Systematic review

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Surgery for constipation: systematic review and practice recommendations

Results II: Hitching procedures for the rectum (rectal suspension)

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Abstract

Aim To assess the outcomes of rectal suspension procedures (forms of rectopexy) in adults with chronic constipation.

Method Standardised methods and reporting of benefits and harms were used for all CapaCiTY reviews that closely adhered to PRISMA 2016 guidance. Main conclusions were presented as summary evidence statements with a summative Oxford Centre for Evidence-Based Medicine (2009) level.

Results Eighteen articles were identified, providing data on outcomes in 1238 patients. All studies reported only on laparoscopic approaches. Length of procedures ranged between 1.5 to 3.5 h, and length of stay between 4 to 5 days. Data on harms were inconsistently reported and heterogeneous, making estimates of harm tentative and imprecise. Morbidity rates ranged between 5–15%, with mesh complications accounting for 0.5% of patients overall. No mortality was reported after any procedures in a total of 1044 patients. Although inconsistently reported, good or satisfactory outcome occurred in 83% (74–91%) of patients; 86% (20–97%) of patients reported improvements in constipation after laparoscopic ventral mesh rectopexy (LVMR). About 2–7% of patients developed anatomical recurrence. Patient selection was inconsistently documented. As most common indication, high grade rectal intussusception was corrected in 80–100% of cases after robotic or LVMR. Healing of prolapse-associated solitary rectal ulcer syndrome occurred in around 80% of patients after LVMR.

Conclusion Evidence supporting rectal suspension procedures is currently derived from poor quality studies. Methodologically robust trials are needed to inform future clinical decision making.

Keywords Rectopexy, chronic constipation, laparoscopic ventral mesh rectopexy (LVMR), robotic ventral mesh rectopexy (RVMR), laparoscopic resection rectopexy (LRR), open rectopexy (OR)

Introduction

Background and procedural variations

Constipation, in a proportion of patients and in the broad sense of the term, is related to an inability to evacuate the rectum. This obstructed defaecation or rectal evacuation disorder is characterized by excessive straining, the feeling of incomplete evacuation, post-defaecatory seepage and often mucous discharge and pelvic pain [1]. In some of these patients there is clinical and proctographic evidence of a rectocoele and/or intussusception. These anatomical variants are considered to cause obstructed defaecation by a process of loss of force vector (ballooning of the rectum into a rectocoele or invagination of the rectum into an intussusception rather than evacuation of stool on straining) or mucosal obstruction (in the case of an intussusception) [1]. It follows that clinical resolution of symptoms could be achieved by restoration of normal anatomy by surgery. Resuspension of the rectum aims to hitch the prolapsing or redundant rectal wall thus straightening the intussusception and/or effacing the rectocoele. This concept while anatomically rational remains clinically controversial for a number of reasons. First, such anatomical variants are common and are often found in healthy individuals with no symptoms of obstructed defaecation [2]. Secondly, resuspension operations when employed to patients with full thickness rectal prolapse,

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may themselves cause increasing constipatory symptoms [3]. Such procedures include posterior rectopexy [4]. The potential for worsening constipation is thought to relate to fibrosis caused by insertion of foreign material or mobilization of the lateral ligaments of the rectum. These ligaments contain nerves to the rectal wall and the resultant denervation may be the cause. In the process of developing alternative resuspending procedures, surgeons have attempted to limit the effect of the foreign material by using sutures only [5], added a resection of the sigmoid colon to the rectopexy [6–8] or more recently, limiting the dissection of the rectum to the ventral surface by supporting the rectum with mesh [9–23]. In addition, laparoscopy has become the favoured approach procedurally, not only allowing a more rapid recovery but also easing access to, and visibility in the pelvis.

Scope

The purpose of the overall CapaCiTY review process is to assess the efficacy and harms of surgical procedures for chronic constipation in adults. Thus, the aim of this review is to assess the outcomes of rectal suspension procedures in adults presenting with chronic constipation symptoms. In effect, this is however limited to patients with obstructed defaecation and internal prolapse (intussusception). Procedures considered beyond the scope of systematic review included rectal excisional procedures, e.g. STARR [9], rectal reinforcement procedures, e.g. transanal/transperineal repair of rectocele [10], and uncommon variant of suspension procedures, e.g. laparoscopic promonto-fixation [11]. Studies where outcomes could not be segregated by eligible procedure were also excluded due to a mixed patient population with internal and external rectal prolapse [12–19], mixed indications including numerous pelvic floor abnormalities [20] or limited postoperative outcomes [21].

