



Pelvic floor function following ventral rectopexy versus STARR in the treatment of obstructed defecation

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Abstract

Background Obstructed defecation syndrome (ODS), most commonly found in females, can be treated by a transanal or abdominal approach with good success rate. Nevertheless, patients may experience de novo or persisting pelvic floor dysfunctions after surgery. The aim of this study was to compare the functional outcome of stapled transanal rectal resection (STARR) and ventral rectopexy (VRP) in a series of ODS patients.

Methods Forty-nine female patients who had surgery for ODS between 2006 and 2016 were retrospectively evaluated: 28 (median age 60 years, IQR 54–69 years) had VRP and 21 (median age 58 years, IQR 51–66 years) had STARR. ODS was scored with the ODS score while the overall pelvic floor function was assessed with the three axial perineal evaluation (TAPE) score. Quality-of-life was evaluated by the patient assessment of constipation quality-of-life (PAC-QoL) questionnaire administered preoperatively and after 1 year of follow-up.

Results The preoperative median ODS score and TAPE score were comparable in both groups. After a median follow-up of 12 months (range 12–18 months), the median ODS score was 12 (range 10–20) in the STARR group and 9 (range 3–15) in the VRP one ($p=0.02$), while the median TAPE score was 70.5 (IQR 60.6–77.3) in the former and 76.8 (IQR 70.2–89.7) in the latter ($p=0.01$). Postoperatively the physical domain of the PAC-QoL score had a median value of 2.74 (IQR 1.7–3.75) in the STARR group compared to 1.5 (IQR 1–2.5) in the VRP group ($p=0.03$). No major complications were recorded in either group.

Conclusions VRP and STARR can improve defecation in patients with ODS with minimal complications, but the overall pelvic wellness evaluated by the TAPE score improves significantly only after VRP, suggesting a better performance of VRP than STARR when overall pelvic floor function is concerned.

Keywords Defecation · Constipation · STARR · Surgical stapling · Digestive system surgical procedures · Pelvic floor · Quality of life

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Introduction

Obstructed defecation (ODS) is a frequent, disabling condition that mainly affects women, caused by anatomical and/or functional alterations in defecation. It was first identified in 1979 as a subset of constipation [1] and officially included among the functional disorders of defecation in the ROME III criteria [2]. Surgical treatment of ODS is challenging since the correction of anatomy does not always correspond to restored function [3] and because of the risk of new-onset functional disturbances including pain, urgency, fecal incontinence or de novo constipation. Pelvic floor compartments must be considered as a functional unit, since they share muscles, ligaments and innervation. In fact, the occurrence of ODS is frequently associated with other functional

disturbances involving the anterior and middle pelvic compartments like genital prolapse, sexual dysfunction, urinary incontinence or retention which can be influenced by surgery on the posterior compartment [4]. Therefore, the pre-/post-operative measure of pelvic floor function could be improved thanks to the use of a more comprehensive scoring system like the three axial perineal evaluation (TAPE) score [5] instead of the simple ODS score [6].

Rectal intussusception and rectocele are the most common findings at dynamic proctography in patients [7] with ODS. Both can be treated by an abdominal or transanal approach. The most popular transanal approach is stapled transanal rectal resection (STARR) [8] which involves the resection of the rectocele and the rectal intussusception by two circular staplers (PPH01 Ethicon EndoSurgery) or a rechargeable curved linear stapler (Contour Transtar, Ethicon EndoSurgery). Today the most frequently used abdominal approach is the ventral rectopexy (VRP) [9, 10], usually performed by laparoscopy, using resorbable (biological) or unresorbable meshes.

Both techniques have been proven to benefit patients, with a success rate of over 80% [10], but no randomized prospective studies have been published to compare them so far.

The aim of this study was to compare the functional outcome of STARR with that of VRP in a series of patients with ODS, with regard not only to defecation but also to overall pelvic floor function.

