Functional Disorders: Rectoanal Intussusception

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ABSTRACT

Rectoanal intussusception (RI) is a telescoping of the rectal wall during defecation. RI is an easily recognizable physiologic phenomenon on defecography. The management, however, is much more controversial. Two predominant hypotheses exist regarding the etiology of RI: RI as a primary disorder, and RI as a secondary phenomenon. The diagnosis may be suspected based on clinical symptoms of obstructive defecation. Diagnostic modalities include defecography as the gold standard. Dynamic pelvic magnetic resonance imaging (DPMRI) and transperineal ultrasound are attractive alternatives to defecography; however, their sensitivity is poor in comparison to the gold standard at this time. Management strategies including conservative measures such as biofeedback and surgical procedures including mucosal proctectomy (Delorme), rectopexy, and stapled transanal rectal resection (STARR) procedures have varied degrees of efficacy.

KEYWORDS: Rectoanal intussusception, defecography, biofeedback, Delorme, rectopexy, stapled transanal rectal resection (STARR)

Objectives: On completion of this article, the reader should be able to summarize the diagnosis and management options of symptomatic rectoanal intussusception.

ETIOLOGY

Rectoanal intussusception (RI), a telescope infolding of the rectal wall during defecation, is an easily recognizable physiologic phenomenon on defecography. However, the etiology and pathophysiology of RI is less obvious. RI is synonymous with internal prolapse of the rectum, internal procidentia, occult rectal prolapse, and intra-rectal prolapse to name a few.¹

Some theorize that rectoanal intussusception may be the initial stage of a dynamic continuum of anomalies initiated by repetitive traumatic injury from intussusception, which may lead to solitary rectal ulcer and eventual full thickness rectal prolapse.² With this in mind, the severity of intussusception has been graded from non-

relaxation of the sphincter mechanism (grade I) to mild (grade II), moderate (grade III), severe (grade IV) intussusception, and rectal prolapse (grade V).³ Patients with large RI (≥ 10 mm infolding of the rectal wall) have manometric findings similar to patients with full-thickness rectal prolapse: increased incidence of absence of rectoanal inhibitory reflex, lower mean and maximal squeeze pressures, lower resting pressures, and smaller rectal capacity.⁴ However, very few patients with RI develop full-thickness rectal prolapse.⁵

Others hypothesize that rectoanal intussusception is a secondary phenomenon in the majority of patients.⁶ Individuals with pelvic floor abnormalities such as nonrelaxing puborectalis and rectocele may

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develop rectoanal intussusception in the setting of chronic straining. RI may also develop in patients with paradoxical contraction and other spastic anal sphincter disorders.

Rectoanal intussusception may cause rectal outlet obstruction by telescoping and blocking the rectal lumen during defecation.^{7,8} Conversely, RI is found in nearly half of asymptomatic controls on defecography.⁹ Therefore, although it is clear that RI does exist, the cause and effect of RI in obstructive defecation and fecal incontinence is not fully understood.

INCIDENCE AND PRESENTING SYMPTOMS

Allingham described the first case of rectoanal intussusception in 1873.² RI is a common finding on defecography when evaluating patients for an evacuatory disorder.¹⁰ Interestingly, RI is present in up to 50% of asymptomatic subjects.⁹ The incidence of RI as the cause of obstructed evacuation is unknown. In individuals referred for defecography to investigate symptoms of obstructive defecation, one researcher reported an incidence of 40%.⁶ Conversely, RI has been diagnosed in only 10% of patients referred for defecography to investigate fecal incontinence.²

One of the most common frustrations in patients with symptomatic rectoanal intussusception is the sensation of incomplete evacuation. These individuals will also frequently describe a sensation of obstruction and pressure toward the sacrum, which may increase with straining.² The sensation of incomplete evacuation is understandable from an anatomic perspective in that the circular infolding of the rectal wall occupies space within the rectal lumen, possibly causing a sensation of fullness or incomplete evacuation that does not remit with increased straining.²

Fecal incontinence is also a common symptom associated with rectoanal intussusception.^{2,11} The incontinence is presumed to develop after a longstanding history of RI, which may cause a widening of the anal canal and alter the sensory mechanisms and sphincter muscles involved in sphincter tone and continence.¹¹ Individuals with RI presumably have no urge to evacuate and lack rectal sensation.²

