

Fast Track Surgery at the University Teaching Hospital of Kigali: A Randomized Controlled Trial Study in Abdominal Surgery

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Background: Fast Track Surgery is synonymous with Enhanced Recovery after Surgery. It was started in the 1990's initially for colorectal surgery, but later became applicable to other aspects of surgery. Its core elements include epidural or regional anaesthesia, peri-operative fluid management, minimally invasive surgical techniques, optimal pain control, early initiation of mobilization and feeding, and early discharge from hospital. The beneficial effects of this practice arise from early mobilization and feeding, and the reduced hospital stay. They include reduced costs, early discharge from hospital, and increased availability of hospital beds. The main aim of this study was to explore the feasibility of Fast Track Surgery in the Rwandan surgical setting and to demonstrate the reported beneficial effects of Fast Track Surgery.

Methods: A randomised control trial was conducted, with cases for Fast Track Surgery (FTS) carefully selected, and compared with the controls (patients going through the conventional surgical care). A total of 62 patients (31 in each group) were studied. Evaluation and comparison of hospital stay, early mobilization, early feeding, complication rate, were done for the two groups.

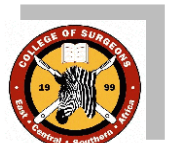
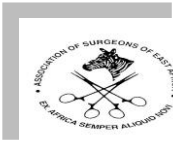
Results: The FTS patients had a mean hospital stay of 2.1 days, while the controls had a mean hospital stay of 5.3 days. 97% of the FTS patients had early mobilization, within the first 24 hours postoperatively, compared to 77% who got mobilization and feeding on the 3rd postoperative day in the control group.

Conclusion: Fast Track Surgery practice is feasible in the Rwandan surgical setting. It facilitates early discharge from hospital, with minimal complication rates because of early mobilization and early feeding. It also results in reduced postoperative pain, leading to reduced or no opioid demands. All these translate into reduced expenses for the patient and the hospital.

Key words: Fast Track Surgery, hospital stay, mobilization, beneficial effects, Randomised control trial.

Introduction

Fast-track surgery (FTS) was initiated by the Danish surgeon H Kehlet in the field of elective colorectal surgery in the 1990s ^{1, 2}, and has rapidly gained popularity around the world because of its significant benefits and safety ³. The core elements of FTS include: epidural or



regional anesthesia, peri-operative fluid management, minimally invasive techniques, optimal pain control, early initiation of oral feeding and early mobilization⁴. The combination of these approaches has led to a significant reduction in complication rates, morbidity and mortality rates, duration of hospital stay and costs of hospitalization, and finally, greatly improved postoperative recovery⁵⁻⁷. In recent years, FTS has been applied to several surgical diseases including radical prostatectomy⁸, cardiac surgery⁹, total knee replacement¹⁰, cesarean section¹¹, coronary artery bypass grafting¹², it has also been used for specific procedures in children¹³ and the elderly¹⁴.

With the conventional surgical practice, patients often stay for several days before and after surgery. The average hospital stay for the majority of surgical patients ranges between 3 to 12 days¹². This results in a chronic shortage of beds, especially in the referral hospitals like CHUK. It also translates into increased medical costs, taking into account the bed and feeding costs per day for both the patient and the care-taker. Some of the reasons for the prolonged hospital stay pre-operatively include limited human resources, limited operating theatre space, limited consumables, and delayed investigations; while postoperatively they include pain, complications, delayed feeding, and delayed mobilization.

In addition, the general mindset of the majority of our patients is that the surgical patient should stay in hospital until the wounds are healed, stitches are removed, and the pain is fully controlled. This is associated with fear to initiate movement or feeding postoperatively. But it is known that prolonged hospital stay often results in many complications including DVT, prolonged pain, cough, pneumonia, and hospital acquired infections. The main aim of this study was to explore the feasibility of Fast Track Surgery in the Rwandan surgical setting and to demonstrate the reported beneficial effects of Fast Track Surgery.

