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Introductory Chapter: Challenges in Colorectal Surgery – Identifying Preoperative Risk Factors

John Camilleri-Brennan

1. Introduction

Many colorectal diseases, both benign and malignant, are managed surgically. The magnitude of surgical intervention varies from the minor incision to drain a perianal abscess to the complex exenteration for recurrent rectal cancer.

All operations are associated with a degree of risk of complications. The more complex the operation is, the higher the risk of complications. Postoperative complications have been noted in up to 35% of patients who undergo radical colorectal cancer surgery. Surgical complications contribute to increased mortality, length of hospital stay and an increased level of community care, as well as having a deleterious effect on quality of life.

Surgical complications may be classified in a number of ways. However, the classification by Clavien and Dindo [1] is the one that has gained most widespread acceptance. This classification, based on the type of intervention required to rectify the complication, is simple, reproducible, and reliable.

In general, complications can be divided into intra-operative and postoperative. Postoperative complications can be immediate, early, and late. Occurrence of intra-operative complications such as bleeding, bowel injury, ureteric and bladder injuries are affected by the presence of intra-abdominal adhesions, anatomic abnormalities, the experience of the surgeon, and many other factors. Major postoperative complications include anastomotic dehiscence, paralytic ileus, and bleeding [2].

2. Risk factors

Risk factors in emergency and in elective open, laparoscopic and robotic colorectal surgery should be recognised prior to surgery in order to reduce complications and to initialize individualised treatment as soon as possible. However, some risk factors such as age, gender, and prior abdominal surgery cannot be obviously modified before surgery [2, 3].

2.1 Non-modifiable risk factors

Increasing age itself remains an important risk factor for postoperative morbidity and mortality in patients having surgery for colorectal disease. Although morbidity and mortality rates in older patients could be similar to that of younger patients undergoing elective surgery, these rates could be up to nine times higher in cases of emergency surgery. With increasing age comes increasing frailty, and in

general the risk of complications in frail patients is higher. The use of laparoscopic and other minimally invasive techniques results in less complications in the older patient when compared to emergency and open surgery.

Male patients have a higher risk of complications in open and laparoscopic colorectal surgery. Male gender is associated with increased anastomotic leakage rates after low rectal anastomoses, presumably due to the technical challenges associated with the male pelvis.

Prior abdominal surgery, especially open surgery, increases one's risk of developing postoperative adhesions. The presence of adhesions increases the rate of conversion from a laparoscopic to an open operation and increases the operating time. Adhesions are associated with increased risk of iatrogenic small bowel perforation leading to peritonitis and intra-abdominal abscess formation and postoperative ileus.

2.2 Modifiable risk factors

The presence of comorbid illnesses may adversely affect the outcome of colorectal surgery. Patients with higher levels of comorbidities, mainly cardiovascular and pulmonary disease, diabetes, and obesity, are expected to have significantly higher rates of complications, longer hospital stays and mortality. In many cases, a patient's general condition may be optimized if there is sufficient time prior to surgery. This applies to surgery for benign disease and early stage malignant disease. High risk assessment clinics and prehabilitation programs have been set up to identify modifiable risk factors and improve them. Such programs have certainly helped to improve cardiovascular and pulmonary function, improve nutritional status and muscle mass, optimize the haemoglobin levels, and achieve targeted weight loss and tighter control over blood sugar levels [3].

The use of mechanical bowel preparation (MBP) prior to elective colorectal surgery is controversial. Although it improves colonic handling especially during laparoscopic surgery, it is not without its risks. It may lead to severe fluid, electrolyte and acid-base abnormalities that may worsen cardiovascular and renal function. Some studies have shown an increased risk of anastomotic leaks and surgical site infection with MBP. Suboptimal MBP leads to liquid stool with a consequent increase in the rate of intra-operative spillage and therefore increasing the risk of postoperative intra-abdominal and wound infections. The author's view is that mechanical bowel preparation should only be used in elective surgery in patients undergoing restorative rectal resection such as when a defunctioning loop ileostomy is planned.

Several studies have shown an inverse relationship between the risk of complications and surgeons' experience. Greater surgeon experience performing colorectal surgery, especially in patients with complex conditions, is associated with reduced risk of surgical complications. Complications became significantly less frequent as the surgeons' learning and experience with the procedure increased. This is very relevant where certain skills are required, such as laparoscopic and robotic skills. In addition, hospital case load and surgical facilities are factors that are associated with complications. Therefore, more complex surgery demands the most experienced surgeon with the most experienced team to ensure the best outcome.

3. Risk scoring systems

In order to minimise and even avoid complications after colorectal surgery, it is vital to assess a patient thoroughly and identify the relevant risk factors. Rather

than rely solely on the surgeon's "gut feeling," scoring systems have been developed to help clinicians assess risk and predict morbidity and mortality of various operations. These systems, using information gained during the preoperative assessment of the patient, evaluate the physiologic condition of the patient at the time of surgery, the severity of the surgery, and the age and general health of the patient to generate a score. Examples of commonly used scoring systems are the American Society of Anaesthesiologists (ASA) score, the Acute Physiology and Chronic Health Evaluation (APACHE) score, and the Physiological and Operative Severity Score for enUmeration of Mortality and Morbidity (POSSUM, and the more specific P-POSSUM and Cr-POSSUM). The National Emergency Laparotomy Audit (NELA) score is used to provide an estimate of the risk of death within 30 days of emergency abdominal surgery. These scoring systems however do not take into account the risks posed by surgical and anaesthetic inexperience and operative time [4].

Identifying pre-operative risk factors, assessing risk as accurately as possible, and optimizing a patient's clinical condition are crucially important to ensure the best outcome possible in colorectal surgery.

Author details


John Camilleri-Brennan^{1,2}

1 Forth Valley Royal Hospital, Stirlingshire, Scotland, UK

2 The University of Glasgow, Glasgow, Scotland, UK

*Address all correspondence to: johncbrennan@doctors.org.uk

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