Clinical Evaluation, Etiology, and Classification of Anal Incontinence

3

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3.1 Clinical Evaluation of Anal Incontinence

Anal continence is based on different factors: the integrity of anal sphincters, the integrity of the rectum, which behaves as a reservoir and has the "adaptation reflex", and the consistency of the stool. Other factors involved in anal continence are as follows: the pudendal nerves, which are both sensorial and motor; the rectal valves or folds, which behave as barriers to the progression of the stool from the upper part to the lower part of the rectal reservoir; the rectosigmoid junction, which has a thicker smooth muscular tissue able to slow the transit of the stool; the integrity of the complex and rich innervation of the anal canal, responsible for the sampling reflex; the length of the anal canal, which is longer in males and shorter in females. Anal incontinence (AI) has to be evaluated with different approaches. First, the patient is assessed in the office and asked about their symptoms (clinical history). AI means that the patient loses flatus and/or stool without control. Patients affected by AI are more likely to be females or older males. Females' anal sphincters are in fact weaker than males' anal sphincters, because of vaginal deliveries. Older males can be affected by AI because of a weakening of their sphincter apparatus that occurs with age [1]. The patient suffering from AI has a worsened quality of life.

3.1.1 How to Examine the Patient

A holistic approach towards patients with AI is needed: the doctor has to evaluate both the body and mind of these patients, in order to thoroughly investigate the causes of AI. For this purpose, the coloproctology unit should have a psychologist. As for the clinical examination, patients have to be asked about possible local

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traumas or if they have frequent receptive anal intercourse, which are known to deteriorate the internal sphincter. When examining the patient, we might see a gaping anus, either spontaneously or after traction. Also, we have to investigate previous anorectal surgery. AI may develop after an internal sphincterotomy or even after a hemorrhoidectomy, especially in multiparous females, as nearly half of them have subclinical continence defects [2]. Once a detailed clinical history has been obtained, we may start to examine the patient, who will be placed in a left lateral Sims' position.

Firstly, we have to observe if the patient has a descended perineum, which refers to the perineum descending more than 2 cm on straining. We should also observe whether the anus is closed or gaping, and whether there is fecal material around it. The patient should then be asked to contract the anus, so we can see if there is a detectable contraction, and if it is strong or weak. The anal reflex is then assessed with pinprick stimulation of the anal region. If the patient does not even feel the light pinprick of the perianal skin, we should suspect a pudendal neuropathy, a frequent cause of AI.

Having completed the first part of the examination, we may gently insert our second finger into the patient's anus. The length of the anal canal can be measured as an important component of anal continence (4–5 cm). When our finger is inserted in the patient's anus, we first try to evaluate the tone of the internal sphincter; this is more precisely evaluated with anorectal manometry, but evaluation by an expert proctologist also has its importance [3]. At this point the patient should be asked to squeeze, so as to allow assessment not only of the strength but also of the duration of the contraction (normal duration is 30 s or more). Ask the patient to cough and, again, evaluate the contraction of the sphincters, both the external sphincter and the puborectalis.

Rectal sensation can then be evaluated by using different inflatable balloons inserted in the rectum. Sensation is usually reduced in patients with AI due to pudendal neuropathy. Ask the patient to tell you when she/he feels that you are inflating something in the rectum. The normal value of onset of feeling should be 20–30 mL of air, the normal value of call for stool is around 60 mL of air. Finally, keep inflating until the patient tells you that he/she feels the urge to rush to the toilet because of discomfort due to the balloon; this maximal urgency is normally around 120 mL of air.

Endoscopy does not play an important role in the diagnosis of AI, except in those clinical syndromes related to a form of "occult" incontinence due to "physiologically" hypotonic internal sphincter, where dynamic proctoscopy may be preferable.

The following diagnostic tests are available to the clinician:

- *Anorectal manometry* This minimally invasive examination allows recording of the resting tone in the anal canal, which ranges between 50 and 70 mmHg in a normal subject and may be lower in a patient with AI; squeeze pressure can also be recorded, which, if normal, ranges between 60 and more than 150 mmHg and is likely to be lower than 60 in patients with AI. Manometry is useful to evaluate a patient with anal fissure and plan an internal sphincterotomy that can be

