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REVIEW ARTICLE

A Prospective Evaluation of Clinical Outcomes with Fast Track Protocols for Colorectal Surgery in an Eastern Caribbean Nation

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ABSTRACT

Background: Fast track protocols (FTPs) have triggered considerable improvements in patients' perioperative care and are accepted as the standardised approach to patient management in developed countries globally. Although the benefits of FTPs have been illustrated for some time, they are not universally used in developing countries. In the Eastern Caribbean, FTPs are implemented in an ad-hoc manner based on the attending surgeons.

Methods: We designed a comprehensive FTP modified for use in Barbados, an island nation in the Eastern Caribbean. After consensus, the FTPs were introduced into clinical practice at a tertiary referral public hospital. We prospectively evaluated clinical outcomes after introduction of FTP protocols for all patients undergoing colorectal operations from January 1, 2018 to February 1, 2019. The study population was divided into three groups: Group I: full adherence (≥ 16 FTP steps completed), Group II: partial adherence (10-15 FTP steps completed), Group III: non-adherence to FTP protocols (≤ 9 FTP steps observed). In each group, we compared morbidity, mortality, return of bowel function, length of post-operative hospital stay and hospital readmission using SPSS version 20 for statistical analyses.

Results: Over the study period, there were 27 colorectal operations performed. When the outcomes in group 1 and group 3 were compared, there was a statistically significant reduction in post-operative LOS (3 Vs 8.9 days; $P < 0.05$) and overall morbidity (10% vs 50%; $P 0.05$) in the full FTP adherence groups.

Conclusions: In this Caribbean healthcare system, FTP implementation resulted in significant improvements in post-operative duration of hospitalization and overall morbidity. The main challenge is to achieve universal buy-in from health care providers in the Caribbean. We believe that the way to achieve this is continued medical education and targeted research to acquire local practice data from the Caribbean. We advocate the incorporation of FTP into colorectal surgical practice for Caribbean hospitals.

Keywords: Caribbean; Colorectal, Cancer, Laparoscopic, Recovery, Protocols

INTRODUCTION

At the turn of the 21st Century traditional surgical management for patients undergoing colorectal surgery was challenged by fast-track protocols (FTPs) that were designed to accelerate recovery and minimize health care costs. These FTPs use a multi-disciplinary approach to optimize physiologic function, attenuate surgical stress responses and expedite the return to baseline health status after elective operations.¹ Numerous meta-analyses support FTP implementation by demonstrating significant reductions in post-operative hospitalization, morbidity and health-care expenditure.²⁻⁹ Consequently, FTPs are now accepted as the standard of care for patients undergoing colorectal operations.

In many Caribbean nations, however, there is no oversight body to evaluate adherence to clinical care standards. Consequently, many healthcare providers and facilities follow individualized protocols as determined by treating physicians. This is evident in the general paucity of adherence to FTPs. Therefore, we designed this study to prospectively evaluate peri-operative outcomes after introducing FTPs for patients undergoing colorectal surgery in Barbados.

METHODS:

Barbados is a small island nation in the Eastern Caribbean with a population of 286,641 persons at the latest census.¹⁰ The Government of Barbados provides free health care to all legal residents through a network of public hospitals. All colorectal operations performed in the public hospital system are carried out at the Queen Elizabeth Hospital - the only tertiary referral public hospital that is located in the capital city of Bridgetown. This hospital is staffed by 4 general surgical teams, all of whom performed colorectal operations. At this facility, we used the following FTP protocol that included interventions at each stage of hospitalization:

Preoperative Protocol

The attending surgeon and/or senior resident met all patients in a pre-operative surgical visit. At this visit, the patient's pathology, investigations and proposed treatment plan were discussed. All patients were to be given a pamphlet containing information about the surgical procedure and postoperative protocols of early feeding, mobilization and expected early discharge provided that physiologic functions have normalized. Additionally, patients were encouraged to cease smoking and to drink a carbohydrate-rich beverage on the morning of the

procedure.

Peri-Operative Protocol

In the immediate perioperative phase, we administered mechanical bowel preparation with dual enemas and a single pre-operative dose of intravenous antibiotics (cefazolin and metronidazole) at induction. Thereafter general anesthesia was induced by midazolam 0.15 mg/kg, fentanyl 0.1-0.25 mg, sevoflurane and nitrous oxide-oxygen. Transverse abdominis plane (TAP) block and/or rectal sheath blocks were performed before initiation of the laparoscopic or open colorectal surgery. All patients received intraoperative restricted goal-directed fluid therapy and were closely monitored to remain normothermic. The use of surgical drains was restricted. Nasogastric tubes, if used, were removed prior to reversal. Urinary catheters were removed on the first postoperative day.