Previous reviews

Seven systematic [3, 22–27] and 4 narrative [28–31] reviews have focused on the outcome of rectal suspension. Of the systematic reviews, 3 [3,23,26] focused on full thickness external rectal prolapse, 2 included both full-thickness prolapse and constipation participants, and 2 [22,25] analysed outcomes of robotic surgery.

Summary of search results and study quality

The search yielded a total of 47 manuscripts for full text review (Fig. 1). From these, 18 articles published between 1995 and 2015 contributed to the systematic review, providing data on outcomes in a total of 1238 patients (range 20–233 patients per study) based on 18 defined patient cohorts (Table 1). Specific exclusions after full-text review (and after exclusion of non-English language publications) included 4 studies where the population sample was confirmed to be less than 20 patients [5,36–38], 4 studies of out-of-scope procedures [9–11,39], 2 studies where data were considered a duplicate

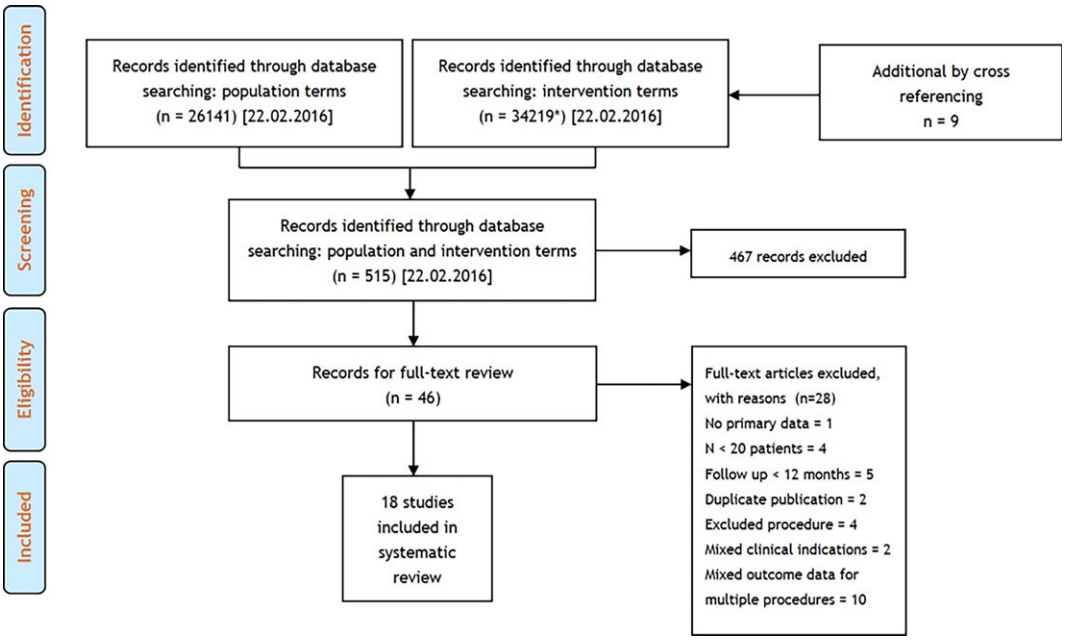

Figure 1 PRISMA diagram of search results.

Table 1 All studies included in systematic review.

Author	Year	Centre	Country	Total N	FU*	Design	Level†
van Tets[4]	1995	Groot	Netherlands	37	72	RCS	IV
Tsiaoussis [6]	2005	Heraklion	Greece	27	45	PCH	IV
Vermeulen [54]	2005	Rotterdam	Netherlands	20	18	RCS	IV
Von Papen [7]	2006	Herston	Australia	56	44	PCS	IV
Collinson [48]	2009	Oxford	UK	75	12	PCS	IV
Kargar [55]	2011	Shaid Sadoughi	Iran	39	32	RCS	IV
Portier [49]	2011	Toulouse	France	40	22	PCS	IV
Wong [45]	2011	Nantes	France	41	12	PCH	IIB
Wong [50]	2011	Nantes	France	84	29	PCH	IV
Sileri [51]	2012	Rome	Italy	34	12	PCS	IV
Wahed [52]	2012	Gateshead	UK	65	12	PCS	IV
Evans [34]	2013	Oxford	UK	30	36	PCS	IV
Formijne Jonkers [56]	2013	Amersfoort	Netherlands	233	30	RCS	IV
Gosselink [57]	2013	Oxford	UK	151	12	RCS	IV
Mantoo [46]	2013	Nantes	France	128	16	PCH	IIB
Borie [58]	2014	Montpellier	France	52	18	RCS	IV
Franceschilli [53]	2015	Rome	Italy	100	20	PCS	IV
Tsunoda [47]	2015	Kamogawa City	Japan	26	16	PCS	IV

PCH, prospective cohort study; RCS, retrospective case series; PCS, prospective case series study.
*Mean follow up in months.
†Oxford CEBM [34]. A median time follow up time was not provided.

