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Acquired fecal incontinence
in community-dwelling adults

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Fecal incontinence (FI) is a condition that causes an individual to involuntarily leak solid or liquid stool.[1] It is estimated that in the community-dwelling population, 6% of women under the age of 40, 15% of women over the age of 40, and 6% to 10% of men suffer from FI.[1] The true rate of FI may be underreported, however, as FI carries a social stigma.

Those who suffer from FI tend to report concomitant depression, anxiety, and poor physical functioning.[2] Although the economic cost of FI has not yet been determined, it is projected to be similar to the estimated $14 billion that it costs community-dwellers to manage urinary incontinence.[1]

Despite its impact on patients, families, and the economy, FI is not well-studied, as patients suffering from FI are often too ashamed to disclose it to their healthcare practitioners, or providers themselves may believe that FI cannot be treated.[3]

The threefold purpose of this article is to educate primary care providers (PCPs) about (a) how acquired FI may manifest in community-dwelling adult patients; (b) how they can assess for FI despite barriers; and (c) how to provide appropriate management for FI. Only acquired etiologies of FI will be discussed, as congenital etiologies are usually addressed before the PCP intercepts the middle-aged or older adult patient. An emphasis will be placed on conservative interventions that are within the scope of the PCP, as advanced treatments for FI require specialist direction.

Mechanics of normal bowel function

Voluntary control of defecation depends on numerous complex physiological components, some of which remain unknown.[4] The main aspects of continence are anal tone, which is comprised of the internal anal sphincter (IAS) and the external anal sphincter (EAS) pressures[5]; anorectal angle, created by the puborectalis (PBR) muscle slinging the anorectal junction[6]; anorectal sensation; and anorectal coordination[7] (see *Interior of the rectum and anal canal*). Contributory factors include rectal accommodation, colorectal motility, stool volume, and stool consistency.[6]

The relationship of pelvic floor sensation and anorectal function is displayed in the rectoanal sphincter inhibition response, or the "anal sampling reflex,"[7] which is vital to continence. In this reflex, rectal filling causes the IAS to open, and rectal contents dip into contact with anal sensory epithelium.[4] Continence is maintained by the contracted EAS and PBR. Finally, a voluntary decision is made to either let the contents escape by relaxing the EAS and allowing peristalsis to proceed, or delay passage by contracting it.[4]

Pathophysiology

FI may occur when any of the aforementioned mechanisms are disrupted, and is often multifactorial. In the following section, the different etiologies of FI are categorized by risk factors and explained physiologically.

Aging

The elderly are disproportionately affected by FI, as they have more comorbid conditions that cause FI. Structural changes that occur in aging, including anal muscle atrophy and pudendal nerve damage due to decades of straining and childbirth, however, also directly decrease anal muscle bulk and tone.[8] Moreover, anal pressure decreases after age 70, and is lower in elderly women than men.[9]

Obstetric injury

Most community-dwelling primary care patients who suffer from FI are postpartum females and have an FI prevalence rate eight times that of males.[10] In this subpopulation,

obstetric injuries during the second and third decades of life typically surface in middle-age.[11]

Obstetric tears of the EAS are commonly associated with birthing complications, including forceps use, mediolateral episiotomy, shoulder dystocia, primiparity, and third-degree EAS tears.[12] Stretch damage to the pudendal nerves supplying the EAS resulting from vaginal delivery has been associated with increased birthweight, multiparity, and prolonged second-stage labor.[13]

