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Current Trends in Management of Defecatory Dysfunction, Posterior Compartment Prolapse, and Fecal Incontinence

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Abstract

While it would be our hope to report that there have been significant gains in the understanding of the correlation between the posterior vaginal compartment and defecatory dysfunction in the last year, this is not the case. Instead, we review the highlights of management of posterior vaginal compartment and defecatory dysfunction including 1) defining and understanding the patient's symptoms; 2) considering systemic disorders, motility dysfunction, and mechanical causes that may be contributing; 3) encouraging conservative management as first-line therapy; and 4) recognizing which surgical options are likely to improve specific symptoms. This is then followed by an update on treatment options for fecal incontinence, which we now prefer to refer to as accidental bowel leakage. We are able to report on five exciting and innovative treatment approaches for accidental bowel leakage. As the scientific community increases focus on patient-centered outcomes, we are likely on the verge of having a greater understanding of how treatment options for posterior compartment prolapse and defecatory dysfunction can improve patient symptoms. This year, we can report that strong evidence based recommendations simply do not exist, and this area is ripe for future investigation.

Keywords

posterior compartment prolapse; rectocele; defecatory dysfunction; accidental bowel leakage; fecal incontinence

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Introduction

It is striking that the treatment options for defecatory dysfunction and posterior compartment prolapse run the gamut from conservative measures such as stool bulking or biofeedback to invasive surgical approaches such as plication of rectovaginal septum via a posterior colporrhaphy or trans-anal stapled resection of a circumferential segment of the rectum. Many of the differences in treatment approaches stem from the differences in definitions, diagnosis, work-up and management. There truly is imperfect understanding of the relationship between anatomy and function of the posterior compartment, and how much of a patient's defecatory dysfunction can be attributed to her posterior compartment prolapse. [1]

The last year brought us no closer to a deeper understanding and consensus of these issues. Fenner and Hale captured this idea perfectly, with their recent publication "Consistently inconsistent, the posterior vaginal wall".[2] The approach to these issues is greatly influenced by the specialty and background of the clinician. To provide a tongue-in-cheek oversimplification, our gastrointestinal colleagues approach constipation systemically and systematically, while colorectal surgeons focus on mechanical function of the colon and rectum, and we, as gynecologists, hone in on the vagina, specifically the posterior vaginal wall. In order to truly advance our understanding of the consistently inconsistent posterior compartment, a more global viewpoint and a multidisciplinary approach to the patient with defecatory dysfunction and posterior vaginal wall prolapse should be taken.

For the practicing gynecologist, the highlights of the management of defecatory dysfunction and posterior compartment prolapse include: 1) defining and understanding the patient's symptoms; 2) considering systemic disorders, motility dysfunction, and mechanical causes that may be contributing; 3) encouraging conservative management as first-line therapy; and 4) recognizing which surgical options are likely to improve specific symptoms.

1. Defining and Understanding Symptoms of Defecatory Dysfunction

The prevalence of constipation in men and women ranges from 2-27% and is known to be increased in women, and those over age 65 [3]. "Constipation" is a commonly and diversely used term. Patients may use this term to refer to frequency of bowel movements ("I only go once a week"), stool consistency ("Every time I poop it comes out like hard little acorns"), ease of defecation ("I have to strain and feel like it does not all come out"), or behavior used to defecate ("I have to push on my perineum or dig out the stool from my rectum"). As physicians, we also define constipation in various ways. A very common definition is less than three stools per week, which focuses on frequency. [4] The American College of Gastroenterology Chronic Constipation Task Force and the American Society of Colon and Rectal surgeons define constipation as unsatisfactory defecation characterized by infrequent stool, difficult stool passage or both.[5, 6] The International Continence Society and International Urogynecological Association define constipation as the complaint that bowel movements are infrequent and/or incomplete and/or there is need for frequent straining or manual assistance to defecate.[7] These latter two definitions focus on frequency and behaviors.

