Functional Disorders: Rectoanal Intussusception

Kristen Blaker, MD¹ Joselin L. Anandam, MD¹

¹ Department of Surgery, Division of General Surgery, University of Texas Southwestern Medical Center, Dallas, Texas

Address for correspondence Joselin L. Anandam, MD, University of Texas Southwestern Medical Center, Dallas, TX 75390 (e-mail: Joselin.anandam@utsouthwestern.edu).

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Abstract

Rectoanal intussusception is an invagination of the rectal wall into the lumen of the rectum. Patients may present with constipation, incomplete evacuation, incontinence, or may be asymptomatic. Defecography has been the gold standard for detection. Magnetic resonance imaging defecography and dynamic anal endosonography are alternatives to conventional defecography. However, both methods are not as sensitive as conventional defecography. Treatment options range from conservative/medical treatment such as biofeedback to surgical procedures such as Delorme, rectopexy, and stapled transanal rectal resection. Recent studies conducted after a trial of failed nonoperative management show adequate results with operations performed for rectal intussusception with or without rectocele if other causes of constipation are not present.

Keywords

- rectoanal intussusception
- rectorectal intussusception
- defecography
- occult rectal prolapse

History

Rectoanal intussusception (RI), also known as internal intussusception, occult rectal prolapse, intrarectal prolapse, and internal procidentia, is a telescoping of the rectal wall during fecal evacuation.¹ Allingham, in the late 1800s, first described what we label today as rectoanal intussusception as the third variety of procidentia recti in which “the upper part of the rectum descends through the lower part, but does not appear outside the anus.”^{2,3} He diagnosed this with physical exam and symptoms included “obstinate constipation unrelieved by purgatives; a sensation of burning and fullness in the bowel attended with tenesmus, straining, and difficulty in defecation with occasional discharges of blood and mucus.” He postulated that the intussusception was caused by a redundant sigmoid or rectal mesentery. Treatment options at that time included cauterizing portions of the intussusception or a sort of rectopexy via a left lower quadrant incision in which a silk suture is passed through the mesentery and secured it to the abdominal wall.³

Since its first description, advances have been made in the diagnosis and treatment of rectal intussusception. However, there are many unanswered questions and the best treatment option remains unclear.

Etiology

The pathophysiology and etiology of RI is not well elucidated. Existing theories of etiology fall along two general lines of thought: RI is a dynamic anomaly which may progress to rectal prolapse; or RI is secondary to other abnormalities of pelvic floor function.^{1,2} Loose fixation of the rectum to the sacrum or connective tissue disorders may contribute to RI.⁴ It is hypothesized that symptoms of obstructed defecation due to RI occur owing to the circular infolding of the rectal wall with subsequent occlusion of the rectal lumen.

Several studies have examined whether RI progresses to rectal prolapse. Wijffels et al found a positive correlation between grade of prolapse and age, supporting this postulation.⁵ However, other studies do not support this hypothesis. Choi et al found that only 1 in 26 patients treated with dietary therapy or biofeedback for large RI (≥ 10 mm) developed full-thickness rectal prolapse during 45 months of follow-up (range: 12–118 months).¹ Similarly, Mellgren et al studied 38 patients with rectal intussusception on defecography who were treated nonsurgically, and found that only 2 developed rectal prolapse during the follow-up period.⁶ A much larger study of 1,014 women with fecal incontinence and/or obstructive defecation found that of the 26 patients with initial rectorectal intussusception, 1 progressed to external rectal

prolapse (3.8%) and 5 progressed to RI (19.2%) within 2 years.⁷ A study by Dvorkin et al observed that the rectal wall biomechanics are abnormal with rectal prolapse but normal with intussusception, identifying these two diseases as separate entities; however, it is possible that RI and prolapse are different stages of a progressive process.⁸

Some regard RI to be a consequence of straining seen with chronic constipation or dyssynergic defecation.^{7,9} A study from Italy found that pure pelvic floor dyssynergia occurs at a younger age and less frequently than mixed pathophysiological patterns (anatomical abnormalities such as intussusception and rectocele in addition to dyssynergia). The authors suggest that pure pelvic floor dyssynergia is the initial cause of outlet obstruction.¹⁰

