A. Köhler
S. Athanasiadis

The value of posterior levator repair in the treatment of anorectal incontinence due to rectal prolapse – a clinical and manometric study

Abstract *Background*: When treating a complete rectal prolapse, the most important objective is elimination of the prolapse. In addition, restoration of sufficient anorectal continence is extremely important for the patients. We examined the value of posterior levator repair with respect to stabilization of the pelvic floor and to improvement in anorectal incontinence. *Methods*: In patients with disabling anorectal incontinence, a posterior levatorplasty can be concomitantly performed during operative removal of the prolapse. To facilitate evaluation of the operative results, we implemented a scoring system to judge the patients' subjective symptoms of incontinence; in addition, we performed manometric measurements of resting and squeezing pressures of the anal sphincter to objectify the anorectal incontinence. *Results*: From 1991 to 1997, 84 patients (mean age 65±10 years, 38–91 years; 79 women, 5 men) with complete rectal prolapse and severe incontinence were operatively treated; corresponding follow-ups were done. The following procedures were performed: Frykmann-Goldberg, 28 patients; Wells, 18 patients; Ripstein, 22 patients; and perineal proctectomy, 16 patients. Incontinence for liquid and solid stools was present in all of these patients. Posterior levatorplasty was implemented in 38 patients, and in this group we found significantly better postoperative results, both clinically and in the manometric measurements. Continence was improved by 84% in the group with levatorplasty, but improvement was only 67% in the other group (*P*<0.05). The incontinence score decreased significantly in the group with levatorplasty (preoperative 16.4±3.1, postoperative 9.3±4.5, *P*<0.05, vs the other group with preoperative 15.6±4.2, postoperative 11.5±5.1). Manometric observations in the group with levatorplasty demonstrated 55% improvement in resting pressure (preoperative 29±17 cm H2O, postoperative 45±21 cm H2O, *P*<0.05) and 40% improvement in squeezing pressure (preoperative 61±25 cm H2O, postoperative 85±31 cm H2O, *P*<0.05). In the group without levatorplasty, resting and squeezing pressure improved only by 20% (resting pressure: preoperative 32±16 cm H2O, postoperative 38±18 cm H2O; squeezing pressure: preoperative 64±29 cm H2O, postoperative 75±26 cm H2O). *Conclusions*: Posterior levatorplasty is an easy and efficient operative procedure which facilitates an improvement in anorectal continence. There are no apparent disadvantages. For this reason, levatorplasty can be part of operative procedures implemented in the treatment of a complete rectal prolapse accompanied by disabling anorectal incontinence.

Keywords Rectal prolapse · Levatorplasty · Incontinence · Anorectal manometry

A. Köhler (✉) · S. Athanasiadis
St. Joseph Hospital Laar,
Clinic for Colo-proctology,
Ahrstrasse 100,
47139 Duisburg, Germany
Fax: +49-203-8001666

Introduction

Rectal prolapse is a disease entity which generally occurs in the older population, most often in women 60–80 years of age. As a rule, it is accompanied by severe anorectal incontinence, and obstipation also occurs quite often. Pathological mechanisms leading to the disease are not yet fully understood. Numerous operative methods and variations thereon have been developed. Until now, no method has been proven optimal.

Safety from recurrence is the most important criterion when treating a rectal prolapse. The rate of recurrence for all currently implemented procedures is under 10%. However, patients are most satisfied when their continence has also been sufficiently restored, and this objective has not been well realized. There are very few references in the literature that deal with incontinence changes after implementation of a levatorplasty [4, 13, 14, 15, 16]. Without exception, all of these authors report positive results. Until now, prospective randomized studies have not yet been performed.

In this study, we examined the value of posterior levator repair in the treatment of complete rectal prolapse. To judge procedural efficiency, the following questions should be asked:

1. Does continence change when utilizing only rectopexy?
2. Is continence different in patients who underwent dorsal levatorplasty when compared with patients with no levatorplasty?
3. Do sphincter pressure values correlate with the operative procedure?
4. May we expect certain disadvantages when we perform a supplemental levatorplasty?

Patients and methods

For patients with rectal prolapse accompanied by incontinence for liquid or solid stool, we have included levatorplasty in our operative decision making since 1991. The decision to perform levatorplasty was made depending on the operative situs and preoperative functional findings, which included subjective symptoms of the patients, clinical impression of the sphincter muscle and pelvic floor, and objective manometric values. Primarily due to our lack of experience with modality related to this treatment, we were very conservative and cautious in not implementing levatorplasty too often during the first few years. Positive results motivated us to implement this treatment more often in later years. This development has made it possible for us to recruit comparable patient populations with and without levatorplasty, both within the same framework of general study conditions.

