

Can an Enhanced Recovery After Surgery (ERAS) programme improve colorectal cancer outcomes in South Africa?

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Introduction

Colorectal cancer (CRC) is the third most common cancer worldwide and the fourth most common cause of cancer related deaths.¹ It is estimated that CRC is amongst the top five malignancies in South Africa (SA) with an age standardised incidence rate of 10.2 and 6.1 per 100 000 for males and females respectively.² The incidence is projected to increase in South Africa as a result of ageing, a growing population and an increase in prevalence of risk factors.¹

Surgery is central to the treatment of patients with CRC. Treatment includes resection for early-stage CRC and a combination of resection and adjuvant chemotherapy for late-stage CRC. The management of metastatic disease includes resection of liver and or lung metastases. Colonic stenting is used as an adjunct to surgery and has a role in palliative care.

Traditionally colorectal surgery is associated with a complication rate of 20% to 40% and a hospital stay of 7 to 10 days.^{3,4,5} Complication rates and length of stay vary significantly between and within countries. Short- and long-term mortality is significantly higher among patients who develop postoperative complications.⁶ Conventional perioperative care after colorectal surgery in SA, as in many parts of the world, is often not evidence-based and frequently lacks a patient-centred, integrated team approach.

The Enhanced Recovery After Surgery (ERAS) care pathway is patient centred, multi-disciplinary team approach to perioperative care. In countries where ERAS has been implemented for patients undergoing elective colorectal surgery postoperative complications and hospital stay has been reduced by 40-50%.^{3,4} and costs by 10 -20%.^{7,8} Further a decrease in nursing work load has also been achieved.⁹ A recent single centre retrospective study from Sweden reported that the risk of 5-year cancer-specific mortality rate was

decreased by 42% when compliance with ERAS guidelines was above 70%.¹⁰ This is the only study reporting on compliance and cancer mortality rate. Randomised controlled trials are required to confirm these findings.

The ERAS Care System

Professors Olle Ljungqvists (Örebro University, Sweden) and Ken Fearon (Edinburg University, Scotland) initiated the ERAS Study Group in 2001, which later evolved into the ERAS Society.¹¹ The Society established the ERAS Care System with 3 main components:¹² (a) Evidence based management guidelines; (b) an implementation program and (c) a monitoring and evaluation system. These are described briefly below:

(a). **The ERAS management guidelines** address pre-, intra- and post-operative practice.¹² and are outline in Table 1. The guidelines focus on reducing the peri-operative pathophysiological catabolic stress response and immune suppression.¹³

A meta-analysis of single and multi-centre studies have shown that as compliance to the ERAS guidelines improve, complications are reduced.^{14,15,16} Centre's with a 90% compliance rate had complication rates of less than 20%. Those with a compliance rate of 50% or less had a complication rate of 50%.

The management guidelines (Table1) are based on best available evidence and use the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system.¹⁷ The GRADE system is used by many international organizations e.g. Cochrane, the National Institute for Health and Clinical Excellence (NICE), UpToDate® and the World Health Organization (WHO), to make recommendations

Table 1: Key elements of the ERAS management guidelines

Preoperative	Intraoperative	Postoperative
Pre admission counselling	Selective, mid-thoracic epidural	Selective, mid-thoracic epidural
Carbohydrate preload	Short acting anaesthetic drugs	Early enteral feeding
Antibiotic prophylaxis	Maintain normothermia	Early mobilization
Thrombo-prophylaxis	Nausea & Vomiting prophylaxis	Prevent nausea and vomiting
Selective use of bowel preparation	Avoid long acting opioids	Avoid opioid analgesia
No prolonged fasting	Avoid fluid overload	Avoid fluid overload
No premedication	Avoid drains	Early removal of catheter
	No nasogastric tube	No nasogastric tube
		Reduce ileus: chewing gum Magnesium

