

Recurrence after Delorme's procedure in a single and multi-surgeon setting

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Background: Delorme's procedure (DP) is a perineal repair reserved for full-thickness rectal prolapse (FTRP) in elderly/comorbid patients due to its low perioperative morbidity. Reported recurrence rates are higher than for abdominal approaches. This study reports the long-term clinical outcomes of recurrence and postoperative bowel function after DP.

Methods: A retrospective cohort study including all patients who underwent a DP for FTRP between February 2001 and March 2014 at two primary study sites: Groote Schuur Hospital (multi-surgeon) and Kingsbury Hospital (single-surgeon). Primary outcome was the absence of recurrence of FTRP after DP. Secondary outcomes were 30-day mortality and morbidity, postoperative bowel function and length of hospital stay.

Results: 70 patients underwent DP: 37 were operated on by the single surgeon and 33 by multiple surgeons. The median age was 76 years (IQR 20 years). Median length of follow-up was 46 months (IQR 55 months). 16 recurrences occurred: 7 in the single-surgeon cohort and 9 in the multi-surgeon cohort ($p = 0.4$). Median time to recurrence was 23 months (IQR 36 months): 48 months in the single-surgeon cohort and 15 months in the multi-surgeon cohort ($p = 0.6$). Six patients each had minor and major complications. Three patients died postoperatively. 8 patients required reoperation. Median postoperative hospital stay was three days (IQR 2 days). There were no significant differences between the multi-surgeon and single-surgeon cohorts.

Conclusion: Long-term follow-up demonstrates a recurrence rate of 23% after DP, with no difference between an experienced colorectal specialist and supervised trainee surgeons.

Keywords: rectal, prolapse, Delorme's procedure

Introduction

Curative treatments of full-thickness rectal prolapse (FTRP) are exclusively surgical. While more than 100 surgical techniques have been described during the last century,¹ most are only of historical interest.² The approach is either abdominal or perineal, with the aim of correcting the prolapse, restoring normal bowel function, and preventing recurrence. Delorme's procedure (DP) is a perineal technique first described by the French military surgeon Edmond Delorme in 1900.³ Its recurrence rate of 20% (range 4–38%) is higher than the five per cent (range 3–9%) reported for rectopexy⁴ and its application has often been restricted to patients not fit enough to withstand an abdominal operation.⁵ Rectal prolapse affects all adult ages and both sexes and, in certain populations, is a condition of young males. The aim of this study was to describe the patient profile in our population and compare outcomes in a multi-surgeon state hospital with a contemporaneous cohort by a single surgeon in a private hospital.

Methods

An observational cohort study was undertaken of all patients who underwent a DP between February 2001 and March 2014 in the two different settings described. Data was collected retrospectively from a prospectively maintained electronic patient database and patient folder records. Information collected included patient demographics, obstetric history

and associated pelvic floor disorders, duration of prolapse, size, reducibility, faecal incontinence, constipation, pain, and bleeding. Faecal incontinence was scored according to Park's classification – incontinent to solid or liquid stool or flatus,⁶ and constipation recorded according to number of bowel movements per week and need for medication, modified from the scoring system proposed by Agachan et al.⁷ Recurrence was defined as any degree of full-thickness prolapse, regardless of symptoms.

Surgical technique

In the multi-surgeon cohort, operations were performed by six colorectal fellows under supervision, often by the same colorectal surgeon responsible for the single-surgeon cohort who had experience with more than 20 procedures before the study began. The technique used was as described in standard texts.^{8,9}

No oral or rectal bowel preparation was used, but prophylactic antibiotics and DVT prophylaxis were administered in all patients and bladder catheterisation used selectively. Patients were positioned in either the prone jack-knife or lithotomy position, and usually a Lone Star retractor (Lone Star Retractor System™, CooperSurgical) was utilised. Throughout the procedure, the rectal submucosa was infiltrated with a mixture of local anaesthetic and adrenaline to reduce bleeding and assist in defining the mucosectomy plane. Commencing a few millimetres distal

