospital stay was significantly shorter among patients with early oral feeding; mean length of stay was (2.5 + 1.71 days) versus (9.93 + 2.60 days) in group (A) versus group (B) respectively. Furthermore we noticed that pulmonary complications were less frequent among group (A) 5(4.1%) patients versus 9 (7.5%) patients in group (B), due to rapid convalescence. Regarding deep venous thrombosis, it was less frequent among patients with early oral feeding compared to patients with delayed oral feeding 4 (3.3%) versus 7 (5.8%) respectively. Group (A) patients resumed their normal activities earlier than patients of group (B) (mean period of 4.5 + 1.12 weeks) versus (7.98 + 0.81 weeks) respectively. As regards mortality, most of deaths occurred during first year of follow up due to events not related to surgery. In our series 5 (4.16%) patients had to be readmitted in group (A) versus two (1.6%) patients in group (B) and this was supported by Hjort et al. (2004).[23] To the best of our knowledge this is the first study to adopt early oral feeding after small bowel resection in addition to colonic resection. These results went parallel to the previously mentioned results in terms of hospital stay, general, local complications and patient satisfaction, without preoperative patients education or epidural analgesia which are essential in fast track protocol. So we achieved these encouraging results without adherence to the typical fast track protocol. It also suggest that early oral feeding could be adopted after small bowel resection. In conclusion; early oral feeding after intestinal resection lowered the number of general complications and reduced the duration of hospital stay in addition to earlier resumption of normal activities and it seems to be simple, safe and reliable.

REFERENCES

1. Kehlet H, Wilmore DW. Fast-track surgery. Br. J Surg. 2005;92:3-4.

2. Kehlet H, Dahl JE. Anaesthesia, surgery, and challenges in post-operative recovery. Lancet. 2003;362:1921-8.

3. Wilmore DW. From Cuthbertson to fast-track surgery: 70 years of progress in reducing stress in surgical patients. Ann Surg. 2002;236:643-8.

4. Kehlet H, Mogensen T. Hospital stay of 2 days after open sigmoidectomy with a multimodal rehabilitation programme. Br J Surg. 1999;86:227-30.

5. Basse L, Jakobsen DH, Billesbolle P, Werner M, Kehlet H. A clinical pathway to accelerated recovery. Ann Surg. 2000;232:51-7.

6. Delaney CP, Zutshi M, Senagor AJ, Remzi FM, Hammel J, Fazio VW. Prospective, randomised, controlled trial between a pathway of controlled rehabilitation with early ambulation and diet and traditional postoperative care after laparotomy and intestinal resection. Dis Colon Rectum. 2003;46:851-9.

7. Delaney CP, Fazio VW, Seriagor AJ, Robinson B, Halverson A, Remzi FM. Fast track postoperative management for patients with high comorbidity undergoing complex abdominal and pelvic colorectal surgery Br J Surg. 2001;88:1533-8.

8. Anderson ADG, McNaught CE, McFie J, Tring I, Barker P. Mitcheli CJ. Randomised clinical trial of multimodal optimisation and standard preoperative surgical care. Br J Surg. 2003;90:1497-1504.

9. Stephen AE, Berger DL. Shortened length of stay and hospital cost reduction with implementation of an accelerated clinical care pathway after elective colon resection. Surgery. 2003;133:277-82.

10. Andersen I, Kehlet H. Fast track open ileo-colic resections for Crohn's disease. Colorectal Dis. 2005;7:1-4.

11. Kehlet H, Wilmore DW. Multimoda1 strategies to improve surgical outcome. Am J Surg. 2002;183:630-41.

12. Kehlet H, Holte K. Effect of postoperative analgesia on surgical outcome. Br J Anaesth. 2001;87:62-72.

13. Slim K, Vicant E, Panis Y, Chipponi J. Meta-analyses of randomised clinical trials of colorectal surgery with or without mechanical bowel preparation. Br J Surg. 2004;91:1125-30.

14. Grantcharov TP, Rosenberg J. Vertical compared with transverse incisions in abdominal surgery. Eur J Surg. 2001;167:260-7.

15. Basse L, Madsen JL, Kehlet H. Normal gastrointestinal transit after colonic resection using epidural analgesia, enforced oral nutrition and laxative. Br J Surg. 2001:88:1498-1500.

16. Lewis JS, Egger M, Sylvester PA, Thomas S. Early enteral feeding versus nil by mouth after gastrointestinal surgery: systematic review and meta-analyses of controlled trials. BMJ. 2001;323:773-6.

17. Schwenk W, Muller JM. What is "Fast-track"-surgery? Dtsch Med Wochenschr. 2005;130:536-40.

18. Wichmann MW, Roth M, Jauch KW, Bruns CJ. A prospective clinical feasibility study for multimodal "fast track" rehabilitation in elective pancreatic cancer surgery. Rozhl Chir. 2006;85:169-75.

19. Schwenk W, Haase O, Raue W, Neudecker J, Muller JM. Establishing "fast-track"-colonic surgery in the clinical routine. Zentralbl Chir. 2004;29:502- 9.

20. Proske JM, Raue W, Neudecker J, Muller JM, Schwenk W. Fast track rehabilitation in colonic surgery: results of a prospective trial. Ann Chir. 2005;130:152-6. Epub. 2005.

21. Raue W, Haase O, Junghans T, Scharfenberg M, Muller JM, Schwenk W. 'Fast-track' multimodal rehabilitation program improves outcome after laparoscopic sigmoidectomy: a controlled prospective evaluation. Surg Endosc. 2004;18:1463-8. Epub. 2004.

22. Walter CJ, Smith A, Guillou P. Perceptions of the application of fast-track surgical principles by general surgeons. Ann R Coll Surg Engl. 2006;88:191-5.

23. Hjort Jakobsen D, Sonne E, Basse L, Bisgaard T, Kehlet H. Convalescence after colonic resection with fast-track versus conventional care. Scand J Surg. 2004;93:24-8.