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Comparison of the combined vaginal-laparoscopic technique with primary laparotomy in the removal of rectal endometriosis via an anterior rectal resection

Abstract In the treatment of symptomatic endometriosis, the aim is to achieve complete surgical removal of the lesions. Primary laparotomy is often regarded as the standard surgical approach for removing intestinal endometriosis. The aim of this retrospective study was to clarify the advantages and disadvantages of combined vaginal-laparoscopic 'en-bloc' resection in comparison with primary laparotomy in patients with endometriosis spreading to the rectum. From October 2002 to June 2005, 28 patients with spreading rectovaginal endometriosis underwent surgery. Infiltration of the rectum was present in all cases. The postoperative evaluation was carried out using outpatient and in-patient medical files, histological findings, surgical reports, and follow-up of the patients for a period of up to 36 months. Anterior rectal resection due to rectal endometriosis was successfully carried out in 11 patients using a combined vaginal-laparoscopic procedure, and in nine patients via a primary laparotomy. Intra-operative conversion of the procedure from primary laparoscopy to laparotomy was necessary in eight cases due to marked adhesions or massive ureteral involvement. The hospitalization period was significantly shorter with the laparoscopic procedure than in patients undergoing laparotomy. No significant differences were found between the two methods with regard to postoperative complications, recurrence rates, establishment of an artificial anus, wound healing disturbances, or functional disturbances of the intestine or bladder. The combined vaginal-laparoscopic procedure for removing rectal endometriosis via an anterior rectal resection can be regarded as a method that is equally as effective as primary laparotomy. Further studies with longer follow-up periods are needed in order to study the long-term results, including the quality of life for the patients concerned.

Keywords Anterior rectal resection ·
Endometriosis · Intestinal endometriosis ·
Rectovaginal endometriosis

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Introduction

After myomatous uterus, endometriosis is the second most frequent form of benign gynecological disease. According to various published reports, 4–17% of premenopausal women suffer from symptomatic endometriosis [37]. The diagnosis of endometriosis is difficult, and affected patients have often already been suffering from the condition for several years and may have undergone various surgical procedures, sometimes only with limited symptomatic relief [20, 24]. The 1985 Revised American Fertility Society (r-AFS) classification (originally published by the American Fertility Society, now the American Society for Reproductive Medicine) is currently used internationally to assess intra-abdominal endometrial implants [2]. The classification is based on describing the location, depth of infiltration, and size of the endometrial implants and the extent of any adhesions. A serious and already much-debated disadvantage of this classification is that it does not allow systematic recording of the infiltrative spread into neighboring organs, implants outside of the small pelvis, the grade of activity of the lesions, receptor status, or clinical symptoms (such as pain, for example).

Advanced and deeply infiltrating endometriosis in particular leads to a marked reduction in quality of life and sexual activity for women affected by it [1, 15]. Involvement spreading to the rectum, colon, appendix, or ureter is found in up to 37% of cases [15, 19, 31]. According to the literature available on the subject, the rate of involvement of the rectum in endometriosis of the small pelvis ranges from 6 to 73% [18, 32]. Symptoms such as cramp-like pain

during defecation, diarrhea, or rectal bleeding during menstruation are often misinterpreted and only lead to a suspected diagnosis of intestinal endometriosis at a very late stage [20, 37]. Unfortunately, it is not possible to demonstrate rectal involvement with adequate sensitivity and specificity using pre-operative rectoscopy, since although infiltration as far as the muscularis propria is reported in 10% of histologically confirmed cases of intestinal endometriosis, infiltration as far as the mucosa is only rarely described [18].

The background to surgical treatment procedures today is an awareness of the fact that the symptoms and/or lesions are progressive and/or tend to become chronic, that the lesions have various morphological "activity grades"; and that they have a potential for infiltrative growth. Rectal endometriosis can therefore be treated surgically either by local resection of a focus or by partial segmental resection of the intestine [12,16, 38]. To achieve this, surgical techniques involving laparotomy, laparoscopy, transvaginal procedures, or a combination of these access routes have been described in the literature.

Laparotomy is currently regarded as the standard procedure for the removal of endometriosis infiltrating into the intestine, but some studies have reported equivalent minimally invasive techniques such as laparoscopy-assisted resection of rectovaginal endometriosis [4, 6–8, 11, 21].