Incidence and Symptomatology

Rectal intussusception is present in 12 to 31% of patients with defecation disorders.^{11,12} Studies show that 20 to 50% of asymptomatic volunteers have rectal intussusception on defecography.^{13,14} Rectal intussusception may be low grade, synonymous with rectorectal intussusception or high-grade RI.¹⁵

Although rectal intussusception may be visualized on defecography in both symptomatic and asymptomatic people, Dvorkin et al observed that there were significant radiologic differences between the two groups. Patients with abnormal rectal evacuation were more likely to have full-thickness intussusception (>3 mm) than asymptomatic patients. They were also more likely to have a mechanically occluding intussusception and the intussusception thickness was greater.¹⁶

Presenting symptoms are generally consistent with obstructive defecation syndrome including constipation and incomplete evacuation.^{9,17} The telescoping of the intussusception may cause an outlet obstruction, and therefore further straining does not alleviate symptoms.⁸ Incontinence has also been described as a symptom.¹ Despite these symptoms, radiographic findings of intussusception have not been shown to correlate with rectal emptying.¹⁸

Rectal intussusception is associated with solitary rectal ulcer syndrome (SRUS) and is present in 45 to 80% of patients with this condition.^{9,19,20} SRUS is thought to occur as a result of forceful straining against a nonrelaxing pelvic floor or as a result of traumatic injury from the intussusception on the rectal mucosa.^{8,9,21} These patients present with rectal bleeding and pain, mucus per rectum, and straining.⁹

Diagnostic Modalities

Because the treatment options vary depending on the cause of obstructed defecation, the exact etiology of symptoms must be elucidated. The gold standard for diagnosis of RI is defecography or evacuation proctography.^{9,22,23} This involves the injection of contrast paste into the rectum, followed by fluoroscopy of the patient evacuating the rectal contents while sitting in an upright position on a radiolucent commode.¹⁴ Anorectal angle, puborectalis length, and perineal

descent are measured. Anatomic abnormalities such as rectocele are readily identified with this diagnostic modality.²

It is possible to diagnose RI on rectal exam or with anoscopy/proctoscopy. Ideally, the stool is evacuated from the rectal vault prior to digital exam. The patient is placed in the lateral decubitus position and instructed to strain as if having a bowel movement. The circular intussusception may be palpated by the examiner. A study of 127 patients with constipation found that of the 71 patients who were diagnosed with rectal intussusception via defecography, clinical exam only detected intussusception in 30 (42%). Clinical exam accurately diagnosed the absence of intussusception in 43 of 56 patients (77%). Accurate correlation of digital rectal exam to defecography was associated with longer intussusception length. Short intussusceptions were more difficult to diagnose with digital exam.²⁴ Similarly, Siproudhis et al found that clinical exam always diagnosed intussusceptions to the level of the anal canal, and the negative predictive value for diagnosis of rectal intussusception on physical exam was 80%.²⁵

Magnetic resonance defecography is a newer alternative to conventional X-ray defecography. Advantages include lack of ionizing radiation, ability to visualize the pelvic soft tissues, and sphincter complex, and patients find the procedure less embarrassing. Disadvantages include supine positioning, increased cost, patient reports of difficulty evacuating their rectum, and underreporting of abnormalities of the pelvic floor.^{26,27} A study by Vitton et al reported a concordance rate of 55% for conventional defecography and dynamic MRI.²² This may be due to the decreased rate of complete rectal emptying seen with MR (2%) compared with barium proctography (29%).²⁷ Other studies have shown more favorable results for MR. In a study of 42 patients who underwent both barium proctography and MR proctography, rectal intussusception was detected in 24 of 35 patients (69%) with MR, but the grade of intussusception was frequently underestimated.²⁷ Similarly, a study by Dvorkin et al²⁸ found that 3 out of 10 patients with symptomatic rectal intussusception by conventional proctography did not show intussusception on MR, with two additional patients who had mucosal descent on MR which appeared to be full thickness on conventional defecography. However, of the 12 measured variables (depth, thickness, pelvic organ descent, etc.), only 2 were significantly different between imaging studies (rectal diameter and lateral rectocele size were both smaller on MR). Furthermore, MR was able to detect significant organ prolapse in the anterior and middle compartments (3/10 patients in this study) (► Fig. 1).

