Asian Biomedicine Vol. 9 No. 2 April 2015; 133-138 DOI: 10.5372/1905-7415.0902.378

Original article

Short-term outcomes after anterior stapling rectotomy using a single stapler device for rectocele

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Background: Stapled transanal rectal segmental resection (STARR) is a technique for treatment of obstructive defecation syndrome (ODS) when associated with rectocele and/or intussusceptions.
Objectives: To evaluate a simplified method using a single stapler device for isolated anterior rectal wall correction of structural abnormalities (single-STARR technique).
Materials and methods: Patients who were diagnosed with ODS underwent the single-STARR procedure. Their baseline symptoms were measured by using a modified obstructed defecation syndrome (MODS) questionnaire score. Evacuation proctography was performed to exclude functional anorectal disorders. Colonoscopy was selectively performed and for all patients older than 50 years. Single-STARR procedure was performed in cases where there was no evidence of an inflammatory, metabolic, neoplastic process, or functional disorders. The summed global score of ODS ranged from 0 (normal) to 24 (severe). Outcomes were determined by evaluating the postoperative improvement using a MODS score.
Results: A total of 9 patients (mean (SD) age 53 (13.6) years) with ODS were eligible for the study. Both rectocele and intussusceptions were diagnosed from preoperative defecography in 7 of the patients. Single-STARR was successfully performed without intraoperative complications in all patients with a mean operative time of 52 (12.7) min. The mean severity of symptoms decreased significantly at the 3rd and 6th ($P < 0.01$) month after surgery. However, one-third of patients experienced persistence of symptoms or symptom score deterioration on the 12th month after surgery.
Conclusion: The single-STARR procedure provided short-term symptom relief with no serious postoperative complication in a small series of 9 cases.

Keywords: Obstructive defecation syndrome, rectocele, stapled transanal rectal segmental resection

Rectocele is a common structural abnormality found in patients with obstructive defecation syndrome (ODS). These conditions are initially managed with dietary and medical therapy. Surgical repair may be indicated for patients with intractable symptoms of obstructive defecation. Sullivan et al. has described a method known as transanal defect-specific rectocele repair [1]. Restoration of the strength of the rectovaginal wall and correction of the rectovaginal fascial defect are primary goals of this technique [2]. Transanal defect-specific rectocele repair is done by plication of the muscular layer of anterior rectal wall with multiple interrupted sutures akin to Delorme's procedure for rectal prolapsed [3, 4]. Stapled transanal rectal resection (STARR) is a novel technique that has been proposed for treatment of ODS patients associated with rectocele and/or intussusception [5]. In the STARR technique; two circular staplers are used for performing transanal rectotomy in both the anterior and posterior rectal wall [6]. STARR is a promising procedure for the treatment of ODS in cases with rectocele and/or intussusception that not only restores pelvic floor anatomy, but also improves pelvic floor function [7-9]. Nevertheless, postoperative morbidities such as staple line bleeding, dehiscence, stenosis, and fatal pelvic sepsis have been reported [10]. To examine an alternative method that may decrease the risk of procedure-related complications, authors evaluated a simplified method using only one stapler device for isolated anterior rectal wall correction of structural abnormalities (single-STARR technique). This simplified STARR procedure may be sufficient to alleviate outlet obstruction and decrease

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procedure-related complications; especially in patients with no evidence of advanced disease.

Materials and methods

The study protocol was reviewed and approved by the institutional review board of Phramongkutklao Hospital. Written informed consent was provided by all patients. Authors conducted a prospective study on single-STARR technique from January 1, 2011 to December 31, 2012. Subjects were diagnosed as ODS on the basis of Rome III criteria. No abdominal discomfort/pain that met the diagnostic criteria for irritable bowel syndrome (IBS) and evacuation proctography was performed to exclude functional anorectal disorders, e.g., nonrelaxing puborectalis syndrome, descending perineal syndrome. Colonoscopy was selectively performed to rule out obstruction because of tumors in cases with cancer alarm symptoms, or for all patients older than 50 years. Single-STARR procedure was indicated for cases that had no evidence of an inflammatory, metabolic, neoplastic, infectious process, or functional disorder. Patient's demographics and clinical data were recorded including operative time, complication rate, type of complications, and length of hospital stay. Patients who were considered possible candidates for the Single-STARR procedure were evaluated preoperatively to elicit their baseline severity of symptoms using the modified obstructed defecation syndrome (MODS) questionnaire score system [11] (**Table 1**). The ODS score ranged from 0 (normal) to 24 (severe). The efficacy of the single-STARR technique was determined by evaluating the postoperative improvement of MODS score. All patients were followed after operation at the 3rd month, 6th month, and 12th month.

