



## Treatment of Complete Rectal Prolapse: To Narrow, To Wrap, To Suspend, To Fix, To Encircle, To Plicate or to Resect?

Han C. Kuijpers, M.D.

Department of Surgery, University Hospital, Nijmegen, The Netherlands

Selection of the best surgical procedure for the treatment of complete rectal prolapse is difficult amid the many different techniques for which excellent results are reported. A critical review is given. It is concluded that any surgical procedure with rectal mobilization and fixation as a standard maneuver will lead to a recurrence rate of 2% to 4%. Advocacy of additional maneuvers to make the procedure easier is acceptable if it does not lead to a higher complication rate. But to obtain a better result its benefit has to be proven, either by a large prospective double-blind study, or by tests from the colorectal laboratory. New surgical techniques for rectal prolapse should therefore be based, not only on a low recurrence and complication rate, but also on tests that evaluate the effect of the procedure on fecal continence.

Complete rectal prolapse is a disorder that occurs infrequently. It was known to Hippocrates who wrote that in order to treat a patient with an irreducible rectal prolapse, "the patient, hanging by his heels, be shaken, for so the gut, by that shaking, will return to its place . . ." During the intervening centuries more than 200 different operative procedures have been reported in the surgical literature. Their concepts have usually been based on abnormalities of local anatomy that are commonly found in patients with complete rectal prolapse such as a deep pouch of Douglas, a patulous, lax anal sphincter, a redundant rectosigmoid colon, an insufficient pelvic floor, rectal intussusception, or a lack of fascial support of the rectum against the sacrum. All concepts of etiology and treatment have been based on these observations and the main argument has been which of the abnormalities was cause and which was effect. Good results have been reported from newly introduced procedures, but most of these operations have generally not given good lasting results in the hands of other surgeons.

### Surgical Options Reviewed

The options for therapy include obliteration of the peritoneum of the pouch of Douglas, narrowing of the anal canal, restoration of the pelvic floor, resection of the redundant bowel either by an abdominal or a perineal approach, and suspension or

fixation of the rectum to the sacrum or other structures by the abdominal, perineal, or trans-sacral route [1].

Obliteration of the peritoneal pouch of Douglas (Moschcowitz procedure) is based on the concept that rectal prolapse is a form of sliding hernia with the abnormally deep *cul-de-sac* constituting a hernial sac [2]. A series of purse-string sutures of silk running horizontally around the pouch of Douglas are placed to obliterate it. The recurrence rate is up to 80% [1].

The idea of encircling the anal canal (Thiersch procedure) is to narrow it, and thus, mechanically support the rectum and prevent it from prolapsing. The procedure is still advocated for older and frail patients since it can be performed under local anesthesia. The recurrence rate is very high [1, 3].

Restoration of a strong and functional pelvic floor is done by plicating the pubo-rectalis muscle in front of the rectum (Roscoe-Graham procedure). Recurrence rates after the perineal approach (McCann procedure) [4] are as high as 80% [5]. Recurrence rates after the abdominal approach [6] are much less, varying from 15% to 30% [7].

Recto-sigmoid resection (Moore procedure) [8] is done to fix the bowel to the sacrum by the fibrosis around the anastomosis, incidentally to treat constipation, and to prevent the risk of volvulus. Recurrence rates are low, about 2% [1]. The recurrence rate after perineal resection of the prolapsed bowel (Altemeyer's procedure) [9] ranges from 2% to more than 60% [1]. A further variation is the Delorme's procedure [10]. The prolapsed bowel is not resected but stripped of its mucosa and then plicated and placed above the levator muscle as a pessary-like ring to form a supra-levatoric muscular pessary or muscular Thiersch wire, which prevents further prolapse. Recurrence rates vary from 0 to 23% [1]. This and the Thiersch procedure are advocated for the older, poor risk patient.

The suspension and fixation procedure was first described by Pemberton and Stalker [11]. It creates the fixation of a mobile rectum and consists of full rectal mobilization followed by a fixation procedure done either anteriorly to the peritoneum, pelvic brim, or uterus (anterior rectopexy), or posteriorly to the sacrum (posterior rectopexy). Recurrence rates are 16% to 35% after anterior rectopexy and 2% to 6% after posterior rectopexy [1].

To prevent inversion of the anterior rectal wall which would

Reprint requests: Department of Surgery, University Hospital Nijmegen, Geert Grooteplein Zuid 14, 6500 HB Nijmegen, The Netherlands.

lead to intussusception, the anterior wall above the pouch of Douglas (the "crucial point") is folded over the segment below it combined with lateral splinting of the rectum by longitudinal plicating sutures (Devadhar procedure) [12]. There were no recurrences in a small series.

Most other operations combine one or more of these techniques or approaches.