Source: Nygren J et al¹³

Table 2: GRADE of evidence and recommendation for the ERAS guidelines

	Evidence	Recommendation
Pre admission Counselling	Low	Strong
Carbohydrate preload	Moderate	Strong
Antibiotic prophylaxis	High	Strong
Thrombo-prophylaxis	High	Strong
Selective use of bowel preparation	High	Strong
No prolonged fasting	Moderate	Strong
No premedication	High	Strong
Selective mid-thoracic epidural	High	Strong
Maintain normothermia	High	Strong
Nausea and vomiting prophylaxis	Low	Strong
Avoid long acting opioid's	High	Strong
Avoid fluid overload	High	Strong
No nasogastric tube	High	Strong
Avoid drains	High	Strong
Early enteral feeding	High	Strong
Early mobilization	Low	Strong
Early removal of urinary catheter	Low	Strong
Stimulation of gut motility		
Chewing gum	Moderate	Strong
Magnesium	Low	Weak

Source: Nygren J et al¹³

for a variety of conditions. The GRADE system classifies the quality of evidence as high, moderate, low or very low and recommendations are graded weak or strong. Using the GRADE system, 20 key elements of ERAS guidelines have been graded as high (13/20), moderate (3/20) and low (4/20). The majority (19/20) of recommendations have been classified as strong (Table 2)

(b). The ERAS Implementation program is focused on building a well-functioning integrated multidisciplinary team that is able to effect the evidence-based guidelines. The program adopts change management principles and includes a series of seminars and action periods. It is run over a period of 10 months.¹¹ The team is centred around the patient and their families. Team members includes the surgeon, anaesthetist,

ERAS nurse coordinator, nursing and theatre teams, physiotherapist, dietician, physician, data-capturer, hospital management and administrators. A key member of the team is the ERAS nurse coordinator who accompanies the patient from the time of diagnosis to their discharge. The nurse coordinator is responsible for the pre-operative counselling, discharge planning, postoperative care and plays a crucial role in teaching and training.

(c). **The ERAS monitoring and evaluation system** is an integral part of the implementation program as it allows the teams to continuously monitor their compliance to the guidelines, measure their outcomes and effect change⁸. This is based on the Deming Plan-Do-Study-Act (PDSA) cycle.¹⁸ The system is a web based, real time database that is also designed for research allowing centres to conduct locally and internationally relevant research and to benchmark their outcomes and compliance against other ERAS centres.

Discussion: Implementation of ERAS in South Africa

The ERAS Care System has been integrated into perioperative care in high income countries: Sweden, Norway, Switzerland, Germany the United Kingdom, Denmark, Spain, New Zealand, Canada and continues to extend its footprint globally. SA, a middle income country, has embarked on implementing the ERAS program. The South African Society of Endoscopic Surgeons (SASES), The Association of Surgeons of South Africa (ASSSA) and the South African Perioperative Research Group (SAPORG) has placed the Implementation of the ERAS Care System a priority in SA. SAPORG has this as one of its top ten perioperative research priorities.¹⁹ However, implementation of ERAS in SA will require consideration of the very different health care context compared that of high income settings. Specifically, implementation will need to take into account the nutritional status of the population, the high prevalence of HIV, the limited access to health care and the resource-constrained health system.

Nutritional status of the population

Obesity adds to the complexity of surgery and perioperative care. It is also associated with increased comorbidities, higher complication rates and longer length of stay. Malnourished patients have significantly higher morbidity and mortality, a longer length of stay (LOS) and increased hospital costs^{20,21,22} Improving the patient's nutritional status prior to surgery is associated with improved outcomes.

In SA malnutrition and obesity are significant public health problems. SA has the highest prevalence of obesity in sub-Saharan Africa. The SANHANES -1 study reports that 65% of adult females and 30% of adult males are either overweight or obese.²³ In SA, 26% of the population are food insecure and 4 -11% of the adult population are malnourished.²³ Given the high prevalence of obesity and malnutrition in SA, the benefits of the ERAS program may not be fully realized if patients are not nutritionally optimized preoperatively. This could be difficult to achieve in LMIC.

