Surgical Management for Fecal Incontinence

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Abstract

Fecal incontinence is a socially debilitating condition that can lead to social isolation, loss of self-esteem and self-confidence, and depression in an otherwise healthy person. After the appropriate clinical evaluation and diagnostic testing, medical management is initially instituted to treat fecal incontinence. Once medical management fails, there are a few surgical procedures that can be considered. This article is devoted to the various surgical options for fecal incontinence including the history, technical details, and studies demonstrating the complication and success rate.

Keywords

- Fecal incontinence
- Anal sphincteroplasty
- sacral nerve stimulation
- artificial anal sphincter

CME Objectives: On completion of this article, the reader should be familiar with the surgical management for fecal incontinence.

Once medical management has failed, there are a few surgical procedures that can be considered for fecal incontinence. For most surgical procedures for fecal incontinence, bowel preps should be given using laxatives and/or enemas. Perioperative antibiotics should be given as well.

Sphincteroplasty

The external anal sphincter defects are the most common cause of fecal incontinence, usually located anteriorly. This can be surgically treated with an overlapping sphincteroplasty.

The technique described by Parks and McPartlin in 1971[1] and by Fang et al in 1984[2] starts with a curvilinear incision in the perineum on the outer edge of the external anal sphincter. The entire sphincter mechanism is then dissected widely from its bed with the cephalad extent to the anorectal ring. Dissection of two-thirds of the circumference should be adequate, but care must be taken to not injure the pudendal nerves posterolaterally. The muscle is then divided through the scar anteriorly, and then overlapped to narrow the anal aperture until the size of an average size index finger. It is advised not to separate the internal and external anal sphincter or excise the scar tissue from the severed muscle ends.[2] Mattress sutures are then placed through the sphincters using 2–0 absorbable suture, such as Vicryl (Ethicon, Inc. Somerville, New Jersey, USA). The perineal body is then reconstructed by bringing together the tissue on either side of the perineum (i.e. transverse perinei muscle) which allows separation of the vaginal introitus and the anus. The anoderm is then approximated loosely with 3–0 absorbable suture, such as chromic catgut. A suction drain can be placed in this perineal wound. There was a high failure rate reported with end-to-end repair in 1940 thus the overlapping technique is recommended.

Some surgeons prefer to give the patients a full bowel prep and clear liquid diet up to 5 days after the surgery to avoid bowel movements. Some surgeons also prefer to give oral antibiotics a few days after the procedure. Complications originally reported by Fang et al included bleeding, urinary retention, abscess formation, fecal impaction, and hematoma. Ninety percent of the patients had good results at 35 months looking over 30 years of experience. Sangalli and Marti[3] reported a 78% success rate for repair after obstetric injury. Ctercteko et al[4] reported that the success rate was decreased with older age, repeat surgery, and those patients who had longer problems with incontinence.

Hasegawa et al[5] conducted a randomized trial to assess whether fecal diversion would improve primary wound healing and functional outcome after sphincter repair. There was no significant difference in the functional outcome or the number of complications after the sphincter repair; however, there was increased morbidity from the stoma. Sexual function improved after sphincteroplasty per a study done by Lewicky et al.[6] Libido, physical sensation, and partner satisfaction improved after the surgery.

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On the basis of the evidence presented, anterior anal sphincter repair is still the best operation in patients with fecal incontinence and documented external anal defect with good short-term results of 70 to 80% with a decline to 50% in 5 years[7] and 40% in 10 years.[8] It has been speculated that this is due to additional external sphincter defects. Advanced age and long-lasting severe incontinence symptoms are significant predictors of poor outcome.

Postanal Repair

Postanal repair was originally proposed to restore the anorectal angle which has not been proven, as well as to increase the length of the anal canal which has been proven in various studies.[9–11] A posterior angular incision is made through the anoderm and proceeds through the intersphincteric plan between the external and internal sphincters cephalad until the puborectalis muscle is reached. Dividing the retrosacral fascia allows access to the pelvic cavity where the perirectal fat is swept off the levator ani muscles. The levator ani muscle is then approximated in layers, first the ischiococcygeus and then the pubococcygeus, and then the puborectalis muscle. A drain is typically placed in this space and the external sphincter is buttressed to narrow the anal canal. The wound is then closed in layers. The surgery can be done in the lithotomy or prone position. Studies done in the 1980s and 1990s revealed disappointing early results to this type of approach for continence to liquid and solid stool and deteriorate over time.[11,12] Therefore, during the last decade, surgeons rarely use this approach.