Surgical technique

All patients were operated on by a single experienced colorectal surgeon in Phramongkutklao (Royal Thai Army) Hospital. All patients underwent mechanical bowel preparation with either polyethylene glycol or sodium phosphate solution. Single dose of prophylactic antibiotics against gram-negative and anaerobic bacteria was given intravenously within 30 min before procedure. The patients were placed in the prone jack knife position under spinal anesthesia. The single-STARR technique was modified from the surgical technique proposed by Antonio Longo [6]. One PPH-03 kit (Ethicon-Endosurgery, Pomezia, Italy) was used for this procedure.

An abdominal spatula was inserted to protect the posterior rectal wall before a circular anal dilator was introduced. The dilator was secured to the skin using four 1-0 silk sutures (**Figure 1A**). The proximal part of the rectocele with redundant anterior rectal wall was held with Babcock tissue forceps (**Figure 1B**). Multiple 2-0 prolene sutures were placed overlapping in a horizontal mattress fashion through-and-through between 9 o'clock and 3 o'clock positions on the anterior rectal wall (**Figure 1C**). A fully open Proximate Hemorrhoidal Circular Stapler 33mm (PPH03, Ethicon Endo-Surgery) was then introduced into the rectum and the open head was positioned above the level of the prolapsed and redundant rectal wall (**Figure 1D**). Ends of the suture material were held together and were brought outwards through the side holes of the staple cartridge before tightening and tying. The sutures were kept in traction to correctly bring the redundant rectal wall into the anvil. In the next step, the stapler was closed and the redundant rectal wall was compressed between the anvil and the staple cartridge. Before the stapler is fired, the vagina was checked to exclude inadvertent incorporation of vagina wall to the stapler (**Figure 1 E and F**). After firing and removing the stapler, the staple line was carefully checked for any bleeding and a series of hemostatic stitches were routinely made along the staple line to prevent possible subsequent bleeding.

Table 1. Modified ODS patient questionnaire

Question and response options	Score			
	1	2	3	4
1. Medication to evacuate (enemas or suppositories)	Never	< 1/week	1–6/weeks	Everyday
2. Difficulties to evacuate	Never	< 1/week	1–6/weeks	Everyday
3. Digitation to evacuate	Never	< 1/week	1–6/weeks	Everyday
4. Return to toilet to evacuate	Never	< 1/week	1–6/weeks	Everyday
5. Feeling of incomplete evacuation	Never	< 1/week	1–6/weeks	Everyday
6. Straining/push to evacuate	Never	Sometimes	Often	Always
7. Time needed to evacuate	<5 min	6–10 min	11–20 min	>20 min
8. Lifestyle alteration	Never	Sometimes	Often	Always