Dynamic transperineal ultrasound is another alternative to conventional defecography. Benefits include lack of radiation, ability to assess the integrity of the anal sphincter, and excellent patient tolerance.²² A prospective study of 56 women with constipation who underwent conventional defecography, MRI defecography, and dynamic anorectal endosonography (DAE) found that most patients preferred ultrasound (72.1%) over MRI (25.6%), or conventional defecography (2.3%). However, in this study, DAE did not successfully diagnose any of the 33 cases of rectal intussusception

Fig. 1 MR defecography: (A) at rest, (B, C) during straining, and (D) during evacuation. The enfolding of the rectal wall is visualized in the evacuation image.

seen on conventional defecography due to the requirement of the probe being in the rectum.²² Other studies have shown more promising results. Bruscianno et al reported 83.3% sensitivity and 100% specificity for the diagnosis of rectal intussusception with anal ultrasound, and 66.6% sensitivity and 100% specificity with perineal ultrasound. However, the sample size was small.²⁹ Beer-Gabel and Carter analyzed the results of 105 women who underwent defecography and dynamic transperineal ultrasound and reported a sensitivity of 82% and specificity of 84% for diagnosis of rectal intussusception with dynamic transperineal ultrasound.²³ In a multicenter prospective trial of 86 women, three-dimen-

sional transrectal ultrasound identified 37 out of 42 cases of rectal intussusception which were seen on defecography (88% sensitivity) and an additional 4 cases which were not seen on defecography (90% specificity).³⁰

Anorectal manometry is often obtained as part of the workup for obstructive defecation. While this is not necessary for the diagnosis of rectal intussusception, it provides additional information that may help distinguish between dyssynergic defecation and anal outlet obstruction.³¹ A study of 188 patients with obstructive defecation who underwent high-resolution anorectal manometry and MR defecography found that patients with structural pathology (intussusception,

rectocele, pelvic organ prolapse, cystocele, and enterocele) had higher rectoanal pressure gradients and lower resting and squeeze pressures. There were 24 patients without dyssynergia who demonstrated an amplified intrarectal pressure over a narrow area of elevated pressure within the anal canal; these patients all had anal intussusception on MR (100% specificity, 62% sensitivity).³¹

Treatment Options

Nonoperative Management

Most studies of the treatment for rectal intussusception include a trial of conservative medical management. This usually includes dietary modification with a high-fiber diet, good hydration, and use of laxatives/enemas if the presenting symptoms are obstructive defecation. Medical management in combination with electromyography (EMG) biofeedback is a safe treatment option and seems to be effective. A recent study by Hicks et al of 90 women with obstructive defecation and rectocele with or without rectal intussusception underwent 6 weeks of treatment with fiber supplements and at least six sessions of biofeedback training. Patients who failed these treatment measures were offered surgery. Overall 71% of patients were responders and did not require surgery. In fact, the presence of intussusception in patients with rectocele was associated with a lower chance of needing surgery on multivariate regression analysis (odds ratio: 0.18).³² A study by Hwang et al of 34 patients with only rectal intussusception found that patients treated with at least two sessions of biofeedback had a significantly decreased fecal incontinence score (13.1–4.6), decreased incomplete evacuation, decreased frequency of assisted defecation, and increased frequency of spontaneous defecation. However, only 52% of patients had complete resolution or partial improvement in symptoms. Longer duration of constipation symptoms correlated with decreased response to treatment (13% success if greater than 9 years of constipation compared with 78% success if less than 9 years).³³ With a great safety profile, dietary modification with EMG biofeedback is an excellent first-line treatment for symptomatic rectal intussusception and should be tried prior to pursuing surgical options.