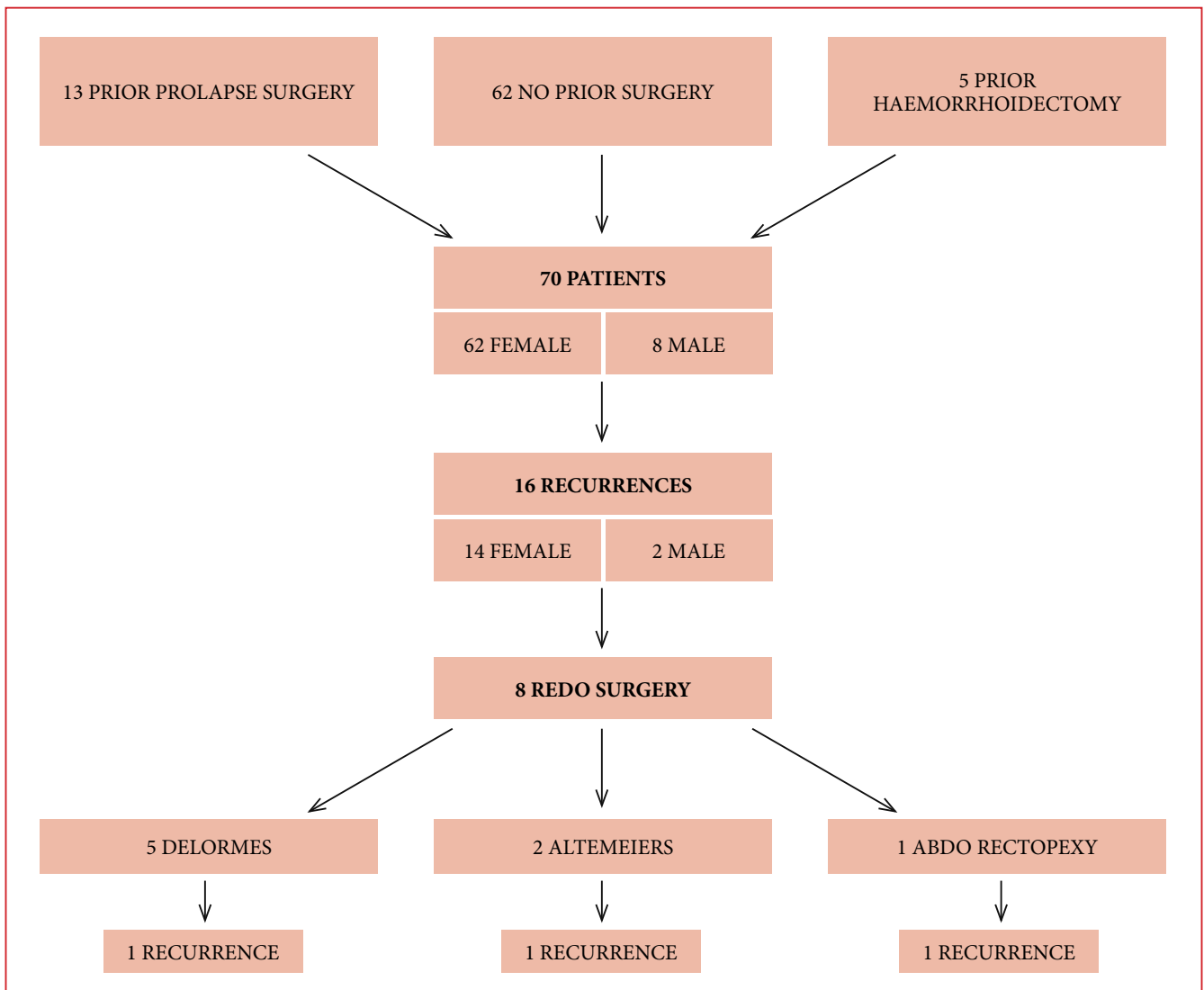


Figure 1: Flow-diagram of patient outcome after primary and redo surgery

to the dentate line, mucosectomy was performed with meticulous needle-point diathermy dissection and extended over the apex of the prolapsed segment until the exposure dictated the limit of dissection. After resecting the mucosal sleeve, the muscular tube was plicated with multiple 2.0 vicryl sutures placed circumferentially between the mucosal edges (approximating the hours of a clock). The prolapsed segment was then reduced as the sutures were tied, achieving mucosal apposition. Aided by a bivalve anal retractor, any residual mucosal defects were sutured. Stool softener was provided postoperatively. All procedures were performed under spinal or general anaesthesia.

