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Comparison of abdominal and perineal procedures for complete rectal prolapse: an analysis of 104 patients

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Purpose: Selecting the best surgical approach for treating complete rectal prolapse involves comparing the operative and functional outcomes of the procedures. The aims of this study were to evaluate and compare the operative and functional outcomes of abdominal and perineal surgical procedures for patients with complete rectal prolapse.
Methods: A retrospective study of patients with complete rectal prolapse who had operations at a tertiary referral hospital and a university hospital between March 1990 and May 2011 was conducted. Patients were classified according to the type of operation: abdominal procedure (AP) (n = 64) or perineal procedure (PP) (n = 40). The operative outcomes and functional results were assessed.
Results: The AP group had the younger and more men than the PP group. The AP group had longer operation times than the PP group (165 minutes *vs.* 70 minutes; P = 0.001) and longer hospital stays (10 days *vs.* 7 days; P = 0.001), but a lower overall recurrence rate (6.3% *vs.* 15.0%; P = 0.14). The overall rate of the major complication was similar in the both groups (10.9% *vs.* 6.8%; P = 0.47). The patients in the AP group complained more frequently of constipation than of incontinence, conversely, in the PP group of incontinence than of constipation.
Conclusion: The two approaches for treating complete rectal prolapse did not differ with regard to postoperative morbidity, but the overall recurrence tended to occur frequently among patients in the PP group. Functional results after each surgical approach need to be considered for the selection of procedure.
[Ann Surg Treat Res 2014;86(5):249-255]

Key Words: Rectal prolapse, Abdomen, Perineum, Procedure

INTRODUCTION

Rectal prolapse is a socially debilitating condition, characterized by rectal protrusion through the anus [1]. Complete rectal prolapse is full-thickness rectal wall prolapse. It is usually associated with a long history of constipation, and with varying degrees of faecal incontinence [2,3]. For this reason, when surgeons select which operational procedure to use, they should consider not only functional results following surgery but also other facts about the patient such as age, sex, comorbidity and the extent of prolapse. In addition, the recurrence, morbidity and mortality rates associated with each procedure need to be considered. Although more than 100 different procedures for the treatment of complete rectal prolapse were described in the 20th century [4-6], the procedures fall into two broad categories, according to whether the route of access is abdominal or perineal [6]. Complete rectal prolapse has been studied in various subjects, and some studies have compared abdominal and perineal procedures [1,6]. Abdominal procedures (APs) generally offer lower rates of recurrence but are associated with

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higher morbidity rates than perineal procedures [1,3,7]. These results might help to select suitable operative procedures for patients with complete rectal prolapse.

In this study we aimed to evaluate and compare the patient factors, operative and functional outcomes of both procedures used to treat patients with complete rectal prolapse.

METHODS

The medical records of all patients who had primary operation for complete rectal prolapse at a tertiary referral hospital and a university hospital between March 1990 and May 2011 were reviewed retrospectively. The study was approved by the Institutional Review Boards.

Of 127 patients, 19 (9 abdominal and 10 perineal) were excluded because follow-up was less than six months and they could not be contacted by telephone and 4 who underwent Thiersch's operation were also excluded. Follow-up data were obtained from medical records and from standardized telephone interviews in May and June 2012. For patients who had died or whose personal information was lost at the time of the telephone interview, we used the data recorded at the previous follow-up.

The 104 eligible patients were divided into two groups: those who had an AP (n = 64) and those who had a perineal procedure (PP) (n = 40). The operations were performed by four colorectal surgeons (A, B, C, and D). The indication of surgical treatment was the patient's distress related to complete rectal prolapse in the entire patient. The APs included open and laparoscopic rectopexy (modified Ripstein's method) with or without resection. The modified Ripstein's method

was performed as follows; posterior fixation of the knitted monofilament polypropylene mesh (Marlex mesh, C.R. Bard, Inc., Murray Hill, NJ, USA) to the sacrum with attachment of the ends of the mesh to the rectum laterally [8], in open as well as laparoscopic surgery. The PPs included Delorme's and Altemeier's procedures.

