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# Correlation Between Outcome and Instrumental Findings After Stapled Transanal Rectal Resection for Obstructed Defecation Syndrome

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**Abstract**

*Objective*. Several studies show that stapled transanal rectal resection (STARR) significantly improves constipation in most patients, while others remain syntomatic for obstructed defecation syndrome (ODS). The aim of the study was to analyze clinical, manometric, and endoanal ultrasonography results in order to find any possible correlation between clinical and instrumental data, particularly in dissatisfied patients, both for those who remain symptomatic for ODS and for patients with new-onset fecal disorders. *Patients and methods*. All patients underwent a preoperative and postoperative assessment based on clinical evaluation, proctoscopy, defecography, anorectal manometry, and endoanal ultrasonography. Furthermore, we asked patients about a subjective satisfaction grading of outcome. *Results*. From January 2007 to December 2009, 103 patients were treated in our department with STARR for ODS. Postoperative endoanal ultrasound did not demonstrate any variations compared with the preoperative one. Postoperative scores showed statistically significant improvement, with respect to the preoperative value, with good and sufficient scores in 79.6% of patients, and an overall rate of satisfaction of 87.1%. Fecal disorders, including also the slightest alteration of continence, occurred in 24% of patients, in particular soiling 1.8%, urgency 7.4%, occasional gas leakage 5.5%, and liquid/solid leakage 9.3%. Anorectal manometry revealed a statistically significant reduction only in sensitivity threshold and maximum tolerated volume compared to patients with no disorders of continence. *Conclusion*. Results indicate good satisfaction grading and a statistically significant improvement in scores of constipation. There is no close correlation between satisfaction grading and scores. Besides, the assessment of patient's satisfaction often does not match the objective functional outcome.

**Keywords**

colorectal surgery, evidence-based medicine/surgery, obstructed defecation syndrome, functional results

## Introduction

The stapled transanal rectal resection (STARR) procedure is a surgical technique introduced to treat obstructed defecation syndrome (ODS) due to rectocele and rectal intussusception and it has been demonstrated to be safe and effective.[1,2] ODS is defined as the normal desire to defecate but with an impaired ability to evacuate the rectum satisfactorily. It is characterized by a cohort of symptoms, including feeling of incomplete evacuation with painful effort, unsuccessful attempts with excessive time spent in the bathroom, defecation with use of perineal support and/or odd posture, digital assistance, and evacuation obtained only with use of enemas.[3,4] It is most commonly found in middle-aged multiparous women and may be associated with the prolapse of other pelvic organs.[5]

The aim of STARR is to correct the mechanical outlet obstruction caused by rectal intussusception and/or rectocele using a stapler device for endorectal resection of the distal rectum.[2,6,7] The STARR procedure could be performed by 2 PPH-01 stapling devices or a CCS-30 stapler (ETHICON Endosurgery, Cincinnati, OH), with the only difference of the amount of resected volume. In our experience[8] and in the current literature, a correlation between

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the amount of the prolapse removed and the functional improvement in patients with ODS has not been reported.[9,10]

Several reports have shown that STARR significantly improves constipation in most patients, while others remain symptomatic for ODS.[9,11] However, continence improves in some patients but worsens in others, in whom urgency to defecate has been identified as the major side effect of this procedure.[11] There are also reports of new-onset fecal incontinence after STARR.[12] Although a decision-making algorithm for the STARR procedure has been published, there are still no studies that provide objective data about predictors of its success or failure in terms of postoperative constipation and continence.[13]

The aim of the study was to analyze clinical, manometric, and endoanal ultrasonography results at the follow-up, until 12 months after surgery, in order to find any possible correlation between clinical and instrumental data, particularly in dissatisfied patients, both for those who remain symptomatic for ODS and for patients with new-onset fecal disorders.

## Material and Methods

### Population Under Study and Preoperative Assessment

From January 2007 to December 2009, 103 patients were treated in our department with STARR for ODS, but only 54 patients (52 females, 2 males, mean age 54.25 years, range 28-77 years) accepted the systematic follow-up and they were enrolled in the study. All patients underwent a preoperative assessment based on clinical evaluation (Longo-OD[13] and Cleveland Clinic Score for Constipation [CCSC][14]), proctoscopy, defecography, anorectal manometry, and endoanal ultrasonography. A colonoscopy was performed when malignant or inflammatory disease was suspected. All patients gave informed written consent.

### Indications for Surgery

Patients selected for surgery were those with (*a*) symptomatic rectocele and rectal intussusception and (*b*) failure of medical therapy (1.5 L/d of water, high-fiber diet, lactulose 10 g/d) and persistence of at least 3 of the following symptoms: feeling of incomplete evacuation, painful effort, unsuccessful attempts with long periods spent in the bathroom, defecation with use of perineal support and/or odd posture, digital assistance, and evacuation obtained only with use of enemas. The presence of hemorrhoids was not a contraindication to the operation.