Postoperative follow-up

Patients were reviewed in clinic within the first postoperative month and thereafter if there was a recurrence of symptoms. Long-term data regarding recurrence, constipation, incontinence and mortality were obtained telephonically, using a structured questionnaire, from patients, their carer or general practitioner.

Statistical analysis

Data are expressed as median and interquartile range (IQR). IBM SPSS Statistical Software (SPSS Inc., Chicago, IL) was

used for all statistical analyses and graphic representations. The chi-squared test was used for cohort comparison. Kaplan-Meier plots were used to calculate the probability of non-recurrence for each parameter examined. $P < 0.05$ was considered statistically significant.

Results

Patient preoperative characteristics

Seventy consecutive patients underwent DP over the 13-year study period: 37 in the single-surgeon cohort, and 33 in the multi-surgeon cohort. These cohorts are compared in Table 1. The median age was 76 years (IQR 20 years), with five patients under 50 years. Eight patients were male, with a median age of 52 years (IQR 24 years). Sixty-two female patients had a median age of 77 years (IQR 18 years). A complete listing of all patients' baseline characteristics is provided in Table 2.

Patients' outcomes are summarised in the flow diagram in Figure 1. Preoperative considerations are provided in Table 2, and included previous pelvic, anal and prolapse surgical history, as well as spinal surgery or trauma, multiparity, obstetric trauma, DM and associated pelvic floor conditions. Nineteen per cent of patients had undergone prior rectal

Table 1: Cohort comparison

	Single surgeon	Multiple surgeons
Number of patients	37	33
Mean age	69	72
Male:Female	5:32	3:30
Other pelvic floor prolapse	9 (24%)	9 (27%)
Multiparity/obstetric difficulty	9 (24%)	11 (33%)
Size > 5 cm	20 (54%)	18 (55%)

$P > 0.05$ for all

prolapse surgery, 54% had a prolapse greater than 5 cm and 70% had been prolapsing for more than a year.

Rectal prolapse was the primary symptom of all patients. Other symptoms included rectal bleeding in 37, constipation in 14, faecal incontinence in 39, and irreducible prolapse in two patients which were repaired on the same admission after the oedema had settled. Overall, 66% of patients had bowel function disturbance attributed to their rectal prolapse (Table 2).

Surgical complications

There were three deaths within 30 days of surgery. A 51-year-old woman with severe scleroderma and end-stage renal failure (ASA IV) died on day 7 of pulmonary oedema despite emergency dialysis. A 90-year-old woman with known ischaemic heart disease and atrial fibrillation (ASA III) died of a perioperative myocardial infarction on day 9, and a 79-year-old woman with ischaemic heart disease and congestive cardiac failure (ASA IV) died of a perioperative myocardial infarction on day 14. Major (Clavien-Dindo Grade 3/4) postoperative complications occurred in six patients: three patients had suture line dehiscence and bleeding in the first postoperative week requiring blood transfusion and resuturing in theatre; two patients assessed as anaemic after operation, but without evidence of having bled, received a blood transfusion; and one patient suffered severe postoperative faecal impaction and colonic ischemia requiring a colectomy and temporary colostomy seven days after operation. Minor (Clavien-Dindo Grade 1/2)

postoperative complications occurred in 6 patients: three patients had rectal bleeding recorded in hospital but did not require re-exploration, resuscitation or transfusion; one patient had urinary retention requiring short-term catheterisation; another patient had severe rectal pain for 48 hours which resolved spontaneously; and one patient had postoperative confusion with mild hyponatraemia. All six patients with minor postoperative complications were managed conservatively.

Outcome following Delorme's procedure

The median length of hospital stay was three days, and no patients were readmitted within 30 days. Life-long follow-up data was obtained for all 70 patients and the median follow-up was 46 months (IQR 55 months). Fifty-five patients were alive at the time of telephonic follow-up. None of the deaths were related to prolapse or its surgery.