The operative outcomes analyzed were operation time, length of hospital stay, complications, and recurrence rate. Recorded functional outcomes were constipation, incontinence and manometric results. Constipation was evaluated using the scoring system of Agachan et al. [9], and faecal incontinence was evaluated using the Wexner score [10]. The constipation and incontinence outcomes were categorized as: none, improved, same, or worse. A same or worse outcome was defined as persistent constipation or incontinence compared with the preoperative condition. Of 70 patients at a tertiary referral hospital, 36 patients agreed with the manometric assessment and manometric values were measured at two time points, preoperative and postoperative period. Postoperative measurement was usually checked between 3 and 6 months after operation. The complications were divided into four categories, based on their timing and severity: immediate major or minor complications (within two months of operation), and delayed major or minor complications (two months or more after operation). Major complications were defined as those requiring surgical intervention or hospitalization. Minor complications were defined as those not requiring surgical intervention or hospital admission. Recurrence of rectal prolapse at the follow-up examination or telephone interview was defined as either a recurring full-thickness prolapse, or the recurrence of prolapsed symptoms.

Table 1. Baseline characteristics of patients with complete rectal prolapse who underwent an abdominal or perineal procedure

Characteristic	Abdominal procedure (n = 64)	Perineal procedure (n = 40)	P-value
Age (yr)	52 ± 17	67 ± 12	<0.001*
Sex			
Female/male	28/36 (43.8/56.3)	27/13 (67.5/32.5)	<0.001*
Reducible, yes	61 (95.3)	38 (95.0)	0.94
Presence of comorbidity[a]	32 (50.0)	24 (60.0)	0.32
Prolapsed length (cm)	6.25 ± 2.68	5.24 ± 2.83	0.07
Duration of prolapse (yr)	11 ± 12	16 ± 17	0.09
Main reason for operation			0.29
History of constipation	17 (26.6)	16 (40.0)	
History of incontinence	13 (20.3)	12 (27.5)	
Prolapse	17 (26.6)	3 (7.5)	
Others[b]	17 (26.6)	10 (25.0)	
Anesthesia type, general	64 (100)	15 (37.5)	<0.001*

Values are presented as mean ± standard deviation or no. of patients (%).
[a]Cardiovascular diseases, chronic obstructive lung diseases, diabetes mellitus, and chronic hepatitis. [b]Anal bleeding, incarcerated rectum, anal pain, and recurrence of prolapse and/or symptoms.
*Statistically significant.

The patient groups were compared using the chi-square test for proportions or Fisher exact test, as appropriate. The pre- and postoperative manometric values were compared using an unpaired Student t-test. Univariate analysis using binary logistic regression was used to assess the risk of delayed major complication. The 5-year recurrence-free period (RFP) was calculated using the Kaplan-Meier method and compared using the log rank test. Statistical significance was defined as P <0.05, and all analyses were performed using the IBM SPSS ver. 19.0 (IBM Co., Armonk, NY, USA).

RESULTS

Patient characteristics

The median follow-up period was 26 months (interquartile range [IQR], 7–87 months) in the AP group and 22 months (IQR, 8–65 months) in the PP group. The PP group had older (67 years vs. 52 years; P < 0.001) and contained more women than the AP group (67.5% vs. 43.8%, P < 0.001). The AP group tended to have longer prolapsed pre-operative bowel lengths without significance (6.25 cm vs. 5.24 cm, P = 0.07) (Table 1). The two groups had similar preoperative parameters: reducibility, presence of comorbidity, duration of prolapse, and main reason

for the operation (Table 1). Of the 64 patients treated with AP, 62 underwent rectopexy (16 rectopexies with resection); of these, 26 used a laparoscopic approach (20 cases of rectopexy and six rectopexies with resection). Two patients underwent open anterior resection. Of the 40 patients treated with PP, 36 underwent Delorme's procedure and four had Altemeier's procedure (Table 2). There were no postoperative deaths in either group.

Operative outcomes and recurrence

The AP group had longer operation times and hospital stays than the PP group, but similar relief of symptoms. The recurrence outcomes showed a lower overall recurrence rate (6.3% vs. 15.0%, P = 0.14) and a higher 5-year RFP (89.3% vs. 79.4%, P = 0.13) in the AP group compared with the PP group (Table 3).