Stapled transanal rectal resection procedure with CCS-30 was preferred in patients in whom the possibility of a larger or a tailored resection could be necessary, or for asymmetrical prolapses.

### Exclusion Criteria

Patients excluded from study were those with nonrelaxing puborectalis muscle at defecography, synchronous genital prolapse or cystocele requiring associated transvaginal operations, fecal incontinence (Cleveland Clinic Score for Incontinence >4),[15] patients with moderate and serious defect according to the Starck Severity Scoring System for endoanal echography lesions (points ≥5, range 0-16),[16,17] patients with manometric patterns indicative of fecal incontinence (maximum resting pressure <45 mm Hg, maximum squeeze pressure <90 mm Hg, sensitive threshold <20 mL), mental disorders, and general contraindications to surgery. Patients with pelvic floor dyssynergia confirmed by clinical and instrumental evaluation were treated with pelvic floor training.

### Surgical Techniques

All surgical procedures were carried out in the lithotomy position by a single senior surgeon. Preoperative enema and antibiotic prophylaxis with intravenous metronidazole 1 g and cefamezin 2 g were performed. Spinal or general anaesthesia were carried out and a particular effort was made to obtain a total muscle curarization in order to avoid a sphincter stretching suddenly during surgery. PPH-STARR was performed using 2 PPH-01 stapling devices (ETHICON Endosurgery, Cincinnati, OH) as described elsewhere,[18] with the variant of the parachute, by means of positioning of 3 stitches for the traction of anterior emi-parachute and 3 stitches for the traction of posterior emi-parachute. For the CCS-30-STARR, a CCS-30 stapler kit (ETHICON Endosurgery, Cincinnati, OH) was used as already described in the literature.[19] In addition, at the end of both STARR procedures, 2/0 vicryl stitches were put on the stapler line in case of bleeding. Finally, an easy-flow drainage is placed in the anus as an indicator of bleeding. The choice of the surgical procedure was mainly based on the intraoperative mobility of the prolapse: The Contour CCS-30 STARR procedure was performed in case of a very mobile, large, or asymmetrical prolapse, wherein a tailored resection was considered preferable.

### Postoperative Management and Follow-up

Patients were treated with a standard protocol for pain control with intramuscular ketorolac 30 mg and intravenous

**Table 1.** Comparison Between Preoperative and Postoperative Scores.

| Score | Preoperative | Postoperative | Significance, *P* |
|---|---|---|---|
| Longo score | 21.38 | 5.47 | .05 |
| Cleveland Clinic Score for Constipation | 19.49 | 6.14 | .05 |

**Table 2.** Correlation Between Postoperative Manometric Data and Scores.

| Postoperative anorectal manometry | Good | Poor | Significance |
|---|---|---|---|
| | Longo score ≤7<br>CCSC ≤12<br>43/54 patients (79.6%) | Longo score >7<br>CCSC >12<br>11/54 patients (20.4%) | |
| MRP | 94.81 | 76.65 | NS |
| MSP | 196.33 | 119.09 | NS |
| Sensivity threshold | 53.93 | 67.27 | NS |
| Defecation stimulus | 97.5 | 120 | NS |
| Maximum tolerated volume | 166.79 | 180 | NS |

Abbreviations: CCSC, Cleveland Clinic Score for Constipation; MRP, maximum resting pressure; MSP, maximum squeeze pressure; NS, nonsignificant.

paracetamol 1 g as a rescue dose. The postoperative pain was evaluated with the Visual Analog Scale (VAS) on the first and second day after the surgical procedure (twice a day). All patients were prospectively evaluated 7 days, 1 month, 3 months, and 6 months after surgery by clinical examination, Longo OD, and CCSC. Patients who accepted to participate in the study were clinically evaluated at 12 months after surgery by endoanal ultrasonography (Bruel and Kjaer 10 MHz 3-D rotating probe) and anorectal manometry. Furthermore, we asked the patients about a simple satisfaction grading of outcome, that is, good, sufficient, or poor judgment.

### *Statistical Analysis*

Statistical analysis was performed using paired *t* test for continuous variables. A *P* value less than .05 was considered statistically significant.

## Results

During the period between January 2007 and December 2009, 54 patients (52 females, 2 males, mean age 54.25 years, range 28-77 years) treated with STARR accepted to be enrolled in the study and were prospectively evaluated; 36 were treated with double PPH-01 stapler and 18 with Contour CCS-30.

No statistically significant differences were noted between double stapler or curved stapler STARR groups about homogeneity of the 2 groups and outcome. For this reason, the group of patient evaluated was considered as "patients who underwent a Stapled Transanal Rectal Resection," regardless of technical approach.