The aim of this retrospective study was to compare the combined vaginal-laparoscopic procedure with laparotomy in endometriosis spreading to the rectovaginal septum with intestinal infiltration, with regard to the following points: operability, complication rates, freedom from postoperative recurrences and pain, maintenance of vesicular and rectal function, wound healing disturbances, and hospitalization periods.

Materials and methods

Patients

Between June 2002 and June 2005, 28 patients with a suspected diagnosis of endometriosis in the rectovaginal septum with intestinal infiltration underwent surgery at the Department of Gynecology in Erlangen. A deep anterior rectal resection was carried out via laparoscopy or laparotomy in all of the patients. The suspected diagnosis was established on the basis of clinical symptoms such as peranal bleeding, painful defecation, severe dyspareunia [8], and/or a suggestive palpation finding in the rectovaginal septum.

The average age of the patients was 34 years (range: 23–47 years). They had undergone an average of 1.6 previous operations (range: 0–11) based on a diagnosis of endometriosis. At admission, the most frequent symptoms reported by the patients were painful defecation (17/28), lower abdominal pain (12/28), dysmenorrhea (10/28), and dyspareunia (10/28). Rectal bleeding during menstruation was reported by four of the patients. Table 1 lists all of the symptoms.

Table 1 History and pre-operative symptoms of the patients

Age (years)	34 (range: 23–47)
Previous operations	1.9 (range: 0–11)
Painful defecation	15 of 28
Diarrhea	2 of 28
Rectal bleeding during menstruation	4 of 28
Dyspareunia	10 of 28
Lower abdominal pain	12 of 28
Dysmenorrhea	10 of 28
Primary sterility	4 of 28
Conservative therapy prior to operation	23 of 28
Smoking habit	9 of 28

Pre-operative procedure

After clinical diagnosis, 23 patients received an therapy with GnRH analogues for 8–16 weeks – depending on the suspected severeness of the rectovaginal endometriosis – in order to relieve the clinical symptoms, to prevent unnecessary bleeding and, therefore, to facilitate the operation. In all cases treatment was stopped 3 weeks before the planned operation. The procedure was changed when there was no evident benefit.

Pre-operatively, the patient was examined by the surgeon belonging to the intended surgical team. Palpation findings were noted, rectoscopy was carried out, and the most favorable location for a protective ileostomy was marked for prophylactic purposes. Pre-operative ureteral splinting was carried out in four patients due to a suspicion of extensive infiltration of the lateral pelvic walls or the sacrouterine ligament, or a suspicion of ureteral involvement and/or bladder infiltration. The patients were informed that autologous blood donation was possible. The primary surgical access route was selected in accordance with the individual patient's medical history. The aim was to be able to offer as many women as possible a combined vaginal-laparoscopic procedure. Primary laparotomy was carried out whenever one or more of the following criteria applied: several previous operations, extreme obesity, known infiltration of the ureter or bladder, or an adhesion site already described in earlier surgical reports. For pre-operative bowel preparation, all of the patients were instructed only to eat a clear fluid diet during the 3 days prior to the planned operation. As a further laxative measure, bisacodyl (Prepacol) was taken on the day before the operation.

Combined vaginal-laparoscopic technique

This combined procedure was carried out in 11 patients. The advantage of vaginal dissection lies in the palpatory control provided and the direct access to endometrial implants in deep locations. After visualization of the vagina, the vaginal part of the cervix is grasped at the posterior lip with ball-tipped grasping forceps, and the posterior fornix is developed. Application of 5–10 mL 1% lidocaine (Xylocaine) with epinephrine 1:200,000 follows

for local hemostasis. A posterior colpotomy is then carried out, and blunt or sometimes sharp separation of the rectum from the posterior cervical wall is carried out with digital guidance. When there is infiltration of the vagina, an incision is made around the lesion with a safety margin of at least 1 cm (Fig. 1). Following dissection, the lesion – still attached to the anterior wall of the rectum – is pulled in an intra-abdominal direction (Fig. 2). After complete mobilization of the lesion from the cervix/posterior uterine wall has been checked with the fingers, the pararectal groups are bluntly opened bilaterally. The posterior colpotomy is then closed (Fig. 3), and repositioning for laparoscopy is carried out. To provide better visualization, before the start of rectal mobilization, the uterus is fixed to the anterior abdominal wall and the two ovaries are fixed to each lateral pelvic wall using intracorporeal sutures.