The characteristics of recurrence differed between the two groups. In the AP group, recurrence depended on the early experience of the surgeons, because it occurred in one of the four patients (25%) who underwent open posterior rectopexy in 1997 to 1998, and this was when two colorectal surgeons began performing these operations. By contrast, there was no recurrence in any of the patients whose open posterior

Table 2. Surgical methods for patients with complete rectal prolapse and surgical details by four surgeons

Operation type	Surgeon A	Surgeon B	Surgeon C	Surgeon D	Total
Posterior rectopexy	16 (15.4)	2 (1.9)	2 (1.9)	6 (5.8)	26 (25.0)
Resection c rectopexy	-	5 (4.8)	4 (3.9)	1 (0.9)	10 (9.6)
Resection, only	-	-	2 (1.9)	-	2 (1.9)
Lap-rectopexy	-	-	-	20 (19.2)	20 (19.2)
Lap-resection c rectopexy	-	3 (2.9)	2 (1.9)	1 (0.9)	6 (5.8)
Delorme's procedure	8 (7.7)	12 (11.5)	9 (8.7)	7 (6.7)	36 (34.6)
Altemeier's procedure	-	-	2 (1.9)	2 (1.9)	4 (3.9)

Values are presented as no. of patients (%).
Lap-rectopexy, laparoscopic posterior rectopexy; Lap-resection c rectopexy, laparoscopic resection with posterior rectopexy.

Table 3. Clinical and functional outcomes of patients with complete rectal prolapse who underwent an abdominal or perineal procedure

Variable	Abdominal procedure (n = 64)	Perineal procedure (n = 40)	P-value
Operation time (min)	165 ± 67	70 ± 38	<0.001*
Hospital stay (day)	10 ± 4	7 ± 2	<0.001*
Functional outcomes	21 (32.8)	17 (41.4)	
Persistent[a] constipation	13 (20.3)	6 (15.0)	0.490
Persistent[a] incontinence	8 (12.5)	11 (27.5)	0.054
Overall recurrence	4 (6.3)	6 (15.0)	0.140
5-year RFP (%)	89.3 ± 5.5	79.4 ± 8.0	0.130

Values are presented as mean ± standard deviation or no. of patients (%).
RFP, recurrence-free period.
[a]Constipation and incontinence was the same or worse after the operation.
*Statistically significant.

rectopexy was carried out by a colorectal surgeon who had enough experience for posterior rectopexy before included period. In addition, recurrence occurred in one of the five patients (20%) who underwent laparoscopic posterior rectopexy in 2002 to 2004, when laparoscopic surgery for colorectal disease was started to be performed at our institution. The overall recurrence rate for the laparoscopic approach in our institution between 2005 and 2011 was 6.7% (1/15), which is consistent with the overall recurrence rates of APs performed previously in our institution. In the PP group, recurrence depended on the type of operative procedure. Recurrence occurred in one of the four patients (25.0%) who underwent Altemeier's procedure, whereas only five of the 36 patients (13.9%) who underwent Delorme's procedure had recurrence.

Compared open posterior rectopexy, which was used the most in AP, with Delorme's operation in PP, the results were similar to those between the AP and PP group. The group that underwent Delorme's operation was older (68 years vs. 51 years, P < 0.001) and contained more women than the open rectopexy group (63.9% vs. 41.3%, P = 0.04). The two groups had similar preoperative parameters like a comparison of the AP and PP group. The open posterior rectopexy group had longer operation times (164 minutes vs. 66 minutes, P < 0.001) and hospital stays (11 days vs. 7 days, P < 0.001) than the Delorme's group, but had similar rates of minor and major complication (minor: 10% vs. 7%, P = 0.78; major: 2% vs. 4%, P = 0.59). Recurrence developed less frequently in the open posterior rectopexy group than in the Delorme's operation group (3.8% vs. 13.9%, P = 0.187).

