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The Modified Delorme Operation:

Its Place in Surgical Treatment for Massive Rectal Prolapse*

BENNETT E. UHLIG, M.D., EUGENE S. SULLIVAN, M.D.

From the University of Oregon Medical School, The Good Samaritan Medical Center and Providence Medical Center, Portland, Oregon

IN THE 78-YEAR interval since Rene Delorme[1] first reported his experience with three patients using a mucosal stripping procedure for rectal prolapse, there have been intermittent advocates endorsing the advantages of this technique.[2-8] His operation, based on Whitehead's method of stripping the mucosa from the underlying circular muscle of the rectum and sigmoid, together with longitudinal plication by sutures placed in the denuded prolapsed rectal wall, has been recommended mainly for patients too old or frail to be suitable candidates for a transabdominal procedure.[4,8,9] The Delorme operation in this group has been felt by its proponents to provide a satisfactory rate of cure of prolapse, restoration of function, and a low morbidity.[7] Historically, each generation of proponents has modified or embellished the procedure in response to evolving surgical methods and materials, and advances in the understanding of the pathophysiology of rectal prolapse, with the hope of improving the anatomic and functional results. It is the purpose of this paper to define the place of the Delorme procedure in the spectrum of operations available for treatment of massive rectal prolapse, to analyze the results of treatment in 44 patients treated in our practice in a recent ten-year period, and to describe the modifications in technique that we have used.

A review of the medical literature on the surgical treatment of massive rectal procidentia leads one quickly to the realization that surgeons hold diverse views in its treatment. As many as 130 operations have been described for the treatment of this condition.[10] These have been categorized by Boutsis and Ellis[11] to be variations of the following: 1) narrowing of the anal orifice, 2) obliteration or removal of the peritoneal pouch of Douglas, 3) restoration of the pelvic floor, 4) resection of the bowel by a) transabdominal approach or b) perineal approach, 5) suspension or fixation of the rectum a) to the sacrum or b) to other structures, 6) prevention of intussusception, or 7) combination of two or more of these methods.

Judging from the literature there is little doubt that in the United Kingdom the Ivalon-sponge wrap operation introduced by Wells[12] is the currently favored procedure.[11,13-16] The operations favored in the United States are more varied, with low anterior resection,[17-20] the Ripstein sling,[21-24] and transsacral fixation[25,26] each having enthusiastic advocates. We have had a good experience with the Ripstein proce-

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Address reprint requests to Dr. Uhlig: 511 S.W. 10th Avenue, Portland, Oregon 97205.

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dure using polypropylene mesh (Marlex®), and feel it is an operation of first choice if the patient is relatively young (less than 70 years of age) and in good health. The fact is, however, that a great number of patients with massive rectal procidentia are old and often in poor health. For this group of patients many surgeons have recommended the Thiersch procedure.[17,20,27,28] One gains the impression though that this procedure is chosen by its simplicity as a palliative alternative rather than for its dependable result.[4,9,13,17] It is specifically this group of ill, old and feeble patients for which we feel the modified Delorme operation is best suited.

Several amputative perineal procedures have been devised to treat massive rectal prolapse, such as the Altemeier, the Delorme, and proctosigmoidectomy. While these procedures do not attend to the primary problem of malfixation of the rectum to the sacrum, they offer the advantage of an anorectal approach, a light anesthetic, and the opportunity to repair associated outlet abnormalities. The Delorme, unlike the others, has the advantage of preserving and replacing the muscle of the intestinal wall which adds substantially to the repair. The plication of the denuded wall forms a "supralevator donut" which has a pessary effect in preventing further prolapse. This muscular ring is significantly supported by modifying the Delorme operation with the addition of a transrectal perineal repair[12] which narrows the pelvic outlet and maintains the plicated bowel wall above the levator ani anteriorly. The ring, in turn, by being structurally incorporated into the repair, prevents lateral distraction of the perineorrhaphy.

Procedure

Patients are admitted to the hospital the afternoon preceding surgery. A meticulously clean bowel is desirable. The patient is usually prepared with Phospho-Soda 45 cc by mouth. Mild preoperative sedation is given and the patient is placed in a position of relative comfort in the prone-flexed position with a pillow under the hips. Because many of these people are cardiopulmonary cripples, we are willing to operate them with a less severe inversion than for the usual anorectal procedure. Cardiac and respiratory monitoring is done during the operation by an anesthesiologist. Intravenous thiopental or light diazepam-meperidine sedation is given to allow the infiltration of 0.5 per cent lidocaine with 1:200,000 epinephrine into the perianal skin, the anal musculature, and the rectal wall. Of 100 cc of solution available, usually 70 to 90 cc are used. Once infiltration of the anesthetic is complete, sedation is lightened and adjusted to the comfort of the patient who is kept lightly asleep for the surgery which takes about an hour.

