

Original Research Article

Comparison of Safety and Efficacy between Laparoscopic Ventral Rectopexy and Delorme's Procedure for External Rectal Prolapse in Nonagenarians

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Abstract

Objectives: This study evaluates the safety and efficacy of laparoscopic ventral rectopexy (LVR) in nonagenarian patients with external rectal prolapse (ERP) compared to Delorme's procedure.

Methods: We conducted a retrospective analysis of prospectively collected data, including nonagenarian patients who underwent either LVR or Delorme's procedure, comparing outcomes such as morbidity, length of hospital stay (LOS), and recurrence rates.

Results: Between September 2009 and August 2023, 22 patients (median age 91, range 90–94 years) underwent LVR, while 12 patients (median age 91, range 90–96 years) received Delorme's procedure. Baseline characteristics, including sex ratio, parity, American Society of Anesthesiology grade, and Body Mass Index, did not significantly differ between the groups. LVR had a significantly longer operating time but lower blood loss than Delorme's procedure. Postoperative LOS was significantly shorter for LVR patients (median 1, range 1–3 days) compared to Delorme's procedure patients (median 2.5, range 1–13 days; $P = 0.001$). Notably, no significant morbidity occurred in the LVR group, while one case of delirium and another of solitary rectal ulcer syndrome were observed in the Delorme's procedure group. Recurrence rates were lower in the LVR group, with no recurrences during a median follow-up of 23 months (range 1–65 months), compared to one recurrence at 2 months during a median follow-up of 34 months (range 1–96 months) in the Delorme's procedure group.

Conclusions: LVR is a safe and effective surgical option for nonagenarian ERP patients, showing favorable outcomes in terms of morbidity, LOS, and recurrence rates compared to Delorme's procedure.

Keywords

external rectal prolapse, laparoscopic ventral rectopexy, Delorme's procedure, nonagenarians, morbidity

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Introduction

External rectal prolapse (ERP) is characterized by the protrusion of the full-thickness rectal wall through the anal canal. This condition predominantly affects women, with a notable female-to-male ratio of approximately 10:1[1,2]. Notably, the incidence of ERP among females peaks during the seventh decade of life, with more than half of female pa-

tients aged over 70 years[3]. The global demographic landscape is witnessing an upsurge in the elderly population owing to increased life expectancies. According to the 2023 Statistics Bureau of Japan, individuals aged 80 to 90 years and 90 to 99 years constitute 7.9% and 2.1% of the population, respectively[4]. Consequently, a concurrent rise in ERP cases within this age bracket is observed. Despite a growing body of research on laparoscopic surgery outcomes among

nonagenarians with various medical conditions[5-7], there remains a paucity of literature addressing the surgical management outcomes of ERP within this specific population.

In recent times, laparoscopic ventral rectopexy (LVR) has emerged as a prominent therapeutic approach for ERP. LVR not only offers the advantage of minimal morbidity but also effectively addresses prolapse-related bowel symptoms, including fecal incontinence and obstructed defecation[8-10]. Moreover, the recurrence rate of ERP subsequent to LVR remains generally low. A comprehensive systematic review underscores this point, citing prolapse recurrence rates ranging from 0% to 17%[11]. Although an earlier study examined the safety of LVR in patients aged 80 years and above, it was neither a comparative analysis involving perineal procedures nor did it adequately include a substantial proportion of nonagenarian patients, accounting for merely 14% (11/80)[12].

Against this backdrop, the present study seeks to evaluate postoperative morbidity following LVR in nonagenarian patients afflicted with ERP. Moreover, it aims to conduct a comparative assessment of outcomes in this age group between LVR and Delorme's procedure—an alternative surgical approach for ERP management.

Methods

Patient selection and data collection

Patients with ERP who underwent surgery for ERP between September 2009 and August 2023 were included in this prospective study. All patient data were meticulously recorded in a dedicated pelvic floor database. From this cohort, a subgroup of patients aged 90 years and older at the time of surgery was identified and retrospectively analyzed. This study was approved by the Ethics Committee of Kamada Medical Center (approval number 23-055).

Diagnostic criteria

Diagnosis of ERP was established through clinical evaluation or, when clinical assessment was inconclusive, based on findings from evacuation proctography. The decision to perform LVR was determined after careful evaluation by an anesthesiologist, considering the safety of general anesthesia and the patient's preference for this approach. Delorme's procedure was chosen in cases where general anesthesia was deemed unsafe by the anesthesiologist or when patients expressed a preference for this technique.

Study objective

The primary objective of this study was to assess the safety and outcomes of LVR in patients aged 90 years and older, in comparison to the perineal procedure, with a specific focus on Delorme's procedure.