[34,40], and 10 studies where outcomes could not be segregated by eligible procedure; [12–21] other exclusion criteria were: constipation not representing an indication ($n = 2$) [32,41], follow-up less than 12 months ($n = 5$) [8,33,35,42,43], and lack of primary patient data (one international survey on 391 surgeons) [44].

The general quality of studies was poor due to inadequate description of methods. The 18 included studies were all observational with no randomised controlled trials. These comprised two good quality prospective cohort studies [45,46] (level IIB), and 16 (level IV) studies comprising two poor quality case-control studies [34,47], eight prospective case series [6,7,48–53], and six retrospective case series [4,54–58]. Mean patient follow-up ranged from 12 to 72 months (median 25 months). Fifteen studies derived from European centres, with one each from Australia, Iran and Japan.

Perioperative data

Perioperative data were reported by all 18 studies (Table 2). Reporting of procedure duration was inconsistent but median procedural duration for laparoscopic ventral mesh rectopexy (LVMR) was 159 (range 75–198) min; for robotic ventral mesh rectopexy (RVMR), 205 (range 191–218) min; for laparoscopic resection rectopexy (LRR), 123 min (one study) [45,46]. Although robotic procedures appeared to take longer, substantial non-reporting of other procedures precluded a clear finding. The two papers on RVMR were from the same centre. It is interesting to note a decrease in duration of operation, which may indicate a learning curve. Conversion to laparotomy was rare (median 2%, range 0–8%) (Table 2), with the most common reason being adhesions. The median length of stay (LOS) was similar for procedures: LVMR, median 3.3 (range 1.0–7.1) days; RVMR, median 4.3 (range 4.0–4.6) days (data from one centre via two reports) [45,46]; LRR, 4 days (data from one study) [7]. LOS possibly reflected local policy rather than clinical need, since day case procedures have been shown to be feasible [59,60]. The reason to keep patients in hospital for up to 1 week was not documented. Only one paper commented on LOS after open rectopexy (OR) (8.5 days) [54].

Summary evidence statements: perioperative data

1 Procedures are reported to take from 1.5 to 3.5 h, with consequent typical LOS of 4–5 days (level IV).
2 There was no clear variation between procedures in perioperative measures, although non-reporting by studies may have concealed differences (level IV).

Harms

There was a considerable heterogeneity in surgical morbidity reported as well as in overall procedural

Table 2 Perioperative data by procedure. (a) Laparoscopic ventral mesh rectopexy (LVMR). (b) Robotic ventral mesh rectopexy (RVMR). (c) Laparoscopic resection rectopexy (LRR). (d) Open rectopexy (OR).

(a) Author	Year	N	Duration, mins	LOS	Total cx, %	Re-op, %	Mesh comps, %	Conv,%	Stoma, %	Mort, %
Collinson [48]	2009	75	NR	2	4	0	0	1.3	0	0
Kargar [55]	2011	39	NR	NR	NR	NR	NR	NR	NR	NR
Portier [49]	2011	17 (40*)	NR	NR	7.5	0	0	NR	0	0
Wong [45]	2011	25	159	4.6	NR	0	0	8	0	0
Wong [50]	2011	84	NR	5	8.3	1.2	1.2	3.6	0	0
Sileri [51]	2012	34	110	2	23.5	2.9	0	0	0	0
Wahed [52]	2012	65	NR	2	7.6	1.5	0	1.5	0	0
Formijne Jonkers [56]	2013	233	NR	5	4.7	0.4	0.9	2.5	0.4	0
Gosselink [57]	2013	151	NR	NR	NR	NR	NR	NR	NR	NR
Mantoo [46]	2013	74	163	5	11	0	0	4	0	0
Borie [58]	2014	25	NR	7.1	24	0	NR	8	0	0
Evans [34]	2015	30	NR	NR	10	0	3.4	NR	0	0
Franceschilli [53]	2015	100	75	2	16	1	0	1	0	0
Tsunoda [47]	2015	26	198	1	7.6	0	0	0	0	0
(b)										
Wong [45]	2011	16	218	4.6	10.5	0	0	6.3	0	0
Mantoo [46]	2013	44	191	4	0	0	0	5	0	0
(c)										
Tsiaoussis [6]	2005	23 (27)‡	NR	NR	22	NR	NA	NR	NR	0
Von Papen [7]	2007	56	123	4	13	7	0	2	0	0

