Laparoscopic colorectal surgery: beyond the short-term effects
Bartels, S.A.L.

Citation for published version (APA):

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Summary and conclusions
SUMMARY AND CONCLUSIONS

The research in the first part of this thesis focuses on laparoscopic surgery and enhanced recovery after surgery (ERAS) or ‘fast track’ programs in patients in need of an elective resection for colorectal cancer.

Chapter 1 is a systematic review in which quality of life after open and laparoscopic colorectal surgery is compared. We included 9 randomized controlled trials in the review, with a total number of 2263 patients who had colorectal surgery for both benign and malignant disease. All studies used validated questionnaires to determine quality of life after surgery at different points in time. In 4 of the included studies, no difference in quality of life was observed at any point in time and in the remaining 5 studies laparoscopic colorectal surgery lead to a better quality of life measured on individual subscales of the questionnaires. We concluded that there were no clinically relevant differences in quality of life after open or laparoscopic colorectal surgery.

Between 2005 and 2009 the randomised controlled LAFA study (laparoscopy and/ or fast track versus open and/ or standard care) ran in 9 Dutch hospitals. Four-hundred patients who had an elective resection for adenoma or adenocarcinoma of the colon were included in the study. The patients were randomized to open or laparoscopic surgery, either within a ‘fast track’ care setting or a standard perioperative care setting. The results of the randomized controlled LAFA study showed that patients who had laparoscopic surgery within a fast track setting had the shortest postoperative hospital stay. In chapter 2 a regression analysis was performed to determine if this effect on hospital stay could be attributed to certain baseline characteristics or accomplished elements of the fast track program. The outcomes of this analysis showed that the reduction in hospital stay could not be attributed to certain single elements of the fast track protocol. Working according to a strict protocol might be the cause of the effect. Laparoscopic surgery and the female sex were significant independent predictors of a faster recovery.

The long-term results of the randomized LAFA study are presented in chapter 3. In 400 patients having a resection for an adenoma or an adenocarcinoma of the colon no difference was observed in overall survival, cumulative incidence of recurrence or quality of life. In a logistic regression analysis we demonstrated that open colectomy is a significant independent predictor for the occurrence of incisional hernias (OR 2.4 (95% CI 1.1 - 5.3) and adhesion-related small bowel obstruction (OR 3.7 (95% CI 1.1 - 12.5) in the 2 to 5 years following resection. The short-term benefits of laparoscopic colectomy have been well-established, and since long-term oncologic outcome of laparoscopic resection for colon carcinoma is similar to that of open colectomy, these long-term clinical benefits of laparoscopic surgery should further encourage and justify the use of laparoscopy for colonic resection.
In chapter 4 a series of 315 patients is presented, who all had a resection for colorectal carcinoma, either in the AMC or in the Gelre Hospitals. In this series the effect of colonoscopic tattooing with Indian ink on lymph node retrieval was reviewed. A higher number of lymph nodes could possibly lead to refined tumour staging. Moreover, we studied the diagnostic accuracy of colonoscopic tattooing as a sentinel node procedure. In the group of patients that had an endoscopic tattoo before surgery (n=95) a higher lymph node yield was observed (15 vs. 12 lymph nodes). More lymph nodes could possibly lead to better tumour staging. The sensitivity of the tattoo as a sentinel node procedure was 83%. However, detection rate of the tattoo was only 71%, therefore it is not yet suitable as a sentinel node procedure. Given the increased visibility of black lymph nodes during laparoscopic surgery and the increased lymph node yield, we recommend preoperative tattooing as standard routine workup in patients with CRC who will have either open or laparoscopic surgery.

The second part of this thesis focuses on the effects of laparoscopic surgery in patients with inflammatory bowel disease (IBD) or familial adenomatous polyposis (FAP).

Chapter 5 is a systematic review and meta-analysis comparing laparoscopic to open surgery in patients with IBD in need of an emergency colectomy. In total, 9 non-randomised studies were retrieved after a literature search, comprising 966 patients. Meta-analysis showed a lower wound infection and a lower intra-abdominal abscess rate after laparoscopic colectomy compared to open colectomy. No difference was observed for mortality, reoperation rate, ileus rate or gastrointestinal bleeding rate. Important advantages were demonstrated, but it is important that laparoscopic emergency colectomy is performed by an experienced surgeon.

In chapter 6 a series of 71 patients is presented who had an emergency colectomy for IBD in the AMC. We aimed to demonstrate possible risk factors for postoperative complications. The results showed that a longer preoperative hospital stay increased the risk of complications in this series. Moreover, patients with postoperative complications had a higher age and a higher BMI. The latter may be a reflection of prolonged corticosteroid use in these patients.

Chapter 7 describes a cohort of 100 consecutive patients having had a two-stage restorative proctocolectomy. In the first stage these patients had either an open or a laparoscopic emergency colectomy in either the AMC or a referring hospital. After the patient had sufficiently recovered, a completion proctectomy with creation of an ileal pouch anal anastomosis (IPAA) was carried out. The results showed that patients who initially had a laparoscopic colectomy, less frequently needed adhesiolysis or incisional hernia correction during the second procedure. Moreover, patients who had a laparoscopic colectomy had a shorter interval to completion proctectomy.
Summary and conclusions

One of the consequences of IPAA is tubal factor infertility in female patients. **Chapter 8** describes a cross-sectional study that includes all female patients who had an IPAA between 1993 and 2009 in the AMC, VUMC and the University Hospital Leuven. Of the 179 eligible female patients, 50 patients had attempted to conceive after the procedure. Of these, 23 (46%) had undergone open and 27 (54%) had undergone laparoscopic IPAA. A survival analysis of the time to first spontaneous pregnancy showed a significantly higher pregnancy rate after laparoscopic IPAA. This makes the laparoscopic approach the method of choice in young women.

A prognostic model for ileoanal pouch failure has been proposed by the Cleveland Clinic. In **chapter 9** a validation study was performed in a cohort of 371 consecutive patients who had an IPAA in the AMC between 1999 and 2012. The proposed prognostic model, incorporating four variables, was validated in this cohort using a Kaplan-Meier survival analysis and Cox regression analysis. Survival analysis showed a worse pouch survival for completion proctectomy, and no significant differences for handsewn anastomosis, diabetes and Crohn’s disease. Although the observed hazard ratios for pouch failure were similar to those reported for the Cleveland Clinic sample, multivariable analysis showed no significant independent predictors in this cohort. Harrell’s concordance error rate was 0.42, indicating poor performance. Therefore the proposed prognostic model is not suitable for application in daily clinical practice.

In **chapter 10** a new technique is described for patients with an anastomotic leakage of a low anastomosis after IPAA or low anterior resection (LAR). In this series of six patients drainage of the cavity was started directly by means of endosponge therapy, which was shortly followed by anastomotic closure by means of either early suture or an endoscopic clip repair. The mean number of days until closure of the defect was 13 days. The procedure was unsuccessfull in the one patients who did not have a defunctioning ileostomy. In the remaining five patients the mean time until ileostomy closure was 137 days. With this new technique, anastomtic leakage closure can be achieved; it therefore offers a possible alternative for the current ‘wait and see’method.