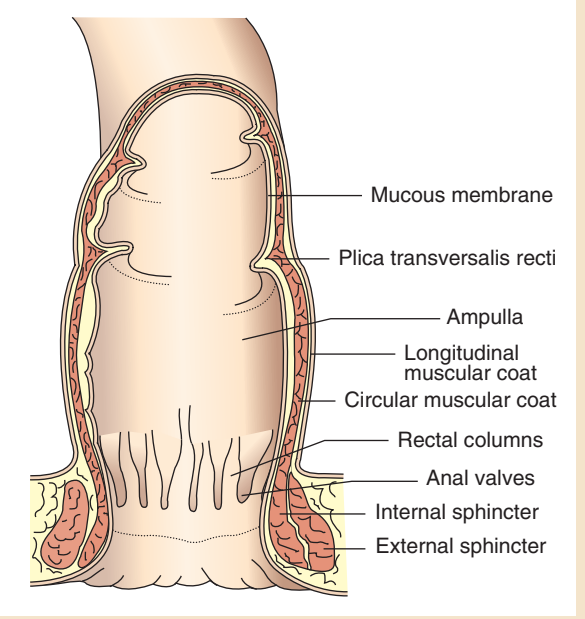
Anorectal surgery

Although anorectal surgery aims to correct structural issues, it may actually cause or exacerbate FI. This has been noted with the following procedures: partial sphincterotomy, fistulotomy, hemorrhoidectomy,[14] and rectocele repair.[15] Studies suggest that stretch injury from anal retractor use during surgery decreases anal resting pressures.[16,17] IAS and EAS may also be injured after anorectal surgery, although only roughly one-third of these patients reported FI[18]; neurogenic damage and rectal ischemia may occur.[19]

Radiation therapy

Pelvic radiation therapy used to treat malignancy may cause FI, especially in women treated for cervical and bladder carcinoma by intracavitary and external beam irradiation.[20]

Interior of the rectum and anal canal



Source: Porth CM, Matfin, G. *Pathophysiology Concepts of Altered Health States.* 8th ed. Philadelphia, PA: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2009:904.

Dose- and duration-dependent fibrosis of connective tissue may then ensue causing decreased colorectal capacity and compliance, manifested as urge FI at smaller volumes.[20]

Conditions affecting nervous system function

Patients with spinal cord injuries, lesions, tumors, and cauda equina syndrome may develop FI if the S2-S4 nerve roots are disrupted, as these give rise to the pudendal nerves that innervate the EAS.[21] Thus, an absence of rectal sensation and a lack of voluntary sphincter control may result, leading to automatic defecation.[22]

In patients with multiple sclerosis (MS), autoantibodies attack the myelin sheath of both motor and sensory nerves, blocking action potentials. This can cause both pelvic floor sensory dysfunction and loss of central sphincter control, causing FI.[22]

In patients with cerebral dysfunction such as Alzheimer disease, Parkinson disease, hydrocephalus, stroke, and frontal lobe disorders, the nerve pathways that signal rectal distension are intact, but the individual is unable to respond appropriately by inhibiting the anorectal reflex, thus causing incontinence.[21,22]

One complication of hyperglycemia from diabetes mellitus is intestinal enteropathy, whereby intestinal and anorectal tissue that is innervated by the autonomic nervous system (ANS) becomes unresponsive.[23] Diabetic enteropathy can cause small bowel stasis, which manifests as diarrhea in 4% to 22% of diabetic patients and can exacerbate FI.[23] True FI can also result from diabetic enteropathy, as the IAS is weakened by disruptions in its autonomic innervations.[24] The EAS remains unaffected, however, as it is only innervated by the pudendal nerves, not the ANS.[6]

Diarrhea

Chronic diarrhea from inflammatory bowel disease (caused by either ulcerative colitis or Crohn disease), irritable bowel syndrome (IBS; a chronic disorder of abdominal pain or discomfort with numerous etiologies[25]), celiac disease, and diabetic enteropathy can overflow the anorectal unit and exacerbate FI.[26] This often occurs in the setting of decreased rectal capacity, but may manifest as urge FI even with normal bowel structure and function.

Fecal impaction

Elderly patients are especially vulnerable to fecal impaction, as they are frequently dehydrated, more sedentary, and suffer from constipating adverse reactions of various medications, such as anticholinergics and antidiarrheals.[27] In fecal impaction, chronic constipation ironically causes overflow FI, as a large fecal mass becomes stuck in the rectum and laxative treatments cause the seepage of liquid fecal matter

around that mass.[26] The chronic dilatation of the rectum also weakens its motility and impairs perineal sensation of rectal distension, one of the components necessary for defecation.[26]

Additional causes

Rectoceles, or rectal prolapse, may cause FI in 40% to 70% of cases due to traction injury of the pudendal nerves innervating the EAS.[28] Hemorrhoids may also block a complete seal, causing some soiling.[28] Although the mechanism is unclear, increased body mass index has also been linked to FI.[29,30] Diarrhea associated with food intolerance (for example, lactose, carbohydrate) or medication-related adverse reactions (for example, donepezil) may, in turn, predispose some patients to FI.

Clinical presentation

Most patients with FI do not directly verbalize this complaint to their healthcare providers due to embarrassment,[31] and will instead complain of chronic diarrhea or problems with defecation.[32] Provider-side barriers to FI discussions include the use of nonspecific language to discuss bowel symptoms, time constraints,[1] and subconsciously ignoring the topic to avoid patient discomfort.