Materials and methods

A retrospective study was performed using a prospectively maintained database of patients complaining of obstructed defecation who attended our colorectal unit between 2006 and 2016. Only patients fulfilling the following selection criteria were included in the study: female gender, the presence of rectorectal or rectoanal intussusception (grades III and IV of the Oxford classification) [11] as main cause of ODS, type of operation performed (STARR or ventral rectopexy), and an ODS score [6] > 10. Exclusion criteria were male gender, the presence of very large (> 4 cm), non-emptying rectocele as main cause of constipation without intussusception, significant fecal incontinence (Vaizey score [12] > 5), previous surgery on rectum or anus, inflammatory bowel disease, pregnancy, other type of surgery to relieve ODS, slow transit constipation defined as ≤ 2 bowel movements per week and/or colonic transit time > 70 h, any psychiatric diseases. The occurrence of large rectocele as the main cause of ODS without intussusception was considered an exclusion criterion for both STARR and VRP because these cases are managed by the perineal/transvaginal route in our Institution.

All patients gave written informed consent to the operation and to the postoperative evaluation of the outcome. The study was approved by the local Ethics Committee.

All patients were preoperatively assessed by proctologic examination with anoscopy, anorectal manometry and dynamic proctography. Colonoscopy or barium enema was also performed in patients over 50 years of age or in case of proctorrhagia to exclude colorectal cancer. Dynamic proctography was performed using a semisolid contrast medium based on porridge, water and barium sulfate powder and recorded on a DVD disk. Patients complaining of slow transit constipation were excluded even if concomitant ODS was present. In these cases, the slow transit was documented by colonic transit time using radiopaque markers.

The severity of the ODS was scored with the ODS scoring system [6], while the overall pelvic floor function was estimated with the three axial perineal evaluation (TAPE) score [5] which is a comprehensive score assessing the function of the whole pelvic floor. It includes 6 scores or classification systems, 2 for each pelvic compartment function, Altomare's ODS and Vaizey's scores for the posterior compartment, the Baden–Walker half-way system and the Pelvic Organ Prolapse Incontinence Sexual Questionnaire, IUGA-revised (PISQ-IR) questionnaire for the middle compartment and the International Consultation on Incontinence Questionnaire—Short Form (ICIQ-SF) and percentage of urinary retention for the anterior compartment. Quality of life was also evaluated by the patient assessment of constipation quality-of-life (PAC-QoL) questionnaire [13].

All the questionnaires were administered preoperatively, at least 3 months after surgery and after 1-year follow-up. Recurrent or persisting rectal prolapse was diagnosed by postoperative dynamic defecography, while possible residual constipation was scored according to the ODS scoring system and considered significant if > 10.

STARR was carried out using the parachute technique with 2 circular PPH01 staplers as described elsewhere [8], while VRP was performed laparoscopically or by laparotomy (Pfannenstiel incision) according to D'Hoore et al. [9] using biological (26 cases) or unresorbable (2 cases) meshes.

Postoperative complications were classified according to the Clavien–Dindo classification [14].

Statistical analysis

Descriptive data were expressed as median and interquartile ranges. The Mann–Whitney *U* test was used to compare symptom scores of VRP and STARR patients, while the Wilcoxon rank-sum was used to test the pre/postoperatively difference within the same group. The statistical analysis was performed by IBM SPSS statistics software for Windows version 23.0 (IBM, Armonk, NY, USA).

p values < 0.05 were considered statistically significant.

Results

Out of 663 ODS patients attending our colorectal unit during the study period, 154 were operated on using different surgical techniques (including Wells rectopexy, Frykman–Goldberg operation, perineal/transvaginal repair of rectocele, Internal Delorme etc.). Only 72 patients had a STARR (37 patients) or a VRP (35 patients). Sixteen of the 37 STARR patients were excluded from the study because they did not meet the inclusion criteria (8 had associated slow transit constipation, 2 large rectoceles treated by transvaginal approach, and 6 were males), and 7 patients who had undergone VRP were excluded because they did not meet the inclusion criteria (males in 2 cases, previous failed STARR operation in 5 cases), leaving 43 patients available for the final analysis.