Surgical technique

LVR

The LVR procedure closely followed the technique initially described by D'Hoore et al.[13]. Throughout the study period, modifications were introduced[14]. Notably, the approach for attaching the polypropylene mesh to the sacral promontory evolved from employing an endofascial stapler (Endopath™, EMS; Ethicon Endo-Surgery, Cincinnati, OH, USA) to using titanium tacks (Autosuture Protract™; Tyco Healthcare, Mansfield, MA, USA) since July 2014. Additionally, the method of mesh insertion underwent a transformation, transitioning from the original intraabdominal technique[13] to a modified technique in female patients[14] from July 2012. This adapted technique involved passing a nylon thread with a straight needle through the posterior vaginal wall during dissection of the rectovaginal septum down to the pelvic floor. The nylon thread was retrieved from the abdominal cavity and secured at the end of the extracorporeal mesh, which was then introduced and maneuvered towards the pelvic floor.

Delorme's procedure

The surgical protocol for Delorme's procedure adhered to the previously established approach[15]. The rectal prolapse was fully exteriorized, and a circumferential incision was made approximately one centimeter proximal to the dentate line. Subsequent steps included submucosal dissection of the mucosa to the apex of the prolapse. Mucosal stripping extended from the external to the internal side of the prolapse, halting when tension impeded further dissection. The length of stripped mucosa approached twice the length of the exteriorized prolapse. Suturing of the rectal muscle wall was performed using 3-0 absorbable sutures. Three or four sutures per quadrant were tied, telescoping the muscular wall. Concluding the procedure, a series of interrupted 3-0 absorbable sutures united the cut mucosal edges.

Follow-up and recurrence assessment

Postoperatively, patients underwent follow-up assessments at 3, 6, and 12 months, and subsequently on an annual basis. Each evaluation included a physical examination utilizing a proctoscope. Patients who missed scheduled follow-ups were contacted by mail or phone to elicit information regarding symptoms. Those reporting sensations of prolapse were further evaluated in a clinical setting. Recurrent ERP was diagnosed based on clinical presentation, characterized by the protrusion of the full thickness of the rectum through the anal canal. Instances of mucosal prolapse, involving only the rectal or anal mucosa, were not classified as recurrent ERP.

Statistical analysis

Quantitative data were presented as medians with ranges.

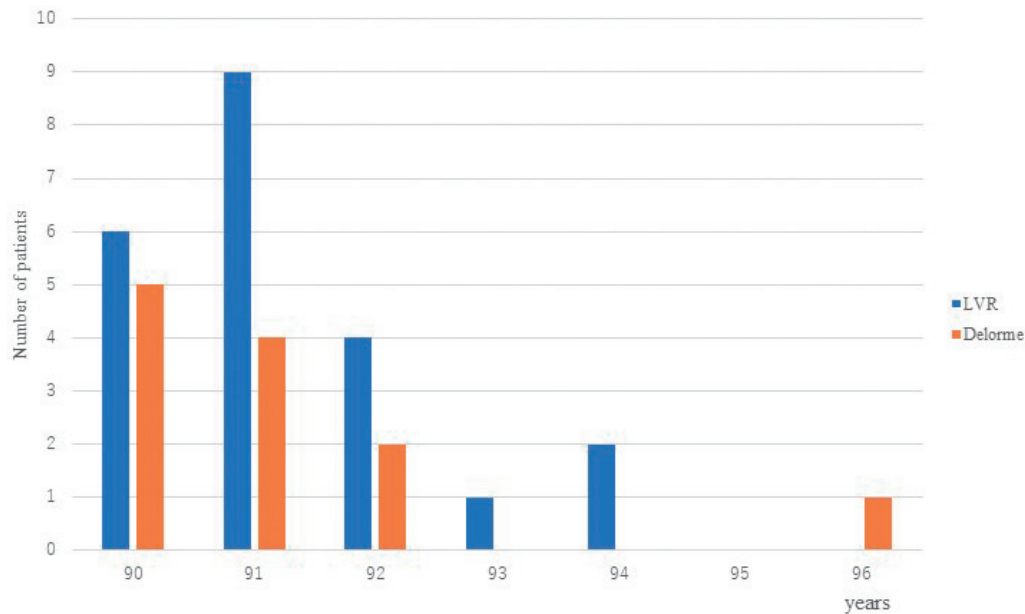


Figure 1. Age distribution.
LVR, laparoscopic ventral rectopexy

Statistical analysis included the Mann-Whitney U test for unpaired data, while categorical variables were compared using the Fisher's exact test. SPSS v26 (IBM Corp., Armonk, NY, USA) was employed for all statistical computations.