Postoperative Longo score and CCSC showed a statistically significant improvement with respect to the preoperative value: Longo score 5.47 versus 21.38; CCSC 6.14 versus 19.49; $P < .05$ (Table 1). Longo score ≤7 and CCSC ≤12 were considered to be good and sufficient scores, while Longo score >7 and CCSC >12 were considered as poor. Data confirmed good and sufficient scores in 79.6% of patients (Table 2). Anorectal manometry did not give any statistically significant differences between patients with improved scores compared with those with poor scores. Increased maximum resting pressure and maximum squeeze pressure was found in both groups of patients, with higher values in patients with good scores, but data were not statistically significant (Table 2).

At 12-month follow-up evaluation, an overall rate of satisfaction of 87.1% (47/54) was achieved.

The correlation between postoperative satisfaction grading and postoperative scores for constipation was also analyzed and 11.9% of patients (5/42) with a good satisfaction grading had poor Longo score and 40% of patients (2/5) with sufficient satisfaction grading had poor Longo score (Table 3).

Analysis of postoperative late complications also revealed that 16.7% of patients with good satisfaction grading had complications, such as occasional gas leakage, urgency, gas/liquid leakage, and fragmented defecation (Table 3).

Fecal disorders at 12 months after surgery, also including slight alteration of continence, occurred in 24% of

**Table 3.** Correlation Between Postoperative Satisfaction Grading and Scores.

| Satisfaction grading | Good<br>42/54 patients<br>77.8% | Sufficient<br>5/54 patients<br>9.3% | Poor<br>7/54 patients<br>12.9% |
|---|---|---|---|
| Poor scores; Longo score >7 | 5/42 patients<br>11.9% | 2/5 patients<br>40% | 4/7 patients<br>57.1% |
| Complications (no. of patients) | Occasional gas leakage (3)<br>Urgency (2)<br>Liquid leakage (1)<br>Fragmented defecation (1)<br>Total 7/42<br>16.7% | Soiling (1)<br>Urgency (1)<br>Liquid leakage (1)<br>Urinary incontinence (1)<br>Total 4/5<br>80% | Recurrence (3)<br>Urgency (1)<br>Liquid leakage (2)<br>Liquid/solid leakage (1)<br>Total 7/7<br>100% |

**Table 4.** Postoperative Continence Disorders at 12 Months After Surgery.

| Complications | Disorders of Continence (n = 13/54; 24%); n (%) |
|---|---|
| Soiling | 1 (1.8) |
| Urgency | 4 (7.4) |
| Occasional gas leakage | 3 (5.5) |
| Liquid/solid leakage | 5 (9.3) |

patients, in particular soiling 1.8%, urgency 7.4%, occasional gas leakage 5.5%, and liquid/solid leakage 9.3% (Table 4). Among these patients, anorectal manometry revealed a statistically significant reduction only in sensitivity threshold and maximum tolerated volume compared with patients with no disorders of continence (Table 5).

Postoperative endoanal ultrasound at 12 months after surgery did not demonstrate any variations compared with the preoperative evaluation, both in terms of lesion following surgery and due to the use of intraoperative dilatation, even in the CCS-30 STARR with the largest circular anal dilator.

## Discussion

Stapled transanal rectal resection consists of a rectal wall resection with a circular stapler. This procedure is the evolution of the stapled hemorrhoidopexy or procedure for prolapsed hemorrhoids (PPH) for the treatment of hemorrhoids proposed by Longo in 1998.[20]

The aim of the STARR procedure is to correct anatomical disorders of the rectum in patients with rectocele and rectal intussusception causing obstructed defecation in order to restore the function. Currently, the exact functional significance of these anatomical abnormalities is not known; in fact, they are asymptomatic in most patients. It is therefore not certain that the normal function is restored by correcting the anatomy.[21]

Several studies have confirmed that the STARR procedure significantly improves constipation in most of the patients with ODS, as shown by the significantly improvement in scores of constipation after these procedure,[8,9] as confirmed by our results. Considering the correlation between postoperative satisfaction grading and postoperative constipation scores, it is interesting to note that only 57.1% of patients with poor satisfaction grading had poor scores as well. This means that more than 40% of patients with poor postoperative constipation scores were anyway satisfied about outcomes. Moreover, no statistically significant differences in anorectal manometric parameters between patients with improved scores compared with those with poor scores were observed.