Sixteen (23%) patients developed a recurrence: seven and nine ($p = 0.4$) in the single-surgeon and multi-surgeon cohorts respectively (Figure 1). Fourteen were female, and two male patients. The median time to recurrence was 23 months (IQR 34 months); 37 months in the single-surgeon cohort and 6 months in the multi-surgeon cohort which was not significant ($p = 0.6$) (Figure 2). The Kaplan-Meier curve in Figure 3 shows the probability of no recurrence for patients undergoing Delorme's procedure comparatively in the 2 cohorts. Recurrences ranged from small asymptomatic partial prolapse to large circumferential prolapse. Only one of the 5 patients under 50 years had a recurrence, which occurred at 37 months. Of the 16 patients that developed recurrent prolapse, eight have undergone repeat prolapse procedures; two Altemeier's procedure, five a second DP, and one an abdominal rectopexy. Eight patients elected not to undergo redo surgery as the recurrence was not sufficiently symptomatic, so that 63 of the patients had no need for further intervention for prolapse.

Changes in bowel function following Delorme's procedure

Of the 39 patients with preoperative incontinence: 23 (59%) reported complete resolution; 12 (31%) reported an improvement in their symptom, with nine (23%) of them

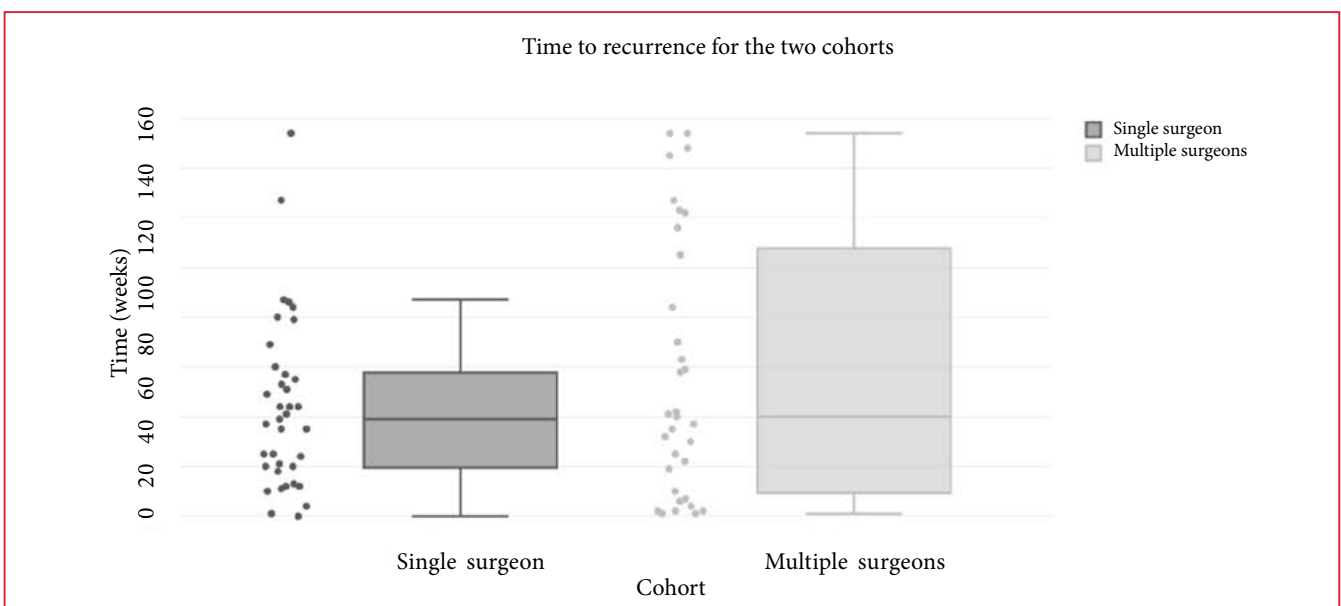


Figure 2: Time to recurrence cohort comparison

Table 2: Baseline characteristics of rectal prolapse patients (with cohort comparison and recurrence)