Patients and Methods

This randomized control trial was conducted in one of the referral hospitals of Rwanda: Kigali University Teaching Hospital (CHUK). The study was conducted for a period of three months. The patients who were on appointment for elective abdominal surgery were briefed about the study at admission. Only those who were willing to participate were enrolled and randomly divided into two groups by picking one sealed envelope containing a paper indicating either FTS or conventional surgery. 62 patients were enrolled in the study; 31 patients in the conventional group, and 31 patients in the fast track surgery group. The latter group was further briefed about the core elements of FTS which included epidural or regional anesthesia, peri-operative fluid management, optimal pain control, early initiation of oral feeding, and early mobilization. The peri-operative management of the FTS group went through all those steps. Included were adult patients who underwent elective abdominal surgery, and were classified as ASA 1&2. Excluded were patients whose conditions required ICU monitoring postoperatively, emergency abdominal surgery, and pediatric patients. A standardized data collection questionnaire was used. Patients were enrolled after initial assessment, and monitored as in-patients, until they were discharged from surgical care.

Follow up was done for all the patients one week after discharge to assess for any complications. The follow-up results indicated that the patients in the FTS group did better in terms of mobility wound healing rate. The principal investigator supervised all data collection. Data was recorded using Epi-data 3.1 software. The data processing and statistical analyses were performed using STATA. The limit of significance was established at $p \leq 0.05$.

Results

This randomized control trial on fast track surgery versus conventional surgery for elective abdominal surgery patients included 6, with 31 patients in each group. The majority of patients were female (58 %). However, there was balanced gender distribution in both groups. ($p=0.345$). Figures 1 and 2 show the sex and age distribution in the fast track surgery and control groups.

Age distribution

The population age range was from 17 years to 73 years old with a mean age of 35 years and standard deviation of 15 years. There was equal distribution between the two groups ($p=0.361$).

Diagnosis

The commonest diagnosis was cholelithiasis accounting for 35 % of all cases combined and was followed by intestinal stoma especially colostomies with 29 cases combined (Figure 3). Others diagnoses included 1 case each of achalasia, gallbladder tumor, entero-cutaneous fistula and of urachal sinus. There was equal distribution for diagnosis in both group ($p=0.285$)

