Modified Gant–Miwa approach versus modified Thiersch's stitch for the management of rectal mucosal prolapse in children: how to decrease recurrence?

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Purposes
The aim of this study was to assess the early outcomes and advantages of a modified Gant–Miwa approach for the treatment of rectal mucosal prolapse in children and determine how this modification helps decrease recurrence when compared with modified Thiersch's stitch in a prospective and randomized setting.

Background
Recurrence of rectal mucosal prolapse after rectal mucosal prolapse repair through the anus represents a problem for the surgeon and the patient. Although there are many trials to prevent this recurrence, a definite solution has not been found yet.

Patients and methods
The study included 60 children with rectal mucosal prolapse (mean age 3.6 ± 1.2 years) who were divided into two groups: group A ($N = 30$), comprising patients who underwent the modified Gant–Miwa operation, and group B ($N = 30$), comprising patients who underwent a modified Thiersch's prolene stitch.

Results
The modified Gant–Miwa operation was a successful approach with which to decrease constipation [2.0 (6.6%) vs. 9.0 (30%) cases; $P < 0.05$] and recurrence [1.0 (3.3%) vs. 5 (16.6%); $P = 0.0002$] to a great extent, although it was followed by more anal soiling in the first 2 weeks (11.3 ± 0.7 vs. 3.7 ± 0.2; $P > 0.05$).

Conclusion
The modified Gant–Miwa operation was a successful approach for decreasing early postoperative morbidity, especially constipation and recurrence, and thus incidences of surgical redo because of complications were also fewer, despite it being associated with more anal discharge especially in the first 2 weeks.

Keywords:
modified Gant–Miwa approach, modified Thiersch's stitch, outcomes, prolene suture, rectal mucosal prolapse

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Introduction

The rectum is located in the last 20 cm or so of the large bowel. It is the temporary storage area for bowel motions. Rectal prolapse was described as early as 1500 BC [1,2]. Rectal prolapse occurs when a mucosal or full-thickness layer of rectal tissue slides through the anal orifice. Problems related to fecal incontinence, constipation, and rectal ulceration are common [1,3,4].

The precise cause of rectal prolapse has not been defined; however, a number of associated abnormalities have been found. As many as 50% of prolapse cases are caused by chronic straining at defecation and constipation. A deep pouch of Douglas, a shallow sacral curvature, weakness of the pelvic floor, and decreased resting anal sphincter pressure have also been associated with rectal prolapse [5,6].

The symptoms of rectal prolapse depend on severity, but can include pain and discomfort, blood and mucus discharge from the anus, difficulty in passing a bowel motion, protrusion of the rectum through the anus, leakage of liquefied feces, particularly following a bowel motion or fecal incontinence, or reduced ability to control the bowel [7,8].

Rectal prolapse was more common 50 years ago than now, and this decreased occurrence is thought to be due to improved nutrition and hygiene in industrialized countries [5,6,9]. Prolapse of the rectum may involve only the mucosa for not more than 1.25–3.75 cm [1,2,5], which is the least serious form and is most common in the pediatric population, or it may involve all layers of the rectum protruding through the anus (procidentia) [9–12]. Most cases of childhood prolapse occur in patients younger than 4 years, with the highest incidence in the first 2 years of life [13–15].

Treatment depends on many individual factors, such as age of the person, severity of the prolapse, and

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whether or not other pelvic abnormalities are present (such as prolapsed bladder). Patients who present with a prolapsed