



The Etiology of Fecal Incontinence: Causes and Diagnosis

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Fecal incontinence is a distressing and isolating condition whose true community prevalence is unknown. The failure to identify patients with fecal incontinence is tragic because the condition is for the most part treatable. And because proper treatment depends upon accurate diagnosis, it is important to understand the common causes of fecal incontinence.

Normal continence depends upon a number of factors, including mental function, stool volume and consistency, colonic transit, rectal distensibility, anal sphincter contraction, anal sensation and anorectal reflexes. It is apparent from this list that fecal incontinence can arise from a number of disorders that can occur anywhere from the cerebral cortex to the anal verge (external portion of the anus). As a practical matter, the variable causes of fecal incontinence can be classified into two groups, those associated with normal and abnormal pelvic floors.

NORMAL PELVIC FLOOR

Causes of incontinence with a normal pelvic floor include diarrheal states, overflow incontinence, and neurologic disorders. Diarrheal states include acute infectious colitis and *enteritis*, inflammatory bowel disease (Crohn's disease and ulcerative colitis), radiation enteritis and short bowel syndrome. The diagnosis is based upon radiologic (x-ray), endoscopic (internal scope) and microbiologic tests, and treatment of the underlying disorder leads to alleviation of the incontinence.

Overflow incontinence is caused by anatomic or functional outlet obstruction with retention of a large fecal bolus (mass) in the rectum. This leads to reflex inhibition of anal sphincter tone and seepage of liquid stool. The most common cause of anatomic obstruction is rectal

cancer, but functional obstruction with fecal impaction (blockage) is seen far more frequently. Numerous factors contribute to fecal impaction: inadequate fiber and water intake; immobility and inadequate toileting facilities; mental status changes due to depression or dementia; metabolic abnormalities such as hypothyroidism, hypercalcemia (excess calcium) and hypokalemia (low potassium); and multiple medications including narcotics, antipsychotics, antidepressants, calcium channel blockers and diuretics. Because fecal impaction is the leading cause of incontinence in elderly patients in chronic care facilities, prevention of the disorder should be a major goal in this population. The diagnosis should be suspected whenever fecal incontinence develops in an elderly patient.

A wide variety of neurologic disorders can lead to fecal incontinence. These include congenital abnormalities such as myelomeningocele; multiple sclerosis; dementia; cerebral vascular accidents; and neoplasms or injuries of the brain, spinal cord or cauda equina. Up to 20% of

GLOSSARY

(Words *Italicized in Text*)

- *Autonomic*—Involuntary nervous system
- *Denervation*—Nerve loss
- *Enteritis*—Inflammation of the intestines
- *Enterocoele*—Posterior vaginal hernia
- *Fistula*—An abnormal passage or hole through tissue
- *Neuropathy*—A general term indicating functional disturbances and/or abnormality of the nervous system
- *Occult*—Symptoms or signs not readily detectable
- *Prolapse*—The slipping out of place of an organ of the body
- *Pudendal Nerves*—Main bundles of nerve fibers going to the anal sphincter muscles
- *Rectocoele*—Hernial protrusion of part of the rectum into the vagina

diabetic patients develop fecal incontinence, which is caused by *autonomic neuropathy*.

ABNORMAL PELVIC FLOOR

Pelvic floor abnormalities leading to fecal incontinence include congenital abnormalities, sphincter injuries and pelvic floor *denervation*. Congenital anorectal abnormalities occur in one per five thousand live born infants. They range in severity from an imperforate anal membrane to total rectal agenesis (absence). The success of treatment depends upon the adequacy of pelvic floor development and the relationship of the rectum and anus to the pelvic floor musculature.

Sphincter injury can be caused by accidental or operative trauma.

Sphincter injury related to accidental trauma is seen following impalement injuries or is associated with pelvic fractures; both of these injuries are frequently seen following motor vehicle accidents. Obstetrical injury is a major cause of fecal incontinence in women.

Prospective studies utilizing endoanal ultrasound have demonstrated a 35% incidence of new sphincter injuries following vaginal delivery in women with a first delivery. Forty percent of women after two or more deliveries have sphincter injuries and forceps use is associated with sphincter injuries in up to 80% of patients. These injuries are usually clinically *occult* but may cause clinical difficulties with stool control. Minor changes of continence are seen in a minority of patients who undergo anal sphincterotomy for treatment of anal fissure. Anal fistulotomy always involves division of anal sphincter muscle. The extent of muscle division depends upon the anatomy of the individual *fistula*, but in general the more sphincter

involved by the fistula, the greater the subsequent functional defect. Anal dilatation, performed therapeutically in some centers for treatment of hemorrhoids, leads to diffuse sphincter injury and associated problems with fecal control.