(d) Author	Year	Operation	N	Duration, mins	LOS	Total cx, %	Re-op %	Mesh comps, %	Conv, %	Stoma, %	Mort, %
van Tets [4]	1995	Posterior mesh rectopexy	37	NR	NR	NR	NR	NR	NA	NR	NR
Vermeulen [54]	2005	Anterior mesh rectopexy	20	NR	8.5	15	0	0	NR	0	0
Portier [49]	2011	Anterior mesh rectopexy	23 (40)*	NR	NR	7.5	0	0	NR	0	0

LOS, length of stay; Cx, complications; Re-op, reoperation; Conv, conversion; Mort, mortality; NR, not reported.
*17 were laparoscopic, 23 open.
‡4 open.

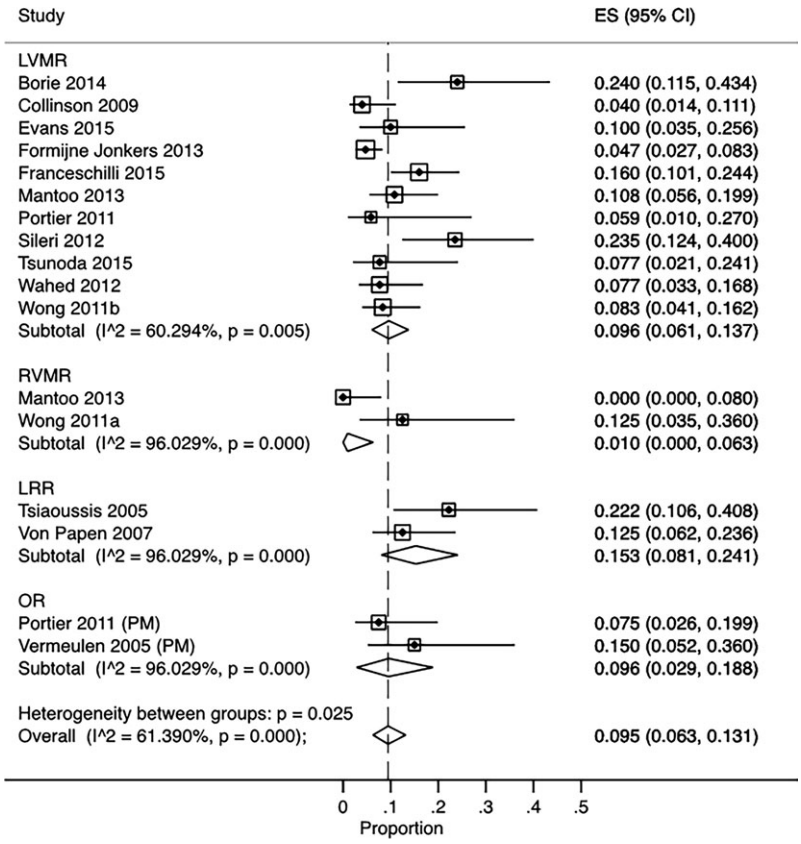

Figure 2 Forest plot showing rates of total procedural complications (percentage of patients) after rectopexy by procedure type. KEY: LVMR, laparoscopic ventral mesh rectopexy; RVMR, robotic ventral mesh rectopexy; LRR, laparoscopic resection rectopexy; OR, open rectopexy.

complication rates (Fig. 2), with individual study rates varying from 0.0% to 23.5% (Table 2). Such heterogeneity may reflect different inclusion, thresholds or conventions for recording complications. Complications typically occurred in about 5–15% of patients. Pooled findings suggest that LRR might be associated with higher morbidity (total complications 15% for LRR *vs* 10% LVMR) although the findings were not statistically significant (Z-test, $P = 0.30$), and absolute patient numbers were small for LRR. The majority of complications were minor and included urinary tract infections (the most common reported), wound infections, haematoma formation, persistent pain and urinary retention. There were some more serious complications including port-site hernia, small bowel obstruction (usually after conversion but also related to mesh or suture adhesions), osteomyelitis and bladder injury (often when associated to bladder prolapse surgery). Specific mesh complication rates were rare, with only five occurrences after 939 procedures (0.53%). Overall, procedures were safe: conversion to laparotomy was rare (median 2%, range 0–8%) (Table 2), with the most common reason being adhesions; stoma was only reported in one study; no perioperative deaths were reported. Two open rectopexy procedures (posterior mesh) were described, but data concerning post-operative complications were limited. There was no mortality recorded after any resuspension procedures.

