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Research Article

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Pediatric Rectal Prolapse. Why Let Them Suffer? Why Dig The Well?

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ABSTRACT

***Objective**: Rectal prolapse is common in children below the age of 4 years. A significant number of children undergo spontaneous resolution over time, hence upfront surgical treatment is not commonly offered to these patients, resulting in prolonged sufferring in symptomatic children while hoping for a spontaneous resolution. Abdominal rectopexy involves extensive mobilization of the rectum followed by its fixation to the presacral fascia(1) thereby increasing the risk of damage to the nervi erigentes, with resultant postoperative constipation, bladder and sexual dysfunction. The present study was done on the premise that the pathophysiology of prolapse begins with intussusception and hence can be prevented by pexing the start point that is the rectosigmoid instead of the rectum.*

***Methods**: Our study included patients over a period of six years who underwent upfront surgery for full thickness rectal prolapse. The surgery performed was a modification of the Well's procedure, by avoiding rectal mobilisation completely and by fixing the rectosigmoid to the presacral fascia using an absorbable mesh.*

***Results**: 17 patients (mean age - 7 years) underwent surgery. Early recurrence occurred in one patient. There was no prolonged constipation, bladder dysfunction or mesh related complications.*

***Conclusion**: Upfront surgery for complete rectal prolapse stops the suffering a child has to undergo each time the child passes stools, while the parents are hoping for a spontaneous resolution with some form of conservative management. The surgical technique we followed is effective and avoids complications arising due to denervation of the rectum during mobilization.*

***Keywords**: Rectal prolapse, Rectopexy, Well's technique, mesh rectopexy, nervi erigentes*

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Introduction

Rectal prolapse is a relatively common condition in children below the age of 4 years. The two accepted theories regarding the etiology of rectal prolapse involve either a sliding hernia protruding through a defect in the pelvic floor, or a circumferential intussusception of the upper rectum and rectosigmoid colon [(1)]. The pathogenesis is poorly understood and hence several treatment options exist with their own advantages and disadvantages. The primary treatment is aimed at avoiding straining at stools by starting on stool softeners and laxatives.

The indications for surgery are ill defined and is usually not offered to patients until the surgeon is convinced that the prolapse has become debilitating despite conservative management. The principle of surgery is to mobilise the rectum and cause adherence of the rectum to the presacral fascia by causing fibrosis. Amongst the abdominal approaches, rectopexy with mesh is the most commonly performed, due to lower recurrence rates. Rectal mobilisation from the sacral promontory to the pelvic floor is a key component of all abdominal approaches. However the extensive nature of rectal mobilisation causes denervation of the rectum due to damage to the nervi erigentes, thereby leading to a high risk of post op chronic constipation, bladder and sexual dysfunction. A few studies have mentioned techniques to avoid this post op morbidity by attempting to preserve the lateral rectal ligaments[2,3].

Our study promotes the concept of upfront surgery in children with full thickness rectal prolapse, irrespective of the age of the patient or the duration of symptoms. A child with a prolapse undergoes immense physical and psychological suffering each time he passes stools, due to the mass protruding out, having to reposit it either by themselves or by the parents and the associated loss of self esteem. This continues to occur in all children on conservative management for varying durations as the definition of failure of conservative management is based only on the severity of the child's symptoms and the surgeon being convinced to stop conservative management and to offer surgery. Offering surgery upfront in these patients puts an end to this immense daily trauma.

The surgical procedure we performed, was a simple modification of the Well's procedure, by not mobilising the rectum, thereby completely avoiding the risk of damage to nervi erigentes. Though the ideal type of mesh to be used in rectopexy has not been proven in literature, our choice of an absorbable Polyglactin mesh reduces the chances of mesh related complications like mesh erosion associated with Polypropylene meshes and also reduces the high failure rate associated with biological meshes. We studied the post operative outcomes of our modified Well's procedure with respect to recurrence and complications.

Materials and Methods

This prospective observational study was conducted from 01st July 2014 till 31st Oct 2020 at a tertiary care Pediatric Surgery centre. Institute Ethics Committee approval was obtained and informed consent was obtained from legal guardians of all patients who were enrolled in the study. All children brought in with complaints suggestive of rectal prolapse were examined. The diagnosis of the type of prolapse was made either by inspection or by viewing photographs/videos recorded by the parents at home when the rectal prolapse occurred in the child. Patients with partial thickness mucosal prolapse were placed on conservative management with stool softeners and Sitz baths and kept on monthly follow up. Those who progressed to full thickness prolapse and all patients who initially presented with full thickness prolapse were enrolled in the study and offered surgery. Data collected included demographics, duration of symptoms and history of previous treatment received. Only exclusion criteria were refusal of surgery by parents/guardian. The Institutional Ethics Committee approved the study.