Results

Patients

Between September 2009 and August 2023, a total of 285 patients with ERP underwent surgery. The surgical procedures employed included LVR in 206 cases, Delorme's procedure in 72 cases, and perineal rectosigmoidectomy in 7 cases. From this cohort, 22 patients who underwent LVR and 12 patients who underwent the Delorme's procedure were identified as those aged 90 years and older at the time of surgery. Information on the study protocol was made public, and the patients were informed that they could withdraw their consent. However, none of the patients or their relatives refused to participate in the study.

Out of the patient cohort, 34 individuals (11.9%) were aged 90 years or older. Among them, 22 patients [median age 91 (range 90–94) years] underwent LVR, while 12 patients [median age 91 (range 90–96) years] underwent the Delorme's procedure (Figure 1). Notably, perineal rectosigmoidectomy was not administered to any of the patients. A comprehensive overview of patient characteristics is provided in Table 1. There were no significant differences observed between the two groups in terms of sex ratio, parity, American Society of Anesthesiology (ASA) grade, Body Mass Index (BMI), or the occurrence of prior pelvic floor

surgeries. It's noteworthy that five patients who received the Delorme's procedure had undergone surgery for recurrent ERP, including prior LVR in three cases, Delorme's procedure in one case, and the Gant-Miwa procedure in another case. Conversely, one patient who underwent LVR was treated for recurrent ERP subsequent to a prior Delorme's procedure. The proportion of recurrent ERP cases for which each procedure was performed differed significantly between patients who underwent LVR and those treated with Delorme's procedure [4.5% (1/22) vs. 41.7% (5/12), $P = 0.01$].

Operative results

A detailed account of operative outcomes can be found in Table 2. LVR was conducted under general anesthesia for all patients, while the Delorme's procedure was performed under general anesthesia in one patient and under spinal anesthesia in eleven patients. In cases where pelvic organ prolapse was concurrent, three patients underwent both LVR and sacrocolpopexy. The operative duration was significantly longer for patients undergoing LVR as compared to those undergoing the Delorme's procedure. Additionally, patients undergoing LVR exhibited significantly lower blood loss in comparison to those undergoing the Delorme's procedure. Notably, the postoperative hospital stay was markedly shorter for patients who underwent LVR, with 68% of LVR patients (15 out of 22) being discharged within a single day, as opposed to only 17% (2 out of 12) of Delorme's procedure patients.

Morbidity

Remarkably, no instances of mortality were recorded in

Table 1. Characteristics of Patients.

	LVR	Delorme	<i>P</i> value*
No. of patients	22	12	—
Age, years	91 (90-94)	91 (90-96)	0.51
Sex			1.00
Female	20	11	
Male	2	1	
Vaginal delivery	2 (0-5)	2 (0-4)	0.82
American Society of Anesthesiology			1.00
2	14	7	
3	8	5	
Body mass index	20.1 (14.9-29.7)	21.2 (17.7-26.0)	0.57
Previous pelvic floor surgery	5	6	0.14
Hysterectomy	4	0	
Hysterectomy + LVR for ERP	0	2	
LVR for ERP	0	1	
Delorme for ERP	0	1	
Pelvic organ prolapse (POP) surgery	0	1	
POP surgery + Delorme for ERP	1	0	
POP surgery + Gant-Miwa procedure for ERP	0	1	
Previous surgery for ERP	1 (4.5%)	5 (41.7%)	0.01

Values are presented as *n* or median (range).

LVR, laparoscopic ventral rectopexy; ERP, external rectal prolapse

*Mann-Whitney *U* test or Fisher's exact test.

Table 2. Operative Data.

	LVR (<i>n</i> = 22)	Delorme (<i>n</i> = 12)	<i>P</i> value*
Operating time, min	146 (99-309)	97 (67-158)	0.001
Blood loss, ml	5 (2-30)	50 (10-220)	< 0.0001
Postoperative hospital stay, days	1 (1-3)	2.5 (1-13)	0.001
Morbidity	0	2	0.12
Delirium	0	1	
Hemorrhage	0	1	
Combined with sacrocolpopexy	30	0	0.54

Values are presented as *n* or median (range).

LVR, laparoscopic ventral rectopexy

*Mann-Whitney *U* test or Fisher's exact test.

Table 3. Recurrence.

	LVR (<i>n</i> = 22)	Delorme (<i>n</i> = 12)	<i>P</i> value*
Follow-up time, months	23 (1-65)	34 (1-96)	0.42
Recurrence	0	1	0.35

Values are presented as *n* or median (range).