Post-Operative Protocol

Postoperatively, paracetamol 1g was given intravenously and then further doses given as required. Opioids were not administered routinely due to cerebral and gastrointestinal motility side effects. All patients were cared for in an environment that allowed close monitoring and encouraged early mobilization. Patients were encouraged to be out of bed on the day of the surgery as well as have early fluid intake by mouth.

After securing permission from the local institutional review board, a meeting was held with all attending surgeons and surgical residents to discuss the implementation of FTPs. All stakeholders voiced their support to introduce the standardized FTP as outlined in table 1. In an attempt to encourage the use of a standardized FTP, a 20-point check sheet was designed to outline the interventions to be observed in the pre-operative, intra-operative and post-operative phases (Table 1). At each stage of the patient experience the attending doctor recorded each intervention on the check sheet, which was then introduced into the patient record.

We prospectively evaluated clinical outcomes after introduction of FTP protocols. In order to do this, the records of all consecutive patients undergoing colorectal operations over the one-year period from January 1, 2018 to February 1, 2019 were retrieved for detailed analysis. Independent investigators performed detailed analysis of patient records and the check sheet to determine compliance to the FTP for each patient. The following data were also collected: patient demographics, operation performed, morbidity,

mortality, return of bowel function, length of post-operative hospital stay and hospital readmission.

Anticipating that there would be varied adherence to the FTP, we divided the study population into three groups: Group I: full adherence (≥ 16 FTP steps completed), Group II: partial adherence (10-15 FTP steps completed),

Group III: non-adherence to FTP protocols (≤ 9 FTP steps observed). The data from each patient record were retrieved and input into an excel spreadsheet. Statistical analyses were performed using SPSS version 20. A P value of < 0.05 was considered significant.

Table 1: Fast Track Protocol used at the QEH

Fast Track Protocol		Protocol Description	Compliance Score
Preoperative	Counseling	1. Verbal education: anticipated procedure and risks 2. Provide written information in a printed pamphlet 3. Discuss patient responsibility in the post-op period 4. Informed consent process completed within 24 hours of operation	1 1 1 1
	Optimization	5. Discuss smoking and actively encourage patient to cease smoking 4-6 weeks prior to surgery	1
	Bowel preparation	6. Two fleet enemas given immediately prior surgery	1
	Nutrition	7. Encourage clear fluids orally up to 6 hours prior to surgery 8. Carbohydrate-rich drink administered on the morning of the procedure	1 1
Intraoperative	Preoperative anaesthesia	9. Withhold sedatives prior to surgery 10. TAP block and/or rectal sheath blocks performed at the start of operation	1 1
	Nasogastric tubes	11. Remove nasogastric tubes, if used, prior to reversal of GA	1
	Prevent hypothermia	12. Intra-operative temperature monitoring to maintain normothermia 13. Use warmed intravenous fluids	1 1
	Fluid management	14. Patients received intraoperative restricted goal-directed fluid therapy 15. Intravenous fluids discontinued as early as possible	1 1 1
Postoperative	Ambulation	16. Encourage ambulation on the same day postoperatively 17. Aggressive physiotherapy	1
	Analgesia	18. Stepwise, multimodal pain management 19. Minimize opioid administration	1 1
	Diet	20. Encourage early oral intake	1

RESULTS:

Over the study period, 37 patients underwent elective colorectal operations. Data for 10 patients were not included because the attending surgeon/managing team withdrew from the study and refused to provide further clinical data for comparative analyses. Therefore, the study population comprised 27 patients undergoing elective colorectal operations.

The compliance score was calculated and the total score was used to assign patients to one of three groups. There were 10 patients in Group I (full adherence), 7 patients in Group II (partial

adherence) and 10 patients in Group III (non-adherence).

The 10 patients in group III all underwent open colectomies. In group II, all 7 patients had laparoscopic colectomies. The deviations from FTPs in this group occurred mostly in the intra-operative phase with fluid management, use of TAP blocks and opioid administration during surgery. There was also resistance from nursing staff who were used to "traditional principles" of post-operative care and were reluctant to implement the changes stipulated in the FTPs. Interestingly, these cases were all in the initial stages of the study and with

increased education, there was increased compliance from the nursing and anaesthetic staff.

In the latter stages of the study, after increased dialogue with all stakeholders, there was full adherence to the FTPs in 10 patients. When the

outcomes in group 1 and group 3 were compared, there was a statistically significant reduction in post-operative LOS (3 Vs 8.9 days; $P < 0.05$) and overall morbidity (10% vs 50%; $P < 0.05$) in the full FTP adherence groups.

