



## Anastomotic leakage and presacral abscess formation after locally advanced rectal cancer surgery: Incidence, risk factors and treatment

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### Abstract

**Purpose of the study:** Anastomotic leakage (AL) and presacral abscess (PA) after rectal cancer surgery are a major concern for the colorectal surgeon. In this study, incidence, prognosis and treatment was assessed.

**Methods:** Patients operated on in our institute, between 1994 and 2011, for locally advanced rectal cancer (LARC, T3+/T4M0) were included. Morbidity was scored using the Clavien-Dindo classification. Prognostic factors were analysed using binary logistic regression.

**Results:** 517 patients were included after a low anterior resection ( $n = 219$ ) or abdominoperineal resection ( $n = 232$ ). AL occurred in 25 patients (11.4%); 50 patients (9.7%) developed a PA. We identified intraoperative blood loss  $\geq 4500$  cc ( $p = 0.038$ ) and the era of surgery; patients operated on before the year 2006 ( $p = 0.042$ ); as risk factors for AL. The time between last day of neo-adjuvant treatment and surgery,  $< 8$  weeks is significantly associated with the development of PA ( $p = 0.010$ ).

**Conclusions:** In our population of LARC patients we found an incidence of 9.7% PA and 11.4% AL, with a 12% mortality rate for AL, which is comparable to surgery in general colorectal cancer. Increased intraoperative blood loss and surgery prior to 2006 are associated with AL. Increased intraoperative blood loss and a timing interval  $< 8$  weeks increases the risk of PA formation.

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**Keywords:** Anastomotic leakage; Presacral abscess; Locally advanced rectal cancer; Treatment

### Introduction

In the last few decades many changes have been made in the perioperative treatment, surgical techniques and general patient care, which have greatly improved oncological outcome and overall survival in locally advanced rectal cancer (LARC).<sup>1–6</sup> Despite these changes, complication rates are still high in some series and anastomotic leakage (AL) and the development of a presacral abscess (PA) is a major concern for the colorectal surgeon.<sup>7–12</sup> AL is a

predominant cause of short- and long-term morbidity and a prolonged hospital stay with mortality rates ranging between 0.6 and 22% in a recent review.<sup>8,12</sup>

In the general population male sex, preoperative radiation, preoperative low serum albumin levels, prolonged duration of surgery, increased blood loss, COPD and a low anastomosis are considered risk factors for anastomotic failure.<sup>10,13–17</sup> Age, co-morbidity and the number of post-operative complications are significantly associated with mortality and worse outcome after colorectal surgery in elderly patients.<sup>17</sup> Leakage rates are similar in younger and elderly patients according to the data from the Dutch TME-trial, but mortality due to AL in elderly patients ( $> 75$  years) is reported up to 57% compared to 8.2% in younger patients ( $< 75$  years).<sup>18</sup>

Short-term morbidity associated with AL includes pneumonia, deep venous thrombosis (DVT), pulmonary

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embolism, CVA, surgical site infections, sepsis and PA formation.<sup>15,19</sup> In addition, long-term morbidity includes the formation of a persistent PA or sinus, creation of a permanent stoma, preservation of a diverting stoma and abdominal herniae.<sup>20,21</sup> Known risk factors for the development of PA are short-term neo-adjuvant radiotherapy, ASA classification and tumour size, but studies regarding the incidence and prognostic factors of PA are scant.<sup>21,22</sup>

There is a wide incidence range for AL in the current literature with incidences up to 53%.<sup>23</sup> A recent review by the International Study Group of Rectal Cancer (ISGRC) reported an incidence range of 3–23%.<sup>24</sup> Variations in surgical techniques and patient selection influence the reported incidence of AL, but the main reason for the wide incidence range found in the literature is the lack of an international definition and grading system regarding AL. However, a clear difference in the incidence of AL is made between a proximal anastomosis, ranging between 5 and 12 cm, with an incidence from 2 to 4% and a more distal anastomosis, with an incidence between 6 and 12%.<sup>12,16,24–26</sup> Due to improvements in neo-adjuvant treatment and surgical techniques, there is an increase in patients with a distal colo-anal anastomosis, subsequently increasing the incidence of AL and PA.