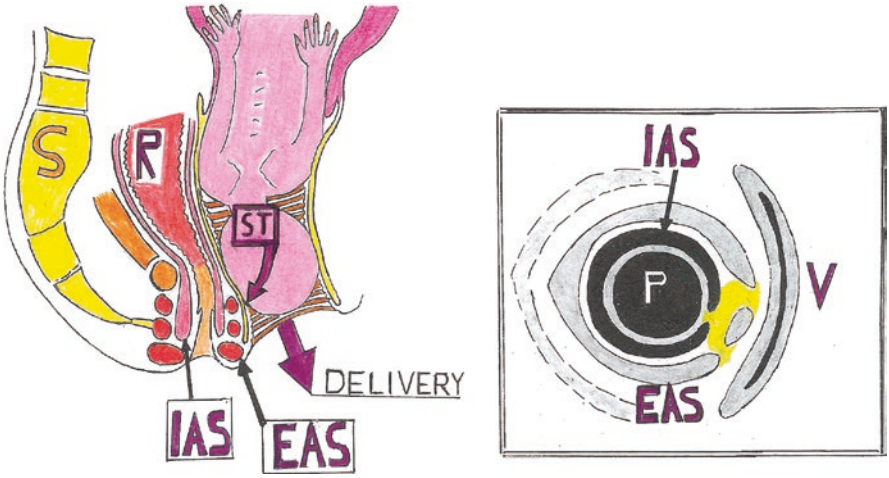

Fig. 3.1 Sagittal view of an obstetric trauma during delivery (*left*): *S*, sacrum; *R*, rectum; *ST*, sphincters' trauma; *IAS*, internal anal sphincter; *dotted orange*, vagina. Transanal ultrasound (*right*), patient in Sims' position: *P*, ultrasound probe; *V*, vagina; *IAS*: hypoechoic internal sphincter; *EAS*, superficial part of the external sphincter; *yellow*, muscles interrupted by the trauma. The patient with anal incontinence needs sphincter reconstruction

"tailored" to the degree of hypertone recorded at preoperative manometry, even if it is related to a number of recurrences compared to "standard" sphincterotomy. A parameter related to AI which may be evaluated by a manometry is the length of the anal canal.

- *Transanal and transvaginal ultrasound (US)* I personally carry out this examination in all patients suffering from AI (Fig. 3.1). 3D transanal US equipment may be better than a 2D device, mainly for the diagnosis of complex anal fistulae. The rotating probe has a reasonable diameter and does not hurt the patient, but injecting EMLA cream locally prior to the examination may protect from the vagal reflex. In our unit, the patient lies in a left lateral Sims' position, though many colleagues use the lithotomy position. The inventor, Dr. Bartram, suggests performing transanal US in the prone position in females, because he believes the anatomical structures are better detectable [4]. Sphincter lesions may be perfectly located and measured. A sphincter reconstruction will then be indicated in the case of large lesions, and neuromodulation (costly, but with an 80% success rate) if the disruption is minor. The puborectalis muscle, which appears as a hyperechogenic sling or boomerang at endoanal US, plays an important role in continence. This examination is also useful for detecting iatrogenic lesions, e.g., an unplanned division of either the smooth or striated sphincter, usually occurring during surgery for anal fistulae and abscesses, but sometimes even after an operation for anal fissure. Transanal and transvaginal US also allow detection of lesions of the sphincters and their position, or injury to the lower rectal muscle occurring after a procedure for prolapse and hemorrhoids (PPH); in this case, the

staples of a stapled transanal rectal resection (STARR) might even be seen attached to the puborectalis muscle [5].

- *Transperineal ultrasound* Based on a less expensive device, in expert hand this examination is also able to visualize both internal and external sphincter defects causing AI.
- *Defecography* This radiological test investigates anorectal morphology and function. It is carried out by introducing around 60 mL of barium into the rectum through the anus, with the patient sitting on a translucent chair. Several parameters, both anatomical and functional, may be investigated, such as the presence of incontinence, the anorectal angle at rest, and change of the anorectal angle on contraction. Subsequently, the radiologist asks the patient first to strain and then to evacuate, in order to exclude or confirm anismus, or non relaxation of the puborectalis on straining, as the anorectal angle should increase or widen on straining. If it does not, the patient has obstructed defecation.
- *Magnetic resonance imaging (MRI)* Endoanal MRI [6] has shown clear accuracy in the delineation of external sphincter defects suitable for surgical treatment and in the definition of internal anal sphincter damage potentially suitable for bioimplant deployment. As stated elsewhere [7], other examinations appear more useful than MRI for evaluating a patient with AI.

3.2 Etiology of Anal Incontinence

The potential causes of AI, as reported by the literature [7], are examined below.

3.2.1 Anal Incontinence after Operations for Anal Fissure

A correlation observed between internal sphincterotomy and AI [8] was the stimulus for treatment with "chemical" sphincterotomy, i.e., nitrates, botulin toxin etc. Indeed, postsphincterotomy AI is likely to be temporary. However, AI is more frequent when the surgeon carries out a posterior sphincterotomy, because of the weak (without muscles) area behind the divided internal sphincter. Therefore the correct procedure is a lateral internal sphincterotomy, where the surgical defect is "protected" by the adjacent external sphincter.

3.2.2 Anal Incontinence after Operations for Anal Fistula

When patients affected by anal fistula are afraid of being incontinent after the operation, ask them about bowel function and parity. In cases of diarrhea or vaginal multiparity, choose an operation which does not damage the sphincters, e.g., a fistulectomy and advanced rectal or cutaneous flap rather than fistulotomy; or alternatively, opt for an innovation, such as a fistula plug or Permacol, which leave the

sphincter intact (bearing in mind that the innovations like plugs or Permacol have a high rate of recurrence, up to 50%).