Additional pararectal and retrorectosigmoid mobilization of the affected bowel segment is carried out to reach below the endometrial focus. Transection of the rectum at the aboral resection margin was always carried out using a linear, adjustable-angle endoscopic stapler (Autosuture™, United States Surgical/Tyco Healthcare, Norwalk, Conn.). The affected bowel segment is pulled extra-abdominally through a suprapubic minilaparotomy (approx. 4–5 cm long) and divided, with a safety margin, using a purse-string-suture clamp. The anvil of the circular transanal stapler (Autosuture™) is attached at the oral end, and reintroduction into the abdominal cavity follows. The rectal stump is then approximated and sealed with the pin on the anvil by means of the transanally introduced stapler. To exclude anastomotic insufficiency, air was insufflated into the rectum using a rectoscope, with the pelvis filled with water. Vaginal visualization was then repeated to assess the vaginal wall and vaginal sutures.

Abdominal technique

Laparotomy was carried out in nine patients with a longitudinal laparotomy and in eight patients with a transverse laparotomy into the skin, dissecting away the subcutaneous
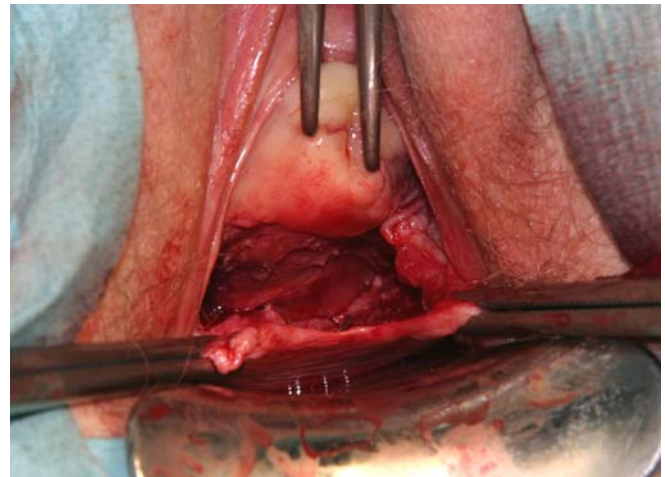

Fig. 2 Demonstration of the posterior wall of the cervix uteri after excision of the vaginal lesion; the pouch of Douglas is opened

tissue as far as the level of the navel, with subsequent longitudinal separation of the fascia. After adhesiolysis – if necessary – pararectal and retrorectosigmoid mobilization of the affected bowel segment was carried out. The affected bowel segment was then divided with a purse-string-suture clamp at least 1 cm distal to the endometriosis lesion. In the presence of infiltration into the vagina, the lesion was initially mobilized transvaginally using the technique described above. The anastomosis of the two stumps was carried out either using a procedure analagous with the laparoscopic technique or using an over-and-over suture, depending on the preference of the surgeon performing the procedure.

Postoperative procedure

Postoperatively, the patients were cared for in the Department of Gynecology's intermediate care ward until transfer to the normal ward in a stable condition was possible. Following the actual surgical procedure, almost
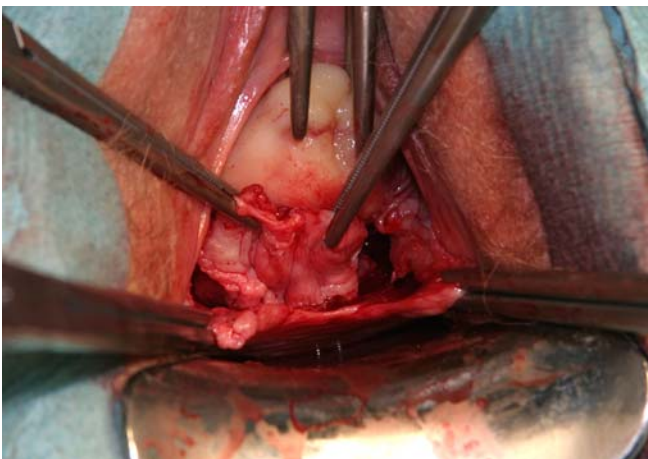