Operative Management

Despite aggressive nonoperative management, some patients will fail treatment and the surgeon will be faced with the difficult decision of which operation to perform. Patients who fail strict dietary modification and biofeedback may be more likely to respond to surgery. In the study by Hicks et al,³² greater than 90% of patients who underwent surgery had significant improvement or resolution of symptoms regardless of which type of surgery was performed. There are a variety of surgical options including Delorme, ventral mesh rectopexy with or without resection, and stapled transanal rectal resection (STARR). Based on current data, it is unclear which approach has the best results. Unfortunately, most studies have small case numbers and are retrospective or prospective in design. The end points of these studies vary and are often based on patient-reported improvement in

symptoms, incontinence or constipation scoring systems, patient satisfaction, and quality-of-life surveys. Long-term follow-up is also lacking.

Delorme

Delorme's transrectal excision, or mucosal proctectomy, is a transrectal perineal procedure which involves a complete mucosal incision above the dentate line, excision of the mucosa, plication of the muscularis, and reanastomosis of the mucosa. This may be done with or without levatorplasty. This procedure may be performed under regional anesthesia and seems to be well tolerated with reasonable results. One of the larger studies of 167 patients with obstructive defecation and RI and/or rectocele who were treated with a Delorme procedure with (91 patients) or without levatorplasty (76 patients) showed that the constipation (Cleveland Clinic Constipation Score, CCCS) scores and rate of tenesmus (from 54 to 17%) significantly decreased after both procedures. Forty-five percent of incontinent patients regained continence after the procedure. Urgency was not significantly changed. The recurrence rate was 5.4% and there was a complication rate of 10.2% (fistula in ano, 4.2%; proctalgia, 3%; dehiscence with stenosis, 1.8%; *Clostridium difficile*, 1.2%).³⁴

Stapled Transanal Rectal Resection

STARR is a relatively new technique developed by Dr Antonio Longo, an Italian surgeon.^{35,36} It involves a transanal rectotomy using a circular stapler with the purpose to remove redundant rectal tissue.² There have been several studies evaluating the effectiveness of STARR. The studies generally report some improvement in symptoms (mainly constipation). Hasan et al prospectively studied 40 patients undergoing STARR and reported that 90% (36/40) had improved constipation 12 months after the procedure, 20% of patients reported excellent results, and 55% reported good results.¹⁷ This study showed no major complications, but 40% experienced defecatory urgency (which improved to 10% after 3 months) and 5% became incontinent to flatus.¹⁷ Leardi et al studied 51 patients undergoing STARR (29 with intussusception) and reported improved symptoms of constipation and incontinence as measured by obstructive defecation and fecal incontinence scoring systems, as well as improved quality of life.³⁷ A larger study of 90 patients with a rectocele and rectal intussusception who underwent STARR had similar results with significant improvement in all constipation symptoms. Slightly more than half of patients (48) reported an excellent outcome at 1 year and 33 patients reported a good outcome. However, there were complications, including 17.8% of patients developed fecal urgency, 8.9% reported incontinence to flatus, 4.4% experienced bleeding, and 3.3% developed anastomotic stenosis.³⁸ According to an international consensus conference held in Rome in June 2005, fecal urgency and incontinence is a frequent complication of STARR but is usually transient and resolves after a few weeks. Other rare complications include rectovaginal fistula, anorectal sepsis, necrotizing fasciitis, and peritonitis.³⁶ The European Stapled Transanal Rectal Resection Registry was developed in

January 2006 and enables postoperative outcome follow-up of patients undergoing the STARR procedure. One-year outcomes were reported by Jayne et al. In the 2,224 patients who had reached 12 months of follow-up at the time of the publication, significant improvement in quality of life, severity of symptoms, and obstructed defecation score were noted when compared with baseline. Complications occurred in 36% of patients including one patient who developed a rectovaginal fistula and one patient who developed rectal necrosis. Other complications included 1.8% incontinence, 3.5% staple line issues, 4.4% events related to sepsis, 5% bleeding, and 20% fecal urgency.³⁹

STARR is contraindicated under certain circumstances according to the international consensus conference. Some of the contraindications include anal incontinence, anal stenosis, enterocele at rest, perineal infection, inflammatory bowel disease, absence of anatomical/physiological abnormality in conjuncture with obstructed defecation syndrome, and mesh adjacent to the rectum.³⁶

