Perineal Stapled Prolapse Resection (PSPR) for Complete External Rectal Prolapse: A Review

Martin Bosch[1], Franc H. Hetzer[1]* and Diana Effinger-Sehmer[2]

[1]Departement of Surgery, Cantonal Hospital Uznach, Switzerland

[2]Department of Visceral and Thoracic Surgery, Cantonal Hospital Winterthur, Switzerland

***Corresponding author:** Franc H. Hetzer, Departement of Surgery, Cantonal Hospital Uznach, Switzerland, E-mail: Franc.Hetzer@spital-linth.ch

Introduction

Although the external rectal prolapse is a rare affection with an incidence of 0, 25-0, 42%, it is associated with negative consequences for quality of life, especially concerning fecal incontinence which is bevailed of more than 90% of patients who are afflicted with a rectal prolapse. Frequently the rectal prolapse causes pain and tends to result in perianal bleedings. Perforation of the colon or ischemia of the bowel is found with a prevalence of about 1%. Women are affected of rectal prolapse 6 times as often as men and risk factors are, beside female sex, a high number of vaginal births, old age, high body-mass-index (BMI) and constipation. In older patients, the external rectal prolapse is generally an instant diagnosis with no need of further diagnostic procedures. In younger patients, the dynamic magnetic resonance tomography of the pelvic floor represents the most important examination. Promising options are surgical procedures, and more of 100 different techniques have been described so far. In many cases, patients do not qualify for an abdominal approach due to old age attended with multimorbidity. Delorme and Altemeier were the firsts who described perineal surgical techniques which also can be performed in local anaesthesia. Both procedures represent a fast and safe treatment.

Altemeier's procedure, with or without levatorplasty, is associated with lower recurrence rates than Delorme's procedure, but higher recurrence rates than abdominal approaches [1-4]. Beside the overall high recurrence rate after perineal approaches, none of these procedures provides complete resolution of symptoms in the majority of patients [5].

The Perineal Stapled Prolapse Resection (PSPR) was introduced by Scherer et al. in 2007 [6]. The limiting factor of this technique is the thickness of the prolapse wall, especially in male patients - sometimes the stapler device is not able to hold the tissue completely. In this case it is sometimes necessary to change to the Altemeier procedure. Compared to the Altemeier technique, the PSPR creates a larger median circumference with less postoperative capacity reduction and less anastomotic stenosis. Since the clinical introduction of the technique in 2007, several studies have been published which investigated the results concerning the safety and the functional outcome of the PSPR-procedure. The up to now established conclusions show predominantly that the Perineal Stapled Prolapse Resection is a fast and safe procedure with good functional results and not only multimorbid and fragile patients benefit from the advantages summed up in the last years.

Surgical Technique

The Perineal Stapled Prolapse Resection is performed in lithotomy position: additionally a slight trendelenburg position is beneficial to free the pouch of Douglas from any deep enterocele [6]. The intervention can be done in general, spinal or in local anaesthesia. Local anesthesia constitutes a good option for patients who cannot undergo a general or spinal anaesthesia due to comorbidities and/or the treatment with anticoagulants. There is no bowel preparation required. At the start of the operation, a single dose of prophylactic antibiotics (a combination of a cephalosporin and metronidazole) is administered intravenously [6]. After the disinfection and the coverage of the operating field, the prolapse is completely pulled out and fixed by Allis clamps placed at its verge. A careful bi-manual examination is required to exclude the entrapment of any remaining intraperitoneal organs between the two redundant rectal walls [6]. The prolapse is now axially cut open at the three (Figure 1) and nine o'clock-positions with a linear stapler (Figure 2) such as the proximate 75 mm linear Cutter Stapler (GIA Stapler; TLC75; Ethicon Endo-Surgery, Cincinnati, OH) [7].
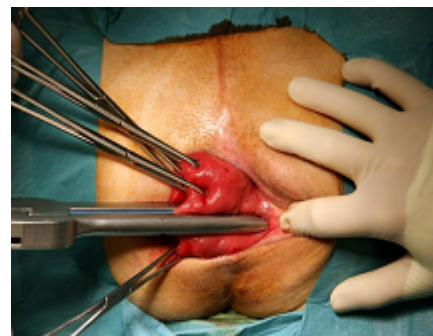
Figure 1: Fixation; The prolapse is completely pulled out and fixed by Allis clamps, then the prolapse is axially cut open at three o'clock with a linear stapler.

