

Postoperative outcome and complications of fast-track colorectal surgery vs. traditional colorectal surgery

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ABSTRACT

Introduction: Colorectal surgical procedures vary in complexity, with fast-track approaches aiming to expedite recovery by minimizing stress responses. Postoperative strategies like multimodal analgesia and early mobilization enhance outcomes. Despite proven benefits, some practitioners still favour traditional methods due to concerns or unfamiliarity. Therefore, comparative studies are crucial for guiding clinical decisions and advancing patient care.

Methods: A comparative cross-sectional study evaluated outcomes and complications in patients who underwent fast track and traditional colorectal surgery from 2016 to 2023. Data were collected retrospectively with analysed.

Results: The study encompassed 298 patients undergoing colorectal surgery, with 68.8% undergoing fast track and 31.2% for traditional procedures. Surgical Site Infection (SSI) prevailed as the primary complication in both groups. Remarkably, traditional surgery exhibited a mortality rate of 0.7% (n = 2), whereas fast track surgery reported no fatalities. Hospital stays were notably shorter for fast-track surgery, with a median duration of 5 days (range: 2 - 18), compared to 7 days (range: 4 - 20) for traditional surgery. In pain management strategies emerged, as fast-track surgery favoured multimodal analgesia and regional anaesthesia, contrasting with the prevalent use of opioids in traditional colorectal surgery.

Conclusions: Fast track surgery showed reduced complications, absence of mortality, and shorter hospital stays, emphasizing the benefits of multimodal analgesia and regional anaesthesia. It highlights superior outcomes compared to traditional colorectal surgery.

Key Words: *Complications, Fast-track colorectal surgery, Mortality, Traditional colorectal surgery.*

Introduction

Colorectal surgery is a common procedure performed to treat many different colorectal diseases including malignancies such as colorectal cancer, and for benign conditions such as inflammatory bowel disease, diverticulitis, rectal prolapse, and benign polyps.

Different types of colorectal surgical procedures have been developed over the past years to treat these different conditions. They are mainly categorized into two, as either open surgery or minimally invasive surgery like laparoscopic and robotic surgery.

In the surcal management of rectal cancer, there are two main approaches. Anterior resection of the rectum which was first introduced in 1921 by Hartmann for proximal rectal tumors, where the distal rectum and sphincters are preserved, and abdominoperineal resection done for tumors of the lower third of the rectum which are unsuitable for a sphincter-saving procedure. At the end of these procedures a stoma is placed either temporarily as in hemicolectomy and anterior resection or permanently in case of abdominoperineal resection to divert colonic content away from the anastomotic site (1).

Total proctocolectomy, another major colorectal surgical operation, where both colon and rectum is removed, are considered as a therapeutic option in ulcerative colitis, a condition which affects the whole of colon starting from the rectum. This is also performed in conditions such as familial adenomatous polyposis, an autosomal dominant inherited disorder which causes colonic adenomas which later progress to colonic cancer. After these surgeries to maintain continuity anastomosis is done between the remaining bowel and a substitute to the rectum is made using terminal ileum, known as an ileal pouch. This procedure was first introduced in 1978 by Parks and Nicholas and is collectively known as restorative proctocolectomy and ileal pouch-anal anastomosis (2). In rectal prolapse, there are multiple surgical options that can be considered to treat the patient, from them abdominal rectopexy is one of the commonly performed procedure where rectal anatomy is restored by either fixing with sutures or a mesh. This can be done as either open or laparoscopic procedure. These operations that have been described are the most frequently performed elective colorectal surgery in our surgical unit at Teaching Hospital Karapitiya (THK).

As there are numerous colorectal surgical procedures described, the complications encountered during these procedures are vast and can vary according to the type of procedure. Among the many complications described in the literature, some complications are considered as common to all types of colorectal surgery. Those can be categorised into early complications and late complications based on the onset. Early complications are anastomotic leak or bleeding, surgical site infection,

paralytic ileus, postoperative urinary retention, venous thromboembolism, and stoma-related complications (3). The anastomotic leak will require either percutaneous drainage or reoperation, depending on the stability of the patient's clinical condition while most stoma-related complications are managed without reoperation. Late complications are bowel dysfunction, sexual dysfunction, anastomotic stricture, adhesion formation, and its associated complication including bowel obstruction. Advancements in surgical techniques and perioperative care over time has reduced these complications.

Traditional colorectal surgery, which has been in practice for more than 100 years, follows conventional perioperative protocols without a specific focus on enhanced recovery. It typically involves longer periods of fasting, mechanical bowel preparation, prolonged bed rest, nasogastric tube, routine drains, and restricted oral intake after surgery. The average hospital stay in traditional colorectal surgery has been reported as 7 to 12 days (4).