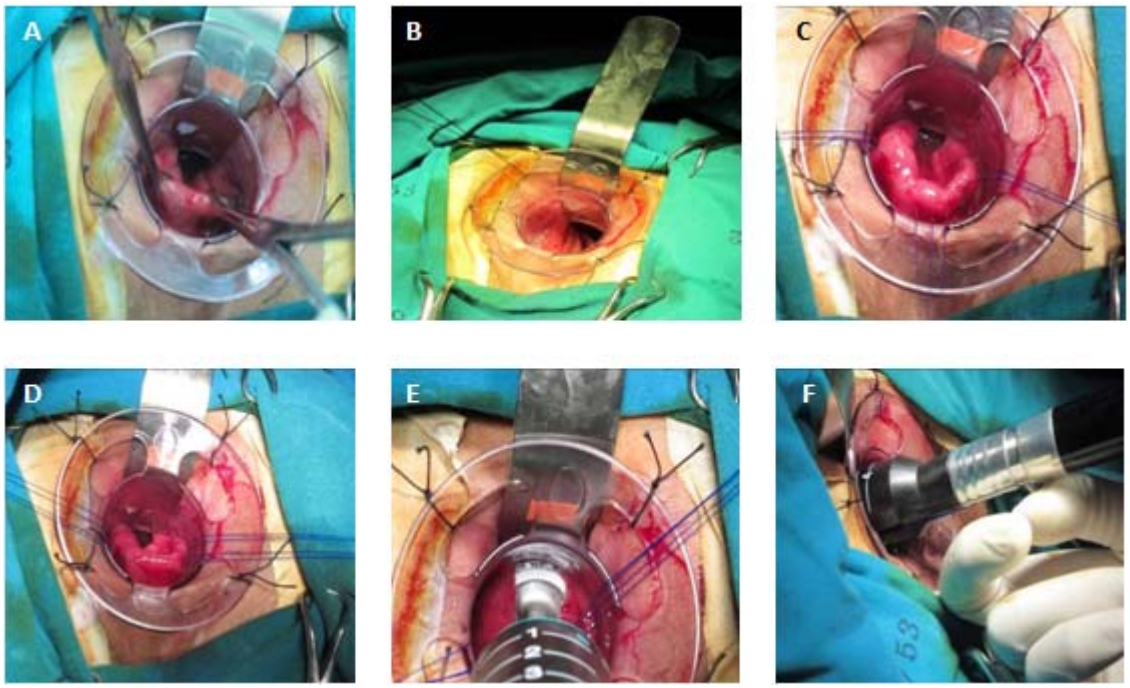

Figure 1. An abdominal spatula was inserted to protect the posterior rectal wall before the circular anal dilator (**A–F**).

Result

A total of 9 patients with ODS were eligible to participate in the present study. The mean (SD) age was 53 (13.6) years. All were female. Both rectocele and intussusceptions were found by preoperative defecography in 7 patients (**Table 2**). Single-STARR was successfully performed without intraoperative complication in all patients with mean (SD) operative time of 52 (12.7) min. Postoperative urinary retention was found in 1 patient. A couple of months later, 1 patient died of cardiovascular disease and 1 patient had a cerebrovascular accident unrelated to surgery. Defecatory urgency was found in 1 patient; however, this symptom disappeared after a few months. The mean (SD) severity of symptom score by MODS questionnaire (**Table 3**) decreased significantly at 3rd and 6th (P <0.01) after surgery. However, approximately one-third of patients experienced persistence of symptoms or symptoms score deterioration at 12th month after surgery.

Table 2. Defecographic findings and operative time in ten patients undergoing Single-STARR

No.	Age	Sex	Defecographic findings	Operative time (min)	MODS Baseline	MODS 3rdmo	MODS 6thmo	MODS 12thmo
1	54	F	Rectocele Intussusception	55	17	13	13	15
2	33	F	Rectocele Intussusception	45	11	2	2	16
3	47	F	Rectocele Intussusception	65	18	16	16	15
4	62	F	Rectocele Intussusception	55	17	1	-	-
5	61	F	Rectocele Intussusception	55	16	10	10	-
6	57	F	Rectocele	50	17	2	1	2
7	55	F	Rectocele	25	16	-	-	3
8	53	F	Rectocele Intussusception	55	20	11	11	7
9	41	F	Rectocele	55	19	13	13	8

Table 3. Preoperative and postoperative symptoms evaluated by MODS questionnaire

	Number (n)	Sum of total score mean (SD)	*P*
Baseline	8	16.87 (2.69)	0.012*
3rd month	8	8.50 (5.92)	
Baseline	7	16.86 (2.91)	0.018*
6th month	7	9.43 (5.72)	
Baseline	7	16.86 (2.91)	0.063
12th month	7	9.43 (5.91)	