A summary of the analysis of complications is presented in Table 4. There were no cardiac, respiratory or renal complications in either group. The frequencies of the four categories of complication were similar in the both groups. Univariate analysis showed no significant association between the operative approach and the frequencies of the four categories of complication. However, in the AP group, delayed major complications occurred more frequently among patients combined with resection than rectopexy-only cases (35.3% vs. 8.5%, P = 0.009).

Functional outcomes

Persistent constipation or incontinence after surgery was observed in 21 patients in the AP group and in 17 patients in the PP group. In the AP group there were more complaints of constipation than of incontinence; by contrast, the patients in the PP group complained more frequently of incontinence than of constipation. The difference of persistent constipation between two groups was not statistically significant (P = 0.49), but persistent incontinence between two groups were marginally different (P = 0.054) (Table 3).

With regard to the manometric results, both groups exhibited higher mean postoperative maximal resting pressure (MRP) than before the operation (Fig. 1) (preoperative vs.

Table 4. Postoperative complications in patients with complete rectal prolapse who underwent an abdominal or perineal procedure

Variable	Abdominal procedure (n = 64)	Perineal procedure (n = 40)	P-value
Immediate[a] minor[c] complications	12 (18.8)	5 (12.5)	0.40
Wound infection	4	2 (D)	
Urinary retention	4 (1 OR, 1 OPR, 2 LPR)	1 (D)	
Anal pain during defecation	3	1	
Temporary hematochezia	1	1	
Immediate[a] major[d] complications	4 (5.8)	1 (2.5)	0.38
Ileus	3 (2 OR, 1 OPR)		
Anastomosis site leakage	1 (LRPR)		
Anal stricture		1 (D)	
Delayed[b] minor[c] complications	6 (9.4)	2 (5.0)	0.42
Urinary retention	2	0	
Sexual dysfunction	4	2	
Anal pain	1	2	
Delayed[b] major[d] complications	9 (14.1)	3 (7.5)	0.30
Ileus	2 (ORPR)		
Anastomosis stricture	3 (2 ORPR, 1 LRPR)	2 (D)	
Incisional hernia	3 (2 ORPR, 1 OPR)		
Recto-vaginal fistula	1 (ORPR)		
Rectal perforation		1 (D)	

OR, open resection; OPR, open posterior rectopexy; LPR, laparoscopic posterior rectopexy; LRPR, laparoscopic resection with posterior rectopexy; ORPR, open resection with posterior rectopexy; D, Delorme's procedure.
[a]Within 2 months of the operation. [b]More than 2 months after the operation. [c]Did not require surgical intervention or hospital admission. [d]Required surgical intervention or hospitalization.
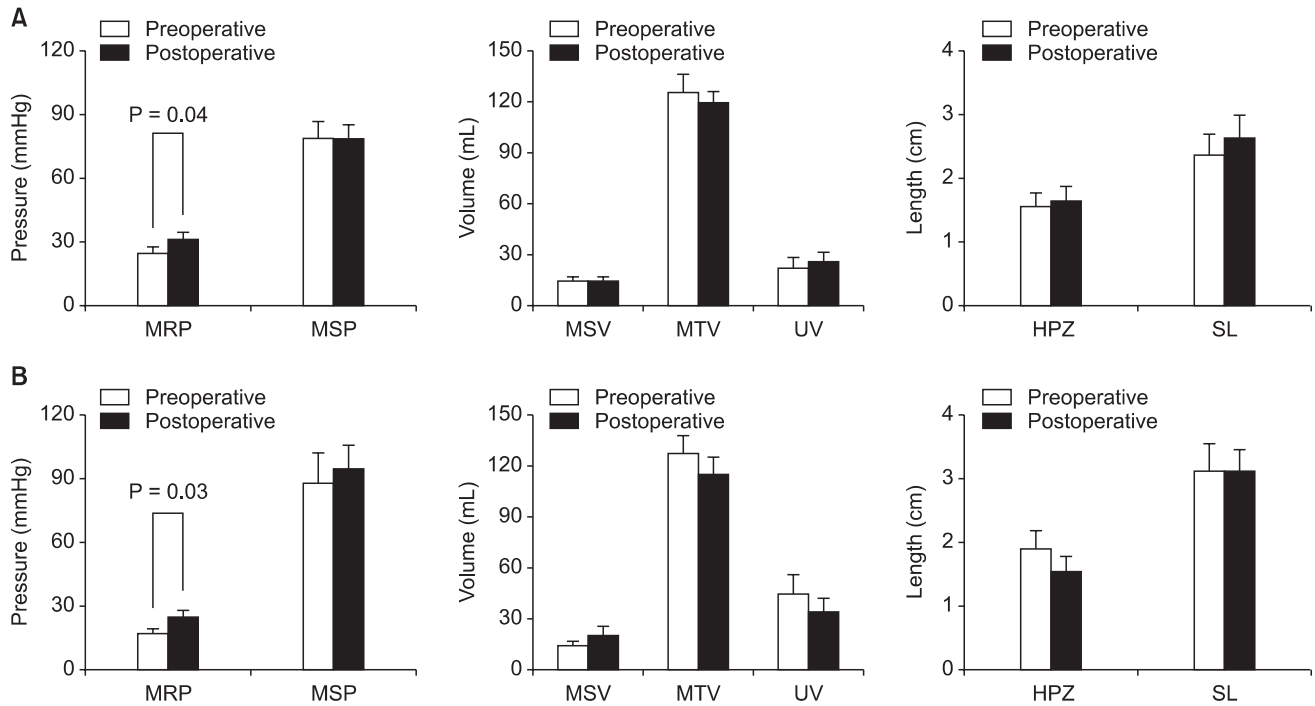
Fig. 1. Pre- and postoperative manometric results in the abdominal (A) and perineal procedure (B) groups. The postoperative values were generally obtained between three and six months after the operation. For both groups, the mean maximal resting pressure (MRP) after the operation was higher than the preoperative MRP. The other manometric values did not changed significantly in either group. MSP, maximal squeezing pressure; MSV, minimal sensory volume; UV, urgent need to defecate volume; MTV, maximal tolerance volume; SL, sphincter length; HPZ, high-pressure zone.

