Sphincter Repair with a Silastic® Sling for Anal Incontinence and Rectal Procidentia

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Sixteen selected patients with rectal procidentia, anal incontinence, or both were treated by the insertion of a Dacron®-impregnated Silastic® sling at the Lahey Clinic between 1981 and 1984. The indications for operation were incontinence in 14 patients, procidentia with incontinence in one patient, and procidentia alone in one patient. No operative deaths occurred. Immediate complications included urinary retention in the three patients and hematoma in one patient. Late complications included infection, requiring removal of the Silastic sling in four patients; however, two of these patients underwent subsequent successful reinsertion of the sling after control of local sepsis. Among patients for whom follow-up data were available, satisfaction with the results of this procedure were excellent in two patients, good in six, fair in two, and poor in one. Sphincter repair with a Silastic sling is a safe, reliable alternative in the treatment of selected patients with anal incontinence or rectal procidentia. [Key words: Incontinence, anal; Procidentia, rectal; Silastic sling repair]

ANAL INCONTINENCE is a distressing problem for the patient, and for the physician attempting to find an effective method of treatment. Complete anal incontinence is defined as involuntary loss of solid feces, while partial incontinence describes inadvertent soiling or the uncontrolled escape of liquid or gas.[1] These conditions must be distinguished from urgency incontinence, which is commonly seen in inflammatory bowel disease, various infectious colitides, and after sphincter-saving rectal resection. All of these conditions are characterized by decreased compliance of the rectum, resulting in an inadequate reservoir but normal sphincter tone.

In 1980 Labow *et al.*[2] reported the technique of repairing the sphincter with a strip of Dacron®-impregnated Silastic® sheet for treatment of rectal procidentia in elderly and debilitated patients. The procedure performed was a modification of the classic Theirsch repair,[3] and produced good results with few complications in the nine patients reviewed. Between 1981 and 1984 we applied this technique in patients with a lax or injured anal sphincter. The operative technique and results of the procedure in 16 patients with anal incontinence, procidentia, or both are described.

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Materials and Methods

Sixteen patients were treated after diagnosis of complete anal incontinence, rectal procidentia, or both, based on a thorough history and physical examination. Barium enema and proctosigmoidoscopic examinations were performed in all patients to exclude the presence of an associated colonic or rectal abnormality. Hospital records from the time of operation and outpatient clinic charts were analyzed, and follow-up information was obtained both from review of charts and personal telephone communication (HRH).

Operative Technique: Preparation of the patient for this operative procedure includes complete mechanical cleansing of the bowel and administration of oral antibiotics to protect against both aerobic and anaerobic bacteria. In addition, a short course of broad-spectrum antibiotics is administered by the intravenous route perioperatively. General anesthesia, although preferred, is not necessary; spinal or epidural anesthesia is equally suitable, and in the elderly or high-risk patient, the procedure may be performed under local anesthesia with sedation induced intravenously. The perineum, vagina, and anal canal are thoroughly prepared with a solution of povidone-iodine. The procedure is performed with the patient in the prone jackknife position described by Lomas and Cooperman.[4]

Two curvilinear incisions, approximately 4 cm each, are made just beyond the outer edge of the external sphincter left posteriorly and right anteriorly or bilaterally (Fig. 1A). Incisions are deepened into the ischiorectal space on both sides by blunt dissection, and a plane is developed with a Kelly clamp to encircle the entire sphincter apparatus at this level (Fig. 1B). Care must be taken to avoid entering the anorectal mucosa or the poste-