All patients enrolled in the study underwent surgery by a modified Well's technique performed by a Pediatric Surgery team consisting of either of four pediatric surgeons alternatively, each of whom were practicing consultants at the tertiary care centre. All the surgeons were experienced and were practicing surgery for more than a decade.

The surgery was performed under General Anesthesia with the patient in the supine position. With the surgeon standing on the left of the patient, a 5cm transverse incision was made at the mid-point of spino-umbilical line (Figure 1). After opening the peritoneum, the sigmoid colon was identified and delivered out (Figure 2). A 2 cm vertical window was created at the base of mesentery of sigmoid. Through this window, the sacral promontory was palpated and located. The posterior peritoneum and the soft tissue overlying the promontory was cleared. In some patients, the left common iliac vein crosses over the promontory. It has to be carefully dissected and lifted off to the left of the promontory to avoid inadvertent needle pass through the vein. A Polyglactin mesh was fashioned to 4 x 2 inches size. It was passed through the vertical window

Figure 1. Sigmoid colon delivered out and sacral promontory identified

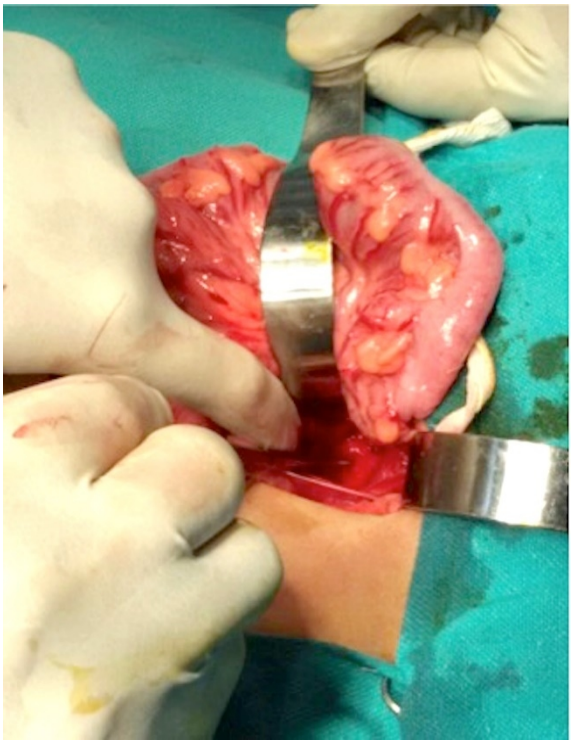

Figure 2. Mesh passed through window in mesosigmoid and fixed to sacral promontory

created in the mesosigmoid so that half of the mesh was on either side of the sigmoid colon, which would later be wrapped around the sigmoid. The mesh was fixed to the promontory using two interrupted Vicryl 3/0 stitches. Now the assistant retracted the sigmoid out of the pelvis gently. Mesh was wrapped around the sigmoid and fixed on either side of midline on the ventral aspect of sigmoid using 4/0 Vicryl suture with three interrupted stitches on either side leaving a finger breadth of sigmoid bare on the ventral aspect. No drain was placed (Figure 3).

Oral feeds were gradually started once bowel motility returned. All the patients were given Syp Lactulose 1 ml/kg so as to avoid straining in the immediate post operative period. Lactulose was gradually tapered off over a period of 1-2 months after dietary modification and toilet training practices were in place. This duration was to cater for the time taken for fibrosis to occur between the mesh and the presacral fascia thus causing adherence.

The patients were followed up in the OPD initially twice a month for two months then monthly, to look for resolution of symptoms and for post op complications like recurrence, constipation.

Figure 3. Mesh wrapped around rectosigmoid and fixed with seromuscular sutures

Table 1. Demographic profile, clinical presentation and outcome of patients

Total number of patients	33	
Type of prolapse at presentation:		
Partial thickness	18	
Full thickness	15	
Total number of patients who underwent surgery		17 (including 2 with partial thickness who progressed to full thickness)
Gender	Male	11
	Female	6
Age	< 4 years	2
(Mean age at surgery: 7 years)	4-10 years	12
	>10 years	3
Duration of symptoms	Acute	1
	<6 months	8
	6 months- 1 year	3
	1 year - 3 years	5
Conservative management prior to surgery	Yes	13
	No	4 (1 had acute irreducible prolapse)
Duration of conservative management (Average duration: 7.5 months)	Nil	5
	1 month - 6 months	8
	6 months -1 year	2
	1 year - 3 years	3
Complications after surgery	Recurrence	2
Follow up	< 1 year	2
	1-3 years	10
	3-6 years	5

