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ORIGINAL ARTICLE

# Value and limits of stapled transanal rectal repair for obstructed defecation syndrome: 10 years-experience with 450 cases

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**KEYWORDS**
Obstructed defecation;
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Rectocele;
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**Summary** *Background/Objective:* In the late's 90' a new surgical treatment, the stapled trans-anal rectal resection (STARR) was born to treat obstructed defecation syndrome (ODS). In this study we retrospectively analyze a series of 450 cases that underwent STARR in 10 years.
*Methods:* Between January 2001 to December 2011, 450 patients, diagnosed with ODS syndrome caused by rectocele or intussusception, underwent to STARR procedure. The presence of rectocele and/or intussusception was verified by dynamic defecography. The preoperative evaluation was completed with anorectal manometry and colonoscopy. Follow-up visits were scheduled 1 week, 1 month, 3 months, 1 years, 3 years and 5 years after surgery.
*Results:* Mean operative time was 30,2 min. In 408 cases (90.7%) hospital discharge occurred 24 hours after surgery. Among postoperative complications urinary retention was observed in 35 patients (7.8%). Five (1.1%) patients presented an early rectal bleeding and 8 (1.8%) patients presented a late bleeding. In 5 (1.1%) patients a stable pelvic hematoma was found. Six (1.3%) patients presented pelvic sepsis due to subperitoneal perforation. An asymptomatic partial dehiscence of stapler row occurred in 19 patients (4.2%).125 patients (27.8%) reported defecation urgency that completely vanished at 3 months follow-up in 83 patients (66,4%) and in further 42 patients (33,6%) at 6-months. The average preoperative ODS score was 14.1; 3.1 at one year; 4.3 at 3 years and 6.4 after five years.

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[c] Substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data.
[d] Drafting the article or revising it critically for important intellectual content.
[e] Final approval of the version to be published.

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*Conclusions:* In expert hands, with right indications, STARR procedure is safe with good results in terms of improvement of the ODS score.


## 1. Introduction

Obstructed defecation syndrome (ODS) is a frequent but underestimated clinical condition only focused in the last decades. ODS can be defined as an impaired ability to evacuate the rectum despite a normal desire to defecate. ODS affects about 15—20% of the female population, usually middle-aged multiparous women. These patients present long history of excessive strained and fragmentized evacuation associated with necessity of vaginal or perineal digital stimulation to induce defecation.

The syndrome can be caused by several anatomical or functional abnormalities. Rectocele and intussusception, sometimes associated with uro-gynecological prolapse, are the most frequent anatomic rectal disorders associated with ODS, but occasionally the etiology can be attributed to functional conditions such as paradoxical puborectalis muscle contraction.

High-fiber diet and biofeedback can be considered the first-line therapy for these patients and rectal surgery should be reserved only if the patient with rectocele or intussusception does not respond to conservative treatment. If uro-gynecological prolapse is associated, a careful gynecological examination is mandatory to exclude a gynecological approach before.

During 90′ a new surgical operation, the stapled transanal rectal resection (STARR) was born to treat the cases of ODS due to a single internal rectal prolapse or rectocele. This is a minimally invasive technique for the correction of rectocele and intussusception aiming to restore the normal anatomy of the rectum by removing redundant tissue.[1,2] Although in the first series sporadic life-threatening complications like pelvic sepsis or massive rectal bleeding were described, large studies demonstrate how STARR procedure determines a significant improvement of patients symptoms, associated with low morbidity and acceptable postoperative pain. In the last decade this technique was increasingly accepted as a valid surgical option for ODS treatment, but its long-term outcomes are still controversial.[3—5]

In this study we retrospectively analyze a series of 450 cases that underwent STARR for ODS due to single internal rectal prolapse and rectocele in 10 years, particularly focusing on complications, long-term results of ODS symptoms and recurrence.

## 2. Methods

### 2.1. Patients

During the period between January 2001 to December 2011, 450 patients, diagnosed with ODS caused by single rectocele or internal rectal intussusception, underwent STARR procedure at our Institution: 387 (86%) were females and 63 (14%) males. The mean age at surgery was 56 years (range: 28—77). In our series 117 (26%) patients were less than 50 years old, 180 (40%) were between 50 and 65 years old and 153 (34%) patients were more than 65 years old (Table 1).

We retrospectively analyzed the collected data of the patients recorded in a department database. The written informed consent was obtained from all patients included in the study. The work described has been carried out in accordance with ethical principles for medical research involving human subjects (World Medical Association—Declaration of Helsinki).

