Diagnosis and Management of Fecal Incontinence in the Elderly

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ABSTRACT

The incidence of fecal incontinence in elderly patients (age ≥65 years) ranges from 3.0%-16.9%, and is more prevalent in women. It is associated with significant psychosocial morbidity. The causes of fecal incontinence include sphincter injury, impaired sensation, incomplete evacuation, and neuropathy. The most common cause is obstetrical injury during forceps delivery. Some drugs such as oxybutinin, antidepressants, caffeine, and laxatives can also result in fecal incontinence. Eighty percent of patients have more than one causative abnormality. Fecal incontinence can be classified as passive incontinence, urge incontinence, or fecal seepage (soiling). Fecal seepage involves incomplete evacuation and impaired rectal sensation. When fecal incontinence is associated with urinary incontinence, it usually suggests significant pelvic floor abnormality. Physical examination should include a thorough perineal and rectal examination including the anocutaneous reflex. Laboratory data including anal manometry, anal endosonography, and pudendal nerve latency are usually informative for an accurate diagnosis. The treatment of fecal incontinence in the elderly should focus on treating underlying conditions, providing supportive measures, and following specific measures. Education and counseling for patients, including dietary control (with attention to fructose and caffeine), are important. Medications such as lomotil, loperamide, cholestyramine, amitryptyline, and alosetron are sometimes useful. Evidence-based data shows that biofeedback is beneficial in the elderly population. Surgical methods including sphincteroplasty, anterior repair, graciloplasty, and an artificial sphincter vary in treatment efficacy, and can be applied to the elderly population after deliberation of their comobidities. Other less invasive treatment modalities such as anal plugs, sphincter bulking, electrical stimulation, and sacral nerve stimulation are sometimes particularly beneficial in improving the quality of life of elderly patients.

Key words: fecal incontinence, elderly

DEFINITION OF FECAL INCONTINENCE

Fecal incontinence is the involuntary release of rectal contents. Fecal incontinence varies in degree from urgency and soiling to true incontinence. Patients with urgency are unable to retain feces after an urge to evacuate stool and if toilet facilities are not available, leakage of faces may ensue. Urgency is usually due to a low rectal capacity or inflamed rectal mucosa and is quite common in inflammatory bowel disease or rectal cancer. Soiling usually indicates that the anal canal is deformed from scarring or there is a solid fecal mass in the rectum. These patients are usually continent but leak small amounts of fecal material which cause excoriation and perianal discomfort. Fecal incontinence is characterized clinically according to the frequency of episodes, nature of the stool lost, and subjective criteria such as the degree of patient disability. In two scoring systems, a distinction has been made between two different types of presentation of fecal incontinence, accidental fecal incontinence and loss of feces without awareness [1-4]. Initially, fecal continence was thought to have been primarily dependent on maintenance of an acute angle between the anal canal and rectal vault, producing, in essence, a flap-valve mechanism. It was proposed that with the contraction of the pelvic floor muscles, with or without increases in intra-abdominal pressure, the anterior rectal wall formed a flap and "covered" the top of the anal canal, providing continence. Other studies have shown that the mechanisms of continence are more complex, particularly in that continence is maintained by the integrated action of the external and internal anal sphincters, the puborectalis, the levator plate, and intact sensory pathways [3,4].

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EPIDEMIOLOGY OF FECAL INCONTINENCE IN THE ELDERLY

The prevalence of fecal incontinence from population-based studies of community-dwelling older adults is reported to range from 3.0% to 16.9% [5,6]. One of the problems in comparing studies of fecal incontinence is the variability in the definition of the condition, particularly in terms of which level of severity constitutes incontinence. For example, one study of adults ≥40 years old found a 1.4% prevalence of major fecal incontinence, defined as "soiling of underwear or worse with a frequency of several times a month or more", whereas another study found a 17% prevalence in adults ≥70 years old when asking the question, "In the past few months, have you ever lost control of your bowels when you didn't want to?" The effect of definitions can also be seen in two studies of older adults living in the same county. One study found prevalences of 11.1% in men and 15.2% in women ≥50 years old who were asked whether they had had stool leakage in the previous year [5]. Another study asked about stool leakage more than once a week in participants ≥65 years old and reported a prevalence of 3.1% in women and 4.5% in men [6].