The staple line ends 1 to 2 cm from the dentate line on both sides. In female patients, the stapler is fired after the digital exploration of the back wall of the vagina to exclude its entrapment. Subsequently, the prolapse is resected continuously counterclockwise by a curved stapler (Contour Stapler, STR5G; Ethicon Endo-Surgery, Cincinnati, OH) and parallel to the dentate line, first anteriorly starting at three o'clock position, second posteriorly beginning at nine o'clock (Figure 3) [7]. After completing the resection, the anal mucosa and the neorectum falls back into place spontaneously. The stapled resection line should be

inspected using a transparent speculum. To ensure haemostasis and to strengthen the anastomosis, Scherer described absorbable monofilament sutures to complete the intervention [6]. After the operation, patients resume a normal low-fiber diet the day after the PSPR procedure [6].

Method

Search strategy and study selection, inclusion an exclusion criteria

A detailed electronic search was carried out from the database PubMed. The search was performed using the Medical Subject Headings (MeSH): perineal stapled prolapse, perineal stapled prolapse resection, Contour® Transtar™ stapler, perineal approach, PSP. No language limitation was applied to the search. Abstracts of potentially relevant publications based on the titles were read and retrieved. All full-text studies published from 2008 to 2017 were considered and we excluded studies without full-text. A review of all the comparative studies was performed. A hand search of the references of all comparative studies retrieved was undertaken for any further potential studies, however, no additional studies were identified. All of these were retrospective cohort studies.

Results

In recent years, several studies have been published which investigated the results of the PSPR-procedure. We analysed the data of 13 publications which were released between 2008 and 2016 (Table 1). The range of the respective group sizes covered a median number from 3 to 64 patients, whose median age ranged from 59 to 84 years [5-17]. The vast majority of the patients incorporated in all studies are female.

The median duration of the surgical intervention ranged from 30 min [9] to 63 min [16]. Median follow up date of patients treated by PSPR ranged from 3 to 72 months; the length of the hospital stay ranged from 3 to 8 days [5-17]. Furthermore, Table 1 shows the ASA-Risc-Score and the average number of cartridges used for the PSPR-Procedure. Table 2 considers the first occurrences of the rectal prolapse and the recurrence-rates after the application of different surgical techniques.
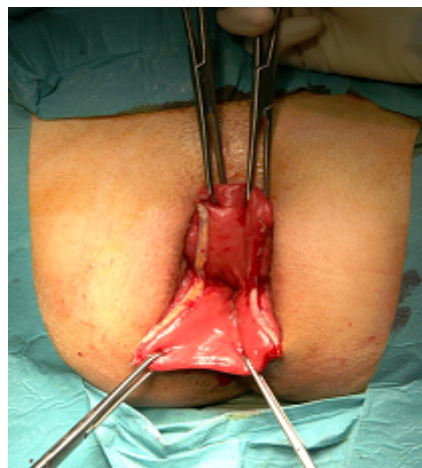
Figure 2: Separation; Separation of anterior and posterior wall of the prolapse after second opening with a linear stapler at nine o'clock.

Author	Year	No. of patients	Age (years)	Follow-up (months)	Operation time (min)	ASA	Cartridges	Hospitalisation (days)
Scherer et al.[6]	2008	15	84	3	33	≥III	6	8
Romano et al.[8]	2009	3	62	3	40	III/IV	-	5
Hetzer et al.[9]	2010	32	80	6	30	I-III	6	5
Mistrangelo et al.[5]	2012	5	67	12	56	III	6	5
Sehmer et al.[7]	2013	56	79	26	-	I-IV	-	5
Petersen et al.[10]	2013	25	82	13	36	-	7	5
Tschuor et al.[11]	2013	9	72	40	60	≥III	-	5
Ram et al.[12]	2014	14	80	32	35	III/IV	7	3
Bajaj et al.[13]	2015	12	59	36	45	-	6	3
Mistrangelo et al.[14]	2016	27	78	30	48	I-IV	6	5
Hummel et al.[15]	2016	64	80	72	33	I-III	-	6
Maternini et al.[16]	2016	7	74	18	63	III	6	3
Raahave et al.[17]	2016	54	78	13	45	-	-	3

Table 1: Characteristics of these including PSPR studies.