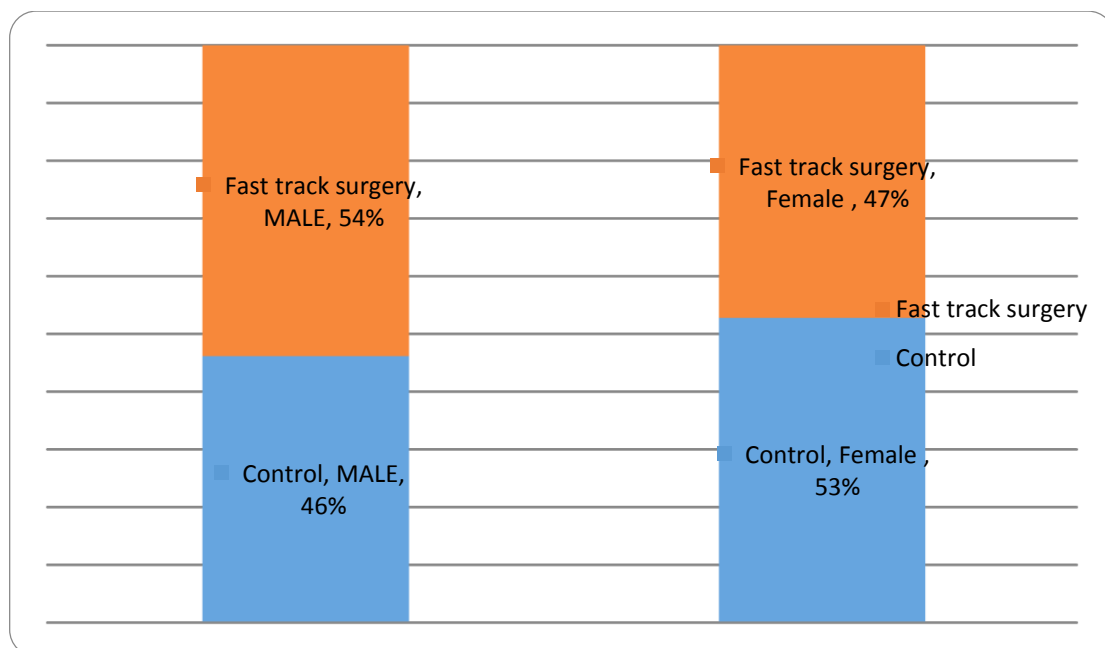


Figure 1. Sex Distribution

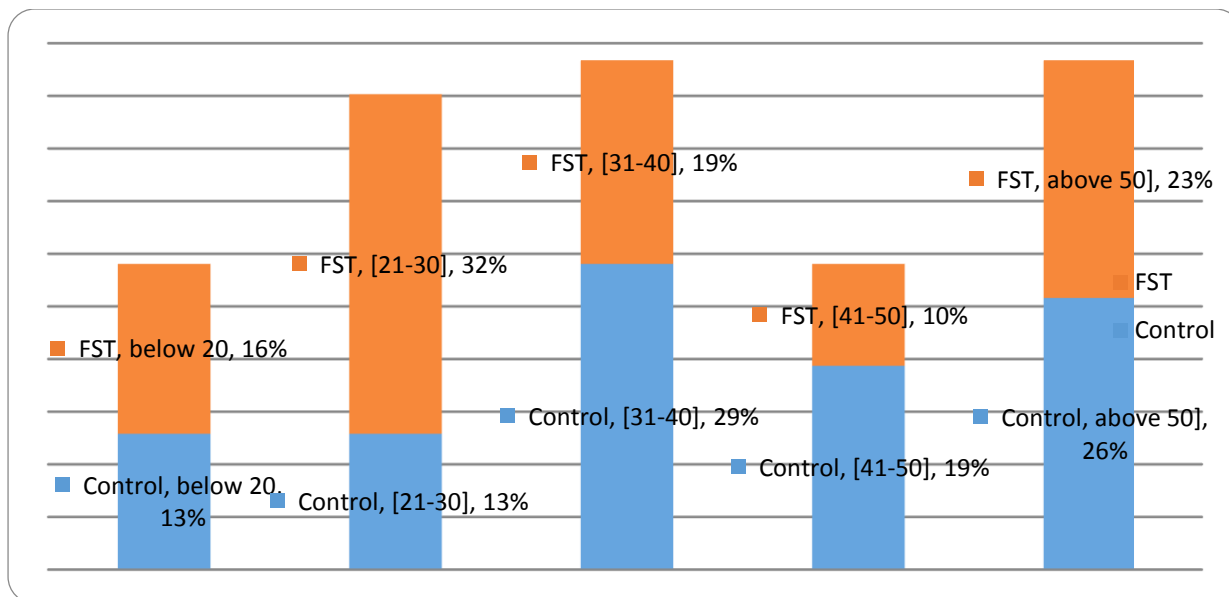


Figure 2. Age Distribution According To Group