Results

A total of 33 patients presented with complaints suggestive of rectal prolapse, of which 18 patients had partial thickness mucosal prolapse and 15 patients had full thickness prolapse. Patients with partial thickness prolapse were started on conservative management with stool softeners and Sitz bath and kept on regular follow up. 16 of 18 patients recovered after varying periods of conservative management ranging from 3 months to 12 months. 2 of 18 patients progressed to full thickness prolapse despite 6 months of conservative management and were taken up for surgery. 15 patients with full thickness prolapse were offered surgery without any further trial of conservative management. A total of 17 patients (15 upfront and 2 after progression from partial thickness prolapse) were enrolled in the study. There were 11 boys and 6 girls. The mean age at surgery was 7 years (range 18 months -13 years). The duration of symptoms lasted from an acute presentation to a maximum of 3 years. 13 out of 17 patients had received some form of conservative management with an average duration of 7.5 months (range 1-30 months). The youngest patient was an 18 months old girl with sudden onset prolapse, which was irreducible and was operated as a semi emergency. The duration of symptoms was from first time presenters to those having prolapsed for over 3 years, who were being treated elsewhere conservatively without any relief. 3 of 17 patients were neurologically impaired with chronic rectal prolapse. The same surgical procedure was performed in all patients and the same surgical team operated all patients. There were no immediate postoperative complications. Orals feeds were allowed on the day post-surgery and children discharged on the fifth postoperative day. No immediate recurrence was noted in any patient. 1 of 17 patients had a

recurrence after 5 months for which he again underwent the same surgery.

Mesh was again fixed to the promontory taking deep bites into the periosteum. The patient had uneventful recovery and has been on follow up for last 5 years since second surgery. In the other 16 patients who underwent surgery, there were no complications in the form of wound infection, seroma formation, enterocutaneous fistulae formation or intractable chronic constipation. Assessment of erectile dysfunction in pediatric age group is difficult hence parents were told to keep a watch on normal early morning penile tumescence in male patients. None of the parents came back with any such complaints. The demographic profile, clinical presentation and outcomes of our patients are mentioned in Table 1.

Rectal prolapse is commonly encountered in children with its highest incidence seen below the age of 4 years. There is a wide variation in the reported incidence of rectal prolapse. Two types of rectal prolapse exist: mucosal prolapse, which is more common and usually resolves with conservative measures, or full-thickness (complete) prolapse, which is more difficult to manage conservatively[4]. The primary treatment of rectal prolapse is nonoperative, through encouraging a high fiber diet, administering stool softeners, minimizing straining during defecation, and discouraging prolonged toilet sitting. The period of conservative management for rectal prolapse needs to be varied according to the severity of the case [3].

Sanders et al, [5] in a study of 341 patients, showed that most responded to conservative management within the first few weeks, and only 20 (5.8%) required treatment for longer than 3 months, with the average duration of presurgical treatment of 6 months. The success rate of primary treatment has been reported to be 28–50%[6-9]. Other studies have mentioned that the percentage of patients who fail conservative management and require surgery ranges from 10% to 40%[10-13]. This varied failure rates of conservative management shows that a large number of children continue to suffer with symptoms while on conservative management, wherein a definitive time period to stop conservative management and offer surgery has not been defined yet. Secondary treatment consists of surgical procedures designed to prevent the rectum from prolapsing. Indications for operative intervention are not definite and include longstanding symptoms, rectal pain, bleeding, ulceration, and prolapse that requires frequent manual reductions or is difficult to reduce [14]. Over 100 surgical procedures have been documented in the literature to treat rectal prolapse, indicating a lack of consensus from the surgical community as to the most efficacious treatment of this condition [6]. Randall et al [15] stated that less than 10% of rectal prolapse cases require a surgical treatment, while Koivusalo et al [14] declared that the ratio is about 14%. The aim of surgical intervention is to create fibrosis between the layers of the rectum in case of mucosal prolapse or between the rectum and its neighboring posterior fascia for full-thickness prolapse. The surgical technique of fixation of the mobilised rectum to the fascia of the sacrum, was first described by Kuemmet, who used single silk sutures. This procedure, however, was associated with a high rate of recurrence. It was modified by Orr using fascia[16], and by Wells using Ivalon sponge [17]. Ripstein [18] suggested the use of teflon mesh. The Wells and Ripstein procedures are commonly used world-wide in the treatment of rectal prolapse with excellent results.