Pelvic floor *denervation*, often referred to as “idiopathic” fecal incontinence, is caused by a traction injury (stretching) of the pelvic nerves as they exit the pelvis to supply nerve fiber to the sphincter muscles. This condition is most commonly caused by childbirth, chronic straining at stool, or rectal *prolapse*. Risk factors for postpartum pelvic *neuropathy* include prolonged labor, use of obstetrical forceps, and delivery of a high birth weight

infant. Postpartum pelvic neuropathy is often seen in conjunction with anatomic sphincter injuries. Rectal prolapse is most commonly a disease of women, with a female to male ratio of approximately 10:1. About 40–60% of rectal prolapse patients have impaired fecal continence, which is due to both pudendal neuropathy and also to the chronic physical dilatation of the anal canal by the prolapse itself. Descending perineum syndrome describes a condition in which *pudendal nerve* injury leads to pelvic floor weakness and visible ballooning of the perineum with straining. This “perineal descent” leads to further neuropathy and, completing the “vicious cycle,” further pelvic floor weakness. The condition is easily diagnosed on physical examination by observing the perineum as the patient strains.

DIAGNOSIS

In most patients, the causes of fecal incontinence can be determined by careful history and physical examination. Standard diagnostic tests, for example gastrointestinal endoscopy, contrast studies and

CAUSES OF FECAL INCONTINENCE

Normal Pelvic Floor

Diarrheal states

- Infectious diarrhea
- Inflammatory bowel disease
- Short gut syndrome
- Laxative abuse
- Radiation enteritis

Overflow

- Impaction
- Encopresis
- Rectal neoplasms

Neurologic conditions

- Congenital anomalies (e.g., myelomeningocele)
- Multiples sclerosis
- Dementia, strokes, tabes dorsalis
- Neuropathy (e.g., diabetes)
- Neoplasms of the brain, spinal cord, cauda equina
- Injuries to brain, spinal cord, cauda equina

Abnormal Pelvic Floor

Congenital anorectal malformations

Trauma

- Accidental injury (e.g., impalement, pelvic fracture)
- Anorectal surgery
- Obstetrical injury

Pelvic floor denervation (idiopathic neurogenic incontinence)

- Vaginal delivery
- Chronic straining at stool
- Rectal prolapse
- Descending-perineum syndrome

CT and MRI scans, are important in the evaluation of diarrheal states, suspected neoplasms (abnormal growth) and neurologic disorders. Specialized radiologic and physiologic tests are necessary when formal assessment of the pelvic floor is required.

Standard anorectal physiologic tests include anal manometry, cinedefecography, electromyography, and endoanal ultrasonography. Anal manometry is utilized to measure the pressures generated in the anal canal by the internal anal sphincter (resting tone) and external anal sphincter (maximum voluntary contraction pressure). Multiple (4-8) channel catheters are used to assess the entire length of the anal canal, leading to a three-dimensional pressure profile that can demonstrate focal sphincter defects. Endoanal ultrasonography has more recently become the test of choice to define local sphincter anatomy. (Ultrasound is an imaging technique that uses sound waves to “see” images without the use of radiation such as x-rays.) Anal manometry also excludes the diagnosis of short segment Hirschsprung’s disease (a rare cause of overflow incontinence) by demonstrating the presence of the normal reflexic relaxation of the internal anal sphincter following rectal distension.

Cinedefecography is a dynamic radiologic study of rectal emptying. Patients are asked to evacuate barium paste while lateral fluoroscopic images are recorded. This study demonstrates abnormal perineal descent, *occult* rectal prolapse, and a variety of associated pelvic floor abnormalities such as functional obstruction of defecation due to a nonrelaxing puborectalis muscle, *rectoceles* and *enteroceles*.

Electromyography can play several roles in the evaluation of fecal incontinence. Concentric needle and single-fiber electrodes have been used to identify sphincter reinnervation, a finding characteristic of pelvic neuropathy. Needle electrodes have also been used to “map” external anal sphincter defects. However, because these procedures are painful, they are infrequently used in the clinical evaluation of patients. Direct measurement of *puddendal nerve* conduction can be obtained utilizing a glove-mounted electrode inserted into the anal canal. Prolonged conduction times are diagnostic of *puddendal neuropathy*.

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