Selection criteria

Authors of many studies recommend PSPR for treating a complete, external rectal prolapse of patients with increased risk for transabdominal surgery due to severe comorbidities like cardiovascular and respiratory disease or patients suffered with multiple sclerosis and secondary anorexia (elevated ASA ≥ lll). Many patients are living in nursing care facilities. Sehmer described of one young woman of childbearing age who declined a transabdominal procedure because of the risk of adhesion formation and another young patient declined because of continuous ambulatory peritoneal dialysis [7]. Bajaj mentioned the perineal technique suited for young patients in order to avoid complications secondary to nerve damage [13]. Petersen described the patient's attitude to underwent PSPR [10].

Raahave noted, that within this period (May 2009-February 2015), no other perineal or abdominal procedures than PSPR were performed [17]. Exclusion criteria were age younger than 18 years and a rectal prolapse thickness >1.5 cm (thickness measured after complete exteriorization and compression of the prolapse). A thickness >1.5 cm contraindicated the PSPR as this is considered to be above the stapler's capacity which might not permit a complete closure, hemostasis and anastomosis of the stapler. The length of the rectal prolapse didn't contraindicated the choice of PSP procedure [14].

Author	No. of patients	No. of primary prolapse	No. of recurrent prolapse	previously operation
Scherer et al.[6]	15	-	-	-
Romano et al.[8]	3	-	-	-
Hetzer et al.[9]	32	26	6	-
Mistrangelo et al.[5]	5	4	1	Delorme
Sehmer et al.[7]	56	37	9	3: lap. resection rektopexy 3: lap. suture rektopexy 3: lap. ventral rektopexy
Petersen et al.[10]	25	-	-	-
Tschuor et al.[11]	9	-	-	-
Ram et al.[12]	14	-	-	-
Bajaj et al.[13]	12	11	1	laparoscopic rektopexy
Mistrangelo et al.[14]	27	25	2	Delorme
Hummel et al.[15]	64	54	10	-
Maternini et al.[16]	7	-	-	-
Raahave et al.[17]	54	52	2	abdominal rektopexy

Table 2: Characteristics of primary and recurrent prolapse and previously operation.

Figure 3: Resection; Resection of the prolapse continuously counterclockwise by the curved stapler and parallel to the dentate line, first anteriorly.

Intra- and postoperative Complications

The following Tables 3 and 4 describe the intra- and postoperative complications associated with the PSPR-procedure. In addition, a potential change of the surgical procedure is specified.

In summary, intraoperative complications were uncommon and usually caused by an insufficient closed stapler-suture. Most frequently, postoperative bleeding occurred as a complication.

Fecal incontinence and Wexner Incontinence Score

Nearly all studies published in the past, fecal incontinence was determined as terminal point. Some studies choosed the Wexner Incontinence Score to categorize the severitiy of the incontinence: Hetzer and Bajaj described an improvement of the Wexner Incontinence Score of 15 points [9,13]. In 2010, Hetzer reported the termination of incontinence in 90% of the patients treated with PSPR [9]. Regarding corresponding studies, a large scope seems to exist concerning this terminal point: In 2014, Ram et al. stated the postoperative consistency of fecal incontinence after the PSPR procedure whereas Sehmer et al. reported an improvement of nearly 39% in combination with a significant enhancement of the Wexner Incontinence Score [12,7]. Raahave et al. reported a preoperative fecal incontinence rate of 33%. After the PSPR procedure, 5, 6% of the patients still suffered from severe incontinence, so that it was necessary to create a colostoma [17]. In 2016, Hummel et al. reported the Wexner Incontinence Score in the following way: the mean and median preoperative Wexner scores were 9.7 ± 6.7 and 10.5. Postoperatively, the Wexner score significantly decreased to a mean of 4.4 ± 4.7 and a median of 3.0. After PSPR, 38% of the patients reported an improvement of incontinence whereas more than 35% complained the occurrence of incontinence as a primary event. In summary, the rate of incontinence decreased significantly after the PSPR has been performed [15].