postoperative; AP group: 24.6 mmHg *vs.* 30.6 mmHg, respectively; PP group: 16.7 mmHg *vs.* 24.4 mmHg, respectively). However, the postoperative MRP values were still below the normal MRP range. The pre- and postoperative measurement of other manometric values remained unchanged in both groups. These included maximal squeezing pressure, minimal sensory volume, maximal tolerance volume, urgent need to defecate volume, high-pressure zone length and sphincter length (Fig. 1).

DISCUSSION

Several operational procedures for complete rectal prolapse have been performed in our institution over the past two decades. Delorme's procedure was the most commonly performed in our institution throughout the entire study period. By contrast, the type of AP has changed during the last decade because laparoscopy has been increasingly used since 2002: two laparoscopic procedures (22.2% of all APs) were introduced in 2002 and half of the patients who underwent AP in 2010 had laparoscopic procedures. Although several different procedures were performed, the current study compared the AP and PP groups.

Before the comparison of the AP group and the PP group, the current study showed that the relationship between gender and the incidence of rectal prolapse in Korea was very different to that in the West. According to a western review [11], rectal prolapse is more common in women, and more than 80% of patients are female. A Korean study, however, reported similar incidences in men and women [12]. Among the patients who were treated surgically for complete rectal prolapse in the current study, there were similar numbers of females and males (female/male ratio, 52.8%/47.2%), but the proportion of women among the elderly patients aged 70 or older was about 80% (female/male ratio, 80.6%/19.4%). This means the incidence in young male patients is relatively high in Korea. Another Korean study demonstrated that the age of onset for male was lower, the duration of symptoms was longer, and surgery in male was performed younger than in female (mean age, 51 years *vs.* 64 years) but the severities of incontinence and constipation were lower in male [13]. What makes this difference in incidence among the Korean and the Western is not clear though we suspected the life style which apt to strain in one of the reason. Further study is needed to investigate the incidence of complete rectal prolapse in Korea because the current study was not population-based.