RISK FACTOR OF FECAL INCONTINENCE

Previous research identified several risk factors for fecal incontinence, such as advancing age, diabetes mellitus, urinary incontinence, stroke, physical limitations, female sex, perianal injury or surgery, gynecological surgery, hypertension, poor general health, and bowel-

related factors such as feelings of incomplete defecation, constipation, and straining at stool. Although female sex is giving by many articles as a risk factor, some studies have found that fecal incontinence is as much a problem in men as it is in woman. In one study, fecal incontinence was associated with advancing age in men but not in woman. However, it is generally accepted that fecal incontinence is a process of degeneration of anorectal function. Therefore, it is no wonder that old age, *per se*, is a major risk factor of fecal incontinence.

PRACTICAL PHYSIOLOGIC EVALUATION OF THE COLON, RECTUM, AND ANUS

When confronted by elderly patients with anal incontinence, physicians should conduct a series of complex examinations to evaluate the various biopsychosocial parameters. Fortunately, the high incidence of functional bowel disorders and advanced technology have led to an increased interest in anorectal physiology. Research in this area has improved our understanding of both normal and disordered defecation. Consequently, prevalent disorders such as fecal incontinence and chronic constipation can actually be stratified into diverse causative diagnoses with distinctive therapeutic approaches [6,7].

Exclusion of an organic etiology, both intestinal and systemic, is a crucial step before referring the patient with functional symptoms to the physiology laboratory. Specific tests are dictated by the history and physical examination. The importance of a comprehensive history, including drug history and comobidities, can not be overemphasized in elderly patients. Barium enema and/or colonoscopy are usually indicated to exclude organic lesions or peristaltic problems, and primary bowel organic pathology, if present, should be treated first. Then, the therapeutic schema should proceed to dietary assessment, and when indicated, a physiological evaluation. A high fiber diet as well as a diary of defecation and symptoms is helpful, as symptoms can be better evaluated or even improved, with dietary modification. Thus, patients referred to the physiology laboratory are those with refractory, severe idiopathic symptoms. However, this step is optional in patients with severe symptoms and an obvious etiology, such as traumatic fecal incontinence. Functional anorectal disorders often present clinically as constipation and/or incontinence, and these symptoms have a complex and multifactorial etiology, usually requiring a combination of tests (Table 1). The major importance of a transit study lies in excluding factitious constipation. It should be mentioned that constipation sometimes can paradoxically result in fecal incontinence. Moreover, in patients with neuromuscular disorders of the colorectum and/or pelvic structures, constipation and fecal incontinence may appear alternately. For example, although antimuscarinic drugs such as oxybutynin often cause constipation, they sometimes compromise the contraction of the internal analsphincter and result in fecal incontinence. Colonic transit time, in fact, provides a definition of constipation, by converting an otherwise hopelessly subjective symptom to an objective part of the medical record. However, the value of segmental colonic transit time assessment remains a controversial issue. To improve accuracy, this assessment may involve either multiple ingestions of markers or multiple abdominal radiographs. From a practical point of view, radiographs on the fourth study day and then at 3-day intervals after ingestion of 20 radiolpaque markers at specific times for 3 sequential days help stratification of motility patterns, colonic inertia and/or outlet obstruction. Examination of patients with colonic inertia includes reassessment of the severity of symptoms (history, transit time and response to trials of therapy with laxatives and prokinetics), exclusion of small bowel dysmotility (lactulose, breath hydrogen test) and exclusion of pelvic floor dysfunction. If dyspeptic symptoms, such as nausea, vomiting, heartburn and bloating are present, gastric emptying studies are indicated to exclude generalized gastrointestinal stasis.