Characteristic	Total number of patients (%)	KBH (recurrence)	GSH (recurrence)
Sex			
Male	8 (11)	5 (1)	3 (1)
Female	62 (89)	32 (6)	30 (8)
ASA			
I	10 (14)	7 (3)	3 (1)
II	31 (44)	15 (2)	16 (3)
III	21 (30)	11 (2)	10 (3)
IV	8 (11)	5 (1)	3 (1)
Previous prolapse surgery			
Delorme's	8 (11)	3 (1)	5 (3)
Other	5 (7)	2	3
Concomitant pelvic floor disease	18 (26)	7 (2)	11 (4)
Parity			
< 2	53 (76)	25 (4)	28 (6)
> 2	17 (24)	9 (3)	8 (3)
Size of prolapse			
< 5 cm	32 (46)	17 (3)	15 (3)
> 5 cm	38 (54)	18 (4)	20 (6)
Duration of prolapse			
< 1 year	21 (30)	12 (2)	8 (4)
> 1 year	49 (70)	23 (4)	26 (6)
Previous hysterectomy	26 (37)	11 (4)	15 (4)
Previous spinal surgery or trauma	10 (14)	5 (1)	5 (1)
History of obstetric difficulty (vaginal tear/large baby)	7 (10)	4	3
Presenting complaint			
Faecal incontinence	39 (56)	20 (3)	19 (3)
Constipation	14 (20)	7 (3)	7 (4)
Rectal bleeding	37 (53)	17 (1)	20 (3)
Irreducible prolapse	2 (3)	1	1

Table 3: Delorme's procedure for rectal prolapse

Author et al	Patients (m:f)	Age	Study design	Recurrence (%)	Improvement incontinence (%)	Improvement constipation (%)
Senapati (1994)	32 (8:24)	70	Retrospective	13	41	16
Oliver (1994)	40 (5:35)	82	Retrospective	22	68	N.S.
Tobin (1994)	49 (6:43)	73	Prospective	26	50	N.S.
Lechaux (1995)	41	'younger'	Retrospective	5	69	N.S.
	44	'elderly'	Retrospective	23	N.S.	N.S.
Pescatori (1998)	33 (11:22)	59	Retrospective	21	30	44
Watts (2000)	101 (10:91)	73	Retrospective	30	89	44
Watkins (2003)	52 (6:46)	68	Retrospective	10	58	N.S.
Tsunoda (2003)	31 (7:24)	70	Retrospective	13	63	38
Marchal (2005)	60 (7:53)	67	Retrospective	23	42	54
Lieberth (2009)	76 (5:71)	74	Retrospective	15	79	57
Lee (2012)	19 (6:13)	67	Retrospective	16	75	N.S.
Mahmoud (2012)	37 (11:26)	54	Retrospective	16	82	70
Fazeli (2013)	52 (31:21)	38	Prospective	12	72	70
Youssef (2013)	41 (15:26)	42	Prospective	14	71	47
	41 (16:25)	29	Prospective	2	98	63
Senapati (2013)	99	76	Prospective	31	N.S.	N.S.
Placer (2015)	42 (12:30)	76	Prospective	12	N.S.	N.S.
Our study	70 (8:62)	71	Retrospective	23	90	71