Summary evidence statements: harms

1 Data on harms were inconsistently reported and heterogeneous, making estimates of harm tentative and imprecise (level IV).
2 Complications typically occurred in about 5–15% of procedures (level IV).
3 Mesh complications were reported in a minority of studies and occurred in about 0.5% (range 0–3.9%) of patients overall (level IV).
4 No mortality was recorded after any resuspension procedure, in a total of 1044 patients reporting this outcome (level IV).

Efficacy

Measurement of clinical outcomes was inconsistent and included the variable use of validated and un-validated scoring instruments for symptoms, such as Patient Assessment of Constipation Quality of Life (PAC-

QOL) and Patient Assessment of Constipation-Symptoms (PAC-SYM) scores (one study only) [57], Cleveland Clinic Constipation score [34,47,48,50,51,53,56], obstructed defecation syndrome (ODS) score [46,50,56,58], Knowles-Eccersley-Scott score (KESS) [48], Cleveland Clinic Incontinence score [46,49,56], Faecal Incontinence Severity Index (FISI) [47,48,51–53,56–58] and St Marks Incontinence score [48]. Global 'success' or 'satisfaction' ratings (GSR) were obtained via a variety of methods in 7 studies (where 'satisfied' or 'very satisfied', 'good', 'very good', and 'excellent' were interpreted as a positive outcome or overall improvement). Further studies also reported individual symptoms. No study reported acquiring data objectively using personnel not involved in the surgical care of the patient or data collection blinded to intervention status. Average reported studies follow-up was 31 months (range 12–72 months).

Accepting these methodological limitations, several reports assert that most patients undergoing rectal suspension procedures were satisfied. Meta-analysis of studies reporting a summary measure found considerable heterogeneity, which may reflect variation in measurements, patients or procedures. Overall improvement (a good or satisfactory outcome) was reported in 83% (95%CI: 74–91%, $I^2 = 77\%$) of cases, based on 328 patients (Table 3; Fig. 3). Similar levels of improvement were recorded for LVMR and OR; only one small study reported improvement after LRR, and data were not available for RVMR.

The initial aim of 'suspension' procedures is to treat symptoms. Functional assessment of constipation is therefore the most important outcome. However, many patients also suffer from incontinence, typically post-defaecatory seepage. The various scoring instruments and functional outcomes employed are reported in Table 4. Generally, measures are too sparsely reported to be informative. For LVMR, Cleveland Clinic Constipation score improved from a median of 14 (range 7–18) to a median of 5 (range 4–7) in 6 studies providing pre- and post-operative data. Improvement in constipation was highly heterogeneous and only reported in a minority of studies, varying from 20% to 97%. By pooling data for LVMR, the reported improvement in constipation was 86% (95%CI: 20–97%).

While the clinical outcome has primacy, the most immediate visible consequence of surgery is to correct anatomy. Therefore, an assessment of anatomical recurrence is also important (although necessarily representing only a surrogate outcome). Anatomical recurrence rates varied between 0 to 21% (Fig. 4), but typically occurred in 2–7% of patients in most studies. Functional outcome data on robotic surgery and LRR were rarely available, but again anatomical correction was very likely achieved with both procedures. No conclusions about functional or anatomical outcomes could be made for the other rectopexy procedures.

Table 3 Overall improvement based on global satisfaction ratings (GSR). (a) Laparoscopic ventral mesh rectopexy (LVMR). (b) Robotic ventral mesh rectopexy (RVMR). (c) Laparoscopic resection rectopexy (LRR). d) Open rectopexy (OR).

(a) Author	Year	Follow up (months)	N	% success
Collinson [48]	2009	12	75	NR
Kargar [55]	2011	22	39	74
Portier [49]	2011	32	40 (17*)	97
Wong [45]	2011	12	25	NR
Wong [50]	2011	29	84	NR
Sileri [51]	2012	12	34	NR
Wahed [52]	2012	12	65	71
Formijne Jonkers [56]	2013	30	233	NR
Gosselink [57]	2013	12	151	NR
Mantoo [46]	2013	16	74	NR
Borie [58]	2014	NA	25	NR
Evans [34]	2015	36	30	NR
Franceschilli [53]	2015	20	100	89
Tsunoda [47]	2015	16	26	NR
(b)				
Wong [45]	2011	12	16	NR
Mantoo [46]	2013	16	44	NR
(c)				
Tsiaoussis [6]	2005	45	23 (27)‡	93
Von Papen [7]	2007	44	56	NR

(d) Author	Year	Operation	Follow up (months)	N	% success
van Tets [4]	1995	Posterior mesh rectopexy	72	37	70
Vermeulen [54]	2005	Anterior mesh rectopexy	18	20	63
Portier [49]	2011	Anterior mesh rectopexy	22	40 (23*)	97

Cx, complications; NR, not reported.
*17 were laparoscopic, 23 open.
‡4 open.