Table 1. Anorectal Physiologic Testing for Fecal Incontinence

1. Manometry
2. Adjunct manometric studies
    1. Sensory threshold
    2. RAIR
    3. Rectal capacity
    4. Rectal compliance
3. Colonic transit study
4. Cinedefecography
5. Electromyography (EMG)
    1. Concentric needle-EMG
    2. Single fiber-EMG
6. Pudendal nerve terminal motor latency
7. Spinal Latency
8. Perineal Latency
9. Sensory evoked potentials
10. Anal mucosal electrosensitivity
11. Anal mucosal thermal sensitivity
12. Anal endosonography

Cinedefecography (CD) permits radiological visualization of the dynamics of defecation. Disorders of defecation dynamics can cause constipation, fecal incontinence, or both [8,9]. Specifically, pelvic dynamic measurements, anatomical abnormalities and rectal emptying can all be assessed. Evaluation of both absolute and dynamic (evacuation-rest) values of the anorectal angle, perineal descent and puborectalis length allows diagnosis of excessive perineal descent and paradoxical puborectalis syndrome. Comparison of an absolute measurement, such as the anorectal angle, in a patient against a group of controls is frequently a frustrating endeavor. Thus, the evaluation of isolated parameters remains of uncertain value. More value is obtained from comparing resting, squeezing and pushing values in a single patient. CD also permits the diagnosis of causative or associated anatomical abnormalities, such as a nonrelaxing puborectalis (puborectalis indentation), rectocele, occult intussusception, sigmoidocele and enterocele. The conventional method using barium paste with a consistency similar to stool is preferred over balloon proctography. Although balloon proctography requires less irradiation, it does not assess either anatomical abnormalities or the completeness of evacuation. Furthermore, displacement of the balloon results in either inaccurate or dubious measurements. Although a patient's position does not affect dynamic pelvic measurements, absolute values are higher in the seated position when compared to the left lateral decubitus, and the former is, therefore, more sensitive in the diagnosis of increased fixed perineal descent. Posteroanterior proctography also can be helpful as a supplementary examination to validate the diagnosis of intra-anal intussusception. Ingestion of 150 mL of barium contrast one hour prior to the examination assists in the delineation of pelvic small bowel loops. Other technical variants that may enhance the diagnostic capability of CD include placement of radiopaque markers on the ischial tuberosities to permit more accurate quantification of perineal descent, and the use of a barium-soaked intra-vaginal sponge, either as an isolated

method or combined with a voiding cystography (colpocystodefecography) to better delineate rectocele and enterocele. Anatomical defecography can find lesions, particularly a small rectocele and an intussusception, in 25%-77% of asymptomatic individuals. Failure to recognize these variants of normal can easily lead to overdiagnosis and overtreatment. Therefore, decisions should be made based upon the clinical history and evaluation of rectal empting during CD.

Anorectal manometry is useful in the evaluation of common functional disorders, such as fecal incontinence and idiopathic constipation. Additionally, for patients undergoing abdominal (low colorectal, coloanal, and ileoanal anstomosis) and anal procedures (fistula and surgery), in which the continence status is endangered, surgery can be planned on a more objective basis. Specifically, preoperative manometry may be indicated when the preoperative history and physical examination suggests clinical incontinence (multiparity, excessive perineal descent, borderline anal tone) or if there is risk of incontinence related to the procedure itself (complex and recurrent fistula, recurrent fissure after sphincterotomy). Vector volume analysis is a more detailed assessment of both the internal and external anal sphincter pressure. However, its role in determining sphincteric symmetry and detection of sphincter defects is still a controversial issue. Correlation with both endoanal ultrasound and electromyography (EMG) mapping is indicated when subclinical defects are suspected in patients with incontinence [8-12].