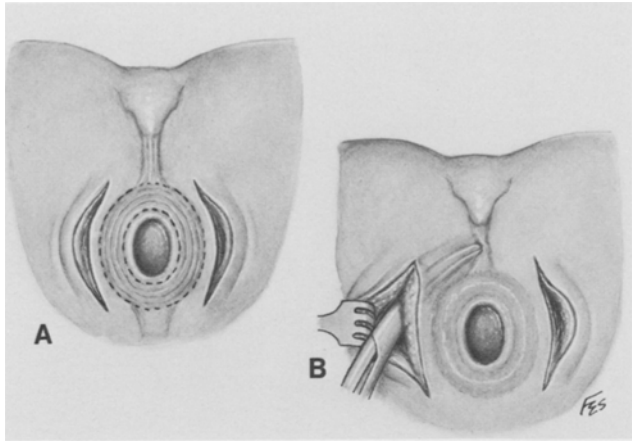

FIG. 1A. Incisions are made over the ischiorectal fossa on both sides and deepened to encompass the external sphincter. B. Posterior tunnel is made by blunt dissection. (From Schoetz DJ Jr. Operative therapy for anal incontinence. Surg Clin North Am 1985;65:44.)

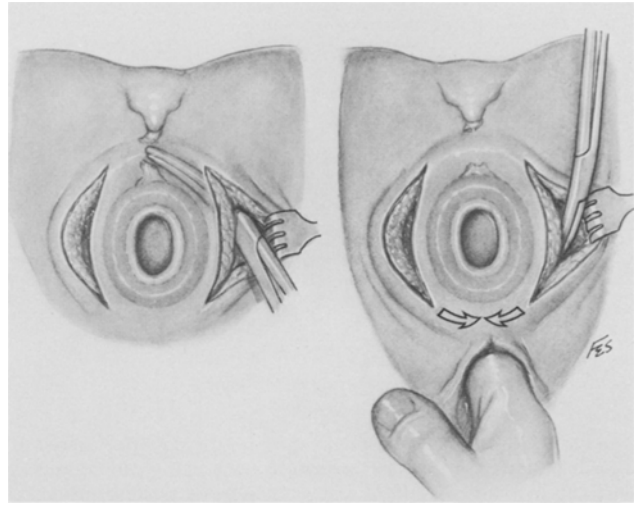

FIG. 2. Anococcygeal raphe is disrupted posteriorly, and with the finger in the vagina, the anterior tunnel is completed by blunt dissection, taking care not to enter either the anorectal mucosa or the vagina. (From Schoetz DJ Jr. Operative therapy for anal incontinence. Surg Clin North Am 1985;65:44.)

rior vaginal wall. The use of the index finger in the rectum and the vagina may aid in this endeavor (Fig. 2). The tunnels are marked by Penrose drains (Fig. 3A), while the Silastic sling is prepared by cutting a strip of Dacron-impregnated Silastic sheet (Dow Corning Corp., Midland, MI) of 2 to 2.5 cm in width. The sheet is oriented so that the sling will be elastic along its longitudinal axis (Fig. 4).

A Kelly clamp is passed through the tunnel using the Penrose drain as a guide (Fig. 3B). The sling is brought through the tunnel, first posteriorly and then anteriorly, taking care to avoid a twist and assuring that the entire external sphincter is encircled (Fig. 5). The sling is tightened to fit snugly around the index finger, and the ends are overlapped and stapled with a TA-30 stapling device (United States Surgical Corporation, Stamford, CT) (Fig. 6A and B). All wounds are irrigated thoroughly with a dilute solution of povidone-iodine, and the skin and perirectal tissues are closed in layers with absorbable suture material (Fig. 6C). Drains are not employed.

Postoperative care is similar to that for all simple anal operative procedures. The patient is not given a constipating diet, but is allowed liquids after adequate recovery from anesthesia and is advanced to a regular diet over a 24- to 36-hour period. Sitz baths are initiated on the first postoperative day and are continued through convalescence.