In the current study, the AP group was younger and had a longer prolapsed length of rectum than the PP group. The choice of approach was generally influenced by a clinical preference for a PP because of age and/or pre-existing conditions [7]. Our data suggest that in our institution the age of the patient and

the prolapsed length were major considerations in selecting the operation type, as in other studies [6,11,14]. However, there was no significant association between the four complication categories and patient factors (age, sex, reducibility, comorbidity, prolapsed length, duration of disease, main reason for operation, and operation types).

Patients in the PP group had shorter hospital stays, shorter operation times, and higher recurrence rates than patients who had an AP, as shown in previous studies [3,4,15-19]. The PP group was followed up for a shorter time (a median of 4 months less than the AP group), so the recurrence rate at set intervals would be higher for the PP patients. When we analyzed the relationship between the recurrence and the operative approach, the current study showed that recurrences were correlated with the surgeon's early experience in the AP group and the operative method in the PP group. Our observations suggest that surgeons' increased familiarity with APs (both open operations and laparoscopy) might be associated with lower recurrence. Some studies [20,21] suggested that the learning curve for AP might be responsible for recurrences. In the PP group, the recurrence rates are consistent with the rates that have been reported previously: 0%–20% for Altemeier's procedure [22], and 4%–38% for Delorme's procedure [11].

In the current study, AP combined with resection was a risk factor of the delayed major complications; six of the seven patients (85.7%) experienced delayed major complications (rectopexy only *vs.* resection; odd ratio, 0.19). Resection procedures are reported to significantly reduce constipation in patients who complain of this symptom before surgery [4], but surgeons should be aware of the tendency for delayed major complications.

Persistent constipation was more common than persistent incontinence in the AP group, although this was not statistically significant. In contrast, persistent incontinence tended to be more frequent than persistent constipation in the PP group. This may indicate that the presence of constipation or incontinence before surgery influenced the choice of operative approach. Especially, surgeon would note higher rate of persistent incontinence in the PP group than in the AP group.

In the current study, manometric measurements revealed that the pre- and postoperative measurement of all manometric values except MRP value remained unchanged in both groups and the postoperative MRP values were still below the normal MRP range. Therefore, this study could not suggest whether manometric studies for complete rectal prolapse could predict functional outcomes. A recent study [23] suggested that preoperative manometry could predict the fecal continence rate after proctectomy, because patients with MSP above 60 mmHg had significantly better outcomes. However, it should be noted that there was no long-term physiological follow-up of patients [23]. Further research might be needed to determine a value of physiological study as a predictor of functional outcome.

A study [24], in the early 1990s, insisted that the AP would be performed when PP was failed in the results obtained from younger patients. Recently, laparoscopic ventral rectopexy (LVR) has gained wide acceptance [25] as the surgical treatment of rectal prolapse associated with low complication and recurrence rate [26]. The results of the current study might support LVR partly because the current study showed high incidence of young patients in Korea, relatively higher 5-year RFP in the AP group, and comparable complications. However, the PP would be preserved for the selected patients who should avoid general anesthesia although comparable study [27] was existed.

The present study has a number of limitations that should be considered when interpreting the results. As in all retrospective observational cohort studies, there is potential for both referral and selection bias. The assessment of patients by telephone without physical examination was subjective; although it used detailed questionnaires, it was likely that recurred prolapse was underestimated by the patients. The subgroup analysis of manometric finding was restricted by the small number of patients and the limited implementation of manometry. Intervention groups in the current study were heterogeneous. For this reason, additional comparison between open posterior rectopexy and Delorme's procedure was performed. The current study, however, would provide insight into changes in procedures over time, factors influencing the choice of operative procedure, and factors affecting recurrence.

In the operative management of complete rectal prolapse, there was no significant association between major or minor complications and patient factors. The AP group had similar postoperative complications compared with the PP group except AP combined with resection for a risk of delayed major complications. The overall recurrence in the PP group tended to occur frequently, compared with the AP group. Persistent constipation was more frequent in the AP group, while, persistent incontinence was more prominent in the PP group. Preoperative functional deficit and the early experience of surgeon for AP procedure, accompanied with age, comorbidities, and the length of the prolapsed rectum, would be considered for the selection of surgical procedures.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ACKNOWLEDGEMENTS

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