A circumferential incision is made in the rectal mucosa, one centimeter proximal (orad) to the dentate line. A plane of dissection between the mucosa and the internal sphincter and circular muscle of the rectum is developed and a sleeve of mucosa is mobilized which ultimately may reach 30 cm in length. The dissection is occasionally difficult to get started especially if the patient has had scarring from long-standing prolapse, previous injection therapy, or hemorrhoidectomy. The plane of dissection becomes more apparent as one proceeds upward. When the mucosal sleeve has been started, the anal retractor is put aside and dissection is aided by a moistened gauze pack of two or more rolled surgical sponges which are inserted in the rectum. These serve as a source of traction as well as a guide to dissection. The upward dissection is continued until a tug on the mucosal sleeve gives resistance and an even tendency to retract is noted. Two army retractors are used for aids to exposure at the highest (internal) level of dissection. Electrocautery is used for hemostasis and very seldom is it necessary to tie a vessel.

When the desired level has been reached the pack is removed and hemostasis is completed. Irrigation of the wound with saline solution at this point will demonstrate any small oozing vessels which should be electrocoagulated. Irrigation of the denuded surface of the wound is done with aliquots of a 50 cc solution containing one ampule each of neomycin sulfate (0.5 g) and lincomycin (0.6 g), to give broad spectrum aerobic and anaerobic antibiotic coverage. This solution is allowed to remain in the wound as repair is commenced.

The repair in our cases has been multiphasic, and will vary from patient to patient depending on the anatomic abnormalities. The aim of the repair is to create a funnel-shaped rectum having a good muscular support intercepting a narrowed anus. This is accomplished by repair of the perineal body and rectocele defect, repair of anal sphincter defects when present, longitudinal plication of the circular muscle of the rectum and sigmoid, amputation of the mobilized mucosa, excision of redundant anal skin, and finally anastomosis at the anorectal junction of the tailored anoderm and the amputated margin of intestinal mucosa.

The repair (Fig. 1) is done with the prolapse reduced. A large retractor, such as the Sawyer, or extra large (1⅜") Hill-Ferguson (Pilling #20-2130) is needed to give exposure for the deep *in situ* suturing 3 or 4 cm above the anal verge. Sutures used for the transrectal perineal repair are O polyglycolic acid or