### 2.2. Pre-operative work-up

Preoperative clinical evaluation consisted in complete medical history (symptoms, previous pregnancies and anorectal, gynecologic or urologic surgery) and examination of perineum, vagina and rectum (evaluation of presence and size of ventral rectocele, presence of concomitant cystocele, uro-gynecological prolapse or perineal descent and assessment of sphincter function). A proctoscopy was routinely performed to exclude concomitant anorectal diseases. The presence of rectocele and/or intussusception was verified by dynamic defecography with synchronous opacification of vagina and ileum for evaluating the presence and the size of enterocele in each patient.[6] In all cases preoperative evaluation was completed with anorectal manometry and colonoscopy.[6,7]

Patients were selected for surgery according to the criteria proposed by consensus recommendations.[8,9] Hemorrhoidal prolapse was not considered a contraindication to surgical treatment. Complete rectal prolapse, symptomatic cystocele, stable enterocele, pelvic floor dyssynergia, perineal infection and inflammatory bowel disease were contraindication for surgery. All patients were preoperatively evaluated with Obstructed Defecation Syndrome Score (ODSS) and Cleveland Clinic Incontinence Score (CCIS).[10]

**Table 1** Population.

| | |
|---|---|
| Female | 387 |
| Male | 63 |
| Mean age | 56 (range: 28—77 yo) |
| Mean operative time | 30,2 min (range 26, 1—34.2 yo). |
| 24 H Hospitalization | 408 (90,7%) |
| ≻ 24 h Hospitalization | 42 (9,3%) |

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### 2.3. Surgical treatment

Patients with symptomatic rectocele or intussusception not responding to conservative treatment (1.5 L/day of water, high-fiber diet and stool softeners for 3 months) underwent STARR. Preoperative bowel preparation consisted in two cleansing enemas at the morning of surgery. All patients received an antibiotic prophylaxis with a single dose of Cefotaxime 2 gr and Metronidazole 0.5 gr intravenously (iv) 30 min before surgery. The operation was generally performed under spinal anesthesia the operation was performed according to the traditional technique.[2] The same surgical team operated all patients. Operative time, intraoperative complications, size and weight of the fresh rectal wall were recorded.

### 2.4. Post-operative follow-up

The postoperative pain was controlled by Ketorolac 30 mg iv twice a day for the first 24 h. Subsequently Paracetamol 1 gr was administered orally at patient's request. A visual analog scale (VAS) was used to assess the level of postoperative pain (1: no pain; 10: very intense pain). Laxatives (Lactulose 10 g/day) by mouth were administrated from the first postoperative day. The patient was routinely discharged 24 h after intervention in absence of complications with a complete pain control.

Postoperative complications and hospital length of stay were recorded. The postoperative pain was evaluated with VAS and analgesic consumption at the first and second day after surgery.

Follow-up visits were scheduled 1 week, 1 month, 3 months, 6 months, 1 years,3 years and 5 years after surgery. At 1 week visit digital examination was used to assess the tone of anal sphincter and to exclude local complications. Proctoscopy was performed at 1 and 3 month to evaluate the right correction of internal prolapse and the rectocele. VAS and analgesic consumption were registered at the first (1 week) follow-up visit. After 1 years and 3 years the ODS score and CCIS score were evaluated by phone. At 5 years all the patients were clinically revaluated to exclude prolapse or rectocele recurrence. ODS score and CCIS score were evaluated.

## 3. Results

Mean operative time was 30,2 min (range 26,1—34.2). All surgical specimens have been analyzed (Table 2).

In 408 cases (90.7%) hospital discharge occurred 24 h after surgery; in 42 cases (9.3%) hospital stay lasted more than 24 h.

**Table 2** Histological data (average).

| | |
|---|---|
| Length (cm) | 6,3 |
| Breadth (cm) | 3,2 |
| Thickness (cm) | 0,4 |
| Weight of fresh tissues (g) | 14,9 |

**Table 3** Complications.

| | |
|---|---|
| Urinary Retention | 35 (7.8%). |
| Early bleeding (<24 h) | 5 (1.1%) |
| Late Bleeding (>24 h) | 8 (1,8%) |
| Pelvic Hematoma | 5 (1.1%) |
| Perforation | 6 (1,3%) |
| Partial Dehiscence | 19 (4,2%) |
| Urgency | 125 (27,8%) |

Among postoperative complications urinary retention was observed in 35 patients (7.8%). Five (1.1%) patients presented an early rectal bleeding (within 24 h from surgery) and 8 (1.8%) patients presented a late bleeding (after more than 24 h from surgery). All these cases needed an urgent surgical reintervention to obtain hemostasis.

In 5 (1.1%) patients a stable pelvic hematoma was found: reintervention was not required but in 4 cases blood transfusion was necessary. Six (1.3%) patients presented pelvic sepsis due to subperitoneal perforation, objectivated by digital exploration and confirmed by abdominal CT: in 2 cases, unresponsive to medical treatment, a temporary colostomy was performed while 4 cases were treated conservatively (intravenous antibiotics and parenteral nutrition for two weeks). An asymptomatic partial dehiscence, objectivated by digital exploration, of stapler row occurred in 19 patients (4.2%). This patients were treated only with oral antibiotics for 7 days (Table 3).