As gynecologists and urogynecologists, we mostly focus on symptoms related to defecatory behavior and dysfunction. **Anorectal dysfunction** includes anal incontinence and defecatory dysfunction. **Defecatory dysfunction** is a heterogeneous disorder that encompasses any difficulty with defecation, excluding accidental bowel leakage. **Obstructed defecation** is a subset of defecatory dysfunction that includes the symptoms of straining, incomplete evacuation, splinting, and manual evacuation/digitation that can often be attributed to rectal or colon defects (rectal prolapse, neoplasia, anal stricture, anal fissure, hemorrhoids, fecal impaction, trauma), pelvic organ support defects (posterior compartment prolapse, perineal descent), or defecatory dyssynergia. **Straining** is defined as the complaint of the need to make an intensive effort (by abdominal straining or Valsalva) to either initiate, maintain, or improve defecation. [7] **Incomplete emptying/evacuation** is defined as the complaint that the rectum does not feel empty after defecation. [7] **Splinting/digitation** is defined as the complaint (need to digitally replace the prolapse or otherwise apply manual pressure to the vagina or perineum), and manual evacuation, digitation (need to place fingers in the vagina or rectum to evacuate stool). **Defecatory dyssynergia** is weak or inadequate propulsion of stool due to failure of relaxation of the external anal sphincter and puborectalis muscles).

Some obstructed defecation is likely due to defects in the posterior vaginal compartment. The **posterior vaginal compartment** contains the posterior vaginal wall, fibromuscular layers between the vagina and rectum, rectal wall, the levator ani muscles, the uterosacral/cardinal ligament complex apically, the perineal body caudally, and nerves and blood vessels. Defects in this compartment lead to **posterior vaginal wall/compartment prolapse**. This term includes commonly used terms of rectocele (prolapse of the anterior rectal and posterior vaginal wall into the lumen of the vagina), enterocele (prolapse of the small bowel into the lumen of the vagina), and perineal descent (perineum descending greater than or equal to 2 cm below the level of the ischial tuberosities at rest or at straining).

Taking time to understand what a patient means by “constipation” is the first step and helps us target how to best evaluate and manage each patient, and perhaps to determine who is best able to treat the patient.

2. Considering causes of defecatory dysfunction

Constipation is often multifactorial and may be related to systemic causes, motility disorders, or mechanical disorders causing obstructed defecation (Table 1).

An evaluation of defecatory dysfunction starts with a complete medical and surgical history, including ensuring that the patient has current colorectal cancer screening if appropriate. A thorough history and physical allows us to identify causes of defecatory dysfunction that are better managed by a gastroenterology, endocrine, neurology, or internal medicine colleague. If alarm symptoms are identified, the patient should be referred to GI or colorectal surgery. Alarm symptoms include blood in the stool, unintentional weight loss, family history of colon cancer or inflammatory bowel disease, anemia, positive fecal occult blood tests, and acute onset of constipation in the elderly.[5] Depending on other systemic symptoms, a TSH, calcium, glucose, or complete blood count (to screen for iron deficiency anemia) should be considered.

Next, symptoms can be divided into those suggesting motility disorders such as slow transit (hard stools, bloating, pain) and those of obstructed defecation (straining, splinting, digitation). For functional disorders, one should consider referral to gastroenterology for evaluation and management, while for obstructed defecation, one should consider referral to female pelvic medicine and reconstructive surgery (FPMRS) or colorectal surgery specialists.

On pelvic examination, the stage of posterior vaginal wall prolapse should be evaluated by a splint speculum examination and the strength of the levator muscles assessed. A digital rectal examination should be performed to evaluate for rectovaginal wall laxity or pocket, and to assess sphincter tone and strength. Perineal descent should be evaluated by having the patient Valsalva and observing whether there is mass effect descent of the perineum past the ischial tuberosities. Anal exam should include assessment for masses, fissures, strictures, hemorrhoids, impaction or trauma.