In this study, we enrolled 84 patients (5 men and 79 women) with complete rectal prolapse and severe incontinence. The operation procedures were performed between 1991 and 1997. Postoperative control examinations were carried out for at least 2 years. Follow-up examinations with respect to clinical and functional results were conducted. All of these patients were incontinent for liquid and solid stool. Mean age was 65±10 years (38–91 years of age). Frykmann-Goldberg procedure [1] was implemented in 28 patients, Ripstein procedure [2] in 22 patients, Wells procedure [3] in 18 patients, and perineal resection [4] in 16 patients. Posterior levator repair was done in 38 patients. The postoperative follow-up period averaged 3.8 years (2–7 years).

After orthograde cleansing, the operation was performed in lithotomy position on the following day. Prophylactic antibiotics were used. The various operative techniques which were implemented are well known [1, 2, 3, 4]. Laparotomy was performed using a left pararectal incision.

Wells procedure

We mobilized the rectum circumferentially down to the pelvic floor, taking care to not damage the pelvic nerves. The rectum was lifted upward and an Ivalon sponge was fixed to the fascia in the concavity of the sacrum. The rectum was laid on fixed mesh which was wrapped around the bowel and trimmed so the anterior aspect of the rectum was left clear to avoid stenosis. The Ivalon sponge was fixed to both sides of the bowel with a row of Vicryl sutures, while the rectum was being drawn upward. Transverse closure of the longitudinal peritoneum pararectal incision scaled down the Douglas-Pouch; the implant was then in an extraperitoneal location, i.e., covered with visceral peritoneum. Two drains were placed at the lowest point of the pelvis.

Ripstein procedure

The peritoneum lateral to the rectum was incised bilaterally. The rectum was mobilized posteriorly from the sacrum. Care was taken to maintain lateral ligaments in the lower half. A 4-cm wide T-shaped band of Teflon mesh was placed around the rectum; the free ends were sutured to the presacral fascia approximately 3–4 cm below the sacral promontory. The sling should be sufficiently loose to allow one finger to be inserted alongside the rectum. The edges of the band were sutured to the rectum. The anterior tab of the Teflon mesh was sutured to the seromuscular layer of the anterior rectal wall below the peritoneal reflection. Finally, after peritoneal closure, the implant was in an extraperitoneal location and the lower pelvis was drained as described above.

Frykmann-Goldberg procedure

The rectum was mobilized posteriorly down to the coccyx and elevated, after which the rectum was attached to the periosteum of the sacral promontory with nonabsorbable suture material [1]. The excess peritoneum in the deep rectouterine or rectovesical pouch was resected and the peritoneal floor was sutured higher up. The redundant left colon was resected and anastomosis was performed with open technique at the site conveniently craniad to the promontory.

Perineal procedure

Prolapsed rectal segment was removed approximately 1.5–2 cm above the dentate line, taking care to not traumatize the sphincter system. Mobilization of the intestinal segment to be removed was performed close to the intestinal wall in order to protect neurogenic pelvic-floor structures. The length of the mobilized segment was chosen to enable tension-free anastomosis. It was sutured perineally with 0-Vicryl, using interrupted sutures.

Levator repair

If disabling anorectal incontinence was preoperatively present, we carried out a posterior levator repair. After locating both muscle

Table 1 Incontinence score (0–20)

	Never	Seldom	Occasionally	Often	Always
Incontinence for solid stool	0	1	2	3	4
Incontinence for liquid stool	0	1	2	3	4
Incontinence for flatus	0	1	2	3	4
Soiling	0	1	2	3	4
Using pads	0	1	2	3	4

divisions, they were adapted using 3–4 nonresorbable sutures to facilitate a narrowing of the hiatus.

We gathered data with respect to incontinence, which included subjective patient symptoms as well as objective manometric measurements. The patient questionnaire was standardized using an incontinence score (Table 1). Manometry was performed with a Microtransducer from Dantec (DISA system, type 21 K 61 Dantec, Dantec Elektronik Medicinsk, 2740 Skovlunde, Denmark). The microtransducer measures only one pressure. Each patient was measured two to three times, both on the left and right side of the anal canal. Mean values of the maximum anal resting and squeezing pressures were determined by means of manometry. The data were prospectively gathered by using documentation protocol. The clinical controls of the above-mentioned patients were carried out more than 2 years postoperatively.

Biometrics

Statistical evaluations were done using the student's t-test, with the $\chi 2$ test evaluated at $P<0.05$. Mean and standard deviations are present.

Results

Subjective symptoms of incontinence

Of the patient group in which levatorplasty was performed, continence improvement was found in 32 of 38 patients (84%). Of the patient group in which we did not perform levatorplasty, 31 of 46 patients (67%) felt that their symptoms had improved (Table 2). The difference between the groups was statistically significant ($P=0.03$).