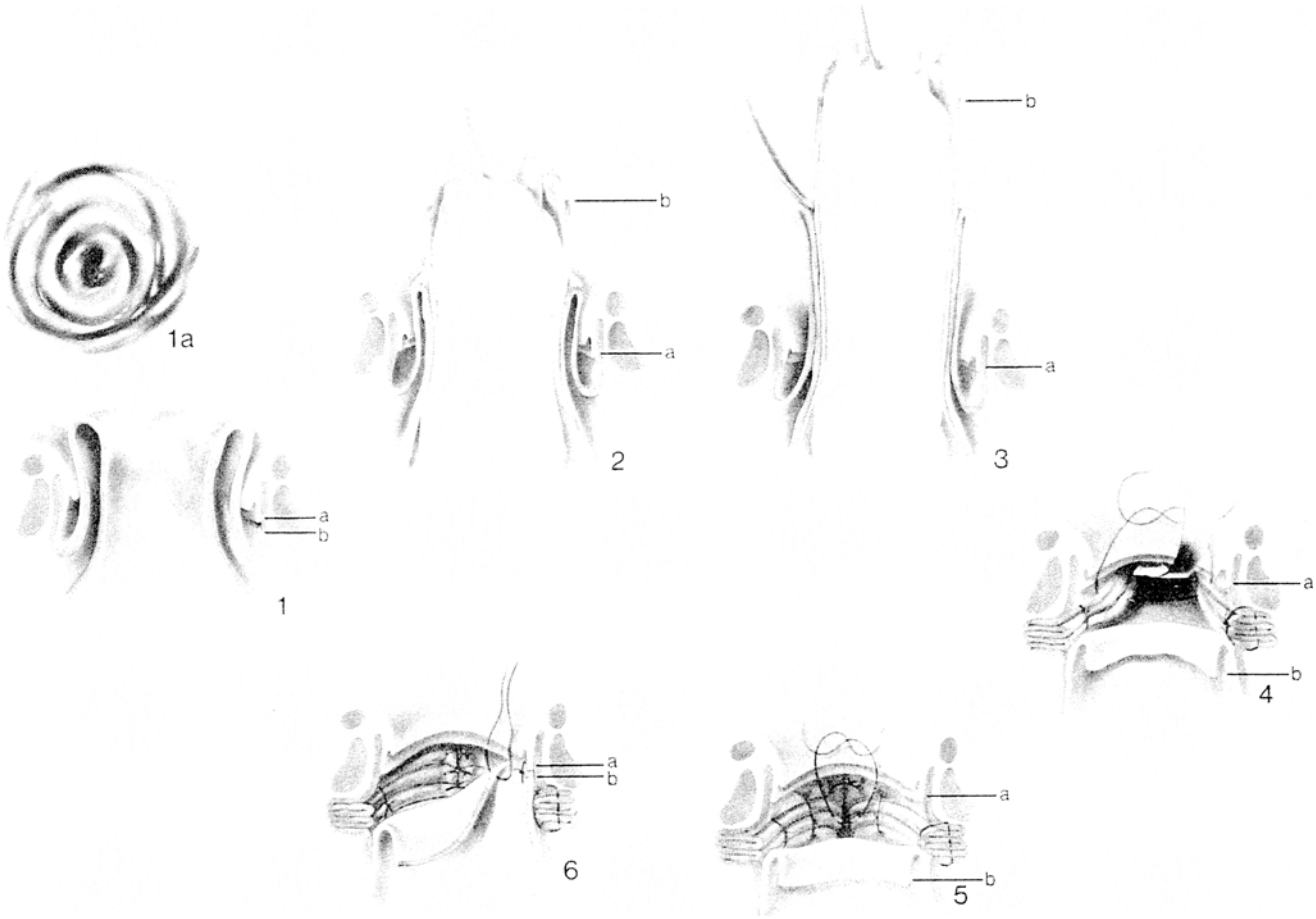

FIG. 1. 1a. Appearance of typical protrusion in cases of procidentia.
1. Representation of the prolapse showing a sulcus and the site of incision just above the dentate line (a) and the margin of mucosa to be mobilized at (b).
2. The beginning of mobilization with gauze plug inserted in the lumen as an aid to traction and guide to dissection.
3. Continuation of the dissection in the submucosal plane.
4. Plication of the denuded rectal wall and anterior repair.
5. Completion of the repair.
6. Circumferential reanastomosis of mucosal edges.

polyglactin on a general closure needle. The plication of reefing of the circular muscle is done usually with the same suture on a tapered gastrointestinal needle. Plicating sutures are taken in quadrants, then sutures placed between so that eight to ten sutures in the circumference are used. It is important not to include the mucosal edges in the muscular plication since the large polyglycolic acid or polyglactin sutures serve as buried retention sutures preventing anastomotic disruption. The mucosal sleeve is divided in quadrants and an interrupted 2–0 chromic anastomosis is done, taking good bites of mucosa together with underlying circular muscle. Twelve or 16 sutures are used for the tension-free anastomosis. The anal skin in the anterior third of the anal circumference has been mobilized to allow transrectal repair of the rectocele, and following this there is usually excessive lining that is trimmed so that the tailored edges lie in approximation for closure with a running 2–0 chromic suture. Tags should be trimmed to give a smooth perianal skin. A dry dressing completes the operation.

Postoperative Care

Ambulation is begun immediately. Urinary catheterization is frequently needed. Pain is rarely a problem and the patients need little narcotic. A regular diet is given. A bulk stool conditioner is used supplemented with Milk of Magnesia if no function is forthcoming by the third day. Enemas are used by the fourth day if there has been no spontaneous bowel function.