Author	No. of patients	Complications intraoperative		
		Number	Complication	Treatment
Scherer et al.[6]	15	1	incomletely closed staple line, thick prolapse	Altemeier
Romano et al.[8]	3	0		
Hetzer et al.[9]	32	0		
Mistrangelo et al.[5]	5	0		
Sehmer et al.[7]	56	1	staple line disruption, thick prolapse	Altemeier
Petersen et al.[10]	25	-		
Tschuor et al.[11]	9	0		
Ram et al.[12]	14	0		
Bajaj et al.[13]	12	0		
Mistrangelo et al.[14]	27	1	partial suture line disruption (incorrect stapler use)	reinforced manually
Hummel et al.[15]	64	1	malfunction of stapler, thick prolapse	Altemeier
		1	rectoanal junction not exposed	laparoscopic rectopexy
Maternini et al.[16]	7	0		
Raahave et al.[17]	54	-		

Table 3: Intraoperative complications and treatment.

Maternini described, none of the seven patients suffered from incontinence and a Wexner Incontinence Score pre-op 8-23, after 18 months 6-12 (improvement 4-16 points). The improvement after 18 months constituted 44-76% [16]. In Tschuors analysis, incontinence worsened in one patient after PSPR, one patient developed new-onset faecal incontinence [11]. The Wexner Incontinence score 2012 in Mistrangelos study was 9,2 before and 4.6 at 3 months after surgery [5]. 2016 he described a significant improvement from 10 presurgery to 5 points after surgery [14].

Functional outcome: constipation, diarrhea

Some studies summarized the functional outcome concerning constipation and diarrhea whereas constipation caused problems more frequently as diarrhea. Hetzer et al., who described the functional outcome after PSPR first, reported a little decrease of constipation after the operation (39% to 31%) whereas Sehmer et al. demonstrated a postoperative improvement of preexisting diarrhea in 4, 3% of the collective, improvement of constipation in 13% and patients who complained about alternating episodes of Diarrhea and constipation showed an improvement of the symptoms in 8, 7% [7,9]. 28, 3% of the patients who suffered preoperatively from irregular bowel movement did not feel any improvement of this disorders after the operation [7]. The data collection of Bajaj et al. showed an improvement of constipation in 66% after the operation. One patient who was afflicted

with constipation after the PSPR procedure reported at least a bettering of the disorders [13]. Romano and Maternini reported an improvement of constipation of all patients included in the respective studies [8,16].

Obstructed Defecation Syndrome (ODS)

Five of the studies examined the outcome concerning ODS [5,8,11,14,15]: A relief of ODS occurred in 15 (71, 4%) of 21 patients with preoperative ODS. In one of 43 (2, 3%) patients without a preoperative ODS, a newly diagnosed ODS was observed postoperatively. Altogether, the rate of ODS was significantly decreased [15]. In 2012, Mistrangelo reported a significant decrease of the ODS-score (16 to 4,75 points) and in 2016 from 12 to 5 points [5,14]. Tschuor analysed an improvement of 11 points [11]. Romano published the reduction of ODS-disorders in all of the included patients after the PSPR procedure [8].

Recurrence rate and following intervention

Table 5 shows recurrence rates and, if those information was available, the following surgical intervention. Hummel et al. reported the median follow-up of recurrence free patients alive at the end of follow-up was 4.6 years and of patients with a recurrence alive 6.6 years. The 5-year recurrence-free survival rate was 54,4%,

corresponding to a recurrence rate of 45.6%. At 2 years, the recurrence rate had only been 19,9% [15].