LVR, laparoscopic ventral rectopexy

*Mann-Whitney *U* test or Fisher's exact test.

either group. One patient who underwent the Delorme's procedure with general anesthesia experienced postoperative delirium, which contributed to an extended hospital stay of 13 days. Another patient who had the Delorme's procedure presented with hemorrhage six months postoperatively, eventu-

ally diagnosed as solitary rectal ulcer syndrome, and subsequently managed successfully with conservative treatment. Interestingly, no cases of significant morbidity were reported among patients who underwent LVR.

Recurrence

The median follow-up period for patients who received LVR was 23 months (range 1–65), while those who underwent the Delorme's procedure were followed for a median of 34 months (range 1-96). Unfortunately, four patients who underwent LVR and six patients who received the Delorme's procedure passed away from unrelated causes. One patient who underwent the Delorme's procedure encountered a recurrence at the two-month mark, prompting the application of LVR to address the recurrent ERP. Notably, no instances of recurrent ERP were observed among patients who underwent LVR (Table 3).

Discussion

This study provides valuable insights into the safety and efficacy of LVR as a treatment for ERP in nonagenarian patients, in comparison to the established Delorme's procedure. Notably, the study's median follow-up of 23 months revealed no recurrences in LVR patients.

Perineal procedures are often favored by proctologists for treating ERP in elderly patients due to their better tolerance in comparison to transabdominal approaches. More recently, laparoscopic approaches have gained prominence, showing short-term advantages such as reduced pain, decreased blood loss, shorter hospital stays, and faster recovery when compared to open surgeries[16,17]. A comprehensive review also highlighted that laparoscopic rectopexy demonstrated lower morbidity rates and fewer recurrences when contrasted with perineal procedures[18].

Despite the growing popularity of laparoscopic rectopexy, concerns remain regarding its application in the elderly population, who might be deemed at higher risk due to age-related factors. A prior non-comparative study showed the tolerance of LVR in patients aged 80 and older, reporting minimal mortality and a low rate of complications[12]. In contrast, our study directly compared LVR with Delorme's procedure in nonagenarian patients, and reassuringly found LVR to be as well-tolerated as Delorme's procedure.

While LVR necessitated a longer operating time compared to Delorme's procedure, it exhibited the advantage of reduced blood loss in this study. This discrepancy is attributed to LVR's minimal dissection, primarily performed anterior to the rectum, and the dissection of the rectovaginal septum down to the pelvic floor. Additionally, LVR patients experienced shorter postoperative hospital stays. Our institute employed an enhanced recovery program for LVR patients, involving postoperative epidural analgesia, early oral intake of analgesics and prokinetics, resumption of oral feeding the following morning, and guided early mobilization[19]. Notably, this program contributed to the shorter hospital stay for LVR patients. Conversely, Delorme's patients did not un-

dergo the same enhanced recovery protocol during the study period. This deviation was primarily due to the protocol being deemed suitable for the patients undergoing surgery with general anesthesia at that time.

In the 23-month median follow-up period, patients who underwent LVR did not experience any recurrence. In contrast, there was one recurrence observed in a patient who underwent Delorme's procedure. It is worth noting that the patients who received Delorme's procedure might have presented more challenging cases, as evidenced by the higher proportion of recurrent ERP cases in this group.

While, a recent study has reported a lower recurrence rate (4.3%, 2 out of 47 cases) for the modified Delorme's procedure, where the length of stripped rectal mucosa was maintained 3 to 4 times the length of the exteriorized prolapse[20], a comprehensive review article highlighted a lower recurrence rate for ERP after LVR when compared to Delorme's procedure (2% [15/680] versus 20% [154/770])[19]. However, considering reports of increased recurrence risk in older patients post-LVR[21,22], and the observation that all recurrences (nine out of 132 patients) occurred within the initial 12 months post-surgery[14], a follow-up period of at least 12 months is recommended, even for nonagenarian patients.

In conclusion, our study highlights the remarkable tolerance of LVR among nonagenarian patients with ERP. This finding underscores the potential of LVR as a viable therapeutic option, particularly for patients who are considered robust enough to undergo general anesthesia. The data strongly suggest that perineal procedures should be reserved for cases involving the most frail individuals. By offering LVR as a primary approach for treating ERP in this elderly demographic, we can potentially enhance patient outcomes and minimize unnecessary risk associated with more invasive procedures. Further research and prospective studies are warranted to confirm and refine these encouraging findings.

Conflicts of Interest

There are no conflicts of interest.

Author Contributions

Akira Tsunoda: acquisition of data, analysis and interpretation of data; drafting the article; and final approval of the version to be published.

Satoshi Matsuda: acquisition of data, analysis and interpretation of data; revising the article critically for important intellectual content; and final approval of the version to be published.

Hiroshi Kusanagi: acquisition of data, analysis and interpretation of data; revising the article critically for important intellectual content; and final approval of the version to be published.

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