TABLE 1. *Classification of Rectal Prolapse (after Beahrs et al.*[17])

Type	Description
I	Incomplete (partial) rectal prolapse (prolapse of rectal mucosa)
II	Complete rectal prolapse (including all layers)
	First-degree—high or early, "concealed," "invisible," "hidden"
	Second-degree—externally visible on straining, sulcus evident between rectal wall and anal canal
	Third-degree—externally visible, anorectal area protruding, no sulcus between rectal wall and anal canal, final stage of rectal prolapse

Clinical Material

The patients included in this series were treated solely by our group in the ten-year period, January 1967 through January 1977. All patients represent cases of massive rectal prolapse of the second and third degree (Table 1). Our enthusiasm for the modified Delorme procedure for first-degree procidentia is unreserved and, in fact, in a ratio of nearly 4:1 represents our major experience with this operation. Only those patients with second and third-degree procidentia, however, are included in this series. There were 44 patients, 39 women and five men. Average age of the group was 62 years with the majority in seventh and eighth decade (Fig. 2). The oldest patient was 94 years old and the youngest 26 years old.

Most of the patients had severe associated medical illnesses that complicated their care. Obstructive pulmonary disease, emphysema, cardiac disease with angina, and diabetes were prominent. Two patients had had previous open heart surgery with coronary artery bypasses. One patient had a villous tumor of the rectum that was removed coincidentally with the Delorme procedure. One patient had had a small-intestinal bypass for exogenous obesity. She had chronic anemia and other metabolic problems related to her bypass. Although many of the older patients had some degree of arteriosclerosis and cerebral vascular disease, only two patients in the series had a severe mental deficiency. Four of our patients had had a previous Thiersch operation which had failed; in one case because of functional outlet obstruction and three because of erosion and/or fistula formation. In these three the infected loop was removed and the Delorme-operation done immediately without a problem.

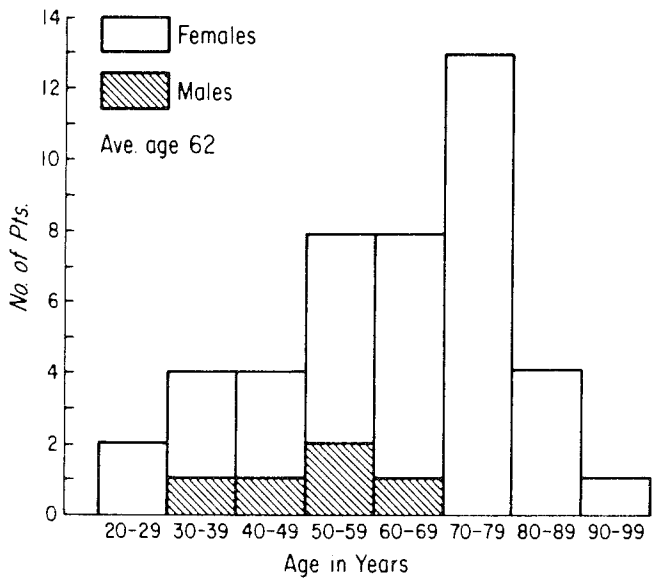

FIG. 2. Age and sex distribution of patients in study.

Results

A two-to-ten-year follow-up has been obtained on all patients. Prolapse has recurred in three of the 44 patients, an incidence of 6.8 per cent. The first patient, an 81-year-old woman with chronic obstructive pulmonary disease, had a severe episode of asthma during the postoperative period requiring extended steroid treatment and developed recurrence of her procidentia one year later. She was then treated with a Thiersch procedure using a polypropylene mesh loop with a satisfactory result. The second failure was an obese woman, age 34, who had had a small-intestinal bypass. She had chronic diarrhea and metabolic deficiencies secondary to her short-bowel syndrome. Her obesity, previous complicated abdominal surgery, and metabolic status led us to opt for a Delorme procedure. Failure occurred within a three-month period. She subsequently has had a Ripstein procedure with relief of her prolapse, though her short-bowel syndrome and impaired metabolic state continued. Takedown of her bypass was ultimately needed. The third recurrence was in an alcoholic man, age 47, with chronic diarrhea and an irritable bowel syndrome. The patient has been advised to have a Ripstein procedure but has deferred his decision.

Urinary bladder dysfunction postoperative was a common problem. Ten patients required a Foley catheter. There were three urinary tract infections requiring antibiotics in the postoperative period. One patient developed a fecal impaction that prolonged his hospital stay for three days. Another patient had a wound separation attended by hemorrhage on the seventh postoperative day which required treatment

TABLE 2. *Evaluation of Treatment of Massive Rectal Prolapse by Modified Delorme Operation*

	Patients Treated 1967–1977		Follow-up Questionnaire		
				Respondents	
Result	Number	Per Cent	Question	Number	Per Cent
Good	20	45.5	Have you had a good result from surgery? Are you happy?	20	55
Satisfactory	20*	45.5	Satisfied with surgery but troubled by occasional problem with urgency, soiling, etc.?	15	41
Poor	4†	9	Poor result, unhappy?	1	4
TOTAL	44			36	

* Includes 5 patients who died of unassociated causes during follow-up period. † Includes 3 known prolapse recurrences.

by transfusion. There were no anesthetic complications in the series. Blood loss, using the local anesthetic with epinephrine, rarely exceeded 100 cc and was usually estimated to be less than 50 cc.

