



High complication rate after low anterior resection for mid and high rectal cancer; results of a population-based study

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Abstract

Background: Surgical resection is the cornerstone of treatment for rectal cancer patients. Treatment options consist of a primary anastomosis, anastomosis with defunctioning stoma or end-colostomy with closure of the distal rectal stump. This study aimed to compare postoperative outcome of these three surgical options.

Methods: Data was derived from the national database of the Dutch Surgical Colorectal Audit. Mid and high rectal cancer patients who underwent rectal cancer resection between January 2011 and December 2012 were included. Endpoints were postoperative complications including anastomotic leakage, reinterventions, hospital stay and mortality within 30 days postoperative.

Results: In total, 2585 patients were included. Twenty-five per cent of all patients received a primary anastomosis; 51% an anastomosis with defunctioning stoma, and 24% an end-colostomy. More than one third of patients developed postoperative complications, the lowest rate being in the primary anastomosis group. Anastomotic leakage rates were 12% in patients with a primary anastomosis, and 9% in patients with an anastomosis with defunctioning stoma ($p < 0.05$). Multivariate analysis showed more postoperative complications, prolonged hospital stay, and increased mortality rates in patients with a defunctioning stoma or end-colostomy. The latter had proportionally less invasive reinterventions when compared to the other two groups.

Conclusions: Patients with a primary anastomosis had the best postoperative outcome. A defunctioning stoma leads to a lower anastomotic leakage rate, though is associated with higher rates of complications, prolonged hospital stay and mortality. The decision to create a defunctioning stoma should be focus of future studies.

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Introduction

Colorectal cancer is the third most common malignancy worldwide, with in the Netherlands more than 12 000 new cases each year.¹ The treatment for colorectal cancer requires a multidisciplinary approach with surgical resection as cornerstone of treatment. In the Netherlands, approximately 10 000 patients per year undergo a resection for colorectal cancer, from which 2,500 patients are operated on for rectal cancer.²

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When in patients with rectal cancer the patient's preference, tumour size, tumour location and stage of disease, allow a sphincter preserving procedure, a low anterior resection of the rectum is performed. A low anterior resection comes with three surgical options: a primary anastomosis, an anastomosis with a defunctioning stoma and an end-colostomy with closure of the distal rectal stump. Each of these options has specific advantages and disadvantages and a corresponding outcome. The creation of an anastomosis bears the risk of anastomotic leakage leading to reinterventions, morbidity, longer hospital stay and sometimes mortality.^{3–5} The fashioning of a temporary defunctioning stoma decreases the leakage rate and its sequelae^{4,6} and the creation of an end-colostomy even avoids anastomotic leakage. However, stoma formation is associated with other disadvantages. Creation of a stoma leads to the burden of stoma care and possibly stoma-related complications like parastomal hernias, readmission for dehydration, stoma revisions, abscesses and postoperative complications after stoma reversal.^{7–10} Moreover, a large amount of temporary stomas is never reversed and becomes permanent.^{11,12} To select the best surgical strategy for individual patients it is important to balance the patient's preference and the outcome of different surgical strategies.

In the Netherlands, public interest in quality and outcome of medical and surgical care led to the initiation of a national audit program, the Dutch Surgical Colorectal Audit (DSCA), founded in 2009.¹³ The DSCA was developed to evaluate and improve quality of care for colorectal cancer surgery in the Netherlands. The audit strives for uniformity of definition and measurement of basic outcome parameters such as complication rates, anastomotic leakage, reinterventions and postoperative mortality. These outcomes may support clinicians when informing patients about risks of different surgical strategies.

The aim of this study is to compare the postoperative outcomes of three different surgical strategies for completion of the operation after a radical mid or high rectal cancer resection over the last two years in the Netherlands.

Methods

Study population

For analysis of surgical outcome, data was derived from the DSCA, a database in which variables concerning patient factors, co-morbidity, diagnostics, disease-specific details, performed treatments, and outcomes, are collected prospectively. The DSCA contains data registered by 92 hospitals (all hospitals performing colorectal cancer surgery, 99% of all hospitals in the Netherlands). The dataset is disease-specific for colorectal cancer and shows a nearly 100% concordance on validation against the National Cancer Registry dataset.² All information concerning individual patients and hospitals are made anonymous, therefore

no ethical approval from the medical ethics committee was required for this study.

All patients undergoing a radical resection (total of partial mesorectal excision) for mid or high rectal cancer (tumour between 5 and 15 cm from the anal verge) between the 1st of January 2011 and 31st of December 2012 were evaluated. Minimal data requirements for inclusion in analyses were information on tumour location, type of surgical resection, date of surgery and mortality. Patients with a double tumour, urgent resections, patients with a T4 tumour, patients undergoing an abdominoperineal resection and patients with an unknown anastomosis/stoma status were excluded, because these patients represent subgroups of patients with other treatment options and subsequent different expected outcomes.

Outcomes

Information on the following patient and tumour characteristics: age, gender, ASA-classification co-morbidity reflected in Charlson score,^{14,15} abdominal surgical history, preoperative tumour complications, tumour stage, extensive resections (resection of other organs during surgery) and distance from the anal verge, were extracted from the dataset of the DSCA.

Study endpoints, defined as endpoints within 30 days after initial surgery, were postoperative complications, reinterventions, prolonged hospital stay and mortality. Complications were defined as all postoperative complications, both surgical and non-surgical. Surgical complications were defined as anastomotic leakage, abscesses, stoma or wound problems, bleeding, wound dehiscence, ileus or iatrogenic lesions. Non-surgical complications were defined as cardiac, thrombo-embolic, pulmonary, infectious, neurological or other. Anastomotic leakage was defined as clinically relevant anastomotic leakage requiring a reintervention. Reinterventions were defined as all additional procedures performed for the treatment of all postoperative complications, both radiological and surgical. Prolonged hospital stay was defined as hospital stay longer than 14 days. Postoperative mortality was defined as in-hospital mortality or within 30 days after primary surgery.

Analyses

Patient and tumour characteristics were described according to performed surgical strategy (primary anastomosis, anastomosis with defunctioning stoma, end-colostomy). Univariate analyses were performed to investigate differences in postoperative outcome between the different groups. Logistic regression analyses were performed to correct for case-mix factors between the three groups. Case-mix consisted of patient and tumour factors as age, gender, ASA classification, Charlson score, preoperative complications, tumour stage, abdominal surgical history, neoadjuvant therapy, additive resections and tumour distance from the anal verge. Results were

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