DIAGNOSIS

Defecography

Currently, the diagnosis of rectoanal intussusception is made primarily by defecography. Static proctography is used to measure the anorectal angle, perineal descent, and puborectalis length. Fig. 1 depicts static images of defecography in an individual with rectoanal intussusceptions. In addition to RI, anatomic abnormalities

such as rectocele, nonrelaxation of the puborectalis, sigmoidocele, and enterocele are well visualized with defecography. The observation of RI may reach clinical importance if the invagination or infolding is ≥ 3 mm thickness and appears to cause obstruction to rectal evacuation. However, findings on defecography must be interpreted with caution. Careful attention and correlation with the clinical history is paramount in formulating the final impression and management recommendations.¹²

Clinical Examination

Siproudhis and colleagues found excellent correlation between clinical assessment and defecography in high-grade rectoanal intussusceptions. The group evaluated 50 patients (38 women, 12 men) with defecation disorders.¹³ The negative predictive values reported were high for rectoceles, anismus, and rectal intussusceptions especially (96%, 96%, and 80%, respectively). Clinical examination diagnosed high-grade intussusceptions in all patients.¹³

Karlbom and colleagues compared the accuracy of digital examination, proctoscopy, and defecography in the diagnosis of rectoanal intussusception.¹¹ Of the 127 consecutive patients with constipation, 71 patients were found to have some degree of intussusception. The majority of intussusceptions were short intrarectal ($n = 53$, < 3 cm), 12 were > 3 cm and reached down to the level of the pelvic floor, and 6 entered the anal canal. The overall clinical assessment accurately diagnosed RI in less than half of these patients (42%, $n = 30$ patients). Eight patients diagnosed with RI clinically did not have intussusception by defecography. The longer the intussusception, the more closely the clinical exam correlated with defecography (66% accuracy if > 3 cm, 83% accuracy if intraanal).¹¹

Dynamic Pelvic Magnetic Resonance Imaging

Dynamic magnetic resonance imaging (DPMRI) is an attractive alternative to defecography for many reasons. The high-resolution capability of MRI, elimination of radiation exposure, and lack of need for opacification of the rectum and vagina makes DPMRI appealing to both examiner and patient alike. Dynamic pelvic MRI has the advantage of imaging all compartments of the pelvis and their interaction during defecation.

In 2001, Matsuoka and colleagues compared DPMRI with video defecography in 22 consecutive patients with constipation.¹⁴ Seven patients were diagnosed with a cystocele by DPMRI only. Unfortunately, there was a significant discrepancy between video defecography and DPMRI in the diagnosis of anterior rectoceles (1/12, 8.3%), rectoanal intussusceptions

Figure 1 Defecography. The rectum is filled with high density, barium paste. In the seated position, static images are taken (A) at rest, (B) during straining, and (C, D) evacuation. The enfolding of the rectal wall is visualized in the evacuation images.

(0/4, 0%), sigmoidoceles (9/12, 75%), and increased fixed perineal descent (1/2, 50%). The discrepancy may be due to patient positioning (prone during DPMRI), absence of barium paste within the rectocele, which is often more apparent during straining and forceful evacuation of the rectum. In addition, the cost of DPMRI is much higher than defecography.¹⁴

Dynamic Transperineal Ultrasound

Real-time dynamic transperineal ultrasound (DTP-US) provides an additional means of evaluation of all compartments within the pelvis and their interaction at rest, as well as during straining and defecation. In 2004, Beer-Gabel and colleagues compared DTP-US with defecography in 33 women with long-standing constipation.¹⁵ DTP-US diagnosed 88% (16/18) of the rectoceles, 89% (17/19) of the intussusceptions, and 100% (5/5) of the prolapse diagnosed by defecography. There is a substantial learning curve in the use of DTP-US with initial studies averaging 45 minutes reduced by 25 minutes with time and experience. However, benefits such as avoid-

ance of pelvic irradiation and high patient tolerance are attractive features.¹⁵

TREATMENT

Medical Therapy

The majority of individuals with symptomatic rectoanal intussusception show either no improvement or worsening symptoms with the use of laxatives, suppositories, and enemas. In one report, cathartic therapy yielded an improvement in 34% of patients, no effect in 46%, and worsening symptoms in 20%.¹⁶

Biofeedback Therapy

Conservative medical therapy in the form of electromyogram- (EMG-) based biofeedback is advocated as a safe, first-line treatment for symptomatic rectoanal intussusception. Biofeedback is performed using an anal EMG sensor connected to a biofeedback computer. Certified therapists perform a series of 1-hour sessions

with the goal of retraining the anal sphincters and pelvic floor musculature to properly and effectively contract and relax. The reported success rate of biofeedback therapy ranges from 37–100% for obstructive defecation and 50–90% for fecal incontinence.²

