



## Relationship between Anatomical and Functional Abnormalities in Complete Rectal Prolapse and Its Various Operative Surgical Management Strategies and Outcome

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### ABSTRACT

This is a review of the various anatomical and functional abnormalities seen in complete rectal prolapse in the adult and the surgical management strategy that effectively corrects the abnormalities producing the least recurrence rates; therefore signaling the important anatomical/functional abnormalities. Literatures on surgical managements of complete rectal prolapse using medline, pubmed and manual were reviewed on the recurrence rates of suture rectopexy and other surgical management strategies. The results of suture rectopexy and resection rectopexy were much more superior to other methods and surgical procedures in surgical management of rectal prolapse.

**KEYWORDS:** Rectal prolapse, anatomical abnormalities, functional abnormalities, rectopexy.

Complete rectal prolapse is a condition that has fascinated surgeons for a long time (Ballantyne 1991). The aetiology remains highly controversial (Ballantyne 1991) with distinct anatomical abnormalities and functional problems such as faecal incontinence and constipation (Maddoff & Mellegren, 1999). The pathophysiology and controversies surrounding these anatomical abnormalities and functional problems also remain a topic of debate (Mann, 1969). It has been described from ancient times in Greek and Egyptian Civilization (Madiba et al., 2005, Parks et al., 1977). Most of the procedures available to the surgeon for the treatment of rectal prolapse which aim at correcting the various anatomical abnormalities and functional problems have been identified to be inadequate (Parks et al, 1977). The surgical management of complete rectal prolapse have evolved from historical encirclement as in Thiersch wiring of the anus to various forms of rectopexies and currently minimally invasive ones. Successful management of rectal prolapse must include adequate attention to correcting the anatomical abnormalities as well as associated functional problems in order to effectively cure the complete rectal prolapse. Success of any operation for rectal prolapse must be judged by its low or no recurrence rates as well as correction of associated constipation or faecal incontinence.

This study reviews the various methods available for management of complete rectal prolapse highlighting their merits and demerits and suggests superior procedures (in the Authors' search) in surgical management of rectal prolapse.

### Method

Search for relevant literature was done using the key words such as: Rectal prolapse, complete rectal prolapse, Anatomical abnormalities and rectal prolapse, management of rectal prolapse and rectopexies. Searches were done manually and through Medline and Pubmed search engines.

### Findings

There are two approaches for complete rectal prolapsed surgery perineal and abdominal. The earliest in series of perineal approaches to the surgical management of rectal prolapse was the Thiersch wiring, using steel wire and later non-absorbable sutures like nylon. The operation involved reducing the complete rectal prolapse and narrowing the anal verge with wire or suture encirclement; thus attempting to keep the rectum from prolapsing. The operation was however associated with very high recurrence rates of between 35% and 85%. (Labow et al, 1980; Poole et al 1985.) As well as many

unacceptable complications like sepsis, anal soiling and faecal impaction and the wire or suture cutting through the perianal skin. Another perineal approach is Delorme procedure, in which the excessive herniated rectal mucosa is peeled off the muscle layer. The exposed muscle layer is now plicated circumferentially and the anorectal mucosa is sutured. The aim is to bunch up the prolapsing rectum thus reducing the prolapse. The recurrence rates of this procedure in literature is high, ranging from 17% to 38%. (Watts et al 1985; Watts, Thompson 2000) The other perineal approach is perineal sigmoid colon rectal resection (Rectosigmoidectomy or Altemeier procedure). In this operation the prolapsed rectum is resected 2cm above the dentate line, and the mesentery of the sigmoid colon is pulled sufficiently, ligated and resected, then colo-anal anastomosis is fashioned. In literature the recurrence rate is reportedly high at between 16% and 30% (Watts et al 1985, William et al 1992) All other perineal approaches like perineal anterior levatorplasty and Lockhart-Mummery (posterior fixation of the rectum via perineal root) have all high recurrence rates. (Chun et al 2004) All perineal approaches are conservative procedures either resecting or removing or reducing the herniated rectal wall.

Reviewing the abdominal approaches for surgical management of complete rectal prolapse in the literature revealed the following viz; The earliest of these abdominal approaches was the Moschowitz operation which involved obliterating the deep pouch of Douglas. The recurrence rates was found to be very high at between 50% and 63%. (Madoff and Mellgren 1999, Madiba et al 2005) Another operation reviewed in literature is the Roscoe-Graham operation, which involved the anterior levatorplasty and obliterating the pouch of Douglas. The recurrence rates for this operation in literature is 11.7-25% (Watts et al 1985) Perberton and Stalker operation which involves mobilization of rectum out of the pelvis and colopexy by fixing the sigmoid colon in an elevated position by stitching to the peritoneum of anterior abdominal wall, pelvic brim, iliac fossa and uterus. This operation has recurrence rate of up to 34.6%.