Outcome Measure	Group I (n=10)	Group II (n=7)	Group III (n=10)
Overall morbidity	1 (10%)	1 (14.2%)	5 (50%)
Minor Morbidity	1 (10%)	0	3 (30%)
Major Morbidity	0	1 (14.2%)	2 (20%)
Return of bowel function (days)	2.4	1.8	2.4
Duration of hospitalization	3.0	4.1	8.9
Mortality	0	0	0

DISCUSSION:

There is level I data to support the use of FTPs during elective colorectal operations.²⁻⁹ These protocols typically extend throughout the continuum of the pre, intra and post-operative periods and encompass aspects of patient education, bowel preparation, fasting policies, optimal intraoperative fluid management, decreased tube use, opioid-sparing analgesia, early postoperative nutrition and aggressive mobilization.^{1,11} Cumulatively, these elements minimize surgical trauma and stress responses, thus improving patient recovery.¹¹⁻¹⁴

The data from this study yielded predictable results, aligned with the existing data on FTPs.²⁻⁹ It is still important data, because there is the underlying belief that accepted practices in developed nations cannot be adopted by low-volume and resource-poor Caribbean healthcare systems which have unique cultural, financial, political and environmental factors influencing the delivery of surgical services in ways that are different from developing countries. We have now shown that in this Caribbean nation, FTP implementation resulted in reduced post-operative LOS and overall morbidity.

Considering that the use of FTP is evidence-based, we believed that there would have been universal adoption of the FTPs at this facility. However, it was disappointing to see only 37% compliance with the FTP protocols. In fact, the atmosphere of passive resistance and non-compliance to FTPs was so great that one of the four teams completely withdrew from the study and refused to provide further clinical data for comparative analysis. In an attempt to align ourselves with evidence-based principles, we have identified the following barriers to FTP implementation:

(1) Absence of standardized institutional protocols

Hospital systems in developed nations usually have standardized protocols in place that direct all aspects of patient care. These protocols are usually developed by teams composed of health care managers with oversight of institutional resources as well as health care professional groups with interest in promoting health.¹⁵ However, many management positions in the Caribbean are assigned to experienced clinicians based on seniority, rather than training.¹⁶ These persons with no formal training are given control over institutional resources in order to direct health care delivery, but many times they are unequipped to effectively steer the healthcare systems. This creates the situation where institutional protocols are lacking, performance audits are not prioritized and the healthcare environment is shaped by a combination of political influences, resource scarcity and financial constraints. This allowed the situation where one surgeon simply decided to manage patients according to "surgeon preference" instead of adhering to FTPs that are supported by a wealth of existing level I data. In a properly functioning system this would not be allowed to happen. The term "sole practitioner culture" was coined to describe this phenomenon, where doctors in the small isolated Caribbean territories are used to making medical decisions autonomously with little collaborative sub-specialty input, few medicolegal consequences and in an autocratic manner without routine application of multidisciplinary team principles.¹⁷

(2) Lack of Adequately Trained Support Staff

A second barrier was the lack of adequately trained support staff. We previously reported that

there was 100% adherence to FTP in the private healthcare sector in Barbados,¹⁰ where nurses conduct pre-operative education and counseling, commencing one week prior to their operation and continuing up to the day of surgery. However, in the public sector there is no comparable patient coaching due to the lack of trained allied healthcare professionals and general staff shortages. Therefore, pre-operative counseling has not been honed to the same degree. In an attempt to compensate for this, surgical residents have assumed this role by providing the educational component at surgical outpatient clinic visits, but the coaching aspect and follow-up interactions are lacking.

(3) Lack of buy-in from anesthetic staff

Generally, there was lack of cooperation from anesthetic teams. Consider the fact that the protocol with the poorest compliance was for the patients to ingest 250mls of a carbohydrate-rich drink on the morning of surgery. This was challenged by senior anesthetic staff who were *“uncomfortable with patients having liquids pre-operatively”*, although there is existing supportive data.¹⁸ There was also active resistance encountered with the use of TAP blocks and fluid restrictions. We noted that senior anesthesiologists were reluctant to restrict fluids especially during the laparoscopic cases where the urine output may appear suboptimal due to the effects of the pneumoperitoneum on renal function. The anesthetic staff also often avoided TAP blocks, stating that *“they were not universally comfortable performing TAP blocks”*, but no attempt was made to learn / take instruction. Consequently, there were pockets of intraoperative opioid use especially in the earlier experience.