Rectopexy

There are multiple methods of abdominal rectopexy including suture rectopexy, biologic or prosthetic mesh rectopexy, and resection rectopexy. The approach may also vary between ventral and posterior. Posterior rectopexy has been shown to improve continence but does not improve and may worsen constipation.^{40,41} The posterolateral rectal dissection may lead to injury to autonomic nerves contributing to constipation.^{15,42} D'Hoore et al developed a laparoscopic ventral rectopexy to spare the autonomic nerves in the treatment of rectal prolapse.⁴² This technique has been used in the treatment of rectal intussusception. Tsunoda et al studied 26 patients with RI who underwent laparoscopic ventral rectopexy and proctography 6 months postoperatively. RI was eliminated; however, eight patients (30.8%) had rectorectal intussusception on follow-up imaging. Despite the successful anatomic correction, only 9 patients (41%) experienced an improvement of 50% or more in the constipation scoring system and 14 patients (67%) experienced improvement of 50% or more in the incontinence severity index score.⁴⁰

A study by Johnson et al of 48 patients who underwent laparoscopic or open resection suture rectopexy for rectal intussusception found that patients had improved constipation scores on short- and long-term follow-up and a decrease in major incontinence, but a slight increase of minor leakage. Overall, 85.4 and 75% reported improved treatment response for short- and long-term follow-up, respectively. However, quality of life was significantly lower than that of the general population for general health, bodily pain, physical function, and role limitation due to physical problems. There were also a significant amount of major morbidities (16.7%), including ureter injury, reoperation for bleeding, rectal perforation with ostomy, incarcerated hernia, pulmonary embolus, and stricture.⁴³

A recent study by Owais et al had favorable outcomes with minimal morbidity. Sixty-eight male patients (50 with rectal intussusception) underwent laparoscopic ventral mesh rec-

topexy. Constipation, obstructive defecation, and quality-of-life scores all improved. At 4-year follow-up, 82% of patients were asymptomatic. Only 8.8% of patients had persistent symptoms. Complications were minor and included urinary retention.⁴⁴ Otto et al also reported good outcomes with improved rectal evacuation, continence, stool consistency, warning period, and overall satisfaction after resection rectopexy with absorbable mesh. However, there were only 21 patients in this study and the majority of patients had rectal prolapse (12 patients with rectal prolapse, 9 with RI).⁴⁵

Comparative Studies

There are a few comparative studies involving STARR versus rectopexy or STARR versus Delorme. A recent randomized trial in Italy of 66 patients with symptomatic rectocele with or without mucosal prolapse or rectal intussusception compared Delorme to STARR. There was no significant difference in postoperative pain, length of stay, complications, continence score, constipation questionnaire, quality-of-life questionnaire, or overall satisfaction. There was significant improvement in symptoms after both procedures with a low complication rate. STARR was faster but more expensive. Dyspareunia was slightly improved with the Delorme procedure.⁴⁶ A smaller prospective study comparing 23 patients who underwent the STARR procedure to 12 patients who underwent the Delorme procedure showed similar findings. Both procedures significantly lowered the Wexner constipation score (from 17 to 4.7 after STARR and from 15.3 to 3.3 after Delorme).⁴⁷

A retrospective study of 52 patients compared STARR to laparoscopic ventral rectopexy (LVR) and found that there was a shorter length of stay for STARR 5.6 versus 7.1 days. Other outcomes were similar. The obstructive defecation score was lowered by 59% after STARR and was lowered by 56% after LVR. Eighty-four percent versus 80% of patients were very satisfied or moderately satisfied after the STARR procedure or LVR, respectively. Complication rates were similar (24% LVR vs. 26% STARR) and no major complications were reported in either group.⁴⁸

Conclusion

Rectal intussusception is a common radiographic finding and is sometimes associated with obstructive defecation including symptoms of constipation, incomplete evacuation, and incontinence. It is important to elucidate symptoms and to exclude other causes such as slow transit constipation when developing a treatment plan for RI. Defecography is the gold standard for detection. If this is not available, MRI defecography and dynamic anal or perineal endosonography are alternatives. However, these methods are not as sensitive. Many patients will respond to medical treatment with biofeedback. For patients who fail a dedicated trial of nonoperative management, Delorme, STARR, and rectopexy are available surgical treatment options. There are not enough data to recommend one surgical option over another. Further higher powered, randomized trials are needed.

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