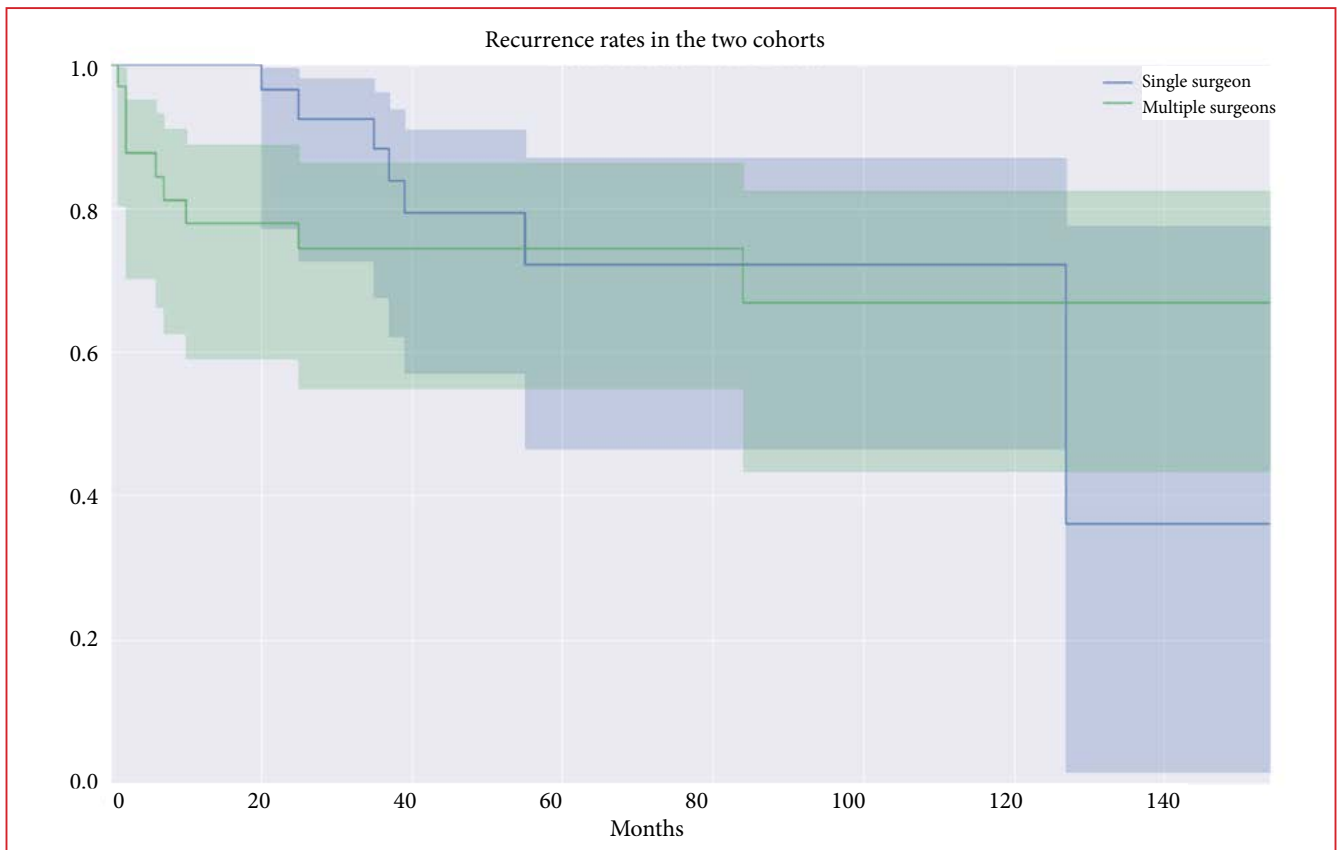


Figure 3: Kaplan-Meier curve showing probability of no recurrence after DP for the two cohorts (with 95% CI)