In the 1990s, Dr. Henrik Kehlet introduced fast-track surgery, challenging traditional perioperative practices. By eschewing norms like prolonged fasting and routine drains, he notably reduced hospital stays in colonic surgery (5).

Fast-track colorectal surgery involves a comprehensive perioperative care plan designed to minimize the surgical stress response, decrease postoperative complications, and accelerate the recovery process through a multi-disciplinary approach. The multi-disciplinary team includes a surgeon, anesthetist, surgical nurse as well as other specialties as needed. These preoperative, intraoperative, and postoperative interventions are now collectively given the name enhanced recovery after surgery (ERAS) protocols.

The ERAS Society is the body that governs and publishes new guidelines on ERAS protocols for different surgical procedures over the years and the latest guideline, the 4th update for elective colorectal surgery was published in the year 2018. Key components in the preoperative period include preoperative counseling, preoperative optimization of health, prehabilitation, preoperative nutritional care, prevention of nausea and vomiting, avoidance

of bowel preparation, selective premedication, no fasting, and providing a carbohydrate drink, antimicrobial prophylaxis, skin preparation and maintenance of euvoemia prior to surgery (5). In the intraoperative period, adequate fluid and electrolyte therapy to maintain normovolaemia, maintenance of normothermia, abstaining from routine drainage insertion as well as following of minimally invasive techniques are key elements (5). As for the postoperative period it has been recommended to provide multimodal analgesia, not to insert routine nasogastric tube, provide thromboprophylaxis, provide adequate fluid therapy to maintain normovolaemia, maintain glycemic control and prevent hyperglycemia, initiation of early oral intake, routine transurethral catheterization for 1 - 3 days after colorectal surgery and early mobilization (5). These strategies aim to reduce the length of hospital stay, enhance patient satisfaction, and improve overall postoperative outcomes.

Avoidance or sparing of opioids such as morphine during postoperative period is recommended in ERAS as it is associated with faster return of bowel function as well as early mobilization. This is done by following a multimodal approach in pain management. It is based on the concept using multiple pain reducing mechanisms will improve pain control while avoiding side effects of high doses of drugs. Multimodal analgesia is provided by combining paracetamol and other opioid sparing drugs such as NSAID with epidural analgesia. Low-dose local anesthetic and an opioid is used in epidural analgesia and it is now widely used as it provides good postoperative analgesia. This is preferably used in open colorectal surgery. The transversus abdominis plane (TAP) block can be used instead of epidural analgesia and by infiltrating local anesthetic into the anterior abdominal wall, analgesic coverage is provided from the T10 - L1 dermatome level. This can be used in both open and laparoscopic colorectal surgery (5).

Numerous studies have investigated the benefits of fast-track colorectal surgery compared to traditional colorectal surgery. These studies have reported several advantages associated with the fast-track approach. For instance, early mobilization has been shown to reduce the risk of deep vein thrombosis and respiratory complications. Minimally invasive

techniques, such as laparoscopic or robotic-assisted surgery, have been found to result in less blood loss, reduced postoperative pain, and faster recovery. Optimised pain management techniques, including regional anaesthesia and multimodal analgesia, have been shown to improve pain control and enhance patient satisfaction. Early oral intake and avoidance of bowel preparation have been associated with decreased rates of postoperative ileus and improved gastrointestinal function.

Despite the growing evidence for supporting the benefits in fast-track colorectal surgery, the adoption of these protocols varies among healthcare institutions. Some surgeons and healthcare providers may still prefer traditional colorectal surgery due to concerns about increased risks of complications or lack of familiarity with the fast-track approach. Thus, a comparative study evaluating the postoperative outcomes and complications of fast-track colorectal surgery and traditional colorectal surgery is essential to provide further evidence and guidance for clinical practice.

Colorectal surgery historically led to complications and prolonged recovery. Fast-track surgery, or ERAS protocols, aims to improve outcomes. Despite popularity elsewhere, Sri Lanka faces challenges implementing ERAS. Research comparing fast-track and traditional approaches is minimum. Our study at Teaching Hospital Karapitiya aims to fill this gap, assessing postoperative outcomes, morbidity, mortality, pain management, and hospital stays. By providing evidence on the benefits of ERAS, we hope to influence national guidelines and improve colorectal surgical care in Sri Lanka, ultimately benefiting patients and healthcare providers alike.

Methods

The study comprised 298 patients who underwent fast track colorectal surgery and traditional colorectal surgery at the University Surgical Unit of Teaching Hospital Karapitiya, Sri Lanka, from June 2016 to June 2023. Inclusion criteria included adult patients aged 20-70 years who had undergone elective colorectal surgery. Those outside this age range and who have undergone emergency colorectal surgery as well as those classified as

ASA 3 or ASA 4 per the American Society of Anaesthesiologists' (ASA) physical status classification system, indicating severe systemic disease or a constant life-threatening condition, were excluded from the study. (ASA 3 - A patient with severe systemic disease; ASA 4 - A patient with severe systemic disease that is a constant threat to life.