In the period of follow-up, five patients have died of unassociated causes. At the time of death the prolapse had not recurred and they had had satisfactory function. Three patients have had known recurrences leaving 36 patients who were known to be relieved of their prolapse and available for evaluation of their functional result. These 36 patients were mailed a questionnaire or were contacted directly.

The woman, age 26, who reported poor results was done fairly early in this series. She had had two previous amputative procedures in an attempt to cure her prolapse and, in retrospect, should have had a Ripstein operation. Although her third Delorme procedure prevented further prolapse, the patient complained of fecal incontinence related to rectal ampullary loss and fibrosis of the sphincter from multiple attempts at repair.

Functional results of this operation have been, we feel, quite satisfactory, with 20 of 36 the questionnaire respondents (55 per cent) reporting an excellent result. Of the 36 patients who answered the questionnaire, 15 (41 per cent) had some problems with their control, with occasional loss of flatus or stool, but were otherwise relieved and are considered to have satisfactory results. To this group we have added the five patients who died in the interim of unassociated disease and who were not available for evaluation by the questionnaire, but whose relief of prolapse and satisfaction were documented by our office records. Thus, overall good and satisfactory results were obtained in 40 of 44 patients or 91 per cent. One patient, relieved of prolapse but unhappy with her functional result, in addition to the three known prolapse recurrences, must be considered an operative failure; this gives an overall operative failure of 9 per cent.

Discussion

The Delorme operation is a rarely commended procedure for the treatment of massive rectal procidentia and one held in low esteem by several current authorities. Beahrs, Theuerkauf and Hill[17,20] based on review of the literature and Mayo Clinic experience with the Altemeier operation dismissed the Delorme operation in principle and recommended it be abandoned.

On the other hand, Nay and Blair,[7] Moskalenko,[6] and Ejaife and Elias[4] have, within the past few years, published results supporting the use of this procedure in selected cases. Nay and Blair treated their 30 patients without a mortality in spite of the fact that more than half were over 65 years of age and had associated medical disease. Nigro[28] in his thoughtful review, "Procidentia of the Rectum," states: "Therapy varies according to the demands of patients as well as to the severity of the procidentia." He has pointed out that there must be a spectrum of choice varying from conservative management to major (abdominal) procedures with several modalities between.

The tendency for a surgeon to seek a "one best" procedure denies the extreme variance in patients' needs. We think most will agree that, in a young active, good-risk patient, a transabdominal procedure, specifically directed at fixation of the rectum to the sacrum with or without resection, offers the highest rate of cure of the prolapse; but it is for the elderly patient as well as for many of the poor-risk group that we perceive the modified Delorme operation to be of value.

The transsacral approach to procidentia favored by Thomas[26] and others[25] offers an interesting alternative to the amputative and abdominal procedure that might well be used in the elderly and poor-risk group. We have had, as yet, no experience with this technique. It is interesting to note, however, from an historical point of view, that it was a series of postoperative herniations of the rectum following sacrococcygectomy and posterior resection that led Moschcowitz to propose his classic transabdominal cul-de-sac repair in 1912. As an alternative for a more formidable operation, the Thiersch wire or loop has been recommended for the poor-risk group of patients[17,20,27,28] Küpfer and Goligher,[13] on the other hand, noted many problems following the Thiersch procedure with the necessity for removal of the loop in 12 of 19 patients so treated. Beahrs has offered the Thiersch as second choice to anterior resection, if the patient is a poor risk, in spite of the finding that "The Thiersch operation for prolapse has been notoriously unsuccessful. . . ." As Nigro[28] has said, even where the Thiersch operation is successful, "The essential requirement for after care is the prevention of fecal impaction. To avoid this, a digital examination should be done every two or three days and enemas should be given at regular intervals . . ."—hardly a satisfactory result from the standpoint of function.