Twenty-eight female patients (median age 59 range 26–81 years) had VRP (20 by open surgery with Pfannenstiel incision, 8 laparoscopic), and 21 female patients had STARR (median age 58 range 32–76 years) performed by the same surgeon (ADF). The patients were well matched according to age, severity of pelvic floor dysfunction (ODS score, Vaizey score and TAPE score) and quality of life related to constipation (PAC-QoL) (Table 1). Eight of them (16%) (6 in the VRP group and 2 in the STARR group) had a history of hysterectomy for benign disease (genital prolapse or uterine fibromas). Seven patients in the VRP group had also had open abdominal surgery for other intra-abdominal diseases.

At defecography, all the patients had grade II or grade III rectal intussusception. No one in the STARR group had significant rectocele, while a not-significant enterocele (not detectable by clinical examination, but visible at defecography) was reported in 4 patients (19%) in the STARR group and 12 (43%) patients in the VRP group.

There was no postoperative mortality or mesh-related complications. Only one grade II (Clavien–Dindo classification) complication was recorded in a patient in the VRP group due to suprafascial hematoma after a repeated Pfannenstiel incision. After STARR, 2 patients had urgent defecation, 1 soiling, 1 fecal incontinence and 1 prolonged anal pain. All these postoperative complications improved within 3–6 months. Persisting obstructed defecation was reported by 8 patients (38%).

The median length of postoperative hospital stay was 6 days in both groups ($p=0.494$).

After a minimum follow-up of 12 months (range 12–18 months), the median ODS score was 12 (IQR 10.75–18.5) in the STARR group and 9 (IQR 3–15) in the VRP group ($p=0.02$), while the median TAPE score was 70.5 (IQR 60.6–77.3) in the former and 76.8 (IQR 70.2–89.7) in the latter ($p=0.01$; Figs. 1, 2). This outcome parallels the quality-of-life outcome. In fact, the postoperative physical domain of the PAC-QoL score had a median value of 2.74 (IQR 1.7–3.75) in the STARR group compared to 1.5 (IQR 1–2.5) in the VRP group ($p=0.03$), while the other 3 domains were better in the VRP group although they did not reach statistical significance (Fig. 3).

When the pre- and postoperative evaluation is considered within each group, the severity of ODS decreased from a

Table 1 Patients characteristics, pelvic floor function and quality of life in the two groups of patients before treatment (score values expressed as median and interquartile ranges)

	STARR 21 patients	Ventral rectopexy 28 patients	<i>p</i> value
Age, years	58 (51–66)	60 (54–69)	0.40
Intussusception grade II/III	15/6	13/15	0.12
Large rectocele (> 4 cm)	0	0	1
Enterocele (not clinically evident)	4	12	0.08
Previous hysterectomy	2	6	0.26
Previous intrabd. surgery	2	9	0.06
Altomare's ODS score	16 (14.5–20)	19 (14–21)	0.11
Vaizey's score	0 (0–0)	2 (0–2)	0.91
TAPE score	66.4 (60.6–69.6)	72.2 (60.9–75.7)	0.17
PAC-QoL (worries)	2.63 (2.4–3.1)	2.8 (2.4–3.1)	0.83
PAC-QoL (psychological)	2.13 (1.5–2.6)	1.88 (1.7–2.2)	0.57
PAC-QoL (physical)	3.25 (2.7–3.7)	3.25 (3–3.5)	0.82
PAC-QoL (dissatisfaction)	3.0 (2.8–3.3)	3.2 (3.0–4.0)	0.11
Follow-up duration, months	14 (13–16)	12 (11.7–16)	0.31

Score values are expressed as median and interquartile ranges

ODS obstructed defecation syndrome, STARR stapled transanal rectal resection, TAPE three axial perineal evaluation, PAC-QoL patient assessment of constipation quality of life

