Nonoperative Management of Fecal Incontinence

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ABSTRACT

Fecal incontinence is a significant health problem that affects quality of life. Continence may often be improved with changes in diet with or without pharmacologic treatment to optimize the consistency of stool. Biofeedback is a multifaceted therapeutic approach that helps an individual improve his or her sensitivity to rectal distention and respond with appropriate voluntary sphincter control. One or more of these techniques can be used in conjunction with education and supportive counseling to optimize an individual's continence.

KEYWORDS: Fecal incontinence, biofeedback, fiber

Objectives: Upon completion of this article, the reader should be familiar with the nonoperative management of fecal incontinence, including biofeedback.

Three factors necessary for continence of stool are an adequate reservoir capacity, the ability to sense stool in the rectum, and a sphincter mechanism that allows free passage of stool during defecation while maintaining a secure closure at all other times. Compromise of any of these elements may result in a decreased ability to control passage of stool. Incontinence may occur acutely as a result of a sphincter injury or colitis, or incontinence may develop over time due to gradual weakening of the sphincter muscle or progression of another underlying pathology. Acute diarrhea is usually due to an infectious colitis. Causes of chronic diarrhea include inflammatory bowel disease, irritable bowel syndrome, malabsorption, and small bowel bacterial overgrowth. Proctitis can exacerbate diarrhea by decreasing rectal compliance.

Constipation may be the underlying cause of fecal incontinence in some individuals. Rectal impaction with hard stool can lead to loose stool seeping around the

impacted stool. The combination of the liquid stool and a persistent sensation of fullness in the rectum can lead to "overflow incontinence." Additionally, incomplete evacuation can result in postdefecation seepage of residual stool. Incomplete evacuation is commonly due to nonrelaxation of the pelvic floor. At rest, the anal canal is normally maintained at approximately a 90-degree angle relative to the rectum. Pelvic floor muscle relaxation during defecation results in straightening of the anal canal facilitating the passage of stool. In the setting of nonrelaxation of the pelvic floor, the angle between the anus and the rectum persists and the passage of stool is impeded. Additionally, habitual straining against an unyielding sphincter mechanism increases pressure on the distal rectum contributing to anterior and, less commonly, lateral rectocele formation. Stool can become trapped in a rectocele during evacuation and seep out minutes to hours after a bowel movement. Constipation can also exacerbate hemorrhoids. Prolapsing rectal

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mucosa associated with hemorrhoids may cause staining of the underwear, which may be perceived as incontinence.

Identifying confounding issues is a first step to treating the incontinence. Nonoperative therapy of fecal incontinence includes diet modification and pharmacologic therapy to improve stool consistency. Additionally, biofeedback is a technique that aims to optimize sensation and voluntary control of the external sphincter muscle.

DIET

The treatment of fecal incontinence in patients with mild fecal incontinence and concomitant loose stools should start with a bowel management program with the goal of optimizing the consistency of the stool. Dietary fiber improves stool consistency by absorbing excess intraluminal water and increasing the viscosity of loose stool. Fiber adds bulk and softens thick, clay-like stool, which can be difficult to eliminate. The recommended dose of fiber is 25 to 30 g per day. The majority of fiber should come from increased intake of fiber-rich foods because fiber supplements provide only a limited amount of additional fiber. Increasing dietary fiber gradually over a period of several days can abate symptoms such as abdominal pain and bloating that may be associated with increased dietary fiber.

Some foods can result in loose bowel movements that may exacerbate incontinence. Dairy products are problematic in individuals with lactose intolerance. In others, stool consistency in response to diet is less well defined, and keeping a diary of bowel habits in response to food intake may help to identify foods that trigger loose stools.

MEDICAL MANAGEMENT OF FECAL INCONTINENCE

The pharmacological therapy of fecal incontinence is based on improving the consistency of liquid stool. Eight to 10 L of fluid enter the small intestine daily. The majority of this is reabsorbed in the small intestine and the colon. Medication used to treat diarrhea acts to improve the stool consistency by adding bulk or to optimize fluid reabsorption, thereby increasing the viscosity and overall volume of the stool.

Adequate fiber intake may be obtained with diet modification alone. Some patients may prefer to use fiber supplements. Common bulk-forming agents include psyllium (Metamucil, Procter & Gamble, Cincinnati, OH), polycarbophil (FiberCon, Wyeth Consumer Healthcare, Madison, NJ), and carboxymethylcellulose (Citrucel, GlaxoSmithKline, Pittsburgh, PA), which are hydrophilic colloids. They absorb water and increase stool bulk. Silicates such as kaolin and attapulgite

(hydrated aluminum silicate and magnesium aluminum disilicate) bind water and may also bind enterotoxins.¹