Graciloplasty/Muscle Transposition

If massive trauma or infection in the perineum has destroyed the bulk of the patient's sphincter mechanism, then a gracilis muscle sling can be used. One end is attached to the pubis, the muscle then encircles the anus and the other end is reattached to the opposite ischial tuberosity. Since this muscle does not act as a dynamic sphincter, there is training required for evacuation of feces. There is a 21% wound infection rate with varying degrees of success in the literature.[13]

Dynamic graciloplasty address some of these issues. After the gracilis muscle transposition is performed as stated earlier, the surgeon implants a stimulator with intramuscular leads. The stimulator provides chronic low-frequency stimulation of the skeletal muscle to obtain sustained contraction.[14] The muscle has to be trained for 8 to 10 weeks to change it from a fast twitch to a slow twitch muscle. The patient can then use an external magnet to turn the neurostimulator on and off. Varying success rates have been reported from 45 to 73%[14–17] with postoperative complication rate as high as 65%,[18] but these are usually treatable.[19]

Gluteal muscle transposition has also been reported by detaching both bilateral gluteus muscle at the sacrococcygeal ligament and mobilizing it around the anal canal. It is supplied by the inferior gluteal artery and innervated by L5-S1 nerve roots. This is reserved for young patients with neurogenic fecal incontinence, multiple failed sphincteroplasties, and severe sphincter defects.[13]

In children with a congenitally absent puborectalis muscle or incontinence from trauma, a free autogenous muscle transposition can be used as a U-shaped sling around the rectum at the location of the puborectalis. A study by Hakelius and Olsen reported 60% good functional results in children with long-term follow-up.[20]

Artificial Sphincter

The artificial bowel sphincter (ABS) was developed to mimic the function of the anal sphincter. Initially, a modified AMS 800 (Acticon Neosphincter - American Medical Systems, Inc. Minnetonka, Minnesota, USA) artificial urinary sphincter device was used with promising results. This led to the development of the Acticon Neosphincter device which is the only implantable anal sphincter device currently available. It consists of an inflatable occlusive cuff placed around the anal canal, a balloon reservoir placed in the prevesical space with a pump placed in the scrotum or labia connecting the cuff and balloon.

Studies have shown that this method for the treatment of fecal incontinence is associated with high morbidity and high reoperation rates with varying degrees of success. In two large studies by Wong et al[21] and Devesa et al,[22] ultimate success occurred in 53 to 65% of patients with a functioning device with an infectious complication rate of 25 to 30% and an explantation rate of 19 to 37%. A study done at the University of Minnesota reported that there was long-term improved continence and quality of life in patients whose implantation was successful. They also reported that once the ABS was successfully established, it remained stable for many years.[23]

SECCA

SECCA is an instrument comprised of an anoscope with four nickel–titanium curved needle electrodes. It is designed to deliver radiofrequency energy to the underlying sphincter/muscle beginning 1 cm distal to the dentate line upto 1.5 cm proximal in four quadrants. Studies demonstrated an improvement in fecal incontinence with a drop in Wexner incontinence scores from 13.5 to 5 with improvement in quality of life.[24] Takahashi-Monroy et al reported sustained improvements in fecal incontinence at 5-year follow-up with no long-term complications.[25] This treatment has not gained widespread acceptance.

Injection of Bulking Agents

The concept of injecting bulking agents around the anal canal and perianal region began in the 1990s with autologous fat. A study by Tjandra et al demonstrated an improvement in fecal incontinence and quality of life with injection of silicone and biomaterial in the submucosa 1 to 2 cm above the dentate line in three to four quadrants.[26] The newest product is Solesta, which is a biocompatible injectable gel composed of

dextranomer microspheres in sodium hyaluronate. A recent study by Graf et al demonstrated a 50% or more reduction in the number of incontinence episodes with Solesta injections with two serious adverse events (abscess) of 206 patients.[27] The long-term outcomes remain to be determined.