Adjunct manometric studies include the rectoanal inhibitory reflex (RAIR), rectal sensory threshold, rectal capacity and rectal compliance. Except for the RAIR, these studies themselves are not strictly diagnostic but allow better comprehension of the pathophysiology involving constipation and incontinence. The RAIR, characterized by transient external anal sphincter contraction followed by pronounced internal anal sphincter relaxation, enables rectal contents to be "sampled" by the sensory area of the anal canal. Patients with Hirschsprung's disease, Chagas' disease, dermatomyositis and scleroderma all have abnormal RAIRs. Disease may selectively reduce the conscious sensation and awareness of rectal fullness with intact autonomic pathways. This can result in either fecal impaction, fecal incontinence, or both. Younger constipated patients tend to have a larger capacity rectum than older incontinent patients. The non-diseased rectum is highly compliant, and it accepts a tremendous increase in volume with a very small change in pressure. Rectal compliance is impaired in diseases such as ulcerative colitis, chronic rectal ischemia, radiation damage and Hirschsprung's disease.

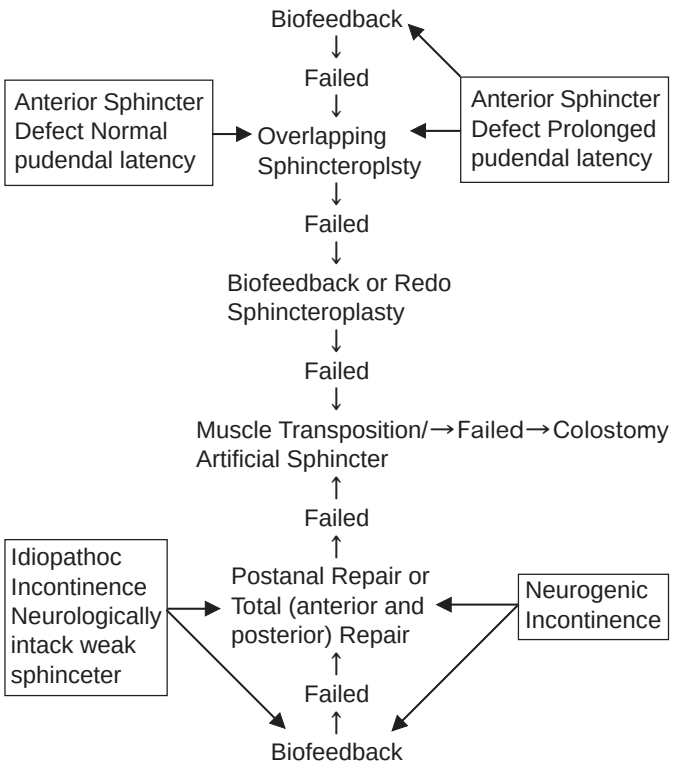

Fig. 1. Algorithm for the treatment of fecal incontinence in the elderly.

EMG is especially valuable in the assessment of fecal incontinence, by providing quantification of motor unit potentials (MUPs), mapping external anal sphincter defects, and assessing reinnervaton patterns. Single-fiber EMG is a quantitative method of assessing denervation in incontinence. It provide a better assessment of reinnervation, especially when extensive muscle atrophy results in insufficient MUPs for adequate evaluation by concentric-needle EMG. However this study is more uncomfortable for the patient and does not seem to alter clinical decisions. Both EMG and CD have comparable sensitivity and specificity, which are individually suboptimal. However, CD should be done first, as its is pain free and provides useful data on rectal emptying.

Anal endosonography has been proven useful in mapping internal anal sphincter (IAS) and external anal sphincter (EAS) defects, and a high correlation with EMG mapping has been demonstrated in patients with traumatic fecal incontinence. Although unable to assess denervation, anal endosonography may reduce the number of needle insertions required for EMG mapping by locating the EAS defect. Additionally it may also be useful in detecting small perianal abscesses in patients with idiopathic anal pain.

Pudendal nerve terminal motor latency (PNTML) is particularly important in suspected neurogenic incontinence and in parous women prior to sphincter repair. PNTML is the most significant predictor of functional outcome after sphincter repair, as neuropathy, even when unilateral, is associated with poor postoperative functional results. However, this test does not seem to predict functional results after biofeedback. Although a prolonged PNTML indicates pudendal neuropathy, normal latencies do not exclude nerve injury, as only the fastest remaining conducting fibers are recoded in this test. Spinal latency enables exclusion of cauda equina injury as a cause of incontinence. About 23% of patients with fecal incontinence and prolonged PNTML have conduction delay in the cauda equina between L1 and L4 [11,12].