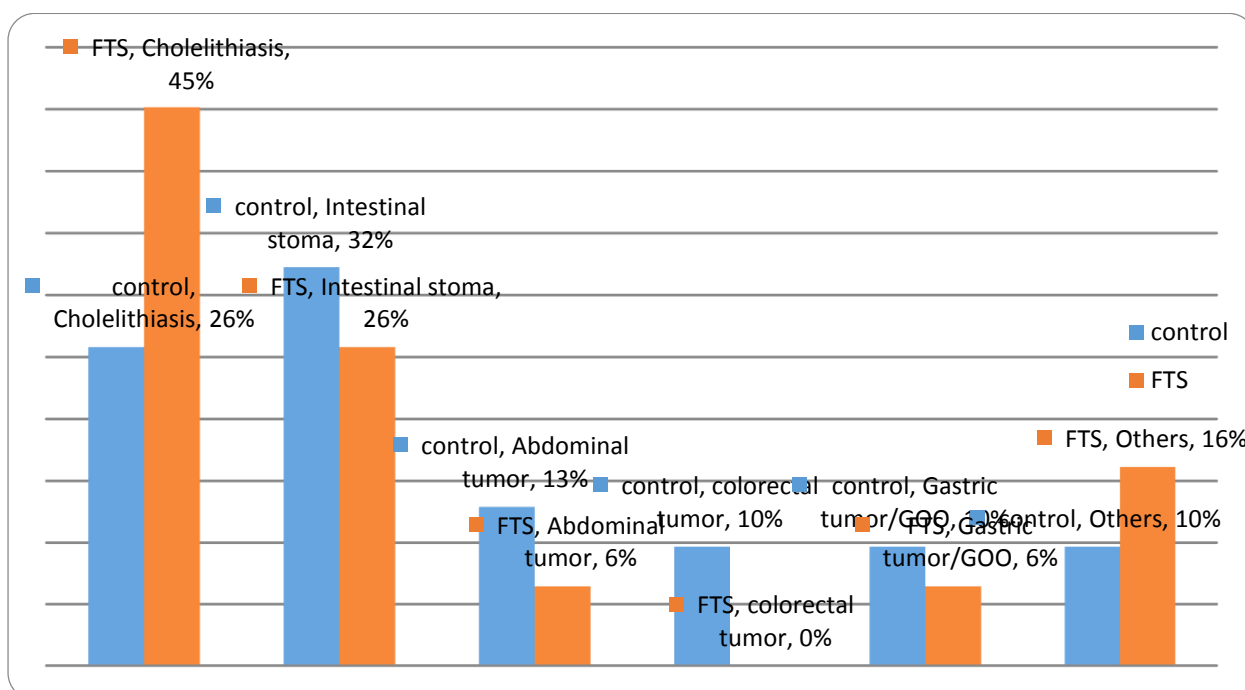


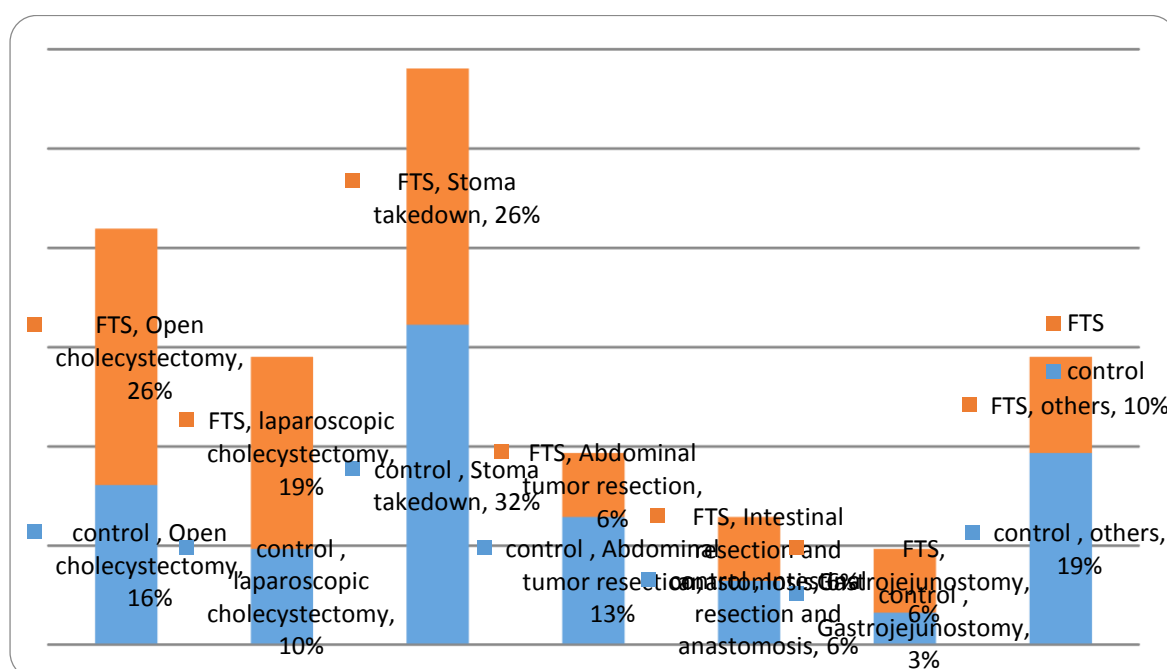
Figure 3 Patients Distribution According To Diagnosis