Bismuth agents (Pepto-Bismol, Procter & Gamble, Cincinnati, OH) are generally used for acute episodes of diarrhea. The mechanism of action is not well understood. Bismuth has antisecretory, anti-inflammatory, and antibacterial effects.¹ Cholestyramine is an anion exchange resin that binds bile acids and is used to treat bile salt-induced diarrhea. Patients who have undergone resection of the terminal ileum have decreased capacity to absorb bile salt. Bile salts in the colon stimulate secretion of water and electrolytes. By binding the bile salts, cholestyramine decreases this effect on the colon. Conversely, cholestyramine may exacerbate diarrhea in individuals with overall bile salt depletion. This occurs in individuals who have had a large amount (100 cm) of terminal ileum removed. Significant bile salt depletion can lead to steatorrhea due to inadequate micellar formation required for fat absorption. The administration of cholestyramine can exacerbate the steatorrhea and associated diarrhea in these individuals.

Antimotility Agents

Opioids are commonly used for the treatment of episodic and chronic diarrhea. Opioids act on μ or δ opioid receptors on the enteric nerves, epithelial cells, and muscle. The effects of opioids include decreased intestinal motility (μ receptors) and decreased intestinal secretion (δ receptors) and increased absorption (μ and δ receptors). Commonly used synthetic opioid agonists include loperamide, diphenoxylate, and difenoxin. These act primarily by peripheral μ opioid receptor and have limited central nervous system (CNS) effects.

Loperamide increases small intestinal transit time. Some studies have also reported that loperamide decreases the sense of urgency associated with chronic diarrhea.² Peak plasma levels occur after 3 to 5 hours and the half-life is ~ 11 hours. The usual dosage is 2 to 4 mg followed by subsequent titration up to a total of 24 mg per 24 hours in divided doses. Studies comparing loperamide to placebo in individuals with chronic diarrhea and fecal incontinence found that patients were better on the drug than on the placebo.^{3,4} Despite limited ability to cross the blood-brain barrier, overdosage can result in CNS depression as well as paralytic ileus.

Diphenoxylate and its active metabolite, difenoxin, have a more rapid onset and peak concentration at 1 to 2 hours. The elimination half-life is ~ 12 hours. The drugs can produce CNS effects at higher doses and therefore have greater potential for abuse. Commercially available preparations include small doses of atropine to discourage abuse and deliberate overdosage (diphenoxylate-atropine sulfate, Lomotil, Pfizer, Peapack, NJ). The usual dose is one tablet every 3 to 4 hours.

In high dosages, these drugs produce CNS and anticholinergic effects (i.e., dry mouth, blurred vision). Tincture of opium also has similar opiate agonist effects on the intestine, but its use is limited given the increased potential for CNS effects and addiction. In a study comparing loperamide, codeine, and diphenoxylate with atropine, treatment with loperamide or codeine was associated with a higher percentage of solid stools and fewer adverse events and complaints of urgency.² A recent Cochrane review of the medical treatment of fecal incontinence summarized that loperamide is considered to be effective in patients with fecal incontinence and loose stool.⁵

Topical Phenylephrine

Phenylephrine is an α -1 agonist that has a sympathomimetic effect on the internal anal sphincter. Preliminary studies evaluating the effect of phenylephrine on the anal sphincter did demonstrate increased resting sphincter pressure with topical application of phenylephrine cream.⁶ Clinical studies showed only limited improvement of incontinence.^{7,8} Further clinical studies have not been reported. This treatment remains investigational.

Constipation

Initial treatment of constipation must be dictated by the underlying pathophysiology. Mild constipation may improve with increasing dietary fiber and oral liquid intake. Docusate salts (docusate sodium, Colace, Perdue Pharma, Stamford, CT) are surfactants that soften the stool by facilitating the combining of aqueous and fatty substances. These agents stimulate intestinal fluid and electrolyte secretion. Mineral oil acts to soften the stool. The use of mineral oil should be limited because it interferes with absorption of fat-soluble vitamins. Chronic constipation that fails diet management is best treated with osmotically active products such as saline laxatives (magnesium citrate, sodium phosphate), nonabsorbable sugars (lactulose), or polyethylene glycol (Miralax, Braintree Laboratories, Braintree, MA). Stimulant laxatives act to increase colonic motility and induce water and electrolyte secretion. There is concern that long-term use of these agents can cause a progressive loss of colonic motility; however, a causative relationship between stimulant laxative use and colon dysfunction has not been well demonstrated.⁹

Enema

An important aspect of fecal incontinence is the impact that it can have on an individual's quality of life. Individuals with urgency may avoid incontinence by staying home to remain close to a toilet. Incontinence

may be more problematic during physical activity such as running or sexual intercourse. Individuals may avoid participating in these activities due to fear of having an incontinence episode. Self-administering an enema before participating in active physical exercise or sexual relations may give an individual more confidence in these potentially stressful situations. For those individuals who experience postdefecation leakage, taking a tap water enema just after a bowel movement may help to cleanse the rectal vault and decrease any seepage that may occur following a bowel movement.