It is obvious that selection of the best surgical procedure is difficult with these many different techniques, all with fairly good results. But a critical study and comparison of the different surgical techniques will demonstrate which part of a procedure is efficacious, which is unnecessary, or even which is useless, which needs further study, and what contributes to the selection.

### Comments

The anal encirclement procedures do not cure the prolapse but merely prevent its descent. The inherent tendency therefore to rectal intussusception remains active and provocative of symptoms since patients continue to complain of tenesmus, incomplete evacuation, and the sensation of "sitting on a lump". Since the procedure may even have exacerbated bowel management problems, frequent postoperative examination and a careful regimen of stool softeners and laxatives is needed to prevent rectal impaction. Careful postoperative management on an in-patient basis may also be needed in spite of the relative simplicity of the operation, thus making the whole procedure rather complicated [13]. Various materials used have been silver wire, polypropylene mesh, nylon, Teflon, Marlex, fascia lata, silicone rubber, silastic, and gracilis muscle. Septic and mechanical complications of the implant occurred in up to 60% of patients, resulting in removal of the commonly implanted wire and recurrence of the prolapse. It should therefore rarely, if at all, be employed.

Procedures which claim to restore a strong and functional pelvic floor are an attempt to bring muscle where it does not really belong. Poor material is sutured together to strengthen the weakness below the deepened pouch of Douglas and support the rectum but these sutures provoke additional weakness of the muscles by scarring or may even pull out, and the purpose of the operation, the establishment of a strong pelvic floor, fails to be achieved. But why is the recurrence rate after the perineal procedure as high as 80% compared to the less than 30% recurrence rate after the abdominal route? Extensive rectal mobilization is needed to reach the pelvic floor muscle by the abdominal approach. As we know from the rectopexy procedures, operative mobilization is essential and creates a wound between the rectum and sacrum. During wound healing, the rectum becomes fixed to the sacrum by scar tissue. The only function of the plicated pubo-rectalis muscle therefore seems to be that of a temporary support to keep the rectum in place until it becomes fixed to the sacrum by scarring.

The concept of rectosigmoid resection is based on the observation that after low anterior resection a dense area of fibrosis is formed between the anastomotic suture line and the sacrum securing the rectum adequately and effectively to the sacrum. Other advantages have been mentioned; resection of the abdu-

nant rectosigmoid avoids the risk of torsion or volvulus or, in diverticulosis, obstructive attacks or inflammation, though these are not common complications.

It is further claimed that after resection the left colon has a straighter course and little mobility from the phrenocolic ligament downward and that this acts as another fixation device [14, 15]. Moreover, it may contribute to the cure of constipation, a common disorder in these patients. Constipation may also have been a causative factor in the etiology of the prolapse since many patients strain at defecation. Partial subtotal resections have been advocated. Functional constipation, however, is still an unsolved problem and colonic resection only seems to be successful in a selected group of patients with delayed colonic transit time and normal small bowel transit [16]. A pre-operative evaluation which is thorough is therefore necessary when colonic resection is considered for prolapse but even then the question remains whether adequate treatment of the associated constipation further decreases the recurrence rate [17].

When the advantages of colonic resection were noted, technical difficulties related to low anterior resection were avoided by making the anastomosis at a more convenient site, such as at the promontory of the sacrum, but some form of rectal fixation with or without the use of an implant had to be added. No doubt colonic anastomosis at the level of the promontory is a safe procedure in the hands of experienced surgeons but anastomotic dehiscence in colon surgery for cancer of up to 30% has been reported in the literature [18] and anastomotic dehiscence in the presence of implanted foreign body material can be a disaster. The addition of colonic resection to a rectopexy procedure that has already a very low recurrence rate, only to achieve an even lower recurrence rate, seems therefore to incur too great a risk.

It has been stated that perineal resection or plication of the prolapsed bowel leads to good results but these procedures either resect or plicate part of the rectum. As a result, rectal capacity and sensory function will be diminished to about 20% of normal as in a colo-anal anastomosis [19]. Combined with a weak pelvic floor and defective anal sphincter which are common in elderly and frail patients for whom the procedure is advocated, it is obvious that fecal continence is often severely impaired postoperatively.

Posterior or pre-sacral rectopexy is the simplest abdominal approach to treat rectal prolapse. It involves a thorough mobilization and upward fixation of the rectum. Its high success rate, as already mentioned, is the result of the scar tissue which fixes the rectum to the sacrum. Many different techniques have been described and discussion usually focuses on how far the rectum should be mobilized, which material should be used for rectal fixation, and how it should be placed.