Procedures

The patients with cholelithiasis underwent either open or laparoscopic cholecystectomy depending on the surgeon's choice (Figure 4). Other procedures included Heller's myotomy and Toupet fundoplication, abdominal rectopexy, abdominal perineal resection and two open biopsies for abdominal tumor. There is equal distribution for procedures performed in two groups ($p=0.563$)

Table 1. Postoperative Pain Management

	Morphine	Morphine+ Paracetamol	Paracetamol+ diclofenac	Tramadol	IV Paracetamol	Total	P - value
Control Group	18 58.1%	8 25.8%	2 6.5%	2 6.5%	1 3.2%	31 100.0%	0.000
Fast Track Group	0 0.0%	7 22.6%	13 41.9%	4 12.9%	7 22.6%	31 100.0%	
Total	18 29.0%	15 24.2%	15 24.2%	6 9.7%	8 12.9%	62 100.0%	


Figure 4. Distribution According to Procedures Performed

Postoperative Analgesia

Table 1 shows the types of analgesics given in the two groups, depending on how severe and prolonged the postoperative pain was. In the control (conventional) group iv morphine alone was used in 58% because pain was felt for a longer duration (average 2 days). A smaller dose of morphine combined with iv paracetamol were used in 25.8 %. In the FTS group iv paracetamol was combined with im diclofenac in 41.9% and iv paracetamol alone in 22.5%. However morphine coupled with paracetamol was used in 22.5% (p=0.000). The duration of pain in the FTS group was on average 6 hours.

Postoperative Resumption of Oral Feeding

Early feeding was considered to be the resumption of feeding before 24 hours postoperatively, and late feeding after 24 hours postoperatively. All FTS patients resumed

their oral feeding within 24 hours post operatively, with mean of 8 hours, except one patient who underwent partial gastrectomy for whom the NGT was removed after 24 hours. In the control group resumption of oral feeding occurred later after 24 hours, with a mean of 32 hours. ($p=0,000$)

Table 2. Resumption of feeding after surgery

Group	Early feeding	Late feeding		P value
Control	15	16	31	0.000
	48.4%	51.6%	100%	
Fast track surgery	30	1	31	
	96.8%	3.2%	100%	
Total	45	17	62	
	72.6%	27.4%	100%	

Table 3. Mobilization Times Postoperative

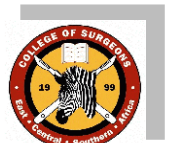
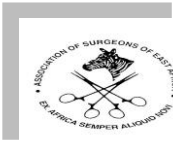
	Within 10 hours	Between 10 to 24 Hours	After 24 hours	Total	P value
Control Group	2	5	23	31	0.000
	6.45%	16.13%	74.19%	100.00%	
Fast Track Group	16	14	1	31	
	51.61%	45.16%	3.23%	100.00%	
Total	18	15	15	62	
	29.03%	24.19%	24.19%	100.00%	