BIOFEEDBACK

Biofeedback is a technique that incorporates external feedback to optimize defecatory function. The normal process of defecation is a controlled response to the sensation of fullness in the rectum. This response involves a coordinated effort of contracting the abdominal wall muscles and relaxing the pelvic floor muscles. In contrast, maintaining continence requires contraction of the external anal sphincter and adjacent pelvic floor muscles in response to rectal distention. This process of sensing fullness in the rectum followed by pelvic floor muscle contraction is seemingly automatic to most people. Individuals with fecal incontinence, however, may need to relearn this process and improve their muscle control in order to compensate for loose stool, neurological deficits, or mechanical injury to the sphincter muscle. The goal of biofeedback is to improve sensation, coordination, and strength. Additionally, supportive counseling and practical advice (e.g., diet, skin care) are paramount elements to a successful biofeedback program. Norton and Kamm conducted a prospective, randomized study comparing counseling alone with counseling and biofeedback. This study found that over half of the patients in the counseling alone group experienced substantial improvement in their symptoms. The success rate in this group was similar to the success rate for individuals who underwent counseling and concomitant biofeedback.¹⁰

Among various reported techniques for biofeedback three main components remain constant. These are improving rectal sensitivity, quickening the response of the anal sphincter to perceived rectal distention, and strengthening the external anal sphincter. Decreased sensitivity of the rectum was identified as an important factor in fecal incontinence over 50 years ago.¹¹ More recently, Gladman and colleagues identified rectal hyposensitivity in 10% of patients with incontinence and 27% of patients with concomitant constipation and incontinence.¹² Rectal sensitivity is increased by training the patient to sense smaller volumes of material in the rectum. A basic described method is to put a water-perfused balloon into the rectum and train an individual to detect gradually decreasing volumes of the balloon.

Coordination training focuses on short latency external anal sphincter and pelvic floor muscle contraction in response to the perception of rectal distention. Often, when asked to squeeze the external anal sphincter, an individual may contract the gluteus or adductor muscles. Understanding how to selectively contract the pelvic floor muscles gives an individual better control. Strength training involves repeated external sphincter and pelvic floor muscle contraction to increase the maximum amplitude and duration of muscle contraction. Action of the external anal sphincter may be monitored by intrarectal or external surface electromyographic (EMG) recorders or an intra-anal myometric probe. The muscle response measured by the electric or pressure transducers is translated into a visual display so that the patient receives immediate feedback regarding the strength and duration of pelvic floor muscle contraction.

Biofeedback should be considered for initial treatment in individuals who do not have a substantial underlying anal sphincter defect or who have recurrent symptoms of incontinence following sphincter repair surgery. It may also be useful in the early postpartum period when women are experiencing sphincter weakness due to transient neuropraxia. Biofeedback may be augmented with manual therapy. Spasm or pain in a muscle can cause reflex inhibition, resulting in decreased muscle contraction and suboptimal function. Identifying and treating painful trigger points in the pelvic floor muscles makes more of the muscle available for training. Manual therapy is especially useful following sphincter repair surgery when the patient experiences persistent fecal leakage or difficulty eliminating completely (Judith Florendo, PT, personal communication, 2004).

Success rates with biofeedback have been reported between 50% and 90%.¹⁰ Initial success with biofeedback may persist long-term after a finite training period. Pager and associates reported on 120 patients who were enrolled in a 4-month biofeedback program. Approximately 75% reported improvement at completion of the training and 84% reported an improved quality of life. Improvement in continence persisted at a median follow-up of 42 months, with 75% experiencing a sustained symptomatic improvement and 83% reporting improved quality of life.¹³ Improved rectal sensation following biofeedback is one of the most consistent predictors of continence.¹⁴ Severe incontinence, pudendal neuropathy, and a full-thickness external sphincter defect are unreliable indicators of a poor prognosis. An individual's perception of improvement following biofeedback may occur without concomitant objective improvement in anal squeeze pressures.

A lack of controlled trials comparing the various reported methods of biofeedback make it difficult to determine which technique is optimal. In most reported series, certain basic principles are followed. These in-

clude repeated training sessions with an experienced physical therapist or nurse clinician and home exercises for reinforcement. Interval follow-up training sessions help to monitor the progress of home exercises and maintain initial improvement.

SUMMARY

Fecal incontinence is a health problem that many people are reluctant to discuss. A thorough medical history should address symptoms of incontinence and the effect of incontinence on quality of life issues. Often continence may be improved with changes in diet, with or without pharmacologic treatment to optimize the consistency of stool. Biofeedback is a multifaceted therapeutic approach that helps an individual improve his or her sensitivity to rectal distention and respond with appropriate voluntary sphincter control. One or more of these techniques can be used in conjunction with education and supportive counseling to optimize an individual's continence.

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