Reports show a low risk of AI in patients whose high fistulae were treated with a lay-open technique [9]. The simple lay-open procedure may have a success rate of 95% [10], but it is a fact that, in my experience at least, patients seem more concerned about losing their continence than having a fistula recurrence. That is why, in the past 20 years, the most frequently performed type of surgery for fistula changed from the lay-open to anal sphincter-preserving procedures.

3.2.3 Anal Incontinence after Operations for Hemorrhoids

AI may follow a hemorrhoidectomy performed in a patient who has already undergone a procedure for prolapse and hemorrhoids (PPH) [11].

3.2.4 Anal Incontinence after Operations for Anal Tumors

In local excision of an anal tumor, the surgeon has to excise tissues at a distance of 2 cm from the lower edge of the neoplasm in order to either avoid or minimize the risk of recurrence. Therefore some fibers of both the internal and the low external sphincter have to be removed. In this case, the surgeon may perform a sphincteroplasty at the end of the operation.

3.2.5 Anal Incontinence after Operations for Rectal Cancer

The risk of the so-called anterior resection syndrome is high (up to 90% in some series) [12] especially if the neoplasm is in the lower rectum. Oncologic radicality may impact on the structures involved in anal continence. The first structure to be impacted is the rectal reservoir, which has to be either totally or partially excised with the tumor. This, especially in cases of very low anterior resection of the rectum and coloanal anastomosis (with the suture just above the anus) or in cases of low intersphincteric resection, with the excision comprising the whole internal sphincter. The anterior resection syndrome also consists in anal pain or discomfort, diarrhea, lack of the "adaptation reflex" which is active if the rectum is present. Therefore, urgency and frequency may occur. Moreover, radiotherapy may worsen AI because the muscular tissue will become rigid, sclerotic, less elastic and will not function properly. In these cases, a Miles procedure and creating a colostomy may appear desirable. A sigmoidostomy evacuates formed stools and may be irrigated every other day, so that the patient might even avoid wearing the bag (except when going out) and wear just a smooth and flat cap to cover the stoma.

3.2.6 Anal Incontinence Following Operations for Slow-Transit Constipation

Colectomy and ileorectal anastomosis still have a place in the surgical management of slow transit constipation refractory to any conservative treatment (laxatives, enemas, etc.). According to some authors [13], it often worsens patients' quality of life. I have carried out around ten of these operations myself.

3.2.7 Anal Incontinence Following Operations for Anorectal Stricture

The most frequent cause of anorectal stricture is the Milligan-Morgan hemorrhoidectomy, when the surgeon does not leave enough mucocutaneous bridges after removing the piles. Sometimes an anoplasty operation is needed, but good results may be achieved just by periodical irrigation through the anorectum [14].

3.2.8 Anal Incontinence Following Surgery for Inflammatory Bowel Diseases

Proctocolectomy and ileoanal anastomosis with an ileal reservoir has become the operation of choice, i.e. the "gold standard" in cases of total ulcerative colitis and familial adenomatous polyposis. When the diseased rectum has to be excised, a reservoir function for anal continence may still be maintained by constructing an ileal reservoir just above the ileoanal anastomosis. Nevertheless either minor soiling or AI may occur in around 20% of these patients, especially at night, when the function of the anal sphincters is reduced. Biofeedback is the therapy of choice in these cases, or surgically constructing a four-loop or "W" large-capacity reservoir above the anal canal. Performing the ileoanal anastomosis above the anorectal ring by stapling, and thus leaving intact the tissues responsible for discriminating low intestine content, can be an option as well, but it may leave a site of disease persistence, become dysplasia or, worse, cancer.

3.3 Classification of Anal Incontinence

Detailed individual scoring systems have been proposed to classify the severity of AI, the most important of which are described below. The most commonly used are the Wexner or Cleveland Clinic score and the Vaizey or St. Mark's score. The patient's quality of life should also be evaluated. These AI scores do not generally incorporate psychometric evaluations and their interaction with other symptoms. More recently, attempts have been made to incorporate sexual dysfunction, urinary obstruction, fecal incontinence, obstructed defecation and urinary incontinence in a

dynamic map, where treatment affects map symmetry [15]. The Manchester Health Questionnaire consists of items a modified 5-point response scale including items in the eight domains of health-related quality of life (HRQoL), and incorporating a symptom severity scale [15]. The advantage of this classification is that it is simple and is the first that also takes into account quality of life. The St Mark's score [16] is often used, but less than Wexner's score.

The Pescatori scale, which was published before the abovementioned Wexner and Vaizey classifications, recalls the Dukes classification for colorectal cancer, as it uses A, B and C, plus 1, 2, 3. To obtain a final numerical score, as in the two preceding classifications, should you want to compare two or more groups of patients statistically, A counts as 1, B counts as 2 and C counts as 3. This classification, also defined PIS (Pescatori Incontinence Score) by Australian colorectal surgeons, was widely used before publication of the Cleveland Clinic score. The Rockwood Fecal Incontinence Quality of Life scale [17] is commonly used to estimate patients' quality of life. It consists of different scales, i.e., coping/behavior, depression/self perception, embarrassment, etc.

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