When a patient's symptoms seem out of proportion to her physical exam findings, imaging should be considered. Dynamic proctography with radio-opaque paste instilled into the rectum can be considered using fluoroscopy or magnetic resonance imaging to visualize evacuation in real-time. However, caution should be taken in interpreting these findings and devising a management or surgical plan as there is a paucity of evidence establishing whether treatments directed at imaging findings improve functional outcomes.

3. Conservative approaches should be considered first-line treatment

The approach to treating constipation and obstructed defecation starts with remembering that the cause is usually multifactorial. The best approach will first address systemic causes, then address stool frequency and toileting behaviors. Stool bulking and biofeedback have been shown to improve defecatory dysfunction resulting from multiple causes, and because of their minimal risks of adverse effects, they are considered safe and reasonable first line treatments[8].

The mainstay for treating defecatory dysfunction, regardless of etiology, is to bulk stool by increasing fiber in the diet or by supplementation (up to 25-35 grams per day). Good sources of fiber include prunes, psyllium, methylcellulose, wheat dextrin, polycarbophil, and raw bran. Many over-the-counter fiber supplements exist and patients should be instructed to experiment until they find the one that is easiest for them to consistently take. Adding fiber to one's diet should be done slowly and steadily; a good rule of thumb is to increase fiber intake 5 grams per week until the stool is appropriately bulked. Adding fiber to one's diet too quickly can cause bloating and abdominal distention, especially in those with slow transit constipation. Once a patient achieves her goal fiber intake, she should be advised to maintain it daily. If her stools are still hard, stool softeners, such as docusate sodium, can be tried.

After adequate fiber intake has been achieved, osmotic or stimulant laxatives (polyethylene glycol, lactulose, magnesium citrate, bisacodyl, senna) can be tried. Patients should be counseled that these agents are helpful and should be used as needed rather than routinely. Finally, secretory agents (lupiprostone, linaclotide) can be prescribed.

Toileting behaviors are crucial. Patients should be encouraged to attempt defecation after eating, especially in the morning, to take advantage of their normal postprandial increase in colonic motility. It is important to correctly position at the time of defecation to help relax the puborectalis muscle and straighten the rectum to assist with elimination. Positioning with the knees slightly higher than the hips allows the pelvic floor to relax, and step stools or other devices such as the Squatty Potty (www.squattypotty.com) can be used. Finally, reassurance should be given to patients that they can splint, digitate, or manually evacuate if they find such maneuvers acceptable. Patients should be advised to avoid excessive straining if possible.

Biofeedback teaches patients to identify their pelvic floor muscles and to appropriately contract and relax. It is often paired with counseling regarding nutrition, fiber supplementation and defecation strategies. Biofeedback has been shown to be the optimal treatment for patients with a component of defecatory dyssynergia when compared to patient education [9], nutritional counseling, exercise and laxative [10], laxative alone [11], diazepam suppositories [12], and sham biofeedback [13]. Many continence nurses and pelvic floor therapists are trained in biofeedback techniques. Patients can use this on-line locator tool to identify providers near them: <http://www.womenshealthapta.org/pt-locator/>.

4. Surgical options

Determining the best surgical approach is beyond the scope of this review, and is actually a question that has still not been satisfactorily answered in the literature. [2] The lack of standardization of definitions and consistent tracking of anatomic outcomes, patient symptoms, and patient satisfaction do not allow us to compare the main surgical approaches out there. Few comparative trials have been performed. In clinical practice, often the approach picked by the surgeon is determined by surgeon training, specialty, and their perception of the mechanical and anatomic outcome, despite weak correlation with defecatory symptoms. We will review some of the main approaches undertaken, and highlight some comparative studies.

Transvaginal approaches – traditional posterior colporrhaphy, site-specific repair, and graft augmentation—Gynecologists approach a posterior compartment prolapse, distal bulge symptoms, and splinting with a native tissue vaginal posterior repair. The vaginal approach has success rates for anatomic restoration of 76-98 % for traditional posterior colporrhaphy and 56-100% for site-specific repairs [14-19]. Vaginal surgery entails posterior colporrhaphy with or without a site-specific repair and with or without levator plication. A posterior colporrhaphy involves making a longitudinal incision in the vaginal mucosa and separating out the underlying fibromuscular tissue which is then plicated in the midline to allow for a thick scar to form to reinforce the weak posterior wall. If isolated defects or areas of weakness are seen or palpated on rectal exam, interrupted imbricating sutures can be placed to repair these defects.