Given the low rate of direct patient complaints of FI, the burden of FI assessment should be placed on the healthcare provider, who should know which clinical cases warrant evaluation. This is exemplified in the proposed algorithm for primary care assessment and management of FI (see *Assessment and management of adult FI*). This algorithm urges the PCP to proactively ask whether FI exists when the risk factors discussed above emerge during the office visit. It is also appropriate to always ask whether FI exists during physical exams for elderly men or women or during gynecologic exams for elderly women.

History of present illness

Once it is established that a patient has FI, it is important to elicit a full history of present illness (HPI). First, the PCP should ask whether the patient has noticed any lesions, masses, or structural abnormalities on the anus, such as hemorrhoids or rectal prolapse.[19] The practitioner should also assess for changes in bowel habits, as this could indicate FI complicated by diarrhea and/or constipation.[33] Evacuation problems may also reveal rectal dysmotility.[33] Asking about defecation control and pelvic sensation of flatus and stool can elucidate whether sphincter weakness or pelvic sensory alterations exist.[33]

Assessing for associated symptoms is also important in determining the FI etiology. For example, the presence of fever and chills could suggest a gastrointestinal (GI) infection or abdominal pain and bloating could indicate obstruction. When a patient has urinary incontinence with FI, he or she may have general pelvic floor weakness.[26] Changes in bowel habits should be noted, and if necessary, further work-up for colonic neoplasia should be initiated.

Discussing precipitating factors can also help reveal the cause of FI. Stress FI, which is elicited by coughing or physical strain, and urge FI, characterized by an inability to delay the defecation urge by more than 60 seconds,[34] indicate EAS dysfunction.[33] Passive FI suggests IAS or pelvic sensory dysfunction.[33] Diabetic enteropathy is associated with nocturnal soiling, which typically occurs without warning.[19]

Inquiring about any previous FI treatments that the patient has tried is also important as these can sometimes exacerbate FI. For example, a patient may be taking a fiber supplement to bulk stool; however, without an adequate fluid intake, the fiber supplement may cause constipation or fecal impaction. It is also important to discuss proper skin care if patients are using absorbent products, as these may lead to contact dermatitis and infection, especially in the elderly.[35]

It is important to assess for FI severity and its impact on the patient's function and quality of life, as patients are often anxious or depressed about FI and may limit their social and professional activities.[6] At this point, it is also appropriate to assess for the impact of FI on the elderly patient's activities of daily living (ADLs), including continence, toileting, dressing, and transferring.[36]