Operation which involves fixation of the rectum to its sacral concavity were reviewed (Aitola et al 1999, Cuitait 1959, Blatchford et al 1989) Posterior Ivalon rectopexy, involving fixation of rectum with sheet of Ivalon and later Marlex between the posterior rectum and the sacrum. The recurrence rate is approximately between 3% and 7%, (Morgan et al 1972, Ross & Thomson, 1989) but with higher rates of morbidity resulting from erosion of mesh into the rectum leading to fistula formation, rectal stenosis and increased pelvic sepsis and wound complications Ripstein procedure is an anterior rectopexy, in which a piece of mesh (e.g. Teflon) is placed round the anterior wall of the rectum and the edges are sutured to the presacral fascia, so that the posterior rectum is bare of the mesh. The recurrence rates of the Ripstein's rectopexy in literature is between 7% and 13% (Gordman Hoxeter 1978)). Simple suture rectopexy involves suturing of the postero-lateral rectal wall with a series of nylon sutures on either side to the presacral fascia. The recurrence rates of this procedure is reported to be between 3% and 9% (Ross, Thompson, 1989). In series where simple suture rectopexy were combined with resection of redundant sigmoid colon, the recurrence rates reported in literature (Frykman 1955, Husa et al 1988)) are of same order as with simple suture rectopexy but with improvement in preoperative constipation. Laparoscopic approaches to all forms of rectopexy are now commonly done in many centres in developed countries and short term results are very comparable to the laparotomy approaches (Kellokumpu et al 2000, Yoon et al 2002).

## DISCUSSION

Complete rectal prolapse (or procidentia) is the description of full thickness protrusion of all layers of the rectum through the anal canal into the external environment. The disease has been a very topical issue amongst the colorectal surgeons for centuries (Ballantyne 1991). The disease occurs most commonly in elderly women, but also occur in males in whom it occurs across all ages (Maddoff and Mellgren 1991 Mann 1969). Amidst the controversies associated with this

condition, the most striking associated anatomical abnormality is the deep pouch of Douglas. Others include weakness of anal sphincters and levator ani muscles, loss of posterior curvature of the rectum in the sacral concavity, associated lax lateral and posterior rectal attachments, elongated mesorectum, redundant rectosigmoid as well as the prolapsing rectum (Maddoff and Mellgren, 1991, Mann 1969). New methods of investigation have also revealed perineal nerve injury in some patients (Madiba et al 2005; Parks et al 1977). From a functional point of view 50-70% of patients with rectal prolapse develop faecal incontinence and 30-50% constipation (Maddoff and Mellgren 1999, Madiba et al 2005). Moschcowitz ((Madoff and Mellgren 1999) as far back as 1912, observed the abnormality of deep pouch of Douglas in patient with rectal prolapse and suggested the theory of a sliding hernia. He reported that the anterior rectal wall is herniated to the defect in the pelvic fascia and that the sliding hernia is the cause of the rectal prolapse. This theory was refuted by Broden and Snellman in 1968 who demonstrated that rectal intussusception is the cause of rectal prolapse by use of cinedefaecography. The theory of rectal intussusception is that the rectal mucosa, 6-8cm from the anal verge becomes the lead point and intussusception is developed. Intussusception is aggravated by excessive straining, and if this occurs persistently over time, an apparent rectal prolapse results. With repeated intussusceptions occurring, the normal posterior curve of the rectum in the sacral concavity is lost making the rectum assume a somewhat straight position. Repeated movements of rectum out of the sacral concavity would appear to lead to elongated mesorectum, as well as laxity of lateral and posterior rectal ligaments. To date, the intussusceptions theories have been widely accepted but controversies still exist (Kairaluoma, Kellokum, 2005). It is unclear whether some of the abnormal anatomical findings are a cause or effect of rectal prolapse (Kairaluoma and Kellokum, 2005). Nonetheless, old and modern procedures described for treatment of rectal prolapse attempt at correcting some or all of these

anatomical abnormalities (Kairaluoma and Kellokum 2005, Corman, 2004).

Over the last century a plethora of techniques have been devised for the treatment of complete rectal prolapse (Kairaluoma and Kellokum, 2005, Corman 2004, Mann 1969). This portrays our imperfect understanding of the full mechanisms of causation of this disease and also indicates the absence of an ideal surgical management of this disease.

The optimal aim of treatment for rectal prolapse is the controlling of the prolapse, restoration of continence and prevention of constipation or impaired evacuation.