When posterior colporrhaphy and site-specific repair are compared, they fare similarly, with some studies slightly favoring posterior colporrhaphy with higher anatomic success rates and similar improvements in defecatory function [20, 21]. Existing literature does not support

the placement of biological or synthetic grafts in the posterior compartment as they do not improve anatomic and symptomatic outcomes [21, 22].

Most studies do not show a correlation between defecatory symptoms and stage of posterior compartment prolapse. However, in the last few years, when the presence of a posterior compartment prolapse (“rectocele”) is defined as a dichotomous variable (usually using a cut-off point of the hymen, or a radiological threshold), a stronger correlation has emerged between posterior compartment prolapse and digitation [23-32]. There is also some evidence, though not as strong, linking the presence of posterior compartment prolapse (point Bp $\geq$ -1) with incomplete emptying and straining [26, 33]

Thus, if a patient with posterior vaginal prolapse specifically complains of stool getting stuck just before it is evacuated and describes splinting, manual evacuation and/or straining after having completed conservative management, surgical repair of the prolapse should be considered.

Transanal approach—Colorectal surgeons traditionally approach the rectocele from the endoanal approach, usually with the patient in the prone jack-knife position. A T-shaped incision is made in the rectal mucosa proximal to the dentate line and a flap is made overlying the rectal mucosa. This flap is then trimmed and/or plicated. Multiple RCTs have demonstrated the inferiority of this approach in terms of anatomic cure, improvement in defecatory symptoms, and complication rates [34, 35].

Transanal stapling—There are many recent case series exploring the double-Stapled Trans-Anal Rectal Resection (STARR) procedure. In this procedure, a medical device is inserted rectally and is used to circumferentially excise the rectal mucosa/area of rectocele and reanastomose the edges. A meta-analysis suggest this technique effectively corrects the anatomic defect but has a high rate of associated complications including rectovaginal fistula, painful defecation, and stricture[36, 37]. No studies comparing this approach to the more generally accepted vaginal approaches of the traditional posterior colporrhaphy and site-specific repair exist, and at this point we would caution gynecologists against a transanal approach.

Transabdominal approach—Often, posterior vaginal compartment defects are associated with apical support defects (uterine or vaginal vault prolapse), internal or full-thickness rectal prolapse, or redundant sigmoid. In these situations an abdominal approach might be preferable, ideally through a minimally invasive technique. A sacral colpoperineopexy can be performed in which mesh is attached to the posterior surface of the vagina extending to the perineal body. This approach has been shown to improve defecatory symptoms and the anatomic defect [38].

For patients with concomitant rectal prolapse or deep herniation of the rectovaginal peritoneal cavity with sigmoid colon, surgery is considered including sigmoidectomy and/or rectopexy. Our colorectal colleagues can perform a rectopexy: fixation of the rectum to the sacrum in an attempt to restore the anatomic position of the rectum and improve mechanical functioning. When redundant sigmoid is identified and thought to be prolapsing into the

posterior compartment, sigmoid resection is often performed concurrent with rectopexy. The rectum can be fixated with free suturing, staples and grafts (biologic or synthetic mesh). No studies exist prospectively comparing these different fixation techniques[39].

In general, fixing the anatomic or mechanical defect has been shown to improve defecatory symptoms, though never completely [40].

Summary of defecatory dysfunction and posterior compartment prolapse—It would be our hope to be able to report in this issue that there have been significant gains in our understanding of the correlation between posterior compartment prolapse and defecatory dysfunction, but that is not the case. Further exploration is acutely needed for us to better understand the symptoms connected to posterior compartment prolapse, the best methods of evaluation and imaging, and the best surgical approaches to improving patient symptoms. We have highlighted four areas that are important in the management of defecatory dysfunction and posterior compartment prolapse. As the scientific community increases focus on patient-centered outcomes, we are likely on the verge of having a greater understanding of how treatment options for posterior compartment prolapse and defecatory dysfunction can improve patient symptoms. This year, we can report that strong evidence based recommendations simply do not exist, and this area is ripe for future investigation.