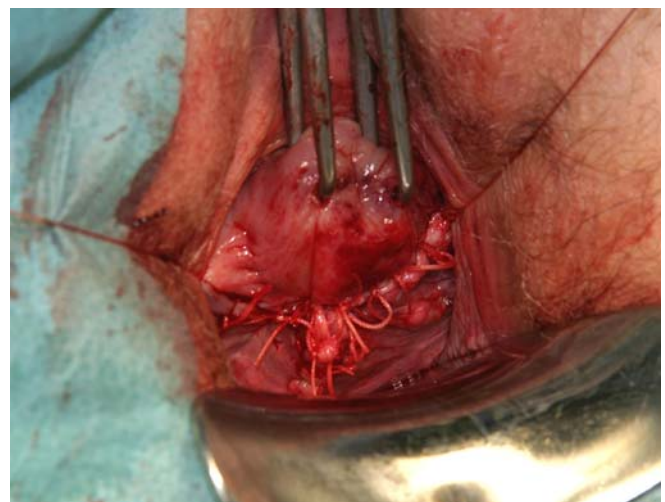**Fig. 1** Circumcision of the vaginal lesion

Fig. 3 Closure of the vaginal walls

all of the patients received a suprapubic urinary drain while still in the operating room, as the initial patients were found to have substantial residual urine values. As a standard procedure, 20-Fr Robinson drains were placed on both sides of the anastomosis intra-operatively and were left in place in all cases until the patient's first solid bowel movement in order to ensure adequate drainage. Postoperative resumption of feeding takes place in accordance with surgical standards. Intravenous antibiotic prophylaxis was administered for 3 days in all cases. On the fourth postoperative day, gradual resumption of feeding started with tea and continued depending on tolerance. On the fifth postoperative day, after urinary tract infection was excluded, bladder training was started. If the residual urine values were less than 100 mL, the suprapubic urinary drain was removed.

Following release from the hospital the patients had three options of therapy: patients with the desire to become pregnant were either trying to become pregnant spontaneously within the year following the operation or were referred to our infertility outpatient clinic for assistance. To all other patients we recommended a continuous therapy with a gestagen-based oral contraceptive.

Follow-up was managed by clinical check ups (including physical examinations and a questionnaire asking for an evaluation of the different phases of the therapy (endocrine/surgery) as well as of the quality of life before/after the operation) twice a year for the first 2 years after the operation. Thereafter, we recommended visits once a year for a total of 5 years.

Data analysis

Postoperative evaluation was carried out on the basis of the outpatient and in-patient files, histological findings, and surgery report. The two surgical techniques were compared retrospectively with regard to the anastomotic technique, the level of the anastomosis, the operating time, and units of packed red blood cells transfused. The postoperative course was assessed with regard to wound healing disturbances, functional disturbances in the bladder and bowel, development of rectovaginal fistulas, anastomotic insufficiency, hospitalization period, development of recurrences, postoperative rectal stenosis at the level of the anastomotic ring, and thrombotic events.

Results

Rectal resection and histological confirmation of endometriosis in the resected bowel segment took place in all cases. Among the 28 patients, a primary vaginal-laparoscopy-assisted anterior rectal resection was started – and successfully concluded – in 11 cases. In eight of the 28 patients, conversion to laparotomy had to be carried out during the operation due to massive adhesions and/or ureteral infiltration. A primary laparotomy was carried out in nine of the 28 patients. Intra-operatively, in addition to

adhesions and peritoneal nodules, involvement of the sigmoid, the terminal ileum, and the left ureter were found ($n=5$), followed by bladder involvement ($n=4$) and involvement of the right ureter ($n=1$). During a follow-up period of 1–36 months at the time of writing, all of the patients – independently of which of the two surgical procedures was used – experienced a marked reduction in pain symptoms, and no recurrences of bowel-infiltrating endometriosis have been observed.

While the stapler was always used for anastomosis in the laparoscopic procedure, during laparotomy the anastomosis was established on ten occasions with the stapler and four times manually. On average, the anastomosis level was 6.5 cm (range: 3.5–11 cm) from the anocutaneous line. Relative to the surgical technique, the median level of the anastomosis with the laparoscopic procedure was slightly deeper, at 6 cm (range: 3–8 cm), in comparison with a mean anastomosis level of 7 cm (range: 3.5–11 cm) with laparotomy.