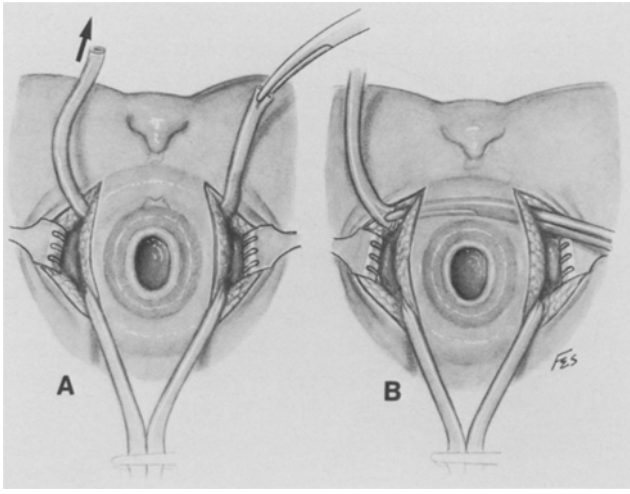

FIG. 3A. Penrose drains are looped through the tunnels both anteriorly and posteriorly. B. Kelly clamp is guided through the tunnel using Penrose drain.

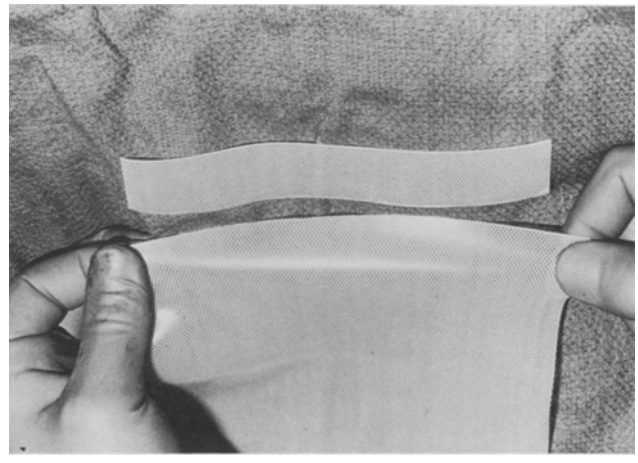

FIG. 4. Dacron-impregnated Silastic sheet with its longitudinal stretch. A 2-cm strip has been cut for use as the Silastic sling.

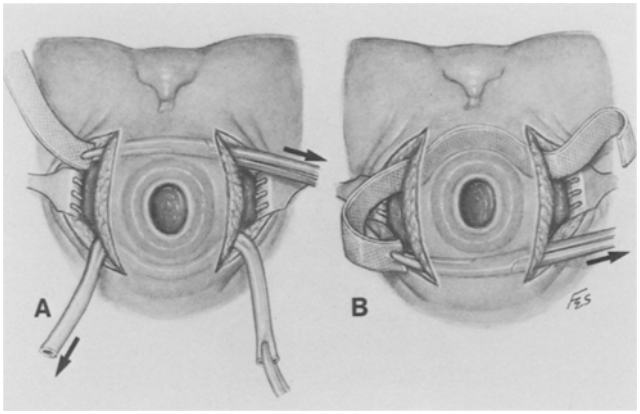

FIG. 5A. Silastic sling is brought through the posterior tunnel. B. Sling is brought through the anterior tunnel taking care to avoid a twist. (From Schoetz DJ Jr. Operative therapy for anal incontinence. Surg Clin North Am 1985;65:45.)

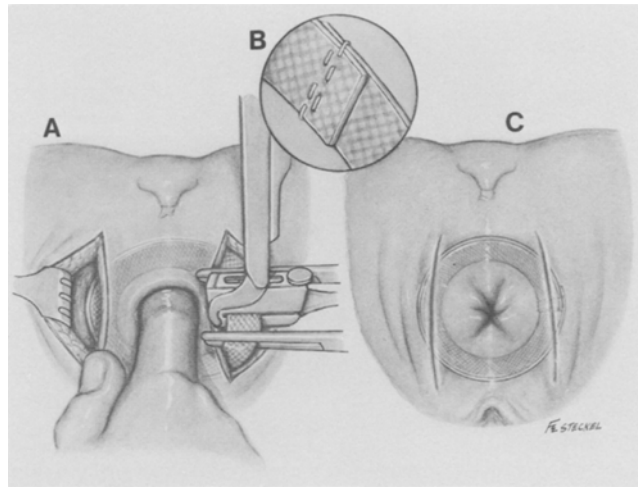

FIG. 6A. With the index finger in the anal canal as a guide and the sling fitted snugly around the index finger, a TA-30 stapler is fired across the overlapped ends. B. Closeup view. C. After irrigation, the wounds are closed in layers. (From Schoetz DJ Jr. Operative therapy for anal incontinence. Surg Clin North Am 1985;65:45.)