Fecal Incontinence (Accidental Bowel Leakage)

While the last year has not seen significant advances in the understanding of defecatory dysfunction and posterior compartment prolapse, advances in treatment of fecal incontinence have been more promising. Fecal incontinence affects 9% of women over 45 at least monthly, and affects 18% on a less frequent basis [41], but fewer than one-third of women with this condition seek care [42]. Though historically there was a paucity of effective therapies for fecal incontinence, there are now multiple minimally invasive therapies with better success rates and more favorable risk profiles than prior treatment options (such as sphincteroplasty, artificial bowel sphincter, or graciloplasty). As obstetrician-gynecologists, we routinely ask about urinary incontinence, and should, given the range of effective treatment options now available, also ask about bowel symptoms. More than 70% of women with fecal incontinence prefer the term “accidental bowel leakage,” to describe this condition [41].

Conservative therapy remains the mainstay of first-line treatment, including optimization of stool consistency through fiber supplementation with or without dietitian referral, bowel regimen to treat constipation or diarrhea, and referral to pelvic floor physical therapy for muscle coordination and biofeedback (see conservative management section above). Following these first-line options, numerous minimally-invasive therapies have appeared on the horizon in the last several years.

1. Renew Insert

The Renew Insert is a soft silicone anal insert that prevents leakage and is well-tolerated, safe, and effective. It is a single-use insert placed with the assistance of a fingertip applicator and evacuated through expulsion at the time of a voluntary bowel movement. The insert

consists of two soft silicone disks connected by a thin stem that spans the anal canal. The inner disk rests at the top of the anal canal and creates a seal to prevent leakage of liquid or solid stool, and the outer disk remains outside the anus to stabilize the device. In a multicenter prospective cohort study of this insert, median incontinent episodes per day decreased from 0.9 to 0.2 and more than half of patients achieved at least a 50% reduction in frequency of incontinence episodes [43]. The Renew Insert comes in two sizes and both a starter pack (5 regular and 5 large inserts) and maintenance therapy packs (30 regular or 30 large) are available by prescription (www.renewmedical.com).

2. Eclipse™ System

The Eclipse System is a vaginal bowel-control device and pump system that received approval by the Food and Drug Administration (FDA) in February, 2015, and will be available commercially in 2016. The Eclipse is a silicon insert that sits in the vagina, similar to a ring pessary, with an inflatable balloon that reversibly occludes the rectum to prevent fecal incontinence. A thin tube, analogous to a tampon string, connects to a small portable pump that is used to inflate and deflate the balloon. The device is worn with the balloon inflated except when the patient wants to have a bowel movement, at which time she uses the portable pump to deflate the balloon, decompressing the rectum and allowing stool to evacuate. In the initial cohort study of the Eclipse system, published in February 2015, 55% of women enrolled were successfully fitted, and almost 80% achieved at least a 50% reduction in incontinence episodes, with no serious adverse events [44]. This system was also associated with improvements in reduced bowel movement frequency, fecal urgency, solid consistency, and improved evacuation in patients with significant fecal incontinence [45]. The Eclipse System is now commercially available in select geographic areas (www.pelvalon.com).