The major shortfall of the perineal amputative procedures in principle is the failure to provide for posterior fixation of the rectum in the hollow of the sacrum. This is made up for in some measure by narrowing the pelvic outlet and/or by sphincter plication. Gabriel[27] improved the result of the proctosigmoidectomy by anterior suturing of the puborectalis. Attention to this defect is also an important feature of the Altemeier repair.

It is the substantial enhancement of the pelvic ring by plication of the denuded rectal wall that makes the Delorme procedure unique. It is this remarkable pessary effect, together with support provided by repair of the perineum anteriorly, that we feel makes the modified Delorme operation the amputative procedure of choice.

That perineal attenuation and rectocele is frequently associated with procidentia was noted by David[3] who recommended perineorrhaphy in addition to reapproximation of the levators to strengthen the pelvic diaphragm. We first reported a transrectal perineal repair as an adjunct to improve function following anorectal surgery in 1967,[29] and it was our perception of improvement in results following institution of this repair as a routine that led us to select for review the present series of patients. The transrectal repair as a modification of the Delorme procedure, deals directly with the associated outlet abnormalities. It allows correction of the patulous anus, the megarectum, the rectocele, and, where they are present, anal sphincter defects. It is the correction of these factors, we feel, that improve significantly the postoperative anatomic and functional result. It has obviated the need for the external sphincter mattress plication as advocated by David.

A significant adjunct to the integrity of these repairs we feel has been the switch in the past few years to the use of polyglycolic acid or polyglactin sutures, size 0 or 2–0, depending on the patient status and size of the defect. The electrosurgical unit has speeded the surgery greatly, nearly eliminating the need for ligature.

In addition to the transrectal perineal repair, our technique for this surgery is at considerable variance with the method used originally by Delorme and the more familiar Rehn-Delorme operation described by David. The other modifications are as follows:

Position of the patient for operation: Although no previous report has indicated that any position other than lithotomy has been used, we have abandoned lithotomy as inadequate for exposure, lighting, and ease of assistance.

We had done many cases in prior years using the lithotomy position. We can well recall a "struggle in the dark" while doing this procedure in a 90-year-old patient whose hips were so ankylosed and the adductors of the thighs so contracted that even under a subarachnoid block anesthesia we stood in a "tent" beneath her draped legs, with the operating table in its highest position and as much Trendelenburg as our anesthesiologist would allow. Little wonder that barely adequate operations with poor recurrence statistics are reported in many early series where amputation of the prolapse alone was thought to be adequate treatment.

Operation in the prone-flexed position has changed from night to day our exposure problem with this operation. Chest rolls can be used where needed and careful and comfortable positioning of the patient has allowed operation safely and effectively under local anesthesia of even the most arthritic and elderly person. Venous distention is less evident with the buttocks uppermost and the blood loss is lessened. When the patient is in the prone-flexed position, such blood loss that does occur drains away from the field and does not interfere with dissection.

Local infiltration anesthesia: Vernon David,[3] in 1929, felt that this operation is preferably done under local anesthesia. He recommended 0.5 per cent novocaine-adrenalin solution, and the tremendous advantage in hemostasis was noted. Others[4,7] have

used saline or saline and epinephrine as a local infiltrate to aid in mucosal elevation and hemostasis. In the early 1960s we were introduced to the use of local anesthesia using 0.5 per cent lidocaine and 1:200,000 epinephrine for all our anorectal operations. This has so revolutionized our technique that we strongly feel that local anesthesia with epinephrine is as vital to precise reconstructive anorectal surgery as the tourniquet and microscope are to hand surgery. Not only is exposure enhanced and blood loss minimized but the patient can be carried under extremely light sedation.

Use of a retractor for *in situ* incision and repair: With the patient in the prone-flexed position we have found it possible to use a large retractor such as the extra large (1⅜″) Hill–Ferguson or the Sawyer which allow ease of exposure for high (internal) placement of sutures, both in the plication and anastomosis. With this improved exposure it is possible to begin the operation with the prolapse reduced. This, of course, is always the situation when this operation is done for first-degree procidentia. In cases of second- and third-degree procidentia, here under discussion, beginning with the prolapse reduced helps the surgeon position the incision at the upper end of the anal canal at least a centimeter proximal (orad) to the dentate line. Care in preservation of the entire sensitive and moisture tolerant anal skin has been emphasized by several authors.[3,6,7] We agree with Moskalenko[6] that it is desirable, in fact, to leave a centimeter of mucosa proximal to the dentate line to insure high positioning of the anastomosis, to minimize trauma to the anoderm by suturing, and to provide for restoration of an anal segment of sufficient length and sensation to improve continence. The use of the retractor allows ease in high suture placement so that the plication of the rectal wall can be created at the supralevator level. It is essential in the repair and plication to place the sutures so that there is coapting of tissues. One should avoid suture bridging which allows dead space for serum collection or hematoma and can offer a nidus for infection. Entry into the extrarectal spaces or peritoneal cavity during dissection occasionally occurs but has caused no problem.