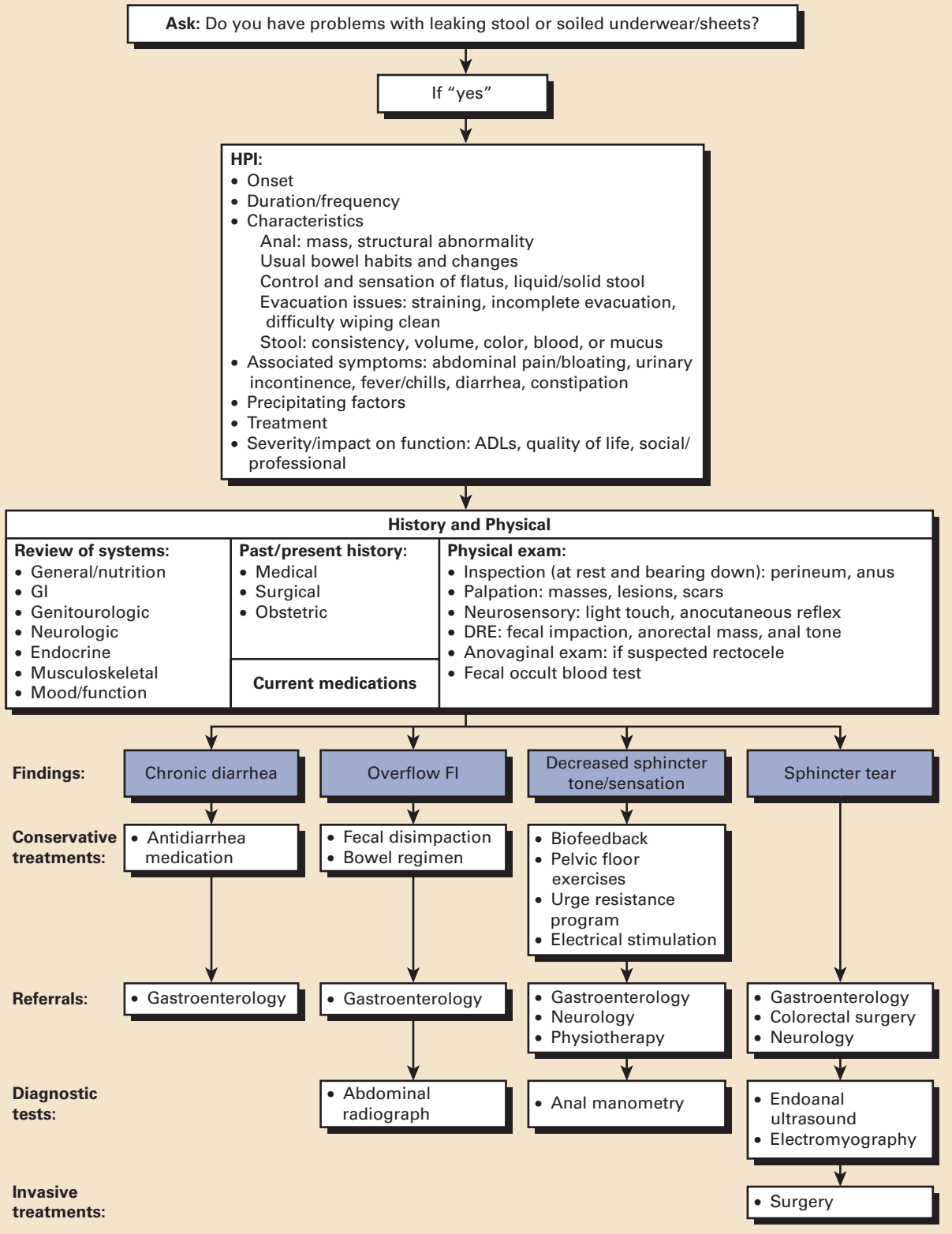
Physical exam

The abdominal exam should be performed first to rule out intra-abdominal pathology for FI. This portion of the exam includes auscultation of bowel sounds and light and deep palpation. A left lower quadrant mass may indicate impacted stool in the colon.[37]

The perineal and anorectal exams should then be performed in either the left lateral or prone positions.[6] Beginning with inspection of the perianal area, the practitioner should first observe whether the patient wears a pad or has fecal soiling on his or her underwear, which may cause perineal dermatitis.[37] If the patient's perineum is erythematous, a perineal swab culture for streptococcal and fungal infections may be taken.[37]

The anus should then be examined at rest for structural abnormalities including prolapsed hemorrhoids, fistulas, a patulous anus, masses, lesions, anal deformities, or excoriation.[6] Next, the patient should be asked to bear down as if to defecate, which may reveal excessive perineal descent seen in neurogenic FI and with weakness of the pelvic floor muscles.[37] Rectal prolapse or prolapsing hemorrhoids may also be revealed upon straining.[37]

Assessment and management of adult FI



Testing of perineal sensation should then follow, beginning with light touch with a cotton wisp.[6] Next, the anocutaneous reflex should be elicited, with a quick contraction after stroking the perianal skin indicating that pelvic floor sensorimotor innervation is intact.[6]

Finally, the digital rectal exam (DRE) should be performed in two positions. In the first, a finger is inserted into the resting anal canal to assess basal tone.[6] In the second, the finger is inserted deeper into the distal rectum, and should palpate posteriorly for the extrinsic traverse PBR muscle.[6] In the second position, the anorectal angle can be estimated by digital palation, with the finger hooked over the PBR sling.[37] The patient should then be asked to squeeze the anus against the finger, which should cause the PBR to contract anteriorly.[37] Performing a DRE also allows the practitioner to assess for fecal impaction or mass.[37]

The rectovaginal exam is a special technique that can be used to identify anterior sphincter defects in females. In this exam, one index finger is placed in the rectum, while either the thumb or the other index finger is placed into the vagina.[37] When the patient is asked to strain, the practitioner may be able to feel a rectocele protrude into the posterior vaginal wall.[37]

As with a routine DRE, the gloved residual stool characteristics should be observed, and a fecal occult blood test should be performed.

