Diagnostic Testing in Fecal Incontinence

Anjana Kumar, M.D and Satish S.C. Rao, M.D, PhD

Fecal incontinence is a common problem that disproportionately affects women and the elderly and has a significant impact on the quality of life. Incontinence is often multifactorial. Anorectal manometry, anal endosonography, magnetic resonance imaging, pudendal nerve latency, and electromyography provide morphologic and physiologic assessments of the internal and external anal sphincters, rectal motor and sensory function, rectal compliance, and rectoanal reflexes. This information, in concert, provides clues to the pathophysiology of fecal incontinence and may help to guide medical, surgical, or biofeedback therapy. These tests have also been used to assess the effectiveness of the therapeutic modalities. No data are available on the cost-effectiveness of diagnostic testing in fecal incontinence. Newer techniques, including electrophysiologic testing and morphologic imaging of the anorectum, are being pursued.

Introduction

Fecal incontinence is defined as either the involuntary passage or the inability to control the discharge of fecal matter through the anus [1••]. The three clinical subtypes of fecal incontinence are passive incontinence, urge incontinence, and fecal seepage. The prevalence of incontinence is disproportionately higher in women, the elderly, and nursing home residents. It causes considerable loss of self-esteem and social isolation and is associated with a diminished quality of life [2].

The maintenance of normal continence requires structural and functional integrity of the neuromuscular apparatus of the anorectum, including the internal and external anal sphincters, pelvic floor muscles, anorectal angle, pudendal nerve function, rectal compliance, and rectal sensation. When one or more of these mechanisms of continence is disrupted to an extent for which others are unable to compensate, incontinence ensues [3]. The evaluation of a patient with incontinence involves clinical assessment, physiologic testing, and imaging of the anorectum [1••]. These three sources of information are complementary.

Together, they provide useful data regarding the severity of incontinence and its underlying cause. This information is helpful in planning appropriate treatment strategies.

Diagnostic Tests to Assess Fecal Incontinence

The American Gastroenterological Association (AGA) and others have provided detailed descriptions of the process and clinical significance of anorectal manometry, anal endosonography, magnetic resonance imaging, and pudendal nerve terminal motor latency [5••]. Here, we present an overview of diagnostic testing with particular emphasis on new developments in the field. The information to be obtained from evaluation and testing of patients with fecal incontinence is outlined in Table 1.

Anorectal manometry and sensory testing

Anorectal manometry (ARM) provides a comprehensive assessment of the following parameters: 1) maximum resting and squeeze sphincter pressure and duration of squeeze; 2) anorectal pressure responses to abrupt increase in intra-abdominal pressure; 3) changes in anal tone during straining; 4) length of anal sphincter; 5) rectal sensation; 6) rectal compliance; and 7) rectoanal reflexes.

Several types of probes and pressure recording devices are available for ARM, and each has its distinct advantages.
and drawbacks [6,7]. However, no uniform standards have been established for either the performance or interpretation of ARM. There is also a dearth of normative data that have been stratified for age and gender. A recent consensus document by the American and European Motility Societies proposes minimum standards for performing ARM that may help to streamline the procedure [8••]. In spite of these limitations, a technical review recommended ARM for evaluating patients with incontinence because it defines the functional weakness of one or both sphincters and helps to perform and evaluate responses to biofeedback training [1••, 5••].

Manometric changes in fecal incontinence

Patients with incontinence have low resting and squeeze sphincter pressures [1••]. The duration of the sustained squeeze pressure, which provides an index of the fatigability of the sphincter muscle, is also decreased. Furthermore, the ability of the external anal sphincter to contract reflexively during coughing may also be lost in incontinent patients [9]. An impaired rectal sensation has been demonstrated in some patients with incontinence [9–12]. Also, the balloon volume required for partial or complete inhibition of anal sphincter tone is lower in incontinent patients, compared with control subjects, suggesting altered rectoanal reflexes [11,12]. In a recent study of 22 unselected patients and 11 control subjects, an impaired temperature sensation was found in patients with incontinence [13]. In addition, an artificial stool tended to induce sensations at lower volumes than balloon inflation, although the perception of rectal distention was not always reduced in incontinent patients. These findings confirm that altered sensory mechanisms may play a role in fecal incontinence.

Rectal compliance (measure of rectal accommodation) is calculated by assessing the changes in rectal pressure during balloon distention with air or fluid. Rectal compliance is reduced in incontinent patients [13]. The clinical impact of rectal compliance testing was assessed in 974 patients and 24 control subjects [14••]. A maximum tolerable volume of less than 60 mL was always associated with incontinence, whereas a maximum tolerable volume of greater than 500 mL was only seen in constipated patients. Values within the normal range excluded the role of the rectum in the pathogenesis of incontinence.

The saline continence test is used to assess the overall capacity of the defecation unit to maintain continence during conditions that simulate diarrhea. This test also helps to quantify improvement after biofeedback therapy [1••]. Incontinent patients leak at much lower volumes than do control subjects [9]. A recent novel retention test was performed by infusing a viscous suspension at 37°C with a consistency of soft stool (viscosity, 10,000 Pois) (Knorr Stocki, Knorr; Thaygen, Switzerland; 110 g in 1750 mL of water) [15]. The study showed an increased difference between the maximum volume retained and the volume at which first incontinence occurred in incontinent patients. Whether this test offers any advantage over the less expensive and more widely available saline infusion test is not known.

Utility of manometric tests

In a prospective study, the utility of anorectal tests in the management of incontinence was assessed by comparing the management plan reached before and after ARM testing [16]. The investigators found that 31% of patients who could have benefited from surgery were not apprised of this option. In contrast, 7% may have undergone unnecessary surgery. They also concluded that anal endosonography was most likely to change the patient’s management plan. In another study the impact of anorectal function testing was evaluated in 135 patients through a questionnaire sent to patients and referring specialists. In 25% of patients, the management plan was changed by anorectal evaluation; anal endosonography seemed to be the most