Sacral Nerve Stimulation

Sacral nerve implantation for urinary incontinence was noted to improve fecal incontinence as well. In 1995, Matzel et al was the first to report on the results of sacral nerve stimulation for fecal incontinence,[28] and there are now multiple studies demonstrating its efficacy.

A test stimulation is done before implantation of the sacral nerve stimulator to better assess the patients who would benefit from the procedure. A needle is positioned in the third sacral foramen posteriorly and stimulated. If in proper position, the pelvic floor contracts and there is contraction of the external anal sphincter as well as plantar flexion of the big toe. Once correct positioning has been confirmed, a temporary stimulator lead is inserted through the needle and connected to the external stimulator. For 2 to 3 weeks, the patient has low-frequency stimulation and is asked to keep a journal of bowel habits. If the number of incontinent episodes drop by 50%, then a permanent stimulator is implanted with a pocket created in the subcutaneous tissue of the buttock or lower abdominal wall. The mechanism of action is unknown. Sacral neuromodulation has been found to be effective in patients with and without sphincter defects as well as patients who have had prior rectal surgery including those who had radiation for rectal cancer.[29]

Jarret et al performed a systematic review and found that 41 to 75% of patients reported complete fecal continence with 75 to 100% with improvements in incontinence and a 13% adverse event rate.[30]

Colostomy

Some patients have disabling fecal incontinence despite medical management. Some patients are not candidates for the surgical procedures mentioned earlier. In these circumstances, a colostomy can provide substantial improvement in the quality of life. Norton et al reported that 83% of the patients had a significant improvement from their former incontinence, which was ascertained through questionnaires.[31]