Author	No. of patients	Complications intraoperative		
		Number	Complication	Treatment
Scherer et al.[6]	15	1	incometely closed staple line, thick prolapse	Altemeier
Romano et al.[8]	3	0		
Hetzer et al.[9]	32	0		
Mistrangelo et al.[5]	5	0		
Sehmer et al.[7]	56	1	staple line disruption, thick prolapse	Altemeier
Petersen et al.[10]	25	-		
Tschuor et al.[11]	9	0		
Ram et al.[12]	14	0		
Bajaj et al.[13]	12	0		
Mistrangelo et al.[14]	27	1	partial suture line disruption (incorrect stapler use)	reinforced manually
Hummel et al.[15]	64	1	malfunction of stapler, thick prolapse	Altemeier
		1	rectoanal junction not exposed	laparoscopic rectopexy
Maternini et al.[16]	7	0		
Raahave et al.[17]	54	-		

Table 4: Postoperative complications (Clavien- Dindo Classification [18]).

Patients satisfaction and sexual function

The scientific works of Sehmer, Mistrangelo, Hummel and Raahave came to the result that the Perineal Stapled Prolpase Resection had a good outcome in the number of cases and patients would undergo the same procedure if necessary [7,14,15,17]. Sehmer reported 72% of contented patients [7]. Rahaave determined the mean satisfaction score who increased from 2.2 to 6, 4 [17]. Bajaj and Raahave noticed that no sexual dysfunction occurred in any of the patients [13,17].

Treating the stapler line with additional sutures

8 of the studies describe the installation of additional sutures in the area of the anastomosis, either monofilament sutures [6,7,9,11,16,17]

or braided Vicryl-sutures [12,13]. Additive sutures were taken if it is necessary in three studies [5,8,10].

The cylindrical hemostatic sponge (Spongostan®) was placed on the staple line additionally in one study [17].

Starting oral feeding

Oral food intake was continued mostly from the first postoperative day with a low-fibre diet [6,7,10,12], in one study after bowel movement [8].

Author	Recurrence rate % (n)	Follow up (months)	following intervention (n= Anzahl)
Scherer et al.[6]	0	3	-
Romano et al.[8]	0	4	-
Hetzer et al.[9]	-	6	no information
Mistrangelo et al.[5]	0	7	-
Sehmer et al.[7]	20 (7)	36	re- PSPR (1), ventral rektopexy (4), no information (2)
Petersen et al.[10]	8 (2)	13	re- PSPR (2)
Tschuor et al.[11]	44 (4)	40	lap. rectopexy (1), open rectopexy with Douglas obliteration (1), Delorme (2)
Ram et al.[12]	29 (4)	32	Altemeier (4)
Bajaj et al.[13]	-	36	no information
Mistrangelo et al.[14]	15 (4)	30	abdominal rectopexy (1), re-PSPR (1), awaiting treatment (2)
Hummel et al.[15]	30 (19)	21	Altemeier (1), re-PSPR (2), anterior rektopexy (13), no information (3)
Maternini et al.[16]	29 (2)	18	no treatment because of a asymptomatic prolapse (2)
Raahave et al.[17]	20 (11)	13	Colostomy (2), re- PSPR (6), no information (3)

Table 5: Recurrence rate and the following intervention.

Discussion

There are many abdominal and perineal procedures described in the treatment of rectal prolapse. Abdominal approaches also have low recurrence rates but are associated with higher rates of morbidity and mortality. These techniques are generally reserved for young patients without comorbidities. Perineal techniques are widely accepted and generally indicated in older frail patients. Below, especially two perineal surgical techniques - the «Altemeier» and the «Delorme»-technique should be compared.

The present review considers 13 studies including 323 patients. The median age of patients was 78 years (59-84 years). In comparison of this, the application of the aforementioned perineal procedures is often used in older patients, too (Altemeier 75, 3 ± 14,1 years *vs.* Delorme 69, 4 ± 15,4 years) [19]. All studies showed also a female gender specificity of more than 90%. Elagili et al. reported an ASA-Score of III or IV at 66% of all patients included in the study, what is roughly equivalent to the other investigations mentioned in this review [19]. The median hospital stay was longer in Altemeier's than in Delorme`s group: 4 (1-44) days *vs.* 3 (0-14) days [19]. The median duration of hospital stay after PSPR was 5 days (3-8 days). The longer stays (more than 5 days) were not caused by post-operative morbidity, but instead mainly by additionally performed diagnostic procedures e.g. pre-operative colonoscopies or cardiac investigations [12,15]. Concerning operational time, there are clear differences between the three perineal techniques. Pinheiro reported a median duration of Altemeier`s procedure of 135 min, which is twice as much as the time needed for performing the procedure done in Delorme`s technique (median 65 min) [20,21]. The shortest operating time could be observed at PSPR-procedure with a median time of 43 min (30-63 min).