In the patient population which was preoperatively incontinent for solid stools, we found an improvement in the continence levels in both subgroups. The patients with an additional levatorplasty faired slightly better (incontinence improvement: 89.5% with levatorplasty vs 82.5% without levatorplasty). However, if you compare these statistics to patients who were incontinent for liquid stools, incontinence improvement was very significant (improvement of 79% with levatorplasty vs 52% without levatorplasty).

Incontinence score

Improved continence was found in both groups. In the group without levatorplasty, improvement was not significant; the incontinence score decreased from 15.6±4.2

Table 2 Pre- and postoperative continence in patients with a complete rectal prolapse according to the operative procedure chosen

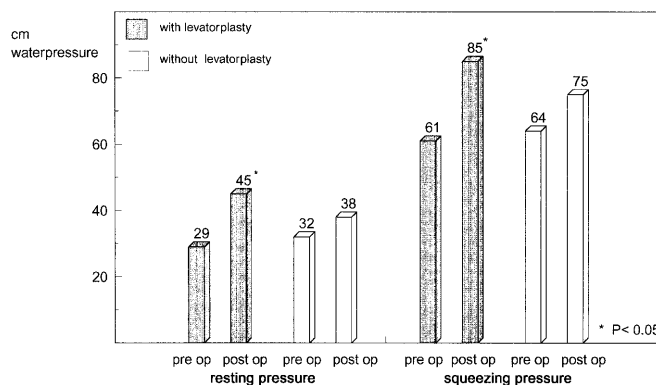|	Improved continence (%) (n)
Incontinence for solid stools (n=42)	
With levatorplasty (n=19)	89% (17)
Without levatorplasty (n=23)	82% (19)
Incontinence for liquid stools (n=42)	
With levatorplasty (n=19)	79% (15)
Without levatorplasty (n=23)	52% (12)
All patients (n=84)	
With levatorplasty (n=38)	84% (32)
Without levatorplasty (n=46)	67% (31)

Fig. 1 Comparison of pre- and postoperative tonometric values (in cm H2O). *Seldom* less than 1× per month, *Occasionally* less than 1× per week but more often than 1× per month, *Often* less than 1× per day but more often than 1× per week, *Always* more than once a day

to 11.5±5.1. In the group where a supplemental levatorplasty was performed, significant benefits were demonstrated ($P=0.0025$); the incontinence score decreased from 16.4±3.1 to 9.3±4.5.

Manometrics

Manometric values demonstrate that, as a whole, the resting and squeezing pressures improve (Fig. 1). When differentiating the groups, one sees a clear advantage for

patients in the levatorplasty group. Resting pressure in this group improved up to 55% (significant, $P=0.00014$), from 29 ± 17 cm H2O to 45 ± 21 cm H2O; for the group without levatorplasty, the corresponding values were 32 ± 16 cm H2O to 38 ± 18 cm H2O (not significant).

Squeezing pressure in the group with levatorplasty improved up to 40% (significant, $P=0.0004$), from 61 ± 25 cm H2O to 85 ± 31 cm H2O; in the other group, the corresponding values were: 64 ± 29 cm H2O to 75 ± 26 cm H2O (not significant).

Discussion

The most important objective when operatively treating a complete rectal prolapse is the effective removal of the prolapsed rectal tissue. Good results with rates of recurrence below 5% in abdominal procedures and below 10% in perineal procedures can be attained [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16]. Incontinence, which generally is also present, is only moderately improved, if at all, independent of the type of operative procedure implemented; this leads to patient dissatisfaction. In medical literature, reference is sometimes made to clinical successes attained when implementing a procedure in which levatorplasty was concomitantly performed with removal of the rectal prolapse. Williams et al. [14] report convincingly on the success of levatorplasty. Of 11 patients, 10 had postoperative clinical improvement in their continence. Prasad [4], Ramanujam [13], Deen [15], and Agachan [16] also report better improvements in continence when combining a levatorplasty with prolapse removal.

Overextension and stretching of the M. puborectalis and M. pubococcygeus lead to an abnormally wide hiatus, which is also displaced caudally. A posterior levator repair narrows the hiatus and partially raises the pelvic floor. This should raise tension in the muscular anal ring with concomitant increases in resting and squeezing pressures and achieve a functional extension of the anal canal with expansion of the anal high-pressure zone. Examinations with a vector manometer, which we do not perform at our institution, would be very helpful in judgement of the results. Long-term effects of supplementarily performed levatorplasty for the treatment of a complete rectal prolapse have been evaluated using patient interrogation concerning their symptoms, determination of incontinence scores, and objective manometric data. In this study, we were able to demonstrate that not only does levatorplasty positively influence both the resting and squeezing pressures of the sphincter system, but also that these improvements in pressure become clinically relevant for patients. In the group with levatorplasty, 84% of the patients felt their continence had improved. By comparison, only 67% of the patients without levatorplasty had the same subjective improvement. The incontinence score we utilized in this study emphasizes the positive effect of a levatorplasty; one can see that the score of this group is significantly better. Our manometric data also demonstrate a significant advantage for patients with levatorplasty: resting sphincter muscle tone increases by 55%, squeezing muscle tone increases by 40%. As there are very few studies in this area, we cannot compare our data.

