Functional outcome and quality of life after rectal resection

van Duijvendijk, P.

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CHAPTER 1

Introduction

The most common indications for rectal resection are treatment or prevention of malignant diseases and failure of medical management in chronic inflammatory diseases. If the disease is confined to the rectum itself, rectal resection together with adjacent tissues can be performed. In case the disease involves the total colon, a total colectomy combined with a resection of the rectum, i.e., a proctocolectomy, will be performed and bowel continuity can be restored by ileal pouch-anal anastomosis.

Over the past two decades, important changes have been made in the techniques of these so-called restorative resections. Restorative surgery for rectal cancer with preservation of the anal sphincter, i.e., low anterior resection that was conventionally performed by blunt dissection of the rectum and adjacent perirectal tissue has changed to sharp dissection of the mesorectum along definable embryological planes. This technique that is known as total mesorectal excision (TME) can result in the complete resection of the rectum and its surrounding mesorectum, enveloped within the visceral pelvic fascia. Moreover, the technique of sharp dissection under direct vision enables the preservation of the pelvic autonomic nerves that are essential in maintaining normal sexual and urinary function. It has been shown that (neo-)adjuvant therapy can lower the local recurrence rate and increase survival in patients with rectal carcinoma.

In patients with ulcerative colitis (UC) and familial adenomatous polyposis (FAP) restoration of intestinal continuity after a proctocolectomy can be achieved by making an anastomosis between an ileal reservoir and the anal canal. This procedure has become a realistic alternative to construction of a permanent ileostomy. Since the first construction of an ileal reservoir in 1978, the procedure has developed into a safe operation. It remains unclear whether a proctocolectomy with an ileal pouch-anal anastomosis is the preferred choice over a colectomy with an ileorectal anastomosis in all patients with UC or FAP. Another major modification in performing restorative rectal surgery is the use of a so called double stapling technique to perform the anastomosis between the anal canal and the colon or to the ileal pouch. This technique enabled the surgeon to perform an anastomosis at a very low level at the top of the anal canal in a relative fast and safe way.
Despite all these changes in techniques of the years, rectal resection for malignant diseases is still associated with a relative poor prognosis, a substantial risk of local recurrence in patients with regional disease and a permanent colostomy in these patients where the anal canal can not be spared. It can be hypothesized that restorative surgery of the rectum will affect the function of the rectum, has an impact on the quality of life of the patients and may hazard fertility. This may ever become more important when surgery is combined with neo-adjuvant therapy with the intention to increase survival and decrease the chance of recurrence. These issues, albeit obviously very important in the choice of therapy, has only infrequently been studied in the past.

The aim of this thesis is therefore to study postoperative functional aspects and its effect on the quality of life of these new developments in the surgical techniques of benign and malignant diseases of the rectum.
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Outline of the Thesis

Patients who have to undergo rectal resection for rectal carcinoma are at risk for reduced postoperative anorectal function. Improved surgical techniques, like total mesorectal excision (TME) who propagate rectal resection via sharp dissection under direct vision along the parietal pelvic fascia, have been reported to result in lower recurrence percentages and probably better 5-year survival. A good long-term functional outcome is therefore becoming increasingly important. At present, only few studies have prospectively evaluated rectal function, before and up to one year after surgery. In Chapter 2, a prospectively study is presented where the effects of TME on anal sphincter and 'rectal' function in both patients with a rectal carcinoma and in healthy volunteers are evaluated. In addition, to gain more insight in the underlying pathophysiological mechanisms, changes in functional outcome at different time points and the degree of adaptation in time are studied in relation to the clinical outcome.

The basic principle in colorectal cancer treatment is wide en-bloc resection of the tumor containing bowel segment with its mesentery, vascular supply and lymph draining structures. For a long time postoperative radiotherapy after curative resection of rectum cancer has been the standard adjuvant treatment, to try to reduce the percentage of locoregional recurrences. Over the last few years two forms of treatment have been reported to improve local control. These are respectively total mesorectal excision (T.M.E.), and pre-operative radiotherapy. In the early postoperative period after rectal resection, bowel function is often compromised, with frequent bowel movements and faecal incontinence whereas pelvic irradiation is associated with a variable degree of injury to the anus, rectum and other pelvic organs. A comparison of anorectal function and neo-rectal compliance and sensation between patients who underwent both radiotherapy and surgery and those who underwent surgery alone, has not been performed. Chapter 3, provides a prospectively study where the effects of TME and radiotherapy on anal sphincter and 'rectal' function is assessed and the degree of adaptation in time is studied. In addition, changes in functional outcome at different time points are evaluated in relation to the clinical outcome in order to gain more insight in the underlying pathophysiological mechanisms.