In the Wells procedure, the rectum is mobilized from the sacral promontory to the pelvic floor. A sheet of polyvinyl sponge (Ivalon) is attached to the anterior surface of the sacrum between the promontory and the third and fourth segment by three midline sutures. The rectum is then drawn upwards and the Ivalon folded around it to enclose all but the anterior fourth or fifth of its circumference and is attached to the rectum by sutures along the anterior free edge of the sponge [17]. The extent of rectal mobilization as described by Wells invariably causes the nervi erigentes that is present in the lateral ligaments of the rectum to be divided, with a potential of causing postop constipation, bladder and sexual dysfunction.

Speakman et al [2] in 1991, studied the effect of division of the lateral ligaments on bowel function and anorectal physiology by randomizing patients to undergo full posterior mobilization with or without division of the lateral ligaments. In the group in whom the lateral ligaments were divided, an increased number of patients suffered constipation. The need for laxatives was greater after rectopexy with division of the lateral ligaments.

In an attempt to avoid the extensive dissection, Potter et al [3] performed laparoscopic suture rectopexy without carrying out dissection of the posterior rectal space or lateral rectal ligaments and reported minimal morbidity and a recurrence rate of 5%.

Studies on post op morbidity after rectal mobilization have been largely done on adult patients and have shown to cause significant post op morbidity in the form of constipation, bladder and sexual dysfunction. A similar extent of rectal mobilization is also likely to cause similar if not more damage in children. No

studies have assessed the post op outcomes of neurological damage after surgery for rectal prolapse in children.

The surgical technique we adopted aimed at avoiding rectal mobilization but at the same time being effective in having minimal chances of recurrence.

Our study intends to promote the concept of upfront surgery in children with full thickness prolapse, irrespective of age or duration of symptoms so that children are not left to continue with their suffering in the hope of a spontaneous resolution which is unpredictable. The surgery we offer is a modified Well's procedure, in that the rectum is not mobilised and an absorbable mesh is placed posterior to the rectogimoid and fixed to it laterally on either sides.

The premise of this study was that, despite all pathophysiological factors described for causation of rectal prolapse, the ultimate anatomical pathology is intussusception of redundant and mobile recto-sigmoid junction into a relatively fixed rectum. If intussusception is addressed by fixation of a mesh to the recto-sigmoid at the level of the sacral promontory, rectal prolapse can be prevented.

The advantages of the present surgical procedure as compared to other surgical procedures are that it avoids dissection in the pelvis and thus preventing hematoma formation & pelvic abscess subsequently, it absolutely prevents presacral autonomic nerve plexus (nervi erigentes) injury. It can be performed through a smaller incision, has reduced operative time and has lesser duration of hospital stay. This procedure has the advantage of being performed equally safely by a newly trained pediatric surgeon as much as an experienced surgeon, without the risk of autonomic nerve injury.

Although the numbers in this study are limited, as it is a single centre study, the spectrum of our patients covered the whole range from very young (18 months) to fairly grown up (13 years, 70 kg). We also had presentations varying from acute irreducible prolapse to chronic ones having symptoms for over 3 years. We also operated on 3 neurologically impaired (cerebral palsy) patients who are generally considered to be having a higher risk of recurrence. We had only one recurrence in a 9-year-old child wherein the sutures fixing the mesh seemed to have given away. In this patient the left common iliac vein was overlying the promontory. To avoid injuring the vein the bites were unintentionally superficial (not through the periosteum) and hence the recurrence. During re exploration, the vein was dissected away from the promontory and the mesh was fixed with deep needle passes through the periosteum.

The results of the present study clearly show that this procedure suits all varieties of patients.

This surgery indicates that the first step in development of full thickness rectal prolapse is the sigmoid intussuscepting into the rectum. The lumen of rectum thereby is reduced so child starts to strain to pass stools through narrowed rectum. This further leads to increasing intussusception and further narrowing of rectal lumen which increases the straining on part of the patient. A vicious cycle develops involving intussusception, narrowed lumen and straining. So if we fix the rectosigmoid the first step is avoided and hence ultimately rectal prolapse is prevented.

Children with complete rectal prolapse should be offered upfront surgery instead of continuing on prolonged trials of conservative management in the hope of a spontaneous resolution. Surgery stops the prolonged preoperative and daily suffering of the child and the associated stress to the child and the parents. Our technique of fixation of the redundant rectosigmoid to the presacral fascia using an absorbable mesh is an effective and safe technique of rectopexy that avoids dissection deep in the pelvis and serious complications like damage to the nervi erigentes associated with rectal mobilization.

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