A temporary artificial anus was placed in ten of the 28 patients undergoing rectal resection, three of whom were in the laparoscopy group and seven in the laparotomy group. Interposition of an ileal loop stoma was carried out in principle in this group of patients when there was extensive recurrent endometriosis in the small pelvis ($n=4$), when there was direct contact between the vaginal and rectal suture after resection of the vaginal nodule and bowel segment ($n=4$), and when there was severe fecal contamination ($n=2$). All prophylactically interposed artificial ani in both groups were taken out after an average of 8 weeks (range: 6–10 weeks), without exception.

There were no significant differences between the two techniques with regard to operating times. The average operating times were 5.27 h (range: 3.5–7 h) for laparoscopy, 5.3 h (range: 4–7 h) for conversion from laparoscopy to laparotomy, and 4.8 h (range: 4–7 h) for primary laparotomy procedures. Packed red blood cell units were prepared prophylactically for all of the patients, and two units each had to be transfused into a total of three patients – twice with the laparoscopic procedure and once with a primary laparotomy. All of the patients received intravenous antibiotic prophylaxis intra-operatively and postoperatively up to at least the third postoperative day. One patient developed an anastomotic insufficiency on the third postoperative day, with a rectovaginal fistula. A minilaparotomy to place an artificial anus and vaginal closure of the fistula were carried out. There were no differences between the two surgical techniques with regard to the number of wound healing disturbances (one with each technique). Prolonged intestinal atony delayed postoperative recovery in one patient after the laparoscopic procedure and in three patients after laparotomy. Postoperative bladder emptying disturbances, with residual urine values larger than 100 mL after the start of bladder training on the fourth postoperative day, were observed in two cases in the group of women who underwent laparoscopy, while these symptoms occurred five times in the laparotomy group. Taking all postoperative courses into account, the hospitalization period was a median of 9.7 days (range: 6–18 days) for the laparoscopy

patients compared with an average of 12.2 days (range: 5–19 days) for women who underwent laparotomy. On the day of discharge, one patient developed thrombosis in a peripheral vein in the lower left leg after removal of the compression stocking. In accordance with the S2 guidelines [25], the patient received antithrombotic cover with a low-molecular-weight heparin derivative (dalteparin; Fragmin P) as well as compression stockings until complete mobilization. The patient was referred to the Department of Internal Medicine on the day of discharge and received further outpatient treatment.

Overall, "late complications" occurred in two patients. Three weeks after discharge, one patient who had undergone a primary longitudinal laparotomy (without placement of an artificial anus and with a psoas hitch procedure due to ureteral involvement) developed an acute coronary syndrome, with subsequent in-patient treatment in cardiological intensive care. She was known to have a history of arterial hypertension and nicotine abuse. However, the connection with the above surgical procedure is questionable after a 5-week latency period. In another patient, a follow-up examination in the department of proctology identified an anal stenosis, which was adequately treated conservatively with bougienage. The level of the stapler anastomosis in this patient, who had undergone a vaginal-laparoscopic procedure, was 7 cm. All of the results are presented in Table 2.

Table 2 Results

Results	Laparoscopy (range)	Laparotomy (range)
Positive histology	11 of 11	17 of 17
Temporary ileal loop stoma	3 of 11	7 of 17
anastomosis (cm from anocutaneous line)	6 (3–8)	7.15 (3.5–11)
Taking back of ileal loop stoma	3 of 3	7 of 7
Insufficiency of anastomosis	1 of 11	0 of 17
Stenting of ureter	6 of 11	4 of 17
Operating time (hours)	5.2 (3.5–7)	5.3 (4–9.5)
Anal stenosis	1 of 11	0 of 17
Malfunction of the bowel	1 of 11	3 of 17
Malfunction of the bladder	2 of 11	5 of 17
Thrombosis	1 of 11	1 of 17
Wound healing disturbances	1 of 11	1 of 17
Length of hospitalization (days)	9.7 (6–18)	12.2 (5–18)
Recurrence rate (2002–2005)	0 of 11	0 of 17
Additionally implants: sigmoid	1 of 11	4 of 17
Additionally implants: terminal ileum	0 of 11	5 of 17
Additionally implants: left ureter	2 of 11	2 of 17
Additionally implants: right ureter	1 of 11	0 of 17
Additionally implants: bladder	2 of 11	2 of 17

Discussion

Bowel-infiltrating endometriosis can cause many different symptoms. Affected patients report a wide variety of symptoms that are not always classically dependent on the menstrual cycle and can range from diarrhea, lower abdominal pain, and defecation pain to dyspareunia. In addition to the patient's history, vaginal and rectal examinations are the decisive pillars of the diagnostic work-up. Precise examination of the posterior fornix during adjustment with the speculum and a digital rectal examination are essential for obtaining diagnostically helpful findings. Although these examinations require some experience, in our group they led to the correct suspected diagnosis in all cases, as confirmed by the postoperative histological findings. According to the literature, endoscopic endoluminal examination of the bowel can lead to a realistic assessment of the involvement of the bowel mucosa in 50–80% of cases [9, 34].