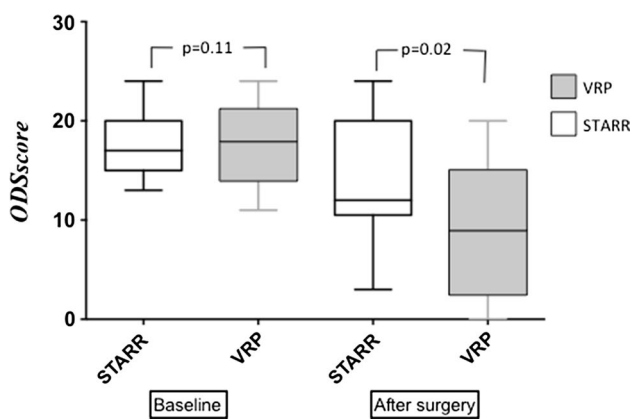


Fig. 1 Median and interquartile ranges of the pre- and postoperative obstructed defecation syndrome (ODS) score in the two groups

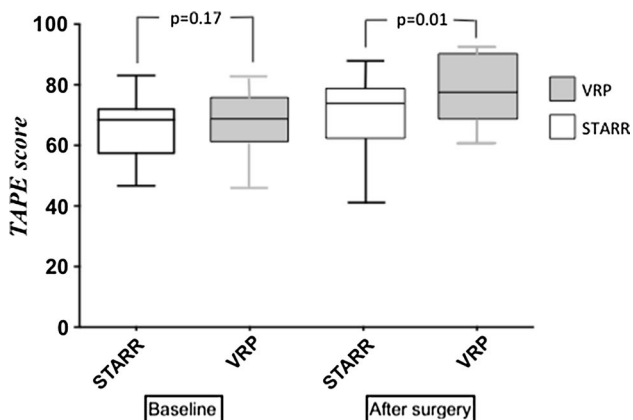


Fig. 2 Median and interquartile ranges of the pre- and postoperative three axial perineal evaluation (TAPE) score in the two groups

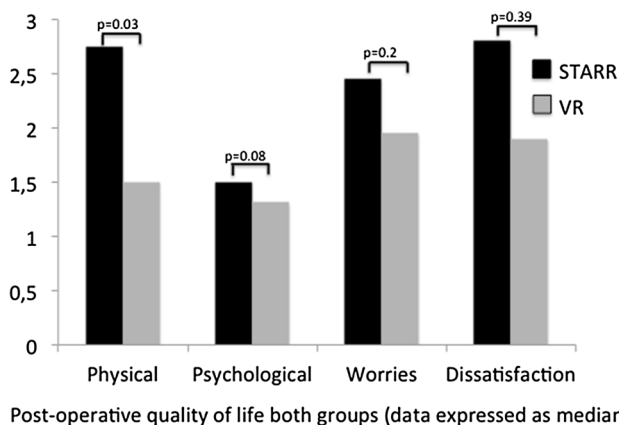


Fig. 3 Pre- and postoperative quality of life in the in the two groups (data expressed as median)

median score of 16 (IQR 14.5–20) to 12 (IQR 10.7–18.5) in the STARR group ($p=0.02$), but the pelvic floor function evaluated by the TAPE score did not change significantly, from a median score of 66.4, (IQR 60.6–69.6) to 70.5 (IQR 60.6–77.3) ($p=0.13$). On the contrary in the VRP group, both scores decreased significantly, (from 19 (IQR 14–21) to 9 (IQR 3–15) ($p=0.001$) for the ODS score and from 72.2 (IQR 60.9–75.7) to 76.8 (IQR 70.2–89.7) ($p<0.02$), for the TAPE score).