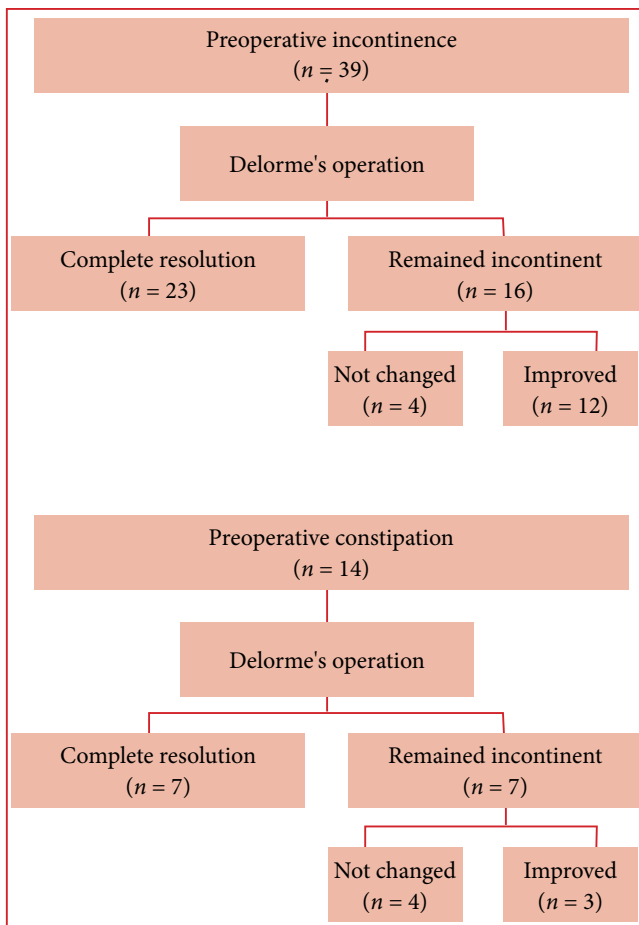


Figure 4: Flow-diagram of bowel function after Delorme's procedure

incontinent to liquid stool/flatus, and three (8%) with only minor PR discharge/leakage postoperatively. Four (10%) reported no change in symptoms. In two (5%) patients this symptom was successfully managed with implantation of a sacral nerve stimulator. Of the 14 (20%) patients with preoperative constipation, seven (50%) reported complete resolution; three (21%) reported an improvement in their symptom; and four (29%) reported no change in symptoms. One (7%) patient continued to require rectal washouts and two (14%) patients needed regular laxatives. No patient reported new onset of constipation or faecal incontinence postoperatively (Figure 4).

Discussion

This is one of the largest studies reporting outcome of DP (Table 3). Two of these studies differ from the majority in emanating from the Middle East where the patient age is considerably younger, including patients in their 20s. The population's demographic data reported in this study is similar to the other 13 studies, with nearly ninety per cent being female and over 70 years, and approximately twenty per cent having had previous pelvic floor surgery. FTRP can be regarded as one end of a spectrum ranging from internal intussusception to complete external prolapse.^{1,10,11} Women above the age of 50 years are six times more likely than men to develop this condition.¹²

These data demonstrate DP to be safe, with only a 4% mortality in an elderly population, frequently with a high-risk ASA status. There was a low analgesic requirement and median three-day hospital stay was usually determined by the patient's social circumstances rather than any clinical need. No patient with symptomatic prolapse was declined

surgery after appropriate preoperative counselling, and the three deaths occurred in patients with ASA III and IV status. Even the most frail patients (ASA III-IV), unfit for an abdominal approach, were operated upon if sufficiently symptomatic with a low mortality rate.

Nearly 80% of patients remained cured of prolapse more than 5 years later, and half of the patients with recurrence declined redo surgery because they felt sufficiently improved by their original surgery. Redo surgery was required in only 10%, so that 90% required no further surgery.

An advantage of DP is the availability of the abdominal approach for symptomatic recurrence. It seems reasonable to offer a DP to all elderly patients as their first procedure, reserving the technically more demanding abdominal surgery for patients with symptomatic recurrences. A redo DP is also an alternative. This will avoid the routine application of pelvic mesh in about 80% of patients. Mesh in pelvic surgery has been associated with some catastrophic outcomes,^{13,14} resulting in international news headlines, and high-profile medicolegal claims against manufacturers. Both units in this study offer laparoscopic rectopexy in selected younger patients in view of its lower recurrence rate and the associated application of a colpopexy where appropriate. However, for the typical elderly prolapse patient, extended longevity of the repair is probably less important.

An evidence-based single operation for all patients with rectal prolapse remains elusive. Laparoscopic rectopexy, with the functional advantages of a ventral, nerve-sparing approach, has become increasingly popular. A follow-up postal survey in 2016 of the PROSPER study questionnaire clearly demonstrates the shift to laparoscopy for the abdominal approach, with an overall decrease in the perineal approach except in the elderly or unfit, where DP remained the most popular operation¹⁵ and the value of DP has been questioned.¹⁶ While Laparoscopic Ventral Mesh Rectopexy (LVMR) has a recurrence rate between 3 and 15%,¹⁷⁻¹⁹ it is technically demanding compared to DP, especially in patients who have had urogynaecological surgery, often with mesh. These operations have no influence on DP.