According to non-probability convenient sampling, 205 patients who had undergone fast track colorectal surgery and 93 patients who have undergone traditional colorectal surgery was chosen, and they were retrospectively analysed. Data was obtained from the medical records including bed head tickets of the patients with prior consent from the Director of THK and all the consultants of the ward. Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, University of Ruhuna, Sri Lanka.

As endpoints of the study, complications between the two groups, mortality, length of hospital stay and modes of pain management were assessed.

Results

The study sample consists of 298 patients who underwent colorectal surgery. From the total sample, 68.8% (n = 205) patients have undergone fast track colorectal surgery while only 31.2% (n = 93) have undergone traditional colorectal surgery. The mean (SD) age of the sample was 57.02(7.83) years. Table 1 summarizes the socio-demographic factors and comorbidities in the sample.

The most common indication for colorectal surgery was colorectal cancer accounting for 86.6% (n = 258). Most common clinical presentation was blood and mucus diarrhoea (71.8%, n = 214).

The mortality in traditional colorectal surgery was 0.7% (n = 2) while in fast-track surgery was 0%. The median duration of hospital stay was 5 days (2-18) in fast tract surgery while in traditional colorectal surgery it was 7 days (4 - 20). In fast-track colorectal surgery multimodal analgesia and regional anaesthesia were used as the main mode of pain management while in traditional colorectal surgery opioids were commonly used.

Table 1: Socio-demographic profile of the sample

		Number	%
Age	< 40	12	3.8%
	40 - 49	33	10.4%
	50 - 59	125	41.9%
	> 60	128	42.9%
Gender	Male	108	36.2%
	Female	190	63.8%
Comorbidities	Diabetes mellitus	90	30.2%
	Dyslipidaemia	55	18.5%
	Hypertension	53	17.8%
	Ischaemic heart disease	9	3%

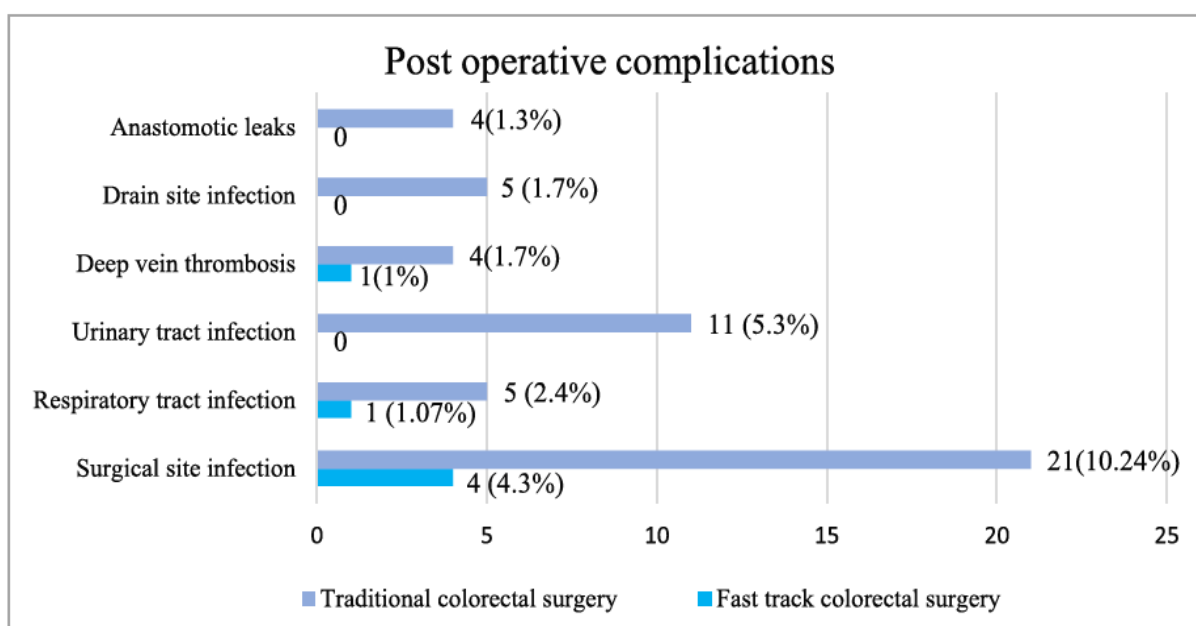


Figure 1: Comparison of post -operative complications of patients who underwent traditional and fast track colorectal surgery

Surgical site infection (SSI) was the most common complication in both groups, occurring 10.24% (n = 21) in traditional colorectal surgery and 4.30% (n = 4) in fast-track colorectal surgery. Urinary tract infections (UTI) (5.3%, n = 11), drain site infection (1.7%, n = 5), and anastomotic leaks (1.3%, n = 4) were reported in traditional colorectal surgery while those complications were not reported in fast-track colorectal surgery. There were five cases (2.4%) of respiratory tract infections (RTIs) in traditional group, whereas in the fast-track group, only one case (1.07%) of RTI was documented. Similarly, traditional surgery witnessed four occurrences (1.7%) of deep vein thrombosis (DVT), contrasting with the fast-track group only one case (1.0%) of DVT was recorded.