The analysis of results following operation for prolapse must be considered from at least two aspects, anatomic relief of the prolapse and restoration of normal function. Morbidity-mortality factors constitute a third perspective. In more recent series the results of the Delorme operation from the standpoint of elimination of the prolapse has been far more impressive than the 20 per cent failure reported by Swinton and Palmer[8] and the 25 per cent failure cited by Theuerkauf *et al.*[20] and Deucher and Blessing.[9] Alexander and McElwain,[2] in an experience with 40 patients done in the manner suggested by David,[3] had an 8 per cent failure. They attributed their improved success to high dissection of the mucosa to the upper limit of redundancy, to the level where the surgeon encounters narrowing of the lumen and a sense of fixation or tug as the mobilized mucosa is drawn outward. Moskalenko[6] also favored high amputation. He has reported 11 cases using his tourniquet modification without significant morbidity or mortality and with no recurrences. Nay and Blair[7] reported their experience using the Rehn-Delorme repair in 30 patients and they found a satisfactory to excellent result in 90 per cent with a failure in 10 per cent due either to recurrent prolapse or to sustained incontinence. Our experience in 44 patients is comparable to these series with failure due to recurrence of prolapse in 7 per cent.

By contrast, one must admit, cure of the prolapse by a transabdominal route is significantly more likely. Low anterior resection as recommended by Beahrs, Theuerkauf, and others[17,19,20] has had failure in 3 per cent or less. The Ivalon-sponge wrap operation studied by Morgan *et al.*[15] had recurrence in 3.2 per cent. The same procedure as studied by Küpfer and Goligher[13] had no complete recurrences in 21 operations though 15 per cent required further surgery for mucosal recurrence. Boutsis and Ellis,[11] on the other hand, have had an 11 per cent initial failure with the Ivalon sponge in 26 cases but with reoperation have reduced failure due to mortality or recurrence to 7.6 per cent. The Ripstein procedure in our experience has had no mortality and a less than 2 per cent recurrence. This is comparable to excellent results reported by Bomar and Sawyers[21] and the 2.3 per cent recurrence reported in the extensive Gordon and Hoexter survey.[22] Transsacral repair as reported by Davidian and Thomas[25] had no mortality or recurrence in 30 cases.

It is apparent, therefore, that from the standpoint of anatomic result the modified Delorme is second rate in comparison with the above alternative procedures for massive rectal procidentia. Its further consideration, it is evident, must rest with analysis of other factors.

Functional results: Although the anatomic relief of prolapse may be obtained, there is persistence of anorectal dysfunction with distressing frequency no matter what surgical approach has been chosen. Recent work by Parks *et al.*[30] has shown that there occurs a demonstrable denervation myopathy affecting, to some degree, all the muscles of the pelvic floor but most severely involving the external sphincter. The

mechanisms of genesis may vary, but in patients with massive rectal procidentia it is thought to be due to over-stretching of the innervating fibers by descent of the prolapse over a prolonged period of time. This may account for the frequently observed fact that in patients with prolapse of long duration poor sphincter tone may persist indefinitely even after the procidentia has been eliminated, although, clinically, it has also been evident that some improvement in tone and function may be seen in most cases over a period of time following operation.[15,17] Nevertheless, continuing problems with incontinence will be seen in from 20–50 per cent of patients following rectopexy and there is considerable variation in the frequency and degree of dysfunction observed following the various methods of treatment.[13,15–17,25,30] Following low anterior resection, for example, Beahrs *et al.*[17] stated that "When the tone was poor, even though there was no incontinence, more than half the patients treated by anterior resection got worse. . . ." Beahrs considered the possibility that reduction in rectal ampullary capacity might be a factor but dismissed this as improbable when it was not found in his analysis of cases treated by perineal amputation (Altemeier). A likely explanation of this phenomenon is found in the work of Parks and others[9,30]; in the course of anterior resection with low mobilization of the rectal segment there is upward traction on the relaxed structures with straightening of the anorectal angle, a situation shown radiographically to be associated with incontinence. A similar high frequency of postoperative dysfunction is seen following the Ivalon-sponge wrap procedure. Boutsis and Ellis[11] reported a 50 per cent improvement in continence over preoperative status but nonetheless a distressingly high 36 per cent incidence of postoperative incontinence overall. Küpfer and Goligher[13] and Morgan *et al.*[15] in each of their series found persisting incontinence in 40 per cent. It is interesting to note in Morgan's series that four patients subsequently underwent a Parks posterior repair to enhance the anorectal angle with complete restoration of continence in three.