3. Sacral Neuromodulation

While not a development in the last year, sacral neuromodulation has revolutionized the treatment of fecal incontinence and a review of this topic would be remiss not to include it. Medtronic's InterStim® Therapy System was approved to treat fecal incontinence by the Food and Drug Administration (FDA) in March, 2011. The therapy involves two ambulatory procedures: the first for sterile placement of an electrical lead along the third sacral nerve as it exits the S3 foramen under fluoroscopic guidance, and the second to implant an internal impulse generator if the patient receives at least a 50% improvement in symptoms during the test phase. A two week long test phase separates these two procedures, during which time an electrical impulse is delivered to the third sacral nerve by an external neurostimulator and the patient keeps a daily symptom diary. If she does not experience at least a 50% improvement in symptoms, the electrical lead is removed. In a randomized controlled trial comparing sacral neuromodulation with optimal medical therapy, mean incontinent episodes per week decreased from 9.5 to 3.1 and almost half of patients achieved perfect continence[46]. Further, this therapy is equally effective in patients with a sphincter defect, a previous sphincter repair, or pudendal neuropathy [47], and thus should be considered before sphincteroplasty, based on its minimal risk and superior effectiveness.

4. Solesta Bulking Agent Injection

Solesta® is a submucosal gel injection of dextranomer in stabilized hyaluronic acid into the anal canal in four injections of 1 mL each. FDA-approved since May 2011, the procedure is performed in the office with an anoscope and the location of the injections above the dentate line obviates the need for local anesthetic. In the initial randomized, double-blind, sham-controlled trial of this therapy, 52% of those who received Solesta and 31% of those who received a sham treatment achieved at least a 50% reduction in incontinence episodes, with 2 serious treatment-related adverse events in 136 patients [48]. A 2014 study reporting long-term outcomes in these patients confirmed that 52% had at least a 50% reduction in incontinence episodes 36 months after injection [49].

5. TOPAS Treatment for Fecal Incontinence Device

The TOPAS System is a self-fixating, polypropylene, anal sling, placed around the puborectalis muscle using a needle-based delivery system through a transobturator approach. The procedure is performed in the operating room using sterile technique and does not require overnight admission. A prospective, multicenter efficacy and safety study published in October 2015 of over 150 women implanted with the TOPAS system demonstrated a reduction in median fecal incontinence episodes from 9.0 to 2.5 per week, with almost 70% achieving at least a 50% reduction in episodes, and with 19% achieving complete continence [50]. In this trial 66 women experienced adverse events, most commonly pelvic pain or infection, and no women experienced erosions, extrusions, or device revisions. The TOPAS System is scheduled for FDA review in late February 2016.

Conclusion

Multiple innovative therapies for fecal incontinence have emerged in the last five years. While defecatory dysfunction and posterior compartment prolapse remain poorly understood, research is actively ongoing to better understand the intersection of functional and mechanical disorders that contribute to these symptoms. We believe the future of care for both fecal incontinence and defecatory disorders is best served with a multidisciplinary approach with input from dietetics, physiotherapy, gastroenterology, female pelvic medicine and reconstructive surgery, and colorectal surgery when appropriate. More studies comparing methods of evaluation and surgical repair are needed.

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Heidi Brown declares that she is the principal investigator at the University of Wisconsin-Madison for an industry-sponsored trial evaluating long-term safety and efficacy of the Eclipse (R) Vaginal Bowel Control system.

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Table 1
Potential Causes of Defecatory Dysfunction

Systemic Causes	Motility Disorders	Mechanical Issues
Endocrine Disorders <ul style="list-style-type: none"> - Hypothyroidism - Hypercalcemia - Hyperparathyroidism - Diabetes 	Slow-transit Constipation <ul style="list-style-type: none"> - allows for increased water reabsorption 	Rectal lesions
Neurologic Disorders <ul style="list-style-type: none"> - Parkinson Disease - Spinal cord lesions - Multiple sclerosis - Stroke 	Constipation-predominant irritable bowel syndrome	Posterior compartment vaginal prolapse
Psychosocial Factors <ul style="list-style-type: none"> - Anxiety disorders - Mood disorders - Post-traumatic stress - Sleep disturbance - Dysfunctional coping - Childhood abuse 	Functional constipation	Defecatory dyssynergia <ul style="list-style-type: none"> - Paroxysmal contraction of sphincter complex during attempted defecation
Medications <ul style="list-style-type: none"> - Opiates - Anticholinergics - Calcium channel blockers - Antidepressants - Diuretics 		