In 2010, the International Study Group of Rectal Cancer (ISGRC) proposed an international uniform definition and grading system for AL, since the lack of a definition contributes to various results in recent literature.<sup>24</sup> Anastomotic leakage was defined as “a communication between the intra- and extraluminal compartments owing to a defect in the integrity of the intestinal wall at the anastomosis between the colon and rectum or the colon and anus”. The ISGRC concluded that any abscess on the anterior side of the anastomosis should be regarded as an AL, thus making no difference between both conditions. The definitions used in our series, which are supported by different authors, make a clear distinction between both conditions, defining a PA as an abscess on CT-scan positioned on the anterior side of the sacrum without signs of AL such as extravasation of enteral contrast on CT-scan, faecal generalised peritonitis or a palpable defect in the anastomosis.<sup>21,27</sup>

This study is conducted to investigate the incidence, prognosis and treatment of AL and PA in LARC patients with the use of a clear definition and a clear distinction between these two complications. Furthermore, risk factors regarding AL and PA were assessed.

## Methods

### *Patients*

As a national referral centre for LARC and locally recurrent rectal cancer our Hospital has gained a lot of experience in the treatment of rectal cancer. In this retrospective study, only patients with LARC were included, which was defined as a threatened (cT3+) or

involved mesorectal fascia (cT4) on MR imaging. All patients who received curative, non-laparoscopic, surgery for primary rectal cancer between 1994 and 2010 were included in the study and are maintained in prospective database. Co-morbidity was scored using the Charlson Co-morbidity Index.<sup>28</sup> Patients with metastatic disease at presentation (cM1) were excluded.

### *Neo-adjuvant treatment and timing interval*

During the study period, different types of neo-adjuvant treatment strategies have been used:  $5 \times 5$  Gy, long-term radiotherapy and different types of chemoradiation schemes. Chemoradiation schemes differed in the type of chemotherapy used. The type of neo-adjuvant treatment depended on the protocols or trials used by the referral hospitals or the Catharine Hospital at the time of inclusion. Details about the different chemoradiation schemes and their influence on survival are described elsewhere.<sup>29</sup> The timing interval was defined as the interval in weeks between the last day of neo-adjuvant treatment and the day of surgery. The duration of the timing interval in LARC has changed over the last decade and was influenced by the accepted consensus at the time of surgery, practical considerations, the degree of acute toxicity due to neo-adjuvant treatment which required a delay of surgery or the need for acute oncologic resection.

### *Postoperative complications*

Postoperative complications were registered for all patients. A PA was defined as an abscess on the anterior side of the of the sacrum without extravasation of enteral contrast on CT-scan or signs of generalised peritonitis due to AL. AL was defined as an extravasation of enteral contrast on CT-scan, the presence of a PA in combination with a defect in the anastomosis on palpation or the presence of faecal peritonitis when performing a laparotomy. All patients had grade B or C AL according to the ISGRC grading system.<sup>24</sup> Complications were scored using the Clavien-Dindo classification of surgical complications.<sup>30</sup> Postoperative complications, including AL, were scored within 30-days after surgery. For PA formation and sinus formation no time limit was set since it is routinely diagnosed >30-days after surgery. Data on PA and AL were obtained by studying medical records, investigating records from the referral hospital or by contacting patients by telephone. Conservative treatment of AL and PA consisted of treatment with antibiotics. Surgical drainage of PA was performed in the operating theatre, either pararectal, transvaginal or through the perineal wound if possible, or by relaparotomy depending on type of surgery performed and the location of the abscess.

### *Statistical analysis*

Statistical analyses was performed using the SPSS Statistics 20.0 software (SPSS Inc., Chicago, IL, USA).

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