Since rectal prolapse was first described, over one hundreds methods of treatment have been written in literature (Fryman and Goldberg 1969, Mckee 1992). All surgical procedures, either old or new, attempt at correcting one or more of the observed anatomical and functional abnormalities. Some of these procedures failed woefully in treating the rectal prolapse, whilst others have varying degrees of success (Finlay and Aitchison 1991, Williams et al 1992). The surgical methods of repair are divided into perineal and abdominal approaches (Eung, 2011). The Thiersch wiring, a perianal approach was designed just to reduce the prolapsing rectum and keep it in place by forming a ring of support below the anal sphincters using wire sutures, later, silk, nylon, or tapes. The result of this repair was very poor, due to the very high recurrence rates (35-85%) (Labow et al 1980, Watts et al 1985) and other numerous complications (wound and anal infection, faecal impaction, anal soiling and wire or suture eroding the anal skin (Watts et al 1985, David 2007). The operation has been largely abandoned and confined to archives of operative surgery (Watts et al 1985). The perineal proctosigmoidectomy (Altemeier repair)- amputating the prolapse as a therapy for rectal prolapsed was introduced over 100 years ago, but because of high recurrence rates of between 16-30% (David, 2007) this has been largely abandoned except for gangrenous rectal prolapse and very high risk patients where abdominal surgery is judged hazardous (David, 2007). Another perineal operation is the Delorme procedure;

this involves reducing the prolapse by plicating the redundant rectal muscle wall after stripping off the mucosa. This is a compromise operation, removing the reservoir function of the rectum and recurrence rate ranges from 17-38% (Olive et al 1994, Kling et al 1996). All the other perineal approaches like anterior levatoroplasty, Lockhart-Murray's operation (posterior fixation of the rectum via perineal approach) have high and unacceptable recurrence rates and are all confined to archives of operative surgery.

A large number of abdominal approaches for repair of complete rectal prolapse have been described. These surgical approaches are targeted at correcting one or more of the observed anatomical abnormalities (Novell et al, 1999). Operations included isolated sigmoid resection, anterior resection of the rectum, transabdominal levator repair (Roseco-Graham repair), narrowing of pouch of Douglas operation (Moschowitz operation) (Watts et al, 1985; Morgan et al 1972, Penfold and Hawley 1992). These procedures have however been abandoned in favour of newer, more dependable techniques because of high and unacceptable recurrence rates (Yoshioka et al 1989, Husa et al 1988, Aitola et al 1999).

Majority of the current procedures involve rectal mobilization, division of lateral ligaments, performance of concomitant sigmoid colon resection and methods of rectal fixation. The rectal fixation operations (rectopexy) have all been shown to have low recurrence rates of 0% to 13% in most literatures (Aitola et al 1999, Cuitait 1959, Blatchford et al 1989) and today form the main bulk of the surgery for rectal prolapse (Blatchford et al 1989). There are various types of rectopexy with Ripstein rectopexy representing an anterior rectopexy (Gordman and Hoxeter 1978). This operation was for a while popular, but its popularity had waned because of slightly higher recurrence rates than posterior rectopexy and its tendency to post operative constipation (Gordman and Hoxeter 1978). The more popular of the rectopexies today are the posterior rectopexy achieved by suture (suture rectopexy), prosthesis (prosthetic or mesh rectopexy) (Aiota et al 1999, Cuitait 1959, Blatchford et al

1989). The recurrence rates of posterior rectopexy by whatever method used are about the same 0% to 8% in most series (Aiota et al 1999, Cuitait 1959, Blatchford et al 1989). There is a slight advantage of suture rectopexy over the repairs utilizing mesh. The lack of mesh could provide a reduction in rates of mesh induced infection rates and constipation from severe rectal stenosis due to mesh induced intense fibrosis (Ross and Thomson 1989). For this reason many surgeons advocate the abandonment of mesh rectopexy in favour of suture rectopexy (Athanasidis et al 1996).

Recently the advent of laparoscopic surgery has widened the horizon in colorectal surgery including surgery for rectal prolapse. All forms of rectopexy, resection and anastomosis can now be accomplished laparoscopically resulting in reduced post operative pain, decreased wound infection rates and shortened hospital stay. Analysis of result of open and laparoscopic rectopexy as regards recurrence rates are similar (Kellokumpu et al 2000, Yoon et al 2002).

## CONCLUSION

Complete rectal prolapsed is associated with distinct anatomical abnormalities, most striking as seen at surgery being the unusually deep pouch of Douglas. However it is the rectifying of the less obvious loss of posterior concavity of the rectum in the sacral curve that gives the best results in terms of low recurrence rates and correction of the functional abnormalities in complete rectal prolapsed.

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