* Statistically significant using a Wilcoxon signed-ranks test

Table 4. Postoperative complications in patients undergoing Single-STARR

Symptoms	Immediate	1st month	3rd month
Defecatory urgency	0	1	1
Acute urinary retention	1	0	0
Anal fissure	0	0	1

Discussion

Blocking of rectal emptying because of rectocele and/or intussusception can cause outlet obstruction. Double-stapled transanal rectal resection procedure (STARR) has been proposed by Longo [6] to correct ODS associated with this structural abnormality. STARR is an effective surgical procedure for patients with ODS associated with rectocele and/or intussusception. According to Longo [6], the first staple is used for removal of the redundant rectal tissue and correction of the bulging rectocele anteriorly; the second staple is for removal of the redundant rectal tissue posteriorly. Postoperative dynamic pelvic floor MRI showed a significant decrease in size of rectocele and in a number of patients with intussusception. However, controversy exists concerning the association between reduction in rectocele size and correction of intussusception and clinical results [7-9, 12, 13]. In 2004, a study on STARR revealed that 90% of cases with ODS reported their overall satisfaction after STARR as good to excellent and only 4% of patients were described as poor [14]. In terms of efficacy, many studies showed an improvement of symptoms of obstruction after the procedure [12-16]. Results with STARR have been good. However, experts remain concerned regarding the risk of procedure-related complications and recurrence. Staple line-related complications are dehiscence of the staple line, staple line bleeding, anastomotic stenosis, and rectal fistula [10, 16]. Other complications include bowel perforation, peritonitis, and pelvic sepsis [16]. One case of fatal pelvic gangrene after STARR was reported in 2007 [17]. Fecal urgency is also frequently found as a consequence of the reduction of rectal capacity and lower rectal compliance after STARR [14-16]. A study reported that 23% of patients with fecal urgency it still persisted at long term follow-up. Staple-line related complications reported included bleeding at staple line in 4% and anastomotic stenosis in 3% [14]. Perineal pain was also a common postoperative problem in many studies [15, 17] and it was believed to be related to staple line problems. Dindo et al. [9] reported one patient with postoperative rectal pain that could be relieved by removal of a staple. To decrease postoperative morbidity and optimize the treatment outcomes with lower procedure-related costs led to development of the single-STARR method. It may be an alternative to the conventional double-STARR method. Only one stapler device is used for performing anterior rectal wall resection, which can avoid possible complications from repeated stapler firing for performing posterior rectal resection. This limits the extent of tissue resection to minimize possible risk of procedure-related complications, which is the rationale for the single-STARR method. The present study revealed that the single-STARR method provided satisfactory short-term relief of symptom,

but the symptoms deteriorate after a longer follow-up period. A smaller amount of tissue was excised. With rectal volume and rectal compliance preservation, there may be a decrease in the risk of postoperative defecatory urgency. In this study, defecatory urgency developed after surgery in one patient, but disappeared 3 months later. Like the double-STARR method, the anterior prolapsed rectal tissue was excised and the bulging anterior rectocele was corrected. However, there is no posterior stapling rectotomy in the single-STARR method and prolapsed posterior rectal tissue is left in situ. Therefore, the single-STARR method may not be an appropriate option for cases with concomitant advanced posterior rectal wall prolapse. According to the present study, this procedure may not work well for cases having concomitant posterior rectal wall abnormalities. Approximately one-third of our cases experienced persistence of symptoms or deterioration of symptoms score at 12 months after surgery. Therefore, this would be a trade-off between diminished risks and the success rate that might be compromised as a consequence of avoidance of posterior wall stapling rectotomy. The important point is to identify cases for which this procedure is appropriate. Further studies in cases with isolated anterior wall abnormalities are needed to determine the effectiveness of the single-STARR method.

Conclusion

This preliminary study revealed that anterior stapling rectotomy, using a single stapler device (single-STARR), provided promising short-term symptom relief with no serious postoperative complication. Concomitant posterior rectal pathology may lead to failure of this technique. Further studies on selected cases are needed to determine long-term effectiveness of this method.

The authors have no conflict of interest to report.

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