Nursing and medical interventions

Patients with urge—or diarrhea—induced FI can lessen symptoms by avoiding caffeine and immediate postprandial exercise, as these are both colorectal stimulants.[26]

FI originating from chronic diarrhea, and often occurring with a decreased colorectal storage capacity, can be treated with a variety of medications. These conditions include the aforementioned diabetic enteropathy, IBS, and rectal capacity compromise after radiotherapy. Loperamide, diphenoxylate with atropine, and difenoxin with atropine are commonly prescribed antidiarrheal agents for FI complicated with diarrhea.[38] Loperamide is preferred, however, as it does not have central nervous system adverse reactions, and has been found to be more effective than diphenoxylate, even increasing IAS tone in some patients.[6] Fiber supplements may also help increase the bulk of stool,[38] making it more perceptible and easier to control.

Overflow FI, which is caused by fecal impaction that occurs mostly in the sedentary elderly, is treated by disimpaction followed by colon cleansing.[6] Colon cleansing should be performed using large-volume warm-water enemas with mineral oil or polyethylene glycol with electrolyte oral solution.[6] If defecation does not resume in 3 days, laxatives or stimulants should be initiated and monitored with vigilance so that fecal impaction does not recur.[6,39] Laxative therapy should not be aggressive enough to produce liquid stools, however, as this may precipitate FI in the elderly, who have weaker anal sphincter pressures.[39]

Although a drug regimen specifically treating diabetic enteropathy has not been identified in the literature, optimizing blood glucose control may decrease the progression of this complication.[23]

Biofeedback and pelvic muscle exercises

Biofeedback is a general term that means bringing controllable bodily processes to consciousness.[32] In the field of FI, the two most common methods for providing biofeedback in response to anal contraction are manometry and electromyography (EMG).[32] In manometry, an air-filled or triple-balloon anal probe is inserted into the anus and begins to record squeeze pressures, which are displayed onto a computer screen through transducers.[32] The triple-balloon system is especially helpful in pelvic muscle sensory retraining, as the volume of balloon distension at the point of sensing can be monitored.[32] EMG is similar to manometry, except that it uses an intra-anal sensor or perianal electrodes to map electrical activity of the anal muscles onto a computer screen.[32] Biofeedback through manometry or EMG allows the patient with weakened sphincter muscles to visualize when the targeted sphincter muscle is contracted, so that correct contractions can be practiced at home without biofeedback.

Various home pelvic muscle exercise regimens have been used in research studies, but none have been found to be superior.[40] One published regimen recommends the following be performed at least 10 times daily: five 5-second contractions at maximum strength, five half-strength contractions for as long as can be tolerated, then rapid and tight contractions for as long as can be tolerated.[40] The practitioner should teach the patient to place one hand on his or her abdomen to make sure that it does not move during contractions, thereby aiding in anal sphincter isolation.[32]

Most studies on biofeedback and pelvic muscle exercises consistently demonstrated both short- and long-term clinical, physiological, and quality of life improvements in the majority participants.[41-43] The efficacy of biofeedback remains anecdotal, however, as the majority of the studies are methodologically flawed with small sample sizes and nonrandomized conditions, as was confirmed by a 2006 *Cochrane Database Review*.[44]

Electrical stimulation

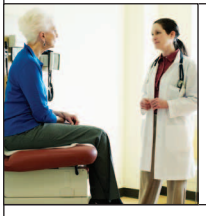
Electrical stimulation is used as an adjunct to improving anal sphincter function[32] and has been lightly studied in research. This treatment uses either an anal probe or transcutaneous electrodes attached to perianal skin to deliver a

perceivable, yet painless shock.[32] It is hypothesized to strengthen the anal sphincter by decreasing the fatigability of the EAS.[19] A regimen of one to two 30-minute sessions per day has been suggested in the literature.[19]

Although many clinicians report efficacy with this treatment, positive research findings are lacking.[45,46] One study that compared sham electrical stimulation to an active dose found that both groups improved, but with no difference between them.[46] Therefore, it has been hypothesized that it is the attention to the anal sphincter, and not the electric shock, that influenced the improvement in continence.[46] Further research is needed in this area to determine whether electrical stimulation has a beneficial effect on strengthening the EAS.

Urge resistance education

Urge resistance education is appropriate for patients with an intact EAS who experience urge FI[47] and can be easily taught by a PCP. In this method, the clinician emphasizes the importance of a voluntary contraction of the EAS in response to the urge to defecate and helps the patient build confidence in his or her ability to delay defecation in a stepwise manner.[32] The patient is taught to sit on the toilet but to try to delay defecation for 1 minute as soon as the urge occurs. Once this is achieved, a longer time increment is set as a goal, until a goal of 10 minutes is reached.[32] Deep breathing and distraction techniques are also taught to decrease the urge to defecate.[32] This program is complemented well by biofeedback and pelvic muscle exercises, which trains EAS contraction.[32]



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Learning urge resistance techniques requires high motivation and coordination. The practitioner should keep in mind that elderly patients may not have the motor skills to achieve sustained contraction of the EAS, but a highly motivated patient should not be discouraged.