Primary and secondary prolapse

The analyzed investigations let us recognize that PSPR was applied in nearly 84% at the first event of a rectal prolapse. In 16% of all patients PSPR was applied as a therapy in case of a recurrence.

Complications

Elagili described a postoperative complication rate of 12% (Altemeier 5 (22%) *vs.* Delorme 4 (7%), p=0.04) [19]. Counterparts, Watkins observed 25% of 52 patients with postoperative complications after the Delormes procedure (urinary infection, fever, hypokalaemia, cardiac arrhythmia, suture line dehiscence, perineal cellulitis and bleeding) [22]. In 2001, Kimmins described a postoperative complication rate of 11% of 63 patients treated by an Altemeier repair. Complications mentioned were anastomotic leakage, stenosis, rectovaginal fistula and bleeding [3]. The postoperative complication rate of all PSPR- studies is about 15%. Most frequently, bleedings and hematomas occurred after the intervention (17/48). A total of 21% of all patients had to undergo a new operation, 12% of them due to bleeding. Sehmer analysed 7 postoperative complications (12,5%). Due to a rebleeding, two patients (3,6%) had to be reoperated [7]. Raahave described a postoperative complication rate of 16,7% (9/54). Four of the nine patients suffering from complications underwent a second procedure: two times a rebleeding had to be stopped and with two patients, the dilatation of a postoperative stenosis had to be dilated [17].

In 2005, Madiba reported mortality rates of 0-4% after the Delorme operation [23]. Senapati described 2013 five treatment-related deaths. Of these, four followed a perineal operation including one having myocardial infarction (Delorme's procedure), one patient suffered a chest infection/renal failure (Altemeier's procedure), one sepsis occurred due to anastomotic leakage (Altemeier's technique) and the other patient suffered a ruptured aortic aneurysm two days after the operation (Delorme's technique). The one deadly complication that followed an abdominal operation was due to peritonitis in a patient who was randomised to resection rectopexy but actually received suture rectopexy [24]. After PSPR, no treatment related deaths were documented.

Incontinence

After the Delorme procedure, fecal incontinence improved by 46% [21] and after the Altemaier-Mikulicz repair, up to 85% of patients reported an improvement in continence in comparison with the

preoperative findings [24]. Concerning fecal incontinence, a great variety can be observed: Hetzer mentioned that preoperative severe fecal incontinence disappeared postoperatively in 90% of patients [9]. Sehmer reported an improvement of those symptoms in 39% of patients treated by PSPR [7]. Several authors described the progress of preexisting incontinence after the PSPR operation, and Hummel reported the first occurrence of fecal incontinence after PSPR [15]. Nevertheless, nearly all studies which considered the Wexner Incontinence Score showed a significant improvement of fecal incontinence after PSPR.

Functional outcome

Senapati described 1994 that no patient became constipated and 50 percent of those constipated preoperatively were improved (after the Delormes repair) [21]. Elagili mentioned the postoperative stool frequency counts a median of 4 (1-40) after Altemeiers procedure and 6 (3-10) after operations performed in Delormes-technique. The bowel function improved from baseline to 6 weeks with this improvement maintained at 1 and 3 years but with no apparent differences between the two surgical procedures [19]. Results of the analysed studies show an improvement of constipation after PSPR.

Recurrence

The reason for a recurrent prolapse may be a weak anal sphincter, a muscle defect and reduced tone and squeeze. In addition, a previous hysterectomy, cysto- or rectoceles or difficult defecation may play a role.