In 2006, Hwang and colleagues retrospectively reviewed 34 patients who attended at least two sessions of EMG-based biofeedback therapy for obstructive defecation ($n=27$) or fecal incontinence ($n=7$) in patients with symptomatic RI.² Outcome in the obstructive defecation group was divided into three categories: complete resolution (3 or more bowel movements per week without cathartic), partial improvement (less than 3 bowel movements per week with decreased dependence on cathartics), and treatment failure for those patients with no improvement. Nine patients (33%) had complete resolution of constipation after at minimum of two sessions of EMG-based biofeedback therapy. Five patients (19%) had a partial improvement. The majority of patients failed to improve ($n=14$, 48%). Patient age, gender, and the number of sessions did not significantly impact the success rate. However, patients with obstructive defecation symptoms for a time frame >9 years had a significantly lower rate of success with biofeedback therapy when compared with those patients with obstructive symptoms <9 years (13 versus 78%)²

Outcome in the fecal incontinence group was divided into three categories based on the Cleveland Clinic Florida Incontinence Scoring System.² Patients were categorized as a complete success if the incontinence score was zero (0=perfect continence, 20=incontinence of solid, liquid, and gas), partial success if the score decreased to ≤ 5 , and treatment failure if the incontinence score remained >5 . Two patients (29%) had complete success, 2 patients (29%) had partial success, and 3 patients (43%) had no response to therapy. Patient age, gender, and the number of sessions did not significantly impact the success rate.²

Transanal Delorme

Mucosal proctectomy, first discussed by Delorme in 1990,¹⁷ has been performed for rectoanal intussusception. Berman and colleagues reported a 71% success rate at three years in 21 women after Delorme's transrectal excision for individuals with constipation and RI. Symptoms of obstructive defecation or pelvic pressure persisted in 6 patients. Complications included low-grade bleeding in 2 patients, focal anastomotic disruption in 1 patient, and stenosis in 1 patient.¹⁸

Abdominal Rectopexy

Abdominal rectopexy in the form of simple suture rectopexy,^{19,20} prosthetic mesh rectopexy, and biologic

mesh rectopexy have been performed for symptomatic rectoanal intussusception. Prosthetic mesh techniques include the use of a polyvinyl alcohol sponge for posterior rectopexy (Ivalon sponge as in the Wells technique),²¹ the Orr–Loygue technique (ventral rectopexy),²² resection rectopexy,²³ and the Ripstein procedure (posterior prosthetic mesh with circumferential wrap).²⁴ The use of biologic mesh, such as PermacolTM (Tissue Science Laboratories plc, Aldershot, Hants, UK), has also been described as a treatment option for symptomatic RI.²⁵

Graf and colleagues reported poor functional outcome after simple suture rectopexy in 1996.¹⁹ A retrospective review of 19 patients with rectoanal intussusception revealed that only 16% had improved obstructive symptoms postoperatively. Rectal emptying was improved in only 5% of patients. Fecal incontinence was improved in 16% of patients. Similarly, Briel and colleagues found that suture rectopexy for fecal incontinence associated with RI was successful in the minority of patients (38%, $n=13$).²⁰

Utilizing the Wells technique (Ivalon sponge rectopexy), McCue and Thomson reported a poor outcome in patients with symptoms of obstructive defecation in 1990.²⁶ Half of the patients with obstructive defecation and RI had persistent straining, and 25% had worsening of their obstructive symptoms after Ivalon sponge rectopexy. Conversely, improved fecal continence was noted in two thirds of patients with incontinence of solid stool.²²

Radiographic findings of rectoanal intussusception are frequently corrected after abdominal rectopexy for symptomatic RI. Christiansen and colleagues demonstrated this in 1992.⁶ Eighty-three percent of patients ($n=24$) were found to have correction of RI on defecography. However, none of the patients had complete resolution of their symptoms.⁶ Multiple case reports and small case series reports continue to publish their results with various surgical techniques based on postoperative defecography results rather than on the clinical outcome with adequate follow-up.