Based on the fact that temperature sensation plays a role in discriminating among gas, liquid and solid, a water perfused thermode can be used in the assessment of fecal incontinence. The anal canal is highly sensitive to temperature changes and incontinent patients are significantly less sensitive then control group patients. Evoked potentials are electrical responses of the nervous system to sensory stimulation and represent an alternative method in evaluation of the functional integrity of the nerve supply to the anorectum.

Colonic transit study, anal manometry, cinedefecography, electromyography and pudendal nerve latency are consider standard physiologic tests. With this thorough physiologic investigation, treatable conditions of the colon, rectum and anus can be diagnosed in 67%

and 55% of patients with constipation and fecal incontinence [13], respectively. In patients with rectal pain, however, these tests yield a definite diagnosis in only 18%, leaving this condition poorly understood and refractory to therapy [14].

SURGICAL THERAPY FOR FECAL INCONTINENCE

Although aggressive surgical procedures are less indicated in elderly patients with fecal incontinence because of poor physical status and comorbidities, with careful evaluation and selection, they can be successfully treated surgically. Surgical procedures used to treat incontinence can be distinctly categorized as direct repair of the EAS defect, posterior plication of the levator ani muscle, and encirclement of the anal canal either with synthetic material or nonsphincteric muscle transposition. Other innovative techniques developed include combinations of the above procedures (total pelvic floor repair) and artificial sphincter implantation. A thorough preoperative evaluation should include a history of previous anorectal procedures, injury to the anal sphincters, and neurologic conditions. The evaluation may continue with anorectal manometry, electromyography, anal ultrasonography, and measurement of pudendal nerve terminal motor latencies as mentioned above. Physiologic studies have become widely available and permit assignment of therapy and objective quantitation of treatment results. Moreover, these studies have challenged some tenets of the mechanism of continence and the impact of current therapies upon those mechanisms.

Treatment of fecal incontinence is evolving; new techniques have become available to avoid the disability caused by either an incompetent sphincter or a colostomy. Treatment should be individualized depending on the etiology of the incontinence and results of preoperative testing. An algorithm is presented in the Figure (Fig. 1). Appropriate treatment options include biofeedback and sphincteroplasty. Biofeedback has resulted in a 90 percent reduction in episodes of incontinence in over 60 percent of patients [14]. Overlapping anterior sphincteroplasty has been associated with good to excellent results in 70% to 90% of patients [14]. The common denominator between medical and surgical treatment groups is the necessity for pretreatment physiologic assessment. It is the results of these tests that permit optimal therapeutic assignment. For example, pudendal nerve terminal motor latencies are the most important predictor of functional outcome. In the absence of pudedal neuropathy, sphincteroplasty is an excellent option. If neuropathy exists, however, then a postanal or total repair remains a viable surgical option for the treatment of idiopathic fecal incontinence. In the absence of an adequate sphincter muscle, encirclement procedures using synthetic materials or muscle transfer techniques might be considered. Implantation of a stimulating electrode into the gracilis neosphincter and artificial sphincter implantation are other valid alternatives. The final therapeutic option is fecal diversion with a permanent colostomy [13,14].

CONCLUSIONS

Fecal incontinence in elderly patients is a common, complex, and challenging problem, both in diagnosis and treatment. Compared with that in younger patients, the mechanisms for fecal incontinence have been speculative and the disordered dynamics are also more difficult to quantify. Fortunately, with the advent of modern techniques for physiologic tests, the treatment approaches for these functional disorders have become more scientific. The treatment of fecal incontinence comprises both medical and surgical approaches. The optimal treatment for elderly patients with fecal incontinence is based on an accurate and objective pretreatment assessment, with consideration of biopsychosocial factors related to the elderly. Although currently available surgical procedures for fecal incontinence are technically feasible, less invasive surgical procedures are more favored for elderly patients with significant comorbidities.

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