125 patients (27.8%) reported urgency that completely vanished at 3 months follow-up in 83 patients (66,4%) and subsequently in further 42 patients (33,6%) at 6-months.

The average preoperative ODS score was 14.1; 3.1 at one year; 4.3 at 3 years and 6.4 after five or more years (Fig. 1).

After five years we don't have any internal prolapse or rectocele recurrence.

## 4. Discussion

ODS can be caused by structural or functional rectal disorders often associated with uro-gynecological prolapse. Single intussusception and ventral rectocele are frequent conditions. Intussusception is detected radiologically in about 50% of the adult population while rectocele is found

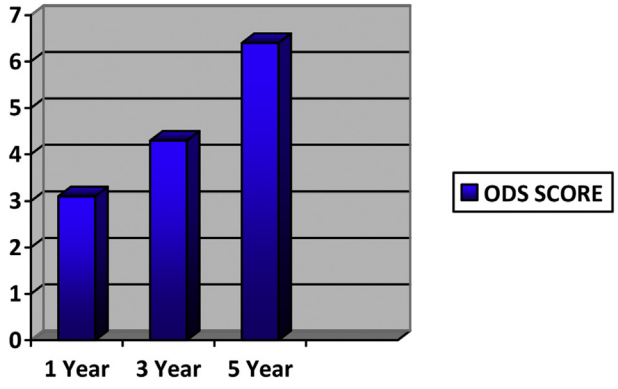


**Figure 1** Post-operative ODS score.

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in 80% of the female population at defecography.[11,12] Single symptomatic intussusception or rectocele justifies intrarectal surgical treatment.

ODS can be also due to lack of relaxation or paradoxal contraction of puborectalis muscle and external anal sphincter muscle during defecation. The puborectalis dyssynergia is characterized by absence of relaxation of the anal canal during defecation. These patients are correctly managed with biofeedback reeducation, while the surgical correction of concomitant anatomic abnormalities may not resolve ODS symptoms. In these patient's appropriate indication for surgery is crucial and consequently a careful patient selection is essential for good postoperative results.

In the early phase of STARR application, some authors described a high rate of severe complications related to this technique.[13,14] The adverse events ranged from life-threatening massive postoperative rectal bleeding, pararectal hematoma, pelvic sepsis associated with retropneumoperitoneum and necrotizing pelvic fasciitis, to recto-vaginal fistula, fecal incontinence and chronic anal pain. After 10 years these severe complications can be considered only related to the first phase of diffusion of technical procedure.

Results from several large clinical series demonstrated the feasibility and safety of this surgical technique and a significant improvement of symptoms related to ODS after STARR: in approximately 80% of patients the functional outcome is improved and the technique is associated with a low morbidity rate in absence of life-threating complication.[15–17] Nevertheless these satisfying results can be reached only with correct indications and if the surgical team is experienced in the procedure and routinely performs colorectal and pelvic floor surgery. At present STARR technique is considered an effective and safe procedure for ODS [NICE].

In our experience the post-operative bleeding are probably due to an unknowingly hemostasis of the arterioles spasmed immediately after stapling. We suggested waiting 5 min after stapling to highlight late bleeding.

The learning curve is probably in cause in the dehiscence rate. In our experience, if the thickness of prolapse is more than 6 mm we prefer to treat it with Transtar® procedure to prevent dehiscence and hematomas on the stapler row.

Pelvic sepsis are probably due to an over-infection of a missed retroperitoneal hematoma. To prevent that we suggest to continue a large specter antibiotic prophylaxis for 24 h after surgery.

A peculiar problem associated with STARR is urgency in postoperative period and its incidence varies from 11% to 34%. Usually urgency is transient and it solves spontaneously within 3–6 months after surgery. This specific complication can be ascribed to the reduction of rectal volume and removal of the receptors.

In our series there was a significantly higher rate of postoperative transient fecal urgency (27,8%). This complaint was absent before surgery and disappeared within six months in all cases.

To reduce the symptomatology, in our department, we administer 1 tablet of loperamide hydrochloride 2 mg per day for 30 days.

In the literature STARR procedure solves or reduces ODS symptoms in 70–90% of patients. Mid-term follow-up data highlight recurrence in a non-negligible proportion of cases. Indeed, a gradual deterioration of outlet function occurs in 10–30% of cases over the following years. In our experience a progressively slight worsening in ODS score was observed without evidence of recurrence in internal rectal prolapse or rectocele.