Results

The operation was performed on 16 patients aged 18 to 73 years, with a mean age of 54 years. Thirteen were women, and three were men. Follow-up period ranged from seven to 38 months, with a mean of 25 months. Indications for operation were incontinence in 14 patients, procidentia in one, and both procidentia and incontinence in one. The causes of the incontinence are shown in Table 1. Four of the patients had had at least one previous operation in an attempt to control incontinence.

No operative deaths occurred in this series. Early complications included urinary retention in three patients, requiring the placement of a Foley catheter; all three of these patients subsequently demonstrated return of normal function of the urinary tract. A hematoma secondary to thrombocytopenia developed in one patient who had lymphoma with involvement of the sacral plexus. However, evacuation of the hematoma was not necessary, and the wounds healed without subsequent infection.

Late complications included infection and skin erosion in four patients, necessitating removal of the Silastic sling. Two of these patients underwent successful reinsertion of the sling after local measures had resolved the perianal septic process. The patient with lymphoma died of the disease several months after the procedure without sepsis from the operation.

Current follow-up data are available for 11 patients, including the two who underwent successful reinsertion of the sling. Information was obtained by personal interview of patients (HRH). Questions were asked regarding satisfaction with the procedure and objective assessment of functional result. An excellent result was defined as complete continence without leakage, a good result was defined as rare episodes of leakage but continence for formed stool, a fair result indicated leakage and occasional episodes of incontinence, and a poor result was characterized by continued incontinence for stool. Results in terms of patient satisfaction and objective assessment of continence are summarized in Table 2. Only one patient wears a pad at all times for scant soiling from liquid stool

TABLE 1. *Indications for Operation in 16 Patients*

Cause	Number
Fecal incontinence	15
Idiopathic (primary)	2
Operation for abscess/fistula	1
Procidentia	3
Imperforate anus (after pull-through)	1
Hemorrhoidectomy	5
Central nervous system	
Myotonic dystrophy	1
Sacral lymphoma	1
Trauma (sexual)	1
Prolapse without incontinence	1

TABLE 2. *Patient Satisfaction and Objective Assessment of Continence after Operation in 11 Patients*

Result	Number
Patient satisfaction	
Excellent	2
Good	6
Fair	2
Poor	1
Continence	
Excellent	2
Good	4
Fair	4
Poor	1

and mucus. The other patients use a protective pad only rarely, when they have diarrhea, and two patients require regular bulk laxatives and periodic enemas.

Of the four patients who had undergone previous operative procedures for anal incontinence, two required removal of the Silastic sling, and treatment was considered a failure. Of the remaining two patients, continence was reported to be excellent in one and fair in the other after reinsertion of the sling. Thus, of the 16 patients who underwent the procedure, death from lymphoma precluded long-term follow-up in one patient, treatment was a failure in two patients, and removal and reinsertion of the Silastic sling was required in two patients because of septic complications. Overall satisfaction with the procedure was good or excellent in 73% of patients for whom follow-up data were available.

Discussion

A varied group of neurologic and other medical disorders comprise the commonest causes of anorectal incontinence. These include cerebrovascular accidents, head injuries, senility, lesions of the spinal cord or lumbosacral nerve roots, collagen vascular diseases, injury from irradiation, and fecal impaction. Chronic abuse of laxatives, particularly mineral oil, is considered by some[5] to be the commonest nonsurgical cause of fecal incontinence.