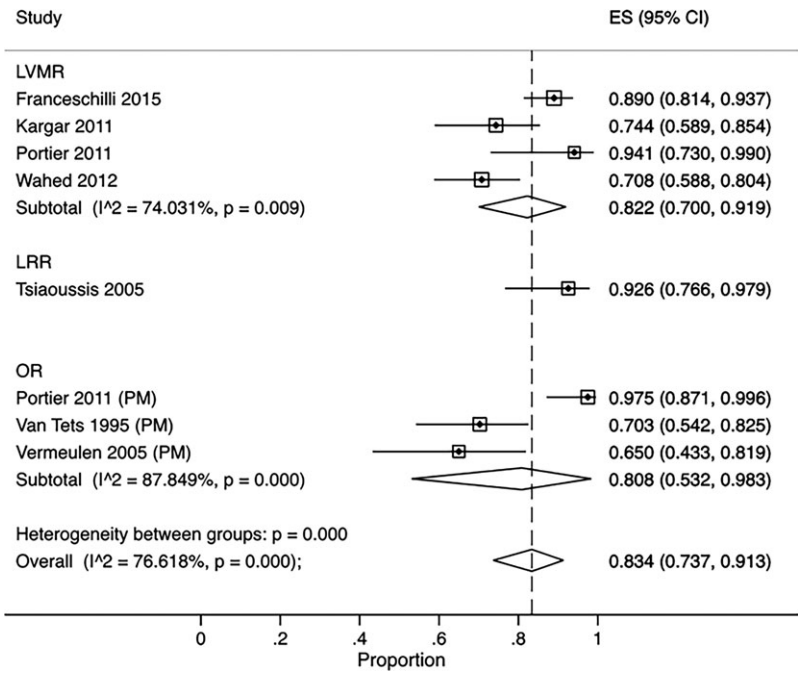

Figure 3 Forest plot showing rates of overall improvement (percentage of patients) after rectopexy by procedure type**.** KEY: LVMR, laparoscopic ventral mesh rectopexy; LRR, laparoscopic resection rectopexy; OR, open rectopexy.

Summary evidence statements: efficacy

1 Data on efficacy were inconsistently reported and findings heterogeneous, making estimates tentative and imprecise (level IV).
2 Although inconsistent, patient GSR suggest that a good or satisfactory outcome typically occurs in 83% (74–91%) of patients (level IV).
3 Similar levels of satisfaction were recorded for all procedures where data were available (LVMR, OR, LRR) (Level IV).
4 Patient-reported improvements in constipation occurred in 86% (95%CI: 20–97%) of patients after LVMR (Level IV).
5 Limited evidence found consistently improved Cleveland Clinic Constipation scores for patients undergoing LVMR (level IV).
6 Anatomical recurrence typically occurred in about 2–7% of patients (level IV).

Patient selection

Patient selection is perceived by many experts as extremely important when choosing the surgical approach. Whilst these procedures may be efficient at correcting normal anatomy (median 95%, range 79–100%), many underlying functional and organic pathologies may jeopardize the success of surgery in the attempt of 'curing' the patient [61]. Fifteen of 18 papers highlight the fact that all patients had undergone a period of conservative management. Other than this common feature, selection was inconsistent. Even the diagnosis of abnormal anatomy varied throughout the literature. Studies described interventions for patients with: ungraded intussusception [7,54]; 'rectoanal' intussusception [6,47]; 'high grade' intussusception [57]; 'grade 3 or 4′ intussusception [48,49,51,53,56]; 'anterior or circumferential' intussusception [4]; rectocoele +/- intussusception [52,54,58] or +/- cystocoele [13]; complex rectocoele of above 2–3 cm [50]; multi-compartment pelvic floor disorders [46]; solitary rectal ulcer syndrome (SRUS) [34,55]. Thus, it was difficult to draw any conclusions as to which group could benefit from intervention. When summarising the data, the most common theme regarding patient selection is a high grade intussusception (i.e. rectoanal or Oxford grade ≥ 3). Table 5 lists the papers where this inclusion criterion has been adopted and one of the primary indications along with a summary of the outcome measures reported (if given in more than one paper). The conclusions from this sub-analysis resemble those described in the whole review.