Absorbent products and skin protection

Absorbent products are commonly used in an attempt to control leakage, barrier the skin, and disguise odor. Because briefs and pads are often unsightly and uncomfortable, however, many FI sufferers, especially men, will choose not to wear them.[33] A recent study found that a small anorectal dressing was rated highly by both men and women in the areas of soiling prevention, ability to stay in place, comfort, and overall effectiveness.[35] Most important, it provided an acceptable alternative to pads for most males, although it is more expensive.[35] Using over-the-counter oral deodorants such as bismuth subgallate or chlorophyllin copper complex may also help to decrease fecal odor.[32] Because anal plugs, rectal trumpets, anal bags, and internal rectal tubes are not frequently used by or readily available to community-dwelling adults, they are not discussed here.

Elderly FI sufferers who choose to wear absorbent pads or briefs are at an increased risk of skin irritation, as aged skin is thinner and more friable.[48] The increased friction and skin humidity caused by the absorbent product may cause contact dermatitis to escalate into skin infections.[49] Therefore, high-quality products with highly absorbent polymers and water vapor-permeable backing are recommended.[49] Frequent monitoring of the perineal skin and use of antifungal powder are also helpful in preventing fungal infections.[6]

Advanced diagnosis, management, and treatments

The PCP should refer the patient to specialists in many situations, including when (a) the cause of FI is uncertain, (b) the provider does not feel comfortable treating the FI, (c) there is a sphincter defect that may be corrected with surgery, or (d) office-based conservative management is ineffective. Gastroenterologists and colorectal surgeons can order special diagnostic tests to confirm diagnoses and determine whether surgery may be necessary or helpful. They also tend to have stronger connections with physiotherapists and wound, ostomy, and continence nurses, who can assist in intensive training or toileting regimens. In cases of FI caused by debilitating disease, such as diabetic enteropathy, cauda equina syndrome, and MS a referral to an endocrinologist or neurologist may also be necessary.

Diagnostic imaging

Anorectal manometry, in which an anal probe is inserted, and anal pressures are measured at rest and contraction can help identify decreased sphincter strength.[11] When the balloon anal probe is used in this method, a patient's ability to sense rectal distension can also be determined.[11]

When a sphincter tear is suspected, endoanal ultrasonography is used to assess structural integrity, particularly of the IAS and EAS.[6] If surgery is indicated, an EMG is usually performed to rule out denervation of the pudendal nerves, which decreases positive outcomes after surgery.[6]

Surgery

The most common surgical procedure for anal repair is the overlapping sphincteroplasty, whereby scarred sphincter tissue is dissected and healthy muscle is reconnected to recreate a continuous sphincter.[32] Although symptom improvement has been reported in the range of 70% to 80%,[11] continence tends to deteriorate within 5 to 10 years following the surgery,[14] especially in those with pelvic muscle denervation.[50]

Sacral nerve stimulation

Sacral nerve stimulation is a therapy whereby electrodes are surgically implanted onto the sacral nerve root, providing chronic stimulation of the nerves innervating the sphincter muscles. Although this treatment has been used with alleged success in treating FI in Europe, it is not yet approved for use in the United States by the FDA.[51] Even in a study that supports its use, the mechanism is unclear. One study[52] found that six of eight patients had improved continence at the 1-year follow-up. As with the other modalities, further research is required for validation.

Conclusions

Landefeld et al.[1] states that FI treatment success in primary care practices depends on four key elements: (a) healthcare providers must value FI detection, (b) healthcare providers must develop protocols as to how and when they will ask about FI, (c) practices must clearly identify patient education materials and GI referrals, and (d) providers must have confidence in the treatments that they offer.

PCPs are in an optimal position for intercepting and helping FI sufferers, and should explore the available treatment options for FI. They should forge relationships with specialists, such as gastroenterologists, wound, ostomy, and continence nurses, and physiotherapists, who can impart their expertise on primary care practices. Those healthcare providers who are involved in public policy should educate stakeholders and third-party payers about the positive experiences patients and practitioners have had with biofeedback and unreimbursed therapies. The completion of each of these steps helps to affect change and brings primary care practices closer to FI treatment success.

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