The pouch of Douglas plays a crucial role in complete rectal prolapse. Rectal prolapse starts as a prolapse of the anterior rectal wall, the peritoneal aspect of which is incorporated into the pouch of Douglas [20, 21]. As a sliding hernia diverts by the anterior wall protruding outside the anal canal, the pouch of Douglas comes to lie below the perineal level. It is therefore essential to elevate the pouch as high as possible by pulling up the rectum which it embraces to this level. In doing so the distance between the pouch of Douglas and the perineum

becomes lengthened as far as is possible, which is the best way to prevent a recurrence. When the rectum is pulled up this tightly stretches the lateral ligaments and division of these ligaments will elevate it further. In case of a persistently deep pouch of Douglas, despite adequate lateral mobilization, the peritoneum of the pouch should be removed, thus fixing the lower anterior rectal wall to the posterior vaginal wall or uterus by scar tissue, as is advocated in the Moschowitz' procedure. The resulting level of the pouch of Douglas is a good indicator of the degree and adequacy of rectal mobilization.

The goal of rectal fixation is to keep the rectum attached in the desired elevated position until fixity by scar tissue is achieved. Insertion of foreign material is commonly performed since it is assumed that this evokes more fibrous tissue formation. Materials used are many such as fascia lata, nylon mesh, Marlex, Ivalon, Teflon, Goretex, and polypropylene mesh. Pelvic sepsis after Ivalon implantation has been reported in up to 16% of patients and is a serious complication [22]. Complete removal of the infected sponge can be difficult and sepsis does not resolve until all foreign material is removed. When foreign material is used, Marlex or Teflon is preferred since these rarely become infected [23, 24].

Complete encirclement of the rectum (Ripstein procedure) [25] may lead to erosion of the mesh with subsequent fistula formation. It can also create a radiological and endoscopic stenosis with functional results in about 7% of patients [26]. The effects may also necessitate further surgery. The incidence of constipation is increased and when colonic evaluation is done by a barium enema, the extent of the anatomical stenosis will be revealed. A rectal fixation procedure with mesh, leaving part of the anterior bowel wall free, does not create this radiological stenosis and therefore is preferred [21].

But is the use of an implant really necessary? For other reasons, we re-operated on 4 patients in whom we had performed posterior rectopexy using a T-shaped Teflon mesh several years previously. None had a prolapse recurrence but both horizontal "legs" of the mesh were retracted to the promontory playing no support role as a fixation device. So the goal of using an implant evoking an intense fibrous tissue formation is not necessarily achieved by using Teflon. Despite this, there were no recurrences in 64 patients. Rectal fixation by means of sutures or lateral peritoneal flaps seems sufficient since recurrence rates of 3% or less are reported [27, 28]. This is the simplest technique of posterior rectopexy since only two to four sutures are required and complications related to the implantation of foreign materials are avoided. In the case of a prolapse of both rectum and vagina, however, a mesh with extended horizontal "legs" appeared to form an ideal device for a colpo-recto-sacropexy in 9 patients thus treated.

It is obvious that any surgical procedure of which rectal mobilization and fixation is a standard maneuver leads to a low recurrence rate of 2% to 4%. Advocating additional maneuvers to make the procedure easier or neater are acceptable if they do not lead to a higher complication rate. Any additional advocated maneuvers to obtain better results via lower recurrence rates have to be proven by a large prospective double-blind study or by results of tests of improved function from the colorectal laboratory.

### The Colorectal Laboratory

The colorectal laboratory combines colorectal and anorectal functional investigations which have been developed to study the different parts of the mechanism of continence, i.e., the anorectum and the pelvic floor muscle [29].

Application of these tests enables us to determine whether the presumed causative dysfunction for which correction of the operative procedure or maneuver is based, indeed exists and, if so, whether the surgical procedure performed completely corrects this and eliminates the prolapse mechanism.

Defecographic studies have demonstrated that complete rectal prolapse starts as a prolapse of the anterior rectal wall a few centimeters from the anal canal, followed by a posterior rectal wall prolapse, creating an intussusception into the lower rectum which subsequently passes into the anal canal. A marked inferior and anterior descent of the rectum occurs from the sacral concavity and, finally, the intussusception protrudes through the anal canal forming a complete rectal prolapse [20, 21]. In a study comparing the results of defecography performed before and after posterior rectopexy it was demonstrated that the procedure adequately corrected these radiological abnormalities. Rectal fixation was excellent and the configuration of the anterior and posterior rectal wall remained "straight" during straining [21], which may explain the excellent results of this procedure.

The same radiological picture, but without an overt external prolapse, was found on defecography in several patients complaining of incomplete evacuation. This demonstrated an intussusception of the rectum and is believed to be the forerunner of rectal prolapse [30, 31]. But the symptoms resolved in only 20% of these patients after rectopexy [31]. Similar signs of rectal wall infoldings during straining, suggesting intussusception, have been found in up to 60% of normal subjects, which may explain the moderate results of surgical treatment [32]. But if a solitary rectal ulcer co-exists, it heals within a few weeks after rectopexy and symptoms resolve completely, demonstrating that the intussusception was symptomatic [33]. So there are data to demonstrate that intussusception does exist and causes problems. But where normal mucosal folding ends and first degree prolapse starts has not yet been determined.