Another major and largely discussed topic was the impact of the STARR procedure on continence. In fact, although STARR is increasingly being accepted as an effective therapy for constipation owing to outlet obstruction, its impact on continence is well known.[12,22] The incidence of fecal incontinence and urgency after STARR technique ranges in literature from 14% to 50%.[23] Patients are likely to complain of incontinence to flatus, urgency, and frequent defecations immediately after the procedure, but these symptoms usually tend to resolve in few weeks. Alterations of continence are the most frequent reason for long-term patient dissatisfaction.[6]

Arroyo et al,[24] in a recent series of 104 patients treated for ODS with a double PPH-01 STARR, report an incidence of incontinence to flatus and urge to defecate after 1 month of 22.1% and 26.9%, respectively. In a published series of 90 patients, Boccasanta et al[18] report an incidence of fecal incontinence of 8.9% and of urgency of 17.8% 1 month after surgery. Moreover, urgency was still present in 23% of cases after a longer follow-up in a large multicenter series of Stuto et al[25] and in 22% after 1 year according to Nicolas et al.[26] Rates of de novo incontinence to flatus in prospective series range from 3% to 19%.[3,17,27,28] In our study, we recorded disorders of continence after 1 year from surgery, including soiling and the occasional gas leakage. We found that 24% of patients had impaired continence but only 7.4% of patients still complained urgency and 9.3% of patients reported liquid and solid leakage at last follow-up. Some authors have

**Table 5.** Manometric Findings in Patients With Continence Disorders.

| Postoperative Anorectal Manometry | Disorders of Continence (13/54; 24%) | No Disorders of Continence (39/54; 76%) | Significance |
|---|---|---|---|
| MRP | 98.7 | 88.52 | NS |
| MSP | 163.2 | 195.88 | NS |
| Sensitivity threshold | 47.69 | 64.07 | $P < .05$ |
| Defecation stimulus | 92.31 | 109.26 | NS |
| Maximum tolerated volume | 147.69 | 182.59 | $P < .05$ |

Abbreviations: MRP, maximum resting pressure; MSP, maximum squeeze pressure; NS, nonsignificant.

tried to explain the postoperative incontinence advocating to a sphincter or mucosal injury due to excessive anal dilatation or to a device-related fragmentation of the internal sphincter.[28,29] In our experience, endoanal ultrasonography did not show any sphincter damage following surgery, even with the largest circular anal dilator of CCS-30. According to Pechlivanides et al,[6] fecal incontinence and urgency could be due to rectal wall edema and reduced rectal compliance. Nicolas et al[26] attribute the onset of urgency in particular to a significantly decreased maximal tolerable volume. This manometrical data could be referred to the anatomical modification after rectal resection, in which the compliance of the ampulla (or neo-ampulla) could be reduced. Other causes reported in the literature refer to neurogenic cause due either to a vaginal multiparity or to chronic straining with consequent stretch of the pudendal nerves.[30] According to Forsgren et al,[31] hysterectomized women are more susceptible to fecal incontinence. In fact, hysterectomy may also involve the pericervical plexus involving anorectal innervations,[31] not an infrequent finding in constipated patients who do not respond to conservative treatment. In our experience, anorectal manometry at 12 months after surgery revealed a significantly decreased rectal compliance in patients with fecal disorders, in particular a reduction of sensivity threshold and maximum tolerated volume. This could also be related to a modification of the sensitivity epithelium level within the rectoanal canal, with consequent alteration on the solid/liquid/gas discrimination, the stool perception and the defecation stimuli. On the other hand, an increased resting pressure is a common finding in all patients treated with STARR and might be a consequence of the lower rectal compliance as a compensatory mechanism. Postoperative rehabilitation could be indicated in these patients.

In the present study, the double circular stapler and the curved stapler (Transtar) STARR were both considered as rectal resections performed with stapler. Despite some technical differences, the aim of the 2 procedures remains the same according to a functional point of view, and there are no statistically significant differences considering the results, as reported in some studies.[9,32]

However, no statistically significant differences were observed in the present study as well in the groups of patients treated with double stapled STARR or with curved stapler with regard to patient characteristics (gender, age, indications, etc) or surgical and functional results.

The number of patients involved in the present study is not high and it could be considered that a patient with an unsatisfactory outcome is more susceptible to carrying out new evaluations than one who has had a positive result.

## Conclusion

Results indicate good satisfaction grading and a statistically significant improvement in constipation scores. There is no close correlation between satisfaction grading and scores. Moreover, the assessment of patient's satisfaction often does not match the objective functional outcome. As regards postoperative disorders of continence, we demonstrated a reduction in compliance, which may explain the symptoms. This reduction in rectal compliance offers good requirements for these patients to be a candidate for a postoperative rehabilitation, in particular of volumetric one. The aim of the STARR procedure is the size reduction of rectal ampulla through a rectal resection, but from our data, the anatomical correction does not always translate to improved functionality.

Further studies with larger number of patients are required to confirm these data.

### Declaration of Conflicting Interests

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