## Conflict of interest

The authors declare they have no conflict of interest.

## References

1. Pescatori M, Quondamcarlo C. A new grading of rectal internal mucosal prolapse and its correlation with diagnosis and treatment. *Int J Colorectal Dis*. 1999;14:245–249.
2. Boccasanta P, Venturi M, Salamina G, Cesana BM, Bernasconi F, Roviaro G. New trends in the surgical treatment of outlet obstruction: clinical and functional results of two novel transanal stapled techniques from a randomized controlled trial. *Int J Colorectal Dis*. 2004;19:359–369.
3. Schulte T, Bokelmann F, Jongen J, Peleikis HG, Fandrich F, Kahlke V. Mediastinal and retro-/intraperitoneal emphysema after stapled transanal rectal resection (STARR-operation) using the Contour Transtar stapler in obstructive defecation syndrome. *Int J Colorectal Dis*. 2008;23:1019–1020.
4. Pescatori M, Gagliardi G. Postoperative complications after procedure for prolapsed hemorrhoids (PPH) and stapled transanal rectal resection (STARR) procedures. *Tech Coloproctol*. 2008;12:7–19.
5. Stuto A, Renzi A, Carriero A, et al. Stapled trans-anal rectal resection (STARR) in the surgical treatment of the obstructed defecation syndrome: results of STARR Italian Registry. *Surg Innov*. 2011;18:248–253.
6. Mellgren A, Bremmer S, Johansson C, et al. Defecography: results of investigations in 2,816 patients. *Dis Colon Rectum*. 1994;37:1133–1141.
7. Andromanakos N, Skandalakis P, Troupis T, Filippou D. Constipation of anorectal outlet obstruction: pathophysiology, evaluation and management. *J Gastroenterol Hepatol*. 2006;21:638–646.
8. Schwandner O, Stuto A, Jayne D, et al. Decision-making algorithm for the STARR procedure in obstructed defecation syndrome: position statement of the group of STARR Pioneers. *Surg Innov*. 2008;20:1–5.
9. Corman ML, Carriero A, Hager T, et al. Consensus conference on the stapled transanal rectal resection (STARR) for disordered defaecation. *Colorectal Dis*. 2006 Feb;8(2):98–101.
10. Agachan Feran, Chen Teng, Pfeifer Johann, Reissman Petachia, Wexner Steven D. A constipation scoring system to simplify evaluation and management of constipated patients. *Dis Colon Rectum*. 1996 Jun;39(6):681–685.
11. Felt-Bersma RJ, Cuesta MA. Rectal prolapse, rectal intussusception, rectocele, and solitary rectal ulcer syndrome. *Gastroenterol Clin North Am*. 2001 Mar;30(1):199–222. Review.
12. Ommer A, Köhler A, Athanasiadis S. Evacuation defecography and defecoflometry in diagnosis of chronic constipation. A prospective comparative study of 49 patients. *Chirurg*. 1998 Apr;69(4):455–460 [German].
13. Dodi G, Pietroletti R, Milito G, Binda G, Pescatori M. Bleeding, incontinence, pain and constipation after STARR transanal double stapling rectotomy for obstructed defecation. *Tech Coloproctol*. 2003;7:148–153.
14. Naldini G, Cerullo G, Menconi C, Martellucci J, Orlandi S, Romano N, Rossi M. Resected specimen evaluation,anorectal manometry,

Please cite this article in press as: Guttadauro A, et al., Value and limits of stapled transanal rectal repair for obstructed defecation syndrome: 10 years-experience with 450 cases, Asian Journal of Surgery (2017), http://dx.doi.org/10.1016/j.asjsur.2017.05.002

endoanal ultrasonography and clinical follow-up after STARR procedures. *World J Gastroenterol*. 2011;17:2411–2416.
15. Arroyo A, González-Argenté FX, García-Domingo M, et al. Prospective multicentre clinical trial of stapled transanal rectal resection for obstructive defaecation syndrome. *Br J Surg*. 2008 Dec;95(12):1521–1527. http://dx.doi.org/10.1002/bjs.6328.
16. Jayne DG, Schwandner O, Stuto A. Stapled transanal rectal resection for obstructed defecation syndrome: one-year results of the European STARR Registry. *Dis Colon Rectum*. 2009 Jul;52(7):1205–1212. http://dx.doi.org/10.1007/DCR.0b013e3181a9120f. discussion 1212-4.
17. Reibetanz J, Boenicke L, Kim M, Germer CT, Isbert C. Enterocele is not a contraindication to stapled transanal surgery for outlet obstruction: an analysis of 170 patients. *Colorectal Dis*. 2011 Jun;13(6):e131–e136. http://dx.doi.org/10.1111/j.1463-1318.2011.02554.x.

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