The mortality rate in traditional colorectal surgery was 0.7% (n = 2) while in fast-track surgery it was 0%. The median duration of hospital stay was 5 days (2 - 18) in fast-track surgery while in traditional colorectal surgery was 7 days (4 - 20). In fast-track colorectal surgery multimodal analgesia and regional anaesthesia (72.6%, n = 149) were used as the main mode of pain management while in traditional colorectal surgery opioids (55.9%, n = 52) were commonly used.

Discussion

Fast-track colorectal surgery has emerged as a promising approach to improve postoperative outcomes and accelerate recovery in patients in comparison to traditional colorectal surgery.

A cohort study comparing ERAS and conventional peri-operative care among patients who underwent elective, open colonic, or rectal resection was carried out by a team of surgeons in the Netherlands in 2010 (8).

In this study, it was reported that the ERAS group did not develop any urinary tract infections during hospital stay while 6.6% of the control group had developed the infection. From the patients in the control group, 11.5% developed wound site infections while 6.6% developed deep SSI and amongst the ERAS group, only 4.9% developed wound site infection while only 1.6% developed deep SSI. Anastomotic leakage and wound dehiscence were also more common among the control group compared to patients who had undergone ERAS regimens. Similarly in our study, the rate of developing UTI was 5.3% and anastomotic leak was 1.3% in traditional colorectal surgery while fast-track group did not develop any UTI or anastomotic leaks. Further,

10.24% developed SSI in traditional colorectal surgery while only 4.3% developed SSI in fast-track surgery.

A pioneering study conducted at Colombo South Teaching Hospital in 2018 regarding methods of implementation and strategies adhered in shifting perioperative care in colorectal surgery from conventional practices to ERAS protocol, revealed that the median duration of hospital stay was 5 days (range 3 - 21 days) and respiratory tract infection (RTI) rate was 4.4% (4). Our study revealed that the median duration of hospital stay was 5 days (range 2-18 days) in fast-track surgery compared to traditional colorectal surgery which was 7 days (range 4-20). Further in our study, RTI was 1.07% in fast-track surgery and while it is 2.4% in traditional colorectal surgery.

A cohort study comparing ERAS and conventional peri-operative care among patients that underwent elective, open colonic, or rectal resection carried out by a team of surgeons in the Netherlands in 2010 revealed that mortality between the individuals who have undergone ERAS and conventional perioperative care, was 0% and 1.6% respectively (8). Similarly, in our study mortality rate was 0% in fast-track surgery and 0.7% in traditional colorectal surgery.

Postoperative pain management is an integral component in the postoperative care of patients after any surgery. In a study conducted at a single hospital in University of California, San Francisco from 2013 to 2014 showed that after implementing ERAS programme to all patients undergoing colorectal surgery, the median opioid consumption in morphine mg equivalents, decreased compared to the pre-ERAS period. This reduction was seen both intraoperatively and postoperatively. The duration of epidural catheterisation also decreased significantly. In our study 55.9% of patients consumed opioids as the mode of pain management in the traditional colorectal group while only 27.4% of patients consumed opioids in fast-track surgery. Majority of patients (72.6%) among fast-track surgery used multimodal analgesia as the mode of pain management.

Strengths and Limitations

As we have selected descriptive cross-sectional study it was relatively quick and cost-effective compared to longitudinal studies, making them suitable for assessing the prevalence of outcomes and complications within a specific time frame. However, this is a single centre study and therefore findings cannot be generalised. By comparing the outcomes and complications between fast-track and traditional colorectal surgery, the study can provide valuable insights into the potential benefits of fast-track protocols. Difficulty in accessing records of readmissions, which were crucial for evaluating post-operative complications was a notable limitation. Since cross-sectional studies do not involve follow-up over time, they may not capture long-term outcomes or complications associated with colorectal surgery.

Conclusions

Our study strongly supports that the fast-track colorectal surgery has more potential benefits compared to traditional colorectal surgery with regards to lower rates of complications, mortality, length of hospital stay and mode of pain management.

It is recommended to promote the adoption of fast-track protocols, as it improves patient recovery and minimizes resource wastage in healthcare settings.

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