Levatorplasty, either as an abdominal or perineal procedure, appears to have long-term positive influence on patient continence. We found no operative or functional disadvantages when performing this procedure adjunctively in the treatment of a complete rectal prolapse. Nonetheless, it should be realized that this patient group has extreme pelvic floor deficits, which may be improved but never normalized.

Conclusion

Answers to the questions

When operatively treating a complete rectal prolapse, rectopexy or perineal resection of the prolapsed rectal segment will bring about an improvement in the continence of patients.

A pronounced improvement in patient continence was found when a supplementary levatorplasty was performed. In the evaluation of patient continence, implementing an incontinence score, statistically better results were found in the group with levatorplasty.

Resting and squeezing sphincter pressures increased postoperatively in both groups. A 55% improvement in resting pressure and a 40% improvement in squeezing pressure demonstrate the significant advantage for patients who had a supplemental levatorplasty done. The procedure was not detrimental in any way; there was no development of severe narrowing of the hiatus with subsequent constipation or evacuation problems, and there were no supplementary technical problems operatively.

On the basis of our positive experiences when performing levatorplasty during removal of the rectal prolapse, we have broadened our indication for this combined procedure. The indication is independent of the operative procedure, be it Wells', Ripstein's, Fryckmann-Goldberg's, or a perineal resection.

Further prospective randomized studies dealing with this treatment modality should be carried out.

192

References

1. Frykmann HM, Goldberg SM (1969) The surgical treatment of rectal procidentia. Surg Gynecol Obstet 129:1225–1230
2. Ripstein CB (1969) A simple effective operation for rectal prolapse. Postgrad Med 45:201–204
3. Wells C (1959) New operation for rectal prolapse. Proc R Soc Med 52:602–605
4. Prasad ML, Pearl RK, Abcarian H, et al. (1986) Perineal proctectomy, posterior rectopexy and postanal levator repair for the treatment of rectal prolapse. Dis Colon Rectum 29:547–552
5. Watts JD, Rothenberger DA, Buls JG, et al. (1985) The management of procidentia: 30 years' experience. Dis Colon Rectum 28:96–102
6. Husa A, Sainio P, Smitten K (1988) Abdominal rectopexy and sigmoid resection (Fykman-Goldberg operation) for rectal prolapse. Acta Chir Scand 154:221–224
7. Gordon PH, Hoexter B (1978) Complications of the Ripstein procedure. Dis Colon Rectum 21:277–280
8. Holmström B, Brodén G, Dolk A (1986) Results of the Ripstein operation in the treatment of rectal prolapse and internal rectal procidentia. Dis Colon Rectum 29:845–848
9. Yoshioka K, Heyen F, Keighley MR (1989) Functional results after posterior abdominal rectopexy for rectal prolapse. Dis Colon Rectum 32:835–838
10. Stelzner F (1994) On the cause and therapy of rectal prolapse. Chirurg 65:533–545
11. Athanasiadis S, Heiligers J, Kossivakis D (1992) Anterior and posterior rectopexy with pelvic repair in patients with rectal prolapse and incontinence. Langenbecks Arch Chir 377:288–294
12. Athanasiadis S, Heiligers J, Kuprian A, Heumüller L (1995) Surgery of rectal prolapse by rectopexy and colectomy. Chirurg 66:27–33
13. Ramanujam PS, Venkatesh KS (1988) Perineal excision of the rectal prolapse with posterior levator and repair in elderly high-risk patients. Dis Colon Rectum 31:704–706
14. Williams JG, Rothenberger DA, Madoff RD, Goldberg SM (1992) Treatment of rectal prolapse in the elderly by perineal rectosigmoidectomy. Dis Colon Rectum 35:830–834
15. Deen KI, Grant E, Billingham C, Keighley MR (1994) Abdominal resection rectopexy with pelvic floor repair versus perineal rectosigmoidectomy and pelvic floor repair for full-thickness rectal prolapse. Br J Surg 81:302–304
16. Agachan F, Pfeifer J, Joo JS, Nogueras JJ, Weiss EG, Wexner SD (1997) Results of perineal procedures for the treatment of rectal prolapse. Am Surg 63:9–12