However, studies have mainly confirmed infiltration into the muscularis layer, while the mucosa is rarely involved initially [9, 24]. The most important task of pre-operative rectoscopy, in addition to the assessment of endometriosis implants, is pre-operative exclusion of a primary malignant process in the rectum. In our group, the proctologists did not find any cases of nodules typical of endometriosis in the mucosa. The histological reports identified a submucosal implant in three cases. Possible explanations for a submucosal implant not being identified during rectoscopy in these three cases might include the following: firstly, because the patients did not present for proctology at the appropriate time – i.e., during menstruation; secondly, because pre-operative treatment with GnRH analogues was administered (in 23 cases only due to a change of pre-operative procedure), so that the nodules were no longer bleeding cyclically.

Diagnostic laparoscopy has proved its value as the "gold standard" in the diagnosis of endometriosis and/or infiltration of neighboring organs. This is particularly true when there is a suspicion of infiltration of the bowel or bladder, so that – in the interests of the woman concerned – histological confirmation can be provided, the extent of the endometriosis can be assessed and, if necessary and in collaboration with the surgeon or urologist, an elective intervention can be planned after adequate patient preparation (laxative measures, stent placement, rectoscopy/cystoscopy, marking of an artificial anus).

When an endometrial implant infiltrates into the anterior rectal wall, one should certainly consider carrying out not only superficial excision but also bowel resection. In 12 of the patients in the present study, histological evidence was found of rectal infiltration into the muscularis propria or deeper. With superficial excision, these implants would not have been completely removed. The recurrence rate of rectal endometriosis, relative to the surgical technique used, shows significant differences when superficial resection is compared with partial bowel resection. In the literature, recurrence rates of 5–74% have been reported with superficial excision [11, 12], in contrast to 0–4% with anterior rectal resection [23, 39]. A recent study has even

ascribed preferential perineural or endoneural infiltration within the bowel wall to endometriosis implants with bowel involvement [3]. This type of perineural infiltration would appear to provide a logical explanation for the usually marked pain symptoms, the rare involvement of the mucosa, and the recurrent pain after inadequate excision of endometriosis implants. In general, published studies have reported a recurrence risk (either after surgery alone, after surgical and endocrinological treatment, or after endocrinological treatment alone) of 7–31% over various follow-up periods [4, 7, 11]. In the present series, the resection margins in the bowel specimens were found to be free of endometriosis in all cases. During the follow-up period – a median of 18 months (range: 1–36 months) – no histologically confirmed or clinically suspected recurrences in the rectovaginal septum were observed in any of the patients who underwent anterior bowel resection (0%). In contrast, in another group of endometriosis patients in our institution who underwent superficial excision of the bowel-infiltrating implant, two of five patients developed a recurrence in the colon within 8 months giving rise to the suspicion that in these cases the excision of the implants was not sufficiently deep or that the lesions were multifocal. Both patients have currently been placed on GnRH treatment for a transitional period, for reasons connected with their work.

The postoperative complication rates in studies reporting only superficial excision of endometriosis lesions in the rectum range in the literature from 1.2 to 24% [10, 17], in comparison with 4–17% in studies of laparoscopic bowel resection in rectovaginal endometriosis [23].