SRUS deserves specific mention as two papers included patients specifically diagnosed with this condition [34,55]. Patients report passage of mucus and bloody liquid on defaecation, with an ulcer seen within the rectum. Treatment is conservative, initially using biofeedback and behavioral intervention. A proportion of patients present an element of internal intussusception, which may reflect the ulcerated area as the apex of the intussusception, repetitively traumatised with straining. The surgical correction of a prolapse (when

Table 4 Functional and clinical outcomes by procedure. (a) Laparoscopic ventral mesh rectopexy (LVMR). (b) Robotic ventral mesh rectopexy (RVMR). (c) Laparoscopic resection rectopexy (LRR). (d) Open rectopexy (OR).

(a)

Author	Year	N	CCS pre	CCS post	ODS pre	ODS post	FISI pre	FISI post	Constipation improved %	Anatomical recurrence %
Collinson [48]	2009	75	12	5	NR	NR	28	8	86	5
Kargar [55]	2011	39	NR	NR	NR	NR	NR	NR	NR	NR
Portier [49]	2011	40	NR	NR	NR	NR	NR	NR	Worse	2.5
Wong [45]	2011	25	NR	NR	NR	NR	NR	NR	NR	0
Wong [50]	2011	84	7	5	NR*	NR*	NR	NR	Improved	6.3
Sileri [51]	2012	34	16	7	NR	NR	9	3	NR	5.9
Wahed [52]	2012	65	NR*	NR*	NR	NR	NR*	NR*	97	3.7
Formijne Jonkers [56]	2013	233	NR	8.1	NR*	NR*	NR*	NR*	81	2.6
Gosselink [57]	2013	151	NR	NR	NR	NR	NR*	NR*	NR	NR
Mantoo [46]	2013	74	NR	NR	NR†	NR†	NR	NR	NR	8
Borie [58]	2014	25	NR	NR	16	7.6	24	2	20	NR
Evans [34]	2015	30	17	6	NR	NR	19	NR	NR	21
Franceschilli [53]	2015	100	18.4	5.5	NR	NR	NR*	NR*	89	14
Tsunoda [47]	2015	26	11	4	NR	NR	30	6	NR	3.8
(b)										
Wong [45]	2011	16	NR	NR	NR	NR	NR	NR	NR	NR
Mantoo [46]	2013	44	NR	NR	NR	NR	NR	NR	NR†	8
(c)										
Tsiaoussis [6]	2005	23 (27)‡	NR	NR	NR	NR	NR	NR	NR	0
Von Papen [7]	2007	56	NR	NR	NR	NR	NR	NR	53	3.6

(d)

Author	Year	Operation	N	CCS pre	CCS post	ODS pre	ODS post	FISI pre	FISI post	Constipation improved %	Anatomical recurrence %
van Tets [4]	1995	Posterior mesh rectopexy	37	NR	NR	NR	NR	NR	NR	NR	NR
Vermeulen [54]	2005	Anterior mesh rectopexy	20	NR	NR	NR	NR	NR	NR	NR	NR
Portier [49]	2011	Anterior mesh rectopexy	40 (23°)	NR	NR	NR	NR	NR	NR	Worse	2.5

NR, not reported; CCS, Cleveland Clinic Constipation score.
*significant improvement (no data given).
†decreased or improved but not significantly (no data given).
‡4 open; ° 23 open procedures.