In 1989, Orrom and colleagues reported that the clinical results of abdominal rectopexy in patients with obstructive symptoms were poor in 82% ($n=17$) of patients.²⁷ Surgical technique included anterior and posterior fixation in 11, posterior fixation only in 6 patients. Tenesmus and straining persisted or worsened postoperatively in 82% of patients.²⁷

The results after a Ripstein rectopexy in 40 patients for incontinence of feces or gas ($n=24$), pain ($n=8$), and obstructive defecation ($n=4$), proctitis with bleeding ($n=2$), and complete rectal prolapse ($n=2$) were published by Ihre and Seligson in 1975.²⁸ Continence was restored in 75% of patients ($n=18$). In patients with either obstruction or pain, these symptoms were improved in 42% of patients ($n=5$).²⁸

Resection rectopexy was performed in 27 women with obstructive defecation and rectoanal intussusception reported a 63% dissatisfaction rate with their results at one month in 2005.²³ Symptoms of obstructive

defecation reportedly subsided substantially. However, 19 patients developed severe tenesmus and urge to defecate, frequent and small bowel movements, and perineal pain that persisted a few hours after bowel

Figure 2 (A, B) Stapled transanal rectal resection (STARR) procedure. After introduction and fixation of the anal dilator, the posterior rectal wall is protected by a retractor (1) and three one-half purse string sutures are placed 1–2 cm above the hemorrhoidal apex to include the top of the rectoanal intussusception (2). The circular stapler is opened and the head placed above the three anterior one-half purse string sutures. Before firing the stapler, care is taken to ensure exclusion of the posterior vaginal wall (3). The stapler is then fired and withdrawn (4). The steps are then repeated for the posterior resection (5–8) ultimately creating a full thickness circumferential excision of the distal rectal wall.

movements immediately postoperatively. Six months postoperatively, dissatisfaction reduced to 50%. Five years following surgery, 11 patients (41%) were available for follow-up and 8 reported no problems with defecation. Two complained of mild, occasional tenesmus and one reported occasional constipation and the feeling of incomplete evacuation.²³

Unfortunately, there are limited well-powered investigational studies and zero randomized controlled studies to make any final conclusions. It appears that obstructive defecation symptoms in individuals with rectoanal intussusception rarely improve and may worsen after abdominal rectopexy. In addition, fecal incontinence may improve in a small number of patients after abdominal rectopexy.

Stapled Transanal Rectal Resection

At the turn of the century, interest in the surgical management of obstructive defecation syndrome increased with the advent of the stapled transanal rectal resection (STARR) procedure. Based on the stapled hemorrhoidopexy procedure,²⁹ the STARR procedure utilizes a double-transanal, 33-mm circular stapler technique to perform a transanal anteroposterior rectotomy (Fig. 2). The goal of this technique is to strengthen the rectovaginal septum and resect the redundant tissue. Boccasanta and colleagues published their results of the stapled transanal rectal resection (STARR) procedure in 2004. This study was a prospective, multicenter trial investigating the STARR procedure in the treatment of obstructive defecation in individuals with symptomatic rectoanal intussusception and rectocele in 90 patients. The overall patient satisfaction at one year was described as excellent in 53% of patients, good in 37%, fairly good in 5%, and poor in 4%. Complications included fecal urgency in 18%, urinary retention in 6%, bleeding in 4%, and anastomotic stenosis in 3%.³⁰

Reports of postoperative rectal bleeding at the staple line, persistent severe anal pain, fecal incontinence, and recurrent symptoms of obstructed defecation deflated the initial heightened interest in the surgical management of symptomatic RI.³¹ Recent publications, however, continue to report compelling data that STARR is an effective therapy for individuals with obstructive defecation due to symptomatic rectoanal intussusception and/or rectocele.^{32,33}

SUMMARY

The treatment of symptomatic rectoanal intussusception is by far more difficult than diagnosing rectoanal intussusception on defecography. The pathophysiology is poorly understood, and the etiology is unknown. The two most popular hypotheses regarding the etiology of rectoanal intussusception are (1) rectoanal intussuscep-

tion is an early manifestation of a dynamic anomaly, which may lead to full-thickness rectal prolapse; and (2) rectoanal intussusception is a secondary phenomenon of obstructive defecation. Proponents of the former hypothesis recommend treatment strategies similar to those for full-thickness rectal prolapse. Proponents of the later recommend a conservative approach and correction of the underlying component causing the obstructive defecation. A comprehensive evaluation and investigation of obstructive defecation and fecal incontinence is of utmost importance in these individuals. The finding of rectoanal intussusception on defecography should be correlated with clinical symptoms and other provocative testing.

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