Published LVMR data are all from specialist units, which limits the reproducibility of their data, particularly in a training and resource constrained environment such as ours. High quality evidence for LVMR is not available yet, and a recent Cochrane review found there to have been very few adequately designed randomised studies to establish superiority of one procedure over another.²⁰ The PROSPER trial found no obvious difference in recurrence rates between abdominal and perineal approaches but has been criticised for a high degree of selection bias. Many patients were lost to an observational, non-randomised arm and only 49 patients were randomised between abdominal and perineal approach. The majority of centres recruited fewer than 10 patients. The follow-up period was only 36 months and there is no intention to obtain longer FU data.²¹ DeloRes, a multicenter study in Germany and Switzerland comparing laparoscopic resection rectopexy to DP, is still, after four years, trying to recruit adequate numbers to meet its study design.²²

Previous studies have been limited in methodological quality and size, resulting in a highly variable recurrence rate (0–32%).⁴ Reasons include small patient numbers, variations in patient selection and severity of prolapse, and incomplete follow-up in an elderly population. While two recent studies have shown slightly lower recurrence

rates (12% and 16% respectively), they have confirmed the similarly satisfactory functional outcomes and low morbidity of the older studies.²³⁻²⁵ This study's recurrence rate of 23% splits the two other large retrospective studies with 101 and 85 patients reporting recurrence rates of 30% and 13.5% respectively.^{26,27}

These data report an improvement of symptoms in 90% of incontinent patients, with nearly two thirds cured. Similarly, over 70% of constipated patients reported improvement, with two thirds reporting normal bowel function. This confirms good outcomes for the two most important measures, bowel function and recurrence, and while similar or better to the other studies reviewed, all of them report substantial functional improvements after DP (Table 3).

There was no statistically significant difference in recurrence rates between the experienced colorectal specialist and the supervised trainees, although there appeared to be a trend in favour of the more experienced single surgeon. Most of the trainees were supervised by the same colorectal specialist responsible for the single surgeon cohort, and the results demonstrate that trainees under supervision could achieve good results without a lengthy and potentially risky learning curve. This is sharply different from the learning curve of trainees in LVMR.^{28,29} The difference in time to recurrence, although not statistically significant, was longer in the single surgeon cohort, but the numbers are small and a type II error is possible. No reliable predictor of recurrence was identified from these data.

In a randomised study of 82 patients, a 14% recurrence rate after DP was reduced to two per cent by the addition of a post anal repair and levatorplasty, but these results must be viewed in context. Forty per cent of the group was male with a median age of 39 years, and follow-up was limited to only 1 year.³⁰ Similarly, a prospective study from Iran reported a recurrence rate of 10% amongst 41 patients younger than 50 years of age.³¹ This difference in demography suggests another pathophysiological mechanism compared to the patients in this and similar studies, making comparisons difficult and probably irrelevant.³²

The strengths of this study include the large size of the study group with all consecutive patients, and no patients lost to follow-up over 13 years. The use of a comprehensive electronic database for more than half of the patients and a complete set of hospital folders for the remainder resulted in a near complete database of all data points. Single surgeon studies are always prone to bias, and the comparator of a contemporaneous multi-surgeon trainee cohort achieving similar results adds validity to the data. The weaknesses are the retrospective nature of this study, and the often third-party telephonic follow-up in an elderly population.

Conclusion

This study demonstrates that Delorme's procedure is an economic, mesh-free, low-risk operation with a short learning curve, which cures nearly eighty per cent of older rectal prolapse patients. Functional symptoms are much improved in all patients and half the recurrences require no further surgical intervention. It can be successfully and safely performed by non-specialist surgeons. It is an attractive alternative to LVMR, which should be discussed with all patients being counselled for surgery.

Conflict of interest

The authors declare no conflict of interest.

Ethical approval

Approval was obtained from the Human Ethics Research Committee (HREC/REF:686/2013) in the Faculty of Health Sciences, University of Cape Town, and all research was in compliance with the Helsinki Declaration.

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