Table 4. Postoperative Hospital Stay in Days

	Within 2 days	3 to 4 days	more than 5 days	Total	P value
Control Group	1	6	24	31	0.000
	3.2%	19.4%	77.4%	100.0%	
Fast Track Group	27	3	1	31	
	87.1%	9.7%	3.2%	100.0%	
Total	18	15	15	62	
	29.0%	24.2%	24.2%	100.0%	

Postoperative Mobilisation

All FTS started mobilization within 10 hours postoperatively in 51 % and 97% patient in FTS had started mobilization within 24 hours. The control group started mobilization in 24 hours in 74 % of cases. This shows that there is a significant difference in mobilization times ($p=0.000$).



Postoperative Hospital Stay

The mean in-hospital stay was 2.1 days in FTS, and 5.3 days in control group ($p=0.000$). Most of the FTS patients were discharged on second day following surgery (87%). Most of the control group patients spent more than 5 days in hospital postoperatively in 77%, with a mean hospital stay of 5.3 days. There was only one FTS patient who got hospital acquired pneumonia and intra-abdominal sepsis and spent more than 5 days in hospital.

Discussion

This study has proved that fast track surgery is feasible in countries with limited resources like Rwanda. It may form a background for larger studies. The study also indicated that FTS is applicable to a variety of operations. This has also been indicated by other similar studies on the subject^{8,9,13}.

The concept of reducing the time spent in the hospital after major abdominal surgery is an attractive one. FTS offers beneficial effects through increasing the availability of hospital beds and reducing the overall cost of the hospital stay. This issue has been studied and proved in several prospective case series on this subject over the last five years. In this study, 62 patients were studied, with 31 patients in each group. The sample size of 62 patients was similar to many other similar studies.^{13,14,15}

The majority of the FTS patients in this study started feeding early (96.7%), within 24 hours, without any problem. Dongjie Yang conducted a similar study in colorectal surgery and found that it was safe for early feeding; the same author found that FTS reduces the hospital stay by 50% compare to conventional surgery. His findings are comparable to ours in this study. 27 FTS patients (87%) had a mean hospital stay of 2.1 days, compared to the control group in which 77% had a mean hospital stay of 5.3 days. ($P=0.000$). Suzanna et al, in their study of fast track surgery in open intestinal surgery, found a significant reduction in hospital stay comparable with to our findings; they also found that late feeding was associated with delayed mobilization and risk of pneumonia¹⁴. In this study, 96.8% of our FTS patients had early resumption of feeding within 24 hours, compared to 48% in the control group ($P=0.000$). Early feeding was found to enhance early mobilization.

The shortened hospital stay and early mobilization, translate into a reduction in the use of hospital resources, and therefore reduced costs for the patient. There is also a reduction of the costs by the hospital: the non-paying visitors to the hospitalized patients, who often use water, toilets, electricity, are reduced if the patient's stay in hospital is shortened. Numerous clinical trials have provided positive evidence of the beneficial effects of FTS^{3,6}. Klappenbach R, in his study on early feeding versus traditional postoperative care after abdominal surgery, found that early feeding was safe and associated with less complications and their results was comparable with those found by Boelus PG et al concluded that early feeding was associated less ileus and less anastomotic leaked in upper gastrointestinal surgery; those studies were comparable to our findings^{17,18,19}.



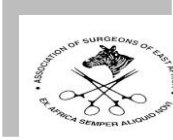
Barlow R found that early enteral feeding was associated with significant shortened length of hospital stay and improved clinical outcome; these findings reinforce the potential benefit of early feeding found in our FTS group ²¹.

Conclusion

Fast Track Surgery practice is feasible in the Rwandan surgical setting. It facilitates early discharge from hospital, with minimal complication rates because of early mobilization and early feeding. It also results in reduced postoperative pain, leading to reduced analgesic demands. All these translate into reduced expenses for the patient and the hospital.

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