In solitary rectal ulcer syndrome the ulcer is situated at the lower anterior rectal wall and can be felt at laparotomy as a localized thickening of the anterior wall. Since this location corresponds with the pouch of Douglas, techniques have been adopted following Devadhar [11] to stabilize this area and have included strengthening of the anterior wall in surgical procedures [34].

The colorectal laboratory also indicates whether new functional or anatomical disorders are created by the surgical procedure or maneuver performed. Little or no attention has been paid to whether all the narrowing, wrapping, suspending, fixing, encircling, plicating, or even resecting can be performed without affecting anorectal function and fecal continence which may already be impaired in 26% to 81% of these patients [1].

Impaired function was formerly believed to be secondary to the prolonged rectal protrusion with mechanical stretching of the sphincters. Electromyographic and histological investigations have demonstrated that it is more often due to stretch injuries of the pudental and perineal nerves supplying the pelvic

floor. It is generally agreed that following surgical correction of the prolapse, the patients should be observed for about 6 months in the hope of a spontaneous improvement of continence. Some improvement occurs in approximately 50% of patients [1] and internal or external sphincter function is lastingly affected [35]. It is just as likely that the return of function is multifactorial consequent upon improved rectal and anal sensation caused by a restored local anatomy as seen in the post-anal repair [36]. This is an important factor [17].

Finally, the colorectal laboratory reveals the role of the pelvic floor in the development of complex urological, gynecological, and colo-rectal prolapse. There is no doubt that this role is an important one. An 18% incidence of rectal prolapse has been reported in patients with prior impairment in pelvic floor function as compared with a negligible incidence in patients with a sphincter rupture only. More than half of the patients had, or had been treated for, some form of urological, gynecological, or colorectal prolapse compared with only 3% of patients with sphincter rupture. Does the prolapse cause the pelvic floor to be denervated or *vice versa*? Since there is a 20% incidence of prolapse after the iatrogenically produced incontinence of manual dilatation, prolapse is believed to be the result rather than the cause of impaired pelvic floor function. Consequent impaired support to the abdominal organs is therefore one of the factors that causes them to prolapse [37].

### Conclusion

Selection of the most appropriate surgical procedure in the management of complete rectal prolapse continues to be a problem for the surgeon. We are obviously in need of more objective data. These may be provided by the application of the techniques of the colorectal laboratory. The results will contribute to the selection of the best procedure. Advocating new surgical techniques to treat rectal prolapse should also be based not only on a low recurrence and complication rate, but also on tests which evaluate the effect of the procedure on anorectal function, the most important of which is the control of fecal continence.

### Résumé

Choisir le meilleur procédé chirurgical pour traiter le prolapsus total du rectum est d'autant plus difficile qu'il existe de nombreuses méthodes thérapeutiques, toutes vantées dans la littérature pour être la meilleure. Une revue critique des ces procédés est faite. On conclue que toute méthode comportant une mobilisation et une fixation du rectum est suivie de récidence dans 2 à 4% des cas. Recommander des gestes supplémentaires pour faciliter la technique n'est acceptable que si le taux des complications n'augmente pas. Pour prouver que les résultats sont meilleurs, cependant, il faudrait soit réaliser une grande étude prospective à double insu, soit faire des comparaisons par des tests de laboratoire de physiologie colorectale. Des techniques nouvelles de chirurgie du prolapsus rectal devraient être basées non pas sur le taux de récidence ou de complication, mais aussi sur le résultats des tests qui démontrent son efficacité sur la continence fécale.

### Resumen

Seleccionar el mejor procedimiento quirúrgico para el tratamiento del prolapso rectal completo es difícil, frente a las numerosas y diversas técnicas, cada una de las cuales reclama excelentes resultados. Se presenta una revisión crítica y se plantea la conclusión de que cualquier procedimiento quirúrgico que implique la movilización y fijación como maniobra estándar, da lugar a una tasa de recurrencia de 2-4%. Es aceptable preconizar maniobras adicionales para una más fácil realización del procedimiento mientras no resulten en incremento de la tasa de complicaciones. Para reclamar un mejor resultado, es necesario comprobar el beneficio mediante un estudio prospectivo y doble ciego mayor o por medio de pruebas funcionales en el laboratorio colorrectal. Las nuevas técnicas quirúrgicas para el tratamiento del prolapso rectal deben fundamentarse no sólo en bajas tasas de recurrencia y de complicaciones, sino también en pruebas funcionales que valoren objetivamente el efecto del procedimiento sobre la continencia fecal.

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