Analysis of the functional result from the Delorme operation has been done by Nay and Blair.[7] In their series, five of 30 patients (17 per cent) had occasional incontinence or slight mucosal protrusion. The remainder, 22 patients or 72 per cent, were classed as excellent result and presumably had neither symptom. Our results show 55 per cent excellent function and 41 per cent satisfactory, showing occasional urgency (problem with control) or slight soiling giving an overall 96 per cent good or satisfactory result in the 36 patients available for analysis. Recurrent mucosal prolapse in our series did not occur as the cause of soiling probably due to our attempt to obtain high anastomosis and fixation in all cases. Most remarkable in our findings was the relief of symptoms of "constipation" present in nearly two thirds of our cases preoperatively, and, next to the prolapse itself, constituting the main symptom complex complained of by these patients. The symptoms included, in addition to dyskinesia, sensations of incomplete evacuation, urge to defecate, and low pelvic pressure symptoms interpreted by the patient as constipation. A similar incidence and improvement of this symptom complex has been noted by Morgan *et al.*[15] Two thirds of their patients complained of these symptoms preoperatively and persistence of these symptoms occurred in 27 per cent following the Ivalon-sponge wrap. With the modified Delorme operation, these symptoms were relieved in our patients in all but three (8 per cent) of the 36 patients evaluated. In general the patients who have complaints of constipation and pressure preoperatively seem, in our experience, to be the most likely to be relieved by the Delorme procedure. Patients who have had "regular" bowel function or irritable bowel with frequent passages or frank diarrhea were less pleased with their postoperative function.

We have had an extensive experience with this procedure in cases of first degree procidentia and feel that it is the procedure of choice in these cases where outlet obstruction syndrome, constipation, and pelvic pressure are preeminent complaints. We have come to recognize several factors in patient selection that will indicate a satisfactory outcome for modified Delorme procedure. It is our procedure of choice for the elderly, frail, or poor-risk patient. If the intestinal history reveals constipation or any element of outlet obstruction the Delorme is "made to order" for this patient. Factors weighing against our choice of the Delorme as the procedure of choice include the younger, physically active patients who are good surgical risks, or those patients with the history of chronic diarrhea, short bowel syndrome, and dumping syndrome. We feel that care in patient selection and familiarity of the surgeon with an anorectal approach make this modified Delorme procedure a reasonable choice in the spectrum of operations for massive rectal procidentia.

Like the inscription on a greater French gift, the modified Delorme operation may be paraphrased:

> "Give me your feeble, your old with prolapsed masses yearning to pass free. The wretched refuse of your frustrations sore. Send these, "The outlet bound," to me.
>
> "I lift my hope beside the surgeon's door."

Summary

The modified Delorme operation represents an effective perineal approach for the treatment of massive rectal prolapse, giving low morbidity and mortality; it is especially suitable for the elderly, the infirm, and most poor-risk patients—and for the surgeon accustomed to an anorectal approach.

Our modifications of the procedure include the following: operation in the prone-flexed position, *in situ* plication of the denuded muscular wall of the rectum above the levators, transrectal perineal repair, local infiltration of anesthetic with epinephrine, the use of polyglactin or polyglycolic suture, and preservation of the entire length of anal skin with a margin of rectal mucosa. Spincter plication where needed, together with excision of existing anal abnormalities and tailoring of the anal skin, improves the comfort, appearance, and ease of care in the area.

In our series, 44 patients, women in a ratio of nearly ten to one, were operated on in a recent ten-year period. Ages ranged from 26 to 94 with an average age of 62 but predominance in the eighth decade. There have been no mortalities. Follow-up has been from two to ten years. Failure of surgery with recurrence of prolapse was found in three patients (7 per cent), and functional failure in one (2 per cent). Functional results were studied in 36 patients with satisfactory result in 35. Improved technique and criteria of patient selection has lowered the incidence of failure in the later years of study.

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