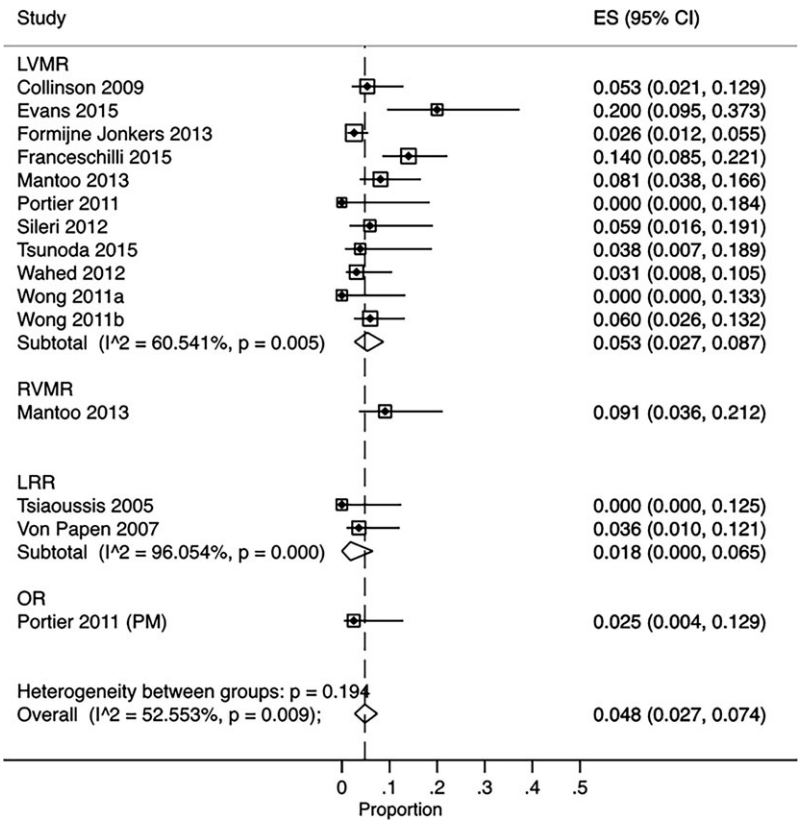

Figure 4 Forest plot showing rates of anatomical recurrence (percentage of patients) after rectopexy by procedure type. KEY: LVMR, laparoscopic ventral mesh rectopexy; RVMR, robotic ventral mesh rectopexy; LRR, laparoscopic resection rectopexy; OR, open rectopexy.

Table 5 Summary of papers where participants had a high grade internal intussusception (rectoanal, Oxford grade ≥ 3).

Author	Year	Op	N	FU	% success	CCS pre	CCS post	FISI pre	FISI post	Constipation improved	Anatomical recurrence
Tsiaoussis [6]	2005	†	27	45	93	NR	NR	NR	NR	NR	0
Collinson [48]	2009	LVMR	75	12	NR	12	5	28	8	86	5
Portier [49]	2011	*	40	22	97	NR	NR	NR	NR	Worse	2.5
Wong [45]	2011	‡	41	12	NR	NR	NR	NR	NR	NR	6.3
Sileri [51]	2012	LVMR	34	12	NR	16	7	9	3	NR	5.9
Formijne Jonkers [56]	2013	LVMR	233	30	NR	8.1	NR	NR	NR	NR	2.6
Gosselink [57]	2013	LVMR	151	12	NR	NR	NR	NR	NR	NR	NR
Borie [58]	2014	LVMR	52	1–18	NR	NR	NR	24	2	20	NR
Evans [34]	2015	LVMR	30	36	NR	17	6	19	NR	NR	21
Franceschilli [53]	2015	LVMR	100	20	89	18.4	5.5	NR	NR	89	14
Tsunoda [47]	2015	LVMR	26	16	NR	11	4	30	6	NR	3.8

*Lap and Open Ant mesh rectopexy.
†Lap resection rectopexy.
‡LVMR and RVMR.

detected) may be reasonable in the hope of resolving the ulcer. Data on a total of 75 patients with SRUS who have undergone LVMR are available from the two papers. Healing of the ulcer occurred in 78% of patients after surgery.

Summary evidence statements: patient selection

1 Although patient selection is perceived as vital in predicting outcome, it was inconsistently documented (level IV).

2 One common indication appears to be high grade rectal intussusception (level IV).
3 For high grade intussusception, LVMR, RVMR and resection rectopexy typically correct anatomy in about 80–100% of cases (level IV).
4 If SRUS is associated with prolapse, a LVMR typically results in healing of the ulcer in around 80% of patients (level IV).

Discussion

A systematic review of evidence for the perioperative and long terms benefits and harms of rectal suspension procedures identified no high quality studies. The evidence base is characterised by observational studies of variable and often uncertain methodological quality. Definitions are poor, e.g. grading of complications was inconsistent. Future studies should provide robust and comparative evidence for clinicians to support patient decision making, in terms both of the incremental benefits and harms of suspension procedures. A Clavien-Dindo (or equivalent) classification is essential. Greater understanding is required of the mediating effects of prognostic factors particularly preoperative definition of both functional and radiological parameters that impact upon treatment success. Relevant to future research would be to define a minimum set of outcomes for reporting future studies. Finally, and most obviously, the evidence base requires urgent augmentation with some high quality studies focused on having at least one well powered randomized controlled trial to inform future clinical decision making.

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Conflict of interest

The authors declare no conflict of interest.

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