Anatomic disruption of the puborectalis muscle by direct impalement, operative procedures, or violent anal erotic activities is the major nonmedical cause of anal incontinence. Obstetric deliveries that involve third-degree perineal lacerations and operations for anal fistulas are the surgical procedures most likely to result in fecal incontinence, although other operations for perirectal abscess, hemorrhoids, and fissures have been implicated. Also, incontinence is a common coexisting condition in patients with complete rectal prolapse, in whom severe abnormality may result both from injury to the nerve supply and denervation of the anorectal ring caused by chronic stretching and from direct repetitive muscle damage caused by the prolapse itself.[6]

The numerous nonsurgical methods that have been proposed for the treatment of anal incontinence, including exercises for strengthening the perineum, dietary changes, and bulk laxatives and other antidiarrheal medications, have produced varying degrees of success. Electrical implants to stimulate the sphincter mechanism[7] and various electrical and mechanical plugs[8] have also been suggested. Electrical implants cause the problems of infection, dislodgment, and a limited (40- to 60-second) period of sustained contraction. An anal stimulator plug has the advantage of being a noninvasive technique, but its use is hampered by poor patient compliance, and reports of success are few. Engel and associates[9] have described operant conditioning of the incontinent patient with good results in a small series. This last technique appears promising but requires an inordinate amount of time and expense, highly sophisticated physiologic monitoring equipment, and specially trained personnel.

Surgical treatment of patients with fecal incontinence includes direct repair of the sphincter defect by techniques of direct apposition or overlapping of transected muscles. Goldberg *et al.*[1] reported results in 47 patients treated by sphincteroplasty using an overlapping technique usually without a concomitant colostomy. Excellent or good results were obtained in 89% of patients in this series, with an 8.5% complication rate. Various reefing or plicating procedures of the deep portion of the external sphincter and puborectalis muscle also exist, and can be performed by way of either an anterior or posterior approach. Parks and colleagues[10] have proposed posterior sphincteroplasty and plication of the puborectalis muscle as primary treatment for patients with fecal incontinence. Their technique restores the anorectal angle and narrows the anal canal, and was successful in 83% of patients with primary incontinence. All sphincter plication procedures require the presence of an adequate puborectalis muscle for success. Most procedures are technically difficult and usually are performed in referral centers specializing in diseases of the anorectum. Despite scattered successful reports,[11] transposition of the gracilis muscle does not seem to provide a physiologic sphincter mechanism, and is in all likelihood a complex modification of the anal encircling procedure.

In 1895 Thiersch described a simple palliative procedure for the treatment of rectal procidentia by encircling the anal orifice with a silver wire.[3] Since that time, numerous modifications of this encirclement technique have been proposed with silk, fascia, tendon, crimped Teflon® tubes, nylon and polyester tapes, and folded Marlex® mesh. Lomas and Cooperman[4] reported 50 such repairs for rectal procidentia using Marlex mesh with excellent results in 47 patients and with few complications.

In 1980 Labow *et al.*[2] reported sphincter repair by use of Silastic sheet in elderly, high-risk patients with rectal procidentia. Performed under local anesthesia, the procedure was a success in their nine patients without failure or rejection after a median follow-up period of 14 months.

Dacron-impregnated Silastic sheet has the advantage of being elastic in one direction, pliable, nonreactive, and of having sufficient strength to hold staples or sutures. The successful use of a Silastic sling in patients with procidentia prompted us to utilize this material as a supplement to a lax or injured sphincter mechanism. The procedure presents minimal technical difficulty, and can be performed in elderly patients under local anesthesia. No operative deaths occurred in 16 patients. Morbidity was

low, consisting of urinary retention in three patients and infection that required delayed removal of the Silastic sling in four patients. Removal of the sling can be accomplished under local anesthesia, and complete healing can be expected promptly. Of the 11 patients followed who maintained the sling in place, eight (73%) reported satisfaction as excellent or good.

Conclusion

The Silastic sling is a safe and relatively effective procedure. Use of standard mechanical preparation of bowel, administration of antibiotics, and placement of the sling into the ischiorectal fossa to encircle the sphincter apparatus completely and to minimize late infection and perineal erosion are the most important aspects of the operative technique. The extension of this operative procedure from patients with procidentia to those who have incontinence of various causes represents an advance in the surgical therapy of fecal incontinence.

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