References

1 Parks AG, McPartlin JF. Late repair of injuries of the anal sphincter. Proc R Soc Med 1971;64:1187–1189
2 Fang DT, Nivatvongs S, Vermeulen FD, Herman FN, Goldberg SM, Rothenberger DA. Overlapping sphincteroplasty for acquired anal incontinence. Dis Colon Rectum 1984;27(11):720–722
3 Sangalli MR, Marti MC. Results of sphincter repair in postobstetric fecal incontinence. J Am Coll Surg 1994;179(5):583–586
4 Ctercteko GC, Fazio VW, Jagelman DG, Lavery IC, Weakley FL, Melia M. Anal sphincter repair: a report of 60 cases and review of the literature. Aust N Z J Surg 1988;58(9):703–710
5 Hasegawa H, Yoshioka K, Keighley MR. Randomized trial of fecal diversion for sphincter repair. Dis Colon Rectum 2000;43(7): 961–964, discussion 964–965
6 Lewicky CE, Valentin C, Saclarides TJ. Sexual function following sphincteroplasty for women with third- and fourth-degree perineal tears. Dis Colon Rectum 2004;47(10):1650–1654
7 Malouf AJ, Norton CS, Engel AF, Nicholls RJ, Kamm MA. Long-term results of overlapping anterior anal-sphincter repair for obstetric trauma. Lancet 2000;355(9200):260–265
8 Bravo Gutierrez A, Madoff RD, Lowry AC, Parker SC, Buie WD, Baxter NN. Long-term results of anterior sphincteroplasty. Dis Colon Rectum 2004;47(5):727–731, discussion 731–732
9 Womack NR, Morrison JF, Williams NS. Prospective study of the effects of postanal repair in neurogenic faecal incontinence. Br J Surg 1988;75(1):48–52
10 Browning GG, Parks AG. Postanal repair for neuropathic faecal incontinence: correlation of clinical result and anal canal pressures. Br J Surg 1983;70(2):101–104
11 Setti Carraro P, Kamm MA, Nicholls RJ. Long-term results of postanal repair for neurogenic faecal incontinence. Br J Surg 1994;81(1):140–144
12 Rieger NA, Sarre RG, Saccone GT, Hunter A, Toouli J. Postanal repair for faecal incontinence: long-term follow-up. Aust N Z J Surg 1997; 67(8):566–570
13 Fleshner PR, Roberts PL. Encirclement procedure for fecal incontinence. Perspect Colon Rectal Surg 1991;4:280–287
14 Hallan RI, George B, Williams NS. Anal sphincter function: fecal incontinence and its treatment. Surg Annu 1993;25(Pt 2):85–115
15 Rongen MJ, Uludag O, El Naggar K, Geerdes BP, Konsten J, Baeten CG. Long term follow up of dynamic graciloplasty for fecal incontinence. Dis Colon Rectum 2003;46(6):716–721
16 Cavina E, Seccia M, Evangelista G, et al. Perineal colostomy and electrostimulated gracilis "neosphincter" after abdomino-perineal resection of the colon and anorectum: a surgical experience and follow-up study in 47 cases. Int J Colorectal Dis 1990;5(1):6–11
17 Baeten CGMI, Geerdes BP, Adang EMM, et al. Anal dynamic graciloplasty in the treatment of intractable fecal incontinence. N Engl J Med 1995;332(24):1600–1605
18 Violi V, Boselli AS, De Bernardinis M, et al. Surgical results and functional outcome after total anorectal reconstruction by double graciloplasty supported by external-source electrostimulation and/or implantable pulse generators: an 8-year experience. Int J Colorectal Dis 2004;19(3):219–227
19 Matzel KE, Madoff RD, LaFontaine LJ, et al; Dynamic Graciloplasty Therapy Study Group. Complications of dynamic graciloplasty: incidence, management, and impact on outcome. Dis Colon Rectum 2001;44(10):1427–1435
20 Hakelius L, Olsen L. Free autogenous muscle transplantation in children. Long-term results. Eur J Pediatr Surg 1991;1(6):353–357
21 Wong WD, Congliosi SM, Spencer MP, et al. The safety and efficacy of the artificial bowel sphincter for fecal incontinence: results from a multicenter cohort study. Dis Colon Rectum 2002;45(9): 1139–1153
22 Devesa JM, Rey A, Hervas PL, et al. Artificial anal sphincter: complications and functional results of a large personal series. Dis Colon Rectum 2002;45(9):1154–1163
23 Parker SC, Spencer MP, Madoff RD, Jensen LL, Wong WD, Rothenberger DA. Artificial bowel sphincter: long-term experience at a single institution. Dis Colon Rectum 2003;46(6):722–729
24 Takahashi T, Garcia-Osogobio S, Valdovinos MA, et al. Radiofrequency energy delivery to the anal canal for the treatment of fecal incontinence. Dis Colon Rectum 2002;45(7):915–922
25 Takahashi-Monroy T, Morales M, Garcia-Osogobio S, et al. SECCA procedure for the treatment of fecal incontinence: results of five-year follow-up. Dis Colon Rectum 2008;51(3):355–359
26 Tjandra JJ, Lim JF, Hiscock R, Rajendra P. Injectable silicone biomaterial for fecal incontinence caused by internal anal

sphincter dysfunction is effective. Dis Colon Rectum 2004;47(12): 2138–2146
27 Graf W, Mellgren A, Matzel KE, Hull T, Johansson C, Bernstein M; NASHA Dx Study Group. Efficacy of dextranomer in stabilised hyaluronic acid for treatment of faecal incontinence: a randomised, sham-controlled trial. Lancet 2011;377(9770):997–1003
28 Matzel KE, Stadelmaier U, Hohenfellner M, Gall FP. Electrical stimulation of sacral spinal nerves for treatment of faecal incontinence. Lancet 1995;346(8983):1124–1127
29 Ratto C, Grillo E, Parello A, Petrolino M, Costamagna G, Doglietto GB. Sacral neuromodulation in treatment of fecal incontinence following anterior resection and chemoradiation for rectal cancer. Dis Colon Rectum 2005;48(5):1027–1036
30 Jarrett ME, Mowatt G, Glazener CM, et al. Systematic review of sacral nerve stimulation for faecal incontinence and constipation. Br J Surg 2004;91(12):1559–1569
31 Norton C, Burch J, Kamm MA. Patients' views of a colostomy for fecal incontinence. Dis Colon Rectum 2005;48(5):1062–1069