According to data reported in the literature, anastomotic insufficiency develops in 3–14% of all cases [5, 17, 35]. In particular, anastomoses at a level of less than 6–7 cm ab ano are associated with an increased rate of insufficiency [22, 27]. However, these data are based on a surgical group consisting of patients with inflammatory bowel diseases and rectal carcinoma. It must be assumed that differing healing processes would apply to these specific groups of surgical patients in comparison with resection of a benign disease in young patients. Only one gynecological study on the laparoscopic technique has reported on primary stapler anastomoses at an average level of 4 cm ab ano, without placement of an artificial anus or postoperative complications after the anastomosis [29]. Among the 28 women in the present study, one patient developed anastomotic insufficiency on the third postoperative day, with a rectovaginal fistula, following laparoscopic anterior rectal resection without placement of an artificial anus. The patient was treated with a 4-cm minilaparotomy and placement of an artificial anus, with vaginal closure of the fistula. Since the bilaterally placed 20-Fr Robinson drains had provided good drainage of the leak in the patient concerned, laparotomy with lavage was not carried out. The stapler was always used for anastomosis during the laparoscopic procedure (n=11), while in laparotomy (n=17) the stapler was used 13 times and manual suturing four times. The anastomosis technique to be used in the group of patients undergoing laparotomy was decided on by the surgeon conducting the procedure in each case. On average, the anastomosis level was 6.54 cm (range: 3.5–11 cm) from the anocutaneous line.

As a general rule, an artificial anus can be placed above the anastomosis to relieve the latter and allow better healing. Since the women affected are mainly young and have no risk factors from what is basically a benign disease, there is certainly scope for considering whether or not an artificial anus should be placed. Both providing the patient with detailed information and taking a joint decision on an individually planned surgical procedure are important here. In our group of patients, interposition of an ileal loop stoma was carried out on principle in cases of extensive recurrent endometriosis or direct contact between the vaginal and rectal sutures. All of the artificial ani that were placed were taken out without complications after an average of 8 weeks (range: 6–10 weeks).

Based on published reports, strictures of the colorectal anastomosis occur in 3–30% of all patients. In most cases, the stricture is less than 1 cm long and can be handled with conservative methods without problems [36]. One patient developed a rectal stenosis following placement of a stapler anastomosis at 7 cm, in which adequate treatment was possible using bougienage. Prolonged intestinal atony is another complication [33]. In the present group of patients, this complication occurred four times, but the symptoms resolved completely in all cases before the patients were discharged. For regular maintenance of autonomous bowel and intestinal function, as in the surgical procedure for cervical carcinoma, surgery in the small bowel must be carried out in such a way as to spare the nerves. With the approximately sevenfold enlargement it provides, the laparoscopic procedure allows safe and clear visualization of the plexus and nerve strands, so that an experienced surgeon can attempt to spare the complex innervation without compromising radicality [28–30]. In all, seven of the patients who underwent surgery in our department (two with laparoscopy and five with laparotomy) suffered postoperative bladder emptying disturbances, with increased residual urine values. Two of the women had to be discharged with a suprapubic urinary drain and instructions for independent bladder training. Restoration of regular bladder function was possible in all of the women.

A retrospective analysis of the anesthesia reports showed that there were hardly any differences in the operating times for anterior bowel resection with laparoscopy, conversion from laparoscopy to laparotomy, or primary laparotomy. Unfortunately, the files do not provide any information about the "waiting times" for the surgeon or urologist. The few literature reports in which the hospitalization period is described independently of the surgical technique show a mean of 8.3 days (range: 7–11 days). In the present study, the mean postoperative hospitalization period were 9.7 days (range: 6–18 days) for the laparoscopy patients and 12.2 days (range: 5–19 days) following laparotomy. This is explained firstly by the large number of procedures for recurrences that were carried out, with additional intraoperative procedures such as resection of the ureter, cystoplasty, and one nephrectomy. Secondly, functional

disturbances in the bladder and bowel prolonged the hospital stay in a total of 11 patients. One case each of minimal, nonirritating suture dehiscence occurred in each group, without the need for secondary abdominal wall closure.

Two units of the packed red blood cells standardly provided had to be transfused in three patients. In the laparoscopy patients, the transfusion was required due to a massive adhesion site in one case and the development of anastomotic insufficiency in the other. The third patient had already undergone two previous operations and received a primary longitudinal laparotomy with a total of three bowel resections (rectum, sigmoid, and terminal ileum).

Conclusions

In summary, anterior rectal resection using the laparoscopic technique represents an adequate form of surgical treatment for severe endometriosis spreading to the bowel. Similar complication rates, without recurrences, were observed in the two groups. From the point of view of preserving the reproductive organs, as well as rectal and vesicular function, the combined vaginal-laparoscopic procedure represents a valid treatment option in a selected group of patients.

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