Discussion

Constipation is one of the most common complaints in coloproctology, and obstructed defecation accounts for up to 60% of them, mainly in female patients [15]; surgical treatment of this condition is still challenging because of potential risks and/or uncertainty of the functional outcome. The introduction of the STARR operation in clinical practice has favored a surgical approach to ODS because it is easy to perform and associated with low postoperative pain and early positive outcome [16]. Nevertheless, unsatisfactory late results [17, 18], occurrence of rare but life-threatening complications [19, 20] and, in some cases, persistence of fecal urgency or pain [21] have cooled the enthusiasm of many colorectal surgeons and other operations, like VRP, have been proposed [9]. This has been recently documented in a European survey carried out by French surgeons in 32 centers of 13 European countries [22], showing that 1/3 of the centers have abandoned STARR in favor of the VRP. Unfortunately, no randomized controlled trials have been implemented to support such a common-sense change.

In agreement with other authors [10, 23], our study shows that both techniques are effective in reducing the severity of the ODS when it is scored by the ODS score and both are safe and associated with minimal morbidity. However, when other pelvic floor functions such as fecal incontinence or sexual function have been explored using a more comprehensive scoring system like the TAPE score, patients who underwent VRP had a significantly better outcome than those who had STARR. In fact, the improvement in the TAPE score after surgery is statistically significant only in the VRP group, suggesting that other pelvic floor functions can deteriorate after STARR, despite improvement in defecation.

The pelvic floor is usually considered a functional unit since there is a close relationship between the anterior, middle and posterior compartments, and the surgical treatment of one of them could affect the function of the adjacent compartment. For this reason, the evaluation of pelvic floor function is better explored by a comprehensive scoring system like the TAPE score instead of single scores of severity for each pelvic floor function. Our findings suggest that other

pelvic floor functions, like urinary or fecal incontinence, genital prolapse, impotence, which could be damaged both before and after surgery, should be extensively investigated in these patients even if ODS is their major complaint.

The literature on this topic lacks comparative studies, and no randomized controlled studies have been published so far. The only other comparative paper published on this topic [24] retrospectively compares 25 patients who had VRP with 27 who underwent STARR, reporting similar morbidities and functional outcome using the ODS score. However, the patients in the two groups were dishomogeneous concerning anal sphincter function, which was normal in the STARR group and impaired in the VRP group. Therefore, any possible consequences of STARR on anal continence could have been overlooked.

Furthermore, in that study, in most of the patients a large rectocele was the main cause of ODS instead of rectoanal or rectorectal intussusception, as in our population.

Despite the long period of patient recruitment, the questionnaires were all administered at scheduled times until 1-year follow-up, making the comparison of the functional outcome between the two groups reliable.

Further considerations in favor of VRP include the risk of rare but disastrous complications after STARR [19], which are unacceptable after surgery for a benign disease, and the easy correction of enterocele, when present, which are unsuitable for treatment with STARR [25].

When VRP is preferred, the choice between the expensive reabsorbable biologic meshes and the cheap unreabsorbable ones is actively debated. In this study, despite their higher cost, reabsorbable biological meshes were preferred in order to avoid mesh-related complications [26] such as erosion and infection, and they lower the risk of accidental organ injuries in case of re-do surgery, even if long-term effectiveness of rectal suspension is uncertain. On the other hand, a reassuring medium-term outcome has recently been reported using biological meshes by Wahed et al. [27] and Franceschilli et al. [28].

Possible limitations of this study are the retrospective design of the study relatively short follow-up period and the rather low number of patients recruited, even if this point is partially compensated by the use of strict inclusion criteria, which makes the population very homogeneous, and by the presence of a single operator, which eliminates inter-operator variability.

Conclusions

In conclusion, in line with the European trend [22], this study favors the use of the VRP over the STARR operation in patients with ODS caused by rectal intussusception. In fact, while both techniques can significantly improve

defecation in patients with rectal intussusception with minimal complications, overall pelvic function evaluated by the TAPE score increases significantly only after VRP.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical approval This study was approved by the independent Ethics Committee of the Azienda Ospedaliero-Universitaria Policlinico BARI.

Informed consent All patients received and agreed to the patient information sheet and informed consent for the study and procedure.

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