Routine nutritional assessment and support, a key element of the ERAS program, is not traditional practice in SA.

To address this, dieticians will need to play a larger role in assessing, monitoring and supporting patients. The current shortage of dieticians in the SA health system will need to be addressed.²⁴ In addition other health care professionals will need training and education on the importance of preoperative nutritional assessment and optimization. Funding will also be required for appropriate nutritional support.

HIV prevalence in SA

SA has the largest HIV epidemic in the world, with an estimated 7.0 million people living with HIV/AIDS.²⁵ There is conflicting and limited evidence of the impact of HIV status on postoperative patient outcomes following elective colorectal surgery in SA. Cacala et al., in a study conducted in Kwa-Zulu Natal, reported no difference in postoperative outcomes in 350 HIV positive patients irrespective of CD4 counts when compared to HIV negative patients. However, the study had few colorectal cancer patients and was under powered to address the association between HIV and postoperative colorectal surgery outcomes.²⁶ A second study, the South African Surgical Outcomes Study (SASOS) found that HIV infection had no impact on hospital mortality. However, complication was not measured and the study included a variety of surgical procedures, of which 10.2 % were for colorectal surgery.²⁷ In contrast, a recent large population based study from China, reported (as an abstract) significantly higher complication rates and a five-fold risk of 30-day mortality in patients with HIV infection undergoing major surgery compared to those that were HIV negative.²⁸ However these findings may not be transferable to SA, as HIV acquisition was mostly due to substance abuse, whereas in SA HIV is mostly sexually transmitted. Further local studies are needed to determine the impact of HIV on postoperative outcomes in SA.

If HIV is associated with poor postoperative outcomes, the benefits of the ERAS program may not be achieved. The ERAS guidelines will need to be revised to take into account the HIV status of patients. This is likely to include routine HIV testing and adequate perioperative antibiotic prophylaxis.

Access to health care

Implementation of the ERAS program has resulted in patients being discharged earlier from hospital. One of the major concerns with early discharge is the delayed presentation of complications, especially that of an anastomotic leak. An anastomotic leak occurs in 1 -30% of patients and is associated with significant morbidity, mortality (6 -22%), repeat surgery, longer length of hospital stay, increased costs and poor long term cancer outcomes.²⁹ It is the leading cause of postoperative mortality after colorectal surgery.²⁹ Early diagnosis and intervention is the key to better outcomes in this group of patients.

Early discharge of postoperative patients might not be as easily achieved in SA as in high income countries. In SA patients attending public sector health services have limited access to transport and health care facilities. Hence surgeons might be hesitant to discharge patients earlier than traditionally done. In additional patients who develop complications at home are likely to present late. Although access to care is better in the private sector, health care

professionals in solo practice are not always available after hours. The benefits of early discharge with ERAS will not be realized and patient care could be compromised if discharge occurs without adequate support systems in place. Solutions will need to be identified and implemented prior to commencement of the ERAS care pathway otherwise. These could include: preoperative discharge planning to identify and address any barriers to early discharge; group private practise; a check list for alarm symptoms for patients on discharge; a single on-call telephone number that gives patients and their families immediate access to the managing team; daily calls to the patient following discharge; home visits by community health care workers; and the use of home monitoring and step down facilities.

Economic implications

Significant resources are required to implement the program. Costs include salaries for the ERAS nurse coordinator, data-capturer and administrator, education, research and training, regular team meetings, nutritional support, computer hardware and software and database management. International data show that ERAS results in a cost saving of 10% -20%.^{8,9} A local cost benefit analysis will need to be conducted to guide implementation of ERAS in SA.

Conclusion

Implementation of the ERAS Care system in SA could provide a platform to improve patient outcomes, improve service efficiency, reduce hospital bed days and improve the use of limited resources. However, implementation needs to be carefully planned to take into consideration the health care system and contextual challenges.

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