Elagili described 2015 after a median follow-up of 13 (1-88) months a rate of recurrent prolapse of 14% (n=11) (Altemeier 2 (9%) *vs.* Delorme 9 (16 %) p=0.071) [19].

Senapati documented 2013 fewer recurrences after Altemeier's than Delorme's procedure (24/102 (24%) *vs.* 31/99 (31%)), but this difference was not statistically significant (HR 0.81; 95% CI 0.47-1.38; P=0.4) and the length of follow-up was 36 months [24]. Agachan compared 1997 the Delorme procedure and the perineal rectosigmidectomy (Altemeier). The recurrence rate was highest with the Delorme procedure, too (38% *vs.* 13% after Altemeier) [25]. Madiba reported 2005 recurrence rates of 4% to 38% [23]. Perineal rectosigmoidectomy has yielded poor functional results with respect to incontinence as well as high recurrence rates because of the loss of reservoir capacity due to a rather narrow colon above the anal anastomosis, together with some reduction in anal sphincter function. In this analysis after PSPR, the recurrence is analysed with 20% with a median follow-up of 18 months (range 3-40 months).

Additive sutures

Petersen analysed the important point of using additive sutures after finish the PSPR to treat the failure of the stapler due to a thick bowel-wall. He reviewed his data with a special respect to the necessity of additional anastomosis suturing. The stapler line was not oversewn routinely. Due to stapling failure, additional suturing of the anastomosis was necessary in 4 of 25 patients (16%). Age (74,1 *vs.* 83.1 years) and BMI (30.8 *vs.* 22,7 Kg/m^2) were significantly different with and without additional suturing (BMI correlates significantly with the specimen weight, and with the respective operative time). Operative time was longer (62 *vs.* 31 min) and more cartridges were used (12 *vs.* 6) in patients treated with additional suturing. Early postoperative complications after PSPR were observed in two patients without anastomosis suturing (bleeding and systematic inflammatory reaction). The postoperative hospital stay did not differ between both groups. Patients with extensive obesity with a substantial rectal prolapse may need additional suturing of the rectal anastomosis. However, this does not correlate with complications and it is not related to significant longer hospital stay [10]. The considered investigations constituted that in 8 of 13 studies the stapler line was reinforced with additional sutures. Raahave described an additional therapy using a hemostatic sponge placed at the stapler line. Nevertheless, he reported e rebleeding in 5 of 54 patients (9, 3%) [17]. Due to a very heterogeneous number of patients it remains unclear if an additional suture can avoid a rebleeding.

Sexual problems

In 1998, Yakut et al. evaluated their results in 94 patients and noted that the most important complications were sexual problems in male patients who underwent abdominal procedures like posterior rectopexy because of the extensive pelvic dissection [26]. In addition, to reduce the potential risk of injury to the pelvic nerves, a perineal approach may be preferable in young male patients. Raahave and Bajaj reported that none of the patients treated by PSPR suffered from postoperative sexual dysfunction [13,17].

Costs

The cost of material required for the PSPR procedure is comparatively high (approx. USD 1850- per intervention). The expense is mainly caused the staplers used in the procedure. Expenses can be reduced, in part, through the very short operation time [7].

Conclusion

In conclusion, the results of the existing studies evaluate the Perineal Stapled Prolapse Resection as an easy, fast and safe procedure. In particular, older and frail patients with a short life expectancy for whom an abdominal laparoscopic procedure under general anaesthesia is not advisable. Even patients with malignant diseases benefit from the aforementioned advantages (short hospital stay, doing the PSPR-procedure in local anesthesia). The reported rate of complications is low. Functional outcome proves satisfactory. The PSPR in younger female patients with substantial obesity and thick prolapse is complicated. In such cases, the Altemeier procedure should be regarded as an alternative. In comparison with the two other established perineal operation techniques, the PSPR procedure is quicker and easier to perform and can be done in short operation time with a very high patient satisfaction. The Altemeier and Delormes procedure are surgically demanding and time consuming.

Indeed, PSPR should be carried out by experienced surgeons who are able to switch to another surgical technique if necessary.

Conflict of Interest

None.

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