(4) Resistance from nursing staff

Nursing staff had significant control over post-operative care plans. The FTP called for a low-residue diet on the first post-operative day, barring a contraindication such as an ileus. Although there were multiple joint discussions to parley this concept to the nursing staff, they still viewed this as a deviation from the traditional norms where oral intake was withheld until there was passage of flatus and/or bowel motions.¹⁹ Simply put, they were not aware of the data supporting oral intake on day one post colon resection.²⁰⁻²¹ This led to an obstinate adherence to the traditional approach of initiating diet based on passage of flatus or a bowel movement.¹⁹ Occasionally the nursing staff delayed discharge until the patient had their first bowel movement after surgery. With ongoing communication and continued education, this

improved, but there is room for improvement.

Areas to Reform

There are changes that may be instituted to increase adherence to FTP. The first is institutional reform. We believe that the previously discussed leadership deficiency is largely responsible for fueling the resistance to change from the established cultural norms, despite the existence of local data in support of change. In the parallel private fee-for-service healthcare system, providers are held more accountable by their patients and they are more conscientious in delivering care. Consequently, it has been easier to implement FTPs in the private care setting, as long as the attending surgeons are aware of - and accept - the evidence-based recommendations.

Continued medical education (CME) for medical and allied healthcare professionals would ensure that healthcare workers are familiar with current principles. In Barbados, evidence of CME is a requirement for registration with the medical board, but it is not a uniform requirement in all Caribbean countries.

From the institutional point of view, creation and enforcement of treatment guidelines would remove the potential for individual healthcare workers to practice according to *“surgeon preference”* and align practice with evidence-based guidelines. The institution should maintain accountability and adherence to standards of care and care protocols. Policy development is an important exercise that lays the foundation for care optimization. Policy makers are charged with a responsibility to ensure that hospital policies and practice guidelines are based on the best available evidence.¹⁷⁻²⁰ Although most published clinical data come from high-volume centers in developed nations, leaders have the additional responsibility to analyze data and interpret them in context in order to develop tailored policies for their operating environment.²¹

Regular clinical audits are important instruments to ensure quality control by identifying existing deficiencies and are prerequisites to achieving their solutions. Without these exercises, it is difficult to ensure that minimal acceptable care standards are maintained. Public sector hospitals in the Caribbean do not have effective auditing systems to generate quality data and objectively evaluate their practice. This is partly due to the lack of electronic databases, a lack of emphasis on the audit process, failure to appreciate the importance of local data and a lack of outcomes expectancy from the exercise. Leaders must appreciate the importance of these activities and encourage them

because in their absence systemic inadequacies persist without consequence. Resource limitations may not allow the use of sophisticated electronic monitoring systems, but clinical audits can still be performed using paper-based systems. The simple act of performing quality control surveys and clinical audits is not sufficient. There must be visible outcomes expectancy from the exercise by using the data to hold leaders accountable when pre-set performance goals are not met, and to reward them when appropriate.

Finally, patient education should be paramount. In parallel with the patient demand contributing to the implementation of MIS, patient education may contribute to the adoption of FTPs if patients know what to expect and make the

demands for healthcare standards in keeping with pre-operative advice and education.

CONCLUSIONS

In this Caribbean healthcare system, FTP implementation resulted in significant improvements in post-operative duration of hospitalization and overall morbidity. The main challenge is to achieve universal buy-in from health care providers in the Caribbean. We believe that the way to achieve this is continued medical education and targeted research to acquire local practice data from the Caribbean. We advocate the incorporation of FTP into colorectal surgical practice for Caribbean hospitals.

Fast Track Protocol		Protocol Description
Preoperative	Counseling	Verbal education at pre-operative visits Written information given in printed pamphlets Verbal counseling as a part of informed consent process
	Optimization	Patients encouraged to quit smoking prior to surgery
	Bowel preparation	2 fleet enemas given immediately prior surgery
	Nutrition	No prolonged fasting Carbohydrate-rich drink administered on the morning of the procedure
Intraoperative	Preoperative anaesthesia	Long or short-acting sedative is withheld prior to surgery TAP block and/or rectal sheath blocks performed at the start of operation
	Nasogastric tubes	Postoperative nasogastric tubes not used routinely
	Prevent hypothermia	Patients were closely monitored to maintain normothermia Warmed intravenous fluids
	Fluid management	Patients received intraoperative restricted goal-directed fluid therapy Enteral postoperative fluids encouraged as early as possible Intravenous fluids discontinued as early as possible
Postoperative	Ambulation	Ambulation is encouraged on the same day postoperatively
	Analgesia	Stepwise, multimodal pain management Minimize opioid administration
	Diet	Encourage early oral fluid intake

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