Since the beginning of the nineteen-eighty's, a sphincter saving proctocolectomy with restoration of the bowel continuity by connecting a reservoir of terminal ileum with the proximal anal sphincter is an option for patients with Ulcerative Colitis
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(UC) and Familial Adenomatous polyposis (FAP), where removal of the entire colon and rectum is the only curative option. Many physicians and patients still believe that proctocolectomy with an ileal pouch-anal anastomosis (IPAA) is an operation with substantial morbidity as well as with bad functional results. In Chapter 4, morbidity, mortality and functional results in patients that had undergone a proctocolectomy with an IPAA in a Dutch center with experience during the last five years was studied.

For patients with FAP the only curative treatment is still surgical. The two main surgical options are colectomy with an ileorectal anastomosis (IRA) or a restorative proctocolectomy with an ileal pouch-anal anastomosis (IPAA). IRA has the advantage both of a low complication rate and of relatively good functional results. Although with a considerable risk of cancer evolving in the rectal stump and risk of a secondary proctocolectomy, Restorative proctocolectomy and IPAA eradicate virtually all of the colonic mucosa, hereby eliminating the risk for cancer. The complication rate may be higher and functional results tend to be less satisfactory than after IRA. The fact that a large proportion of FAP patients need a secondary proctectomy after IRA might constitute a strong argument in favor of performing an IPAA as the primary surgical procedure. Only if the functional outcome of IRA is better than that of IPAA is there still a place for IRA, although this would represent a temporary solution for a substantial proportion of FAP patients. In Chapter 5 the possible difference in functional outcome between IRA and IPAA was evaluated in a series of patients with FAP. In Chapter 6, long-term quality of life after surgery was assessed after IPAA or IRA in patients with FAP.

Restorative proctocolectomy with IPAA in male patients carries some risk of nerve damage that may lead to sexual dysfunction, such as erectile failure and retrograde ejaculation. Therefore, pre-operative semen cryopreservation has been offered since 1989 to all males undergoing an IPAA to warrant eventual procreation. Since the reported incidence of impotence is low after this procedure and alternatives for semen preservation such as microsurgical epididymal sperm aspiration (MESA) have become available, it is disputable whether semen banking in patients undergoing an IPAA is rational. In Chapter 7, an estimation of the feasibility and effectiveness of pre-operative semen-preservation in patients undergoing IPAA has been made.

A proctocolectomy with an IPAA is thought to abolish the risk of colorectal adenoma development. However, an increasing number of case reports have been
published on adenomatous polyps or carcinoma developing at or distal to the 
IPAA. 25-29 These findings raise concern about the at-risk mucosa left behind at 
the anastomotic site. In Chapter 8, the risk of developing adenomas or cancer at 
the anastomosis after IPAA is evaluated in a multi-center study. In addition, the 
risk is compared between patients with a double-stapled anastomosis and those with 
a hand-sewn anastomosis with a mucosectomy.

Familial adenomatous polyposis patients with a large number of rectal adenomas 
or rectal cancer and patients that will not comply to follow up examinations after 
IRA are good candidates for an IPAA procedure. There is, however, no 
agreement about the best surgical option for patients with only a few or no rectal 
adenomas. In the decision making between the two procedures not only 
functional results and quality of life are important, but also the risk of developing 
rectal cancer after IRA. However, even more crucial is the risk of dying of rectal 
cancer.

In Chapter 9, an assessment is made of the risk of dying from rectal cancer in a 
large series of IRA patients, and whether frequent follow up of the rectum leads 
to the detection of rectal cancer at an early stage. In addition, an estimation is 
made with a decision analysis, whether there is a difference in life expectancy 
between the two surgical procedure.

In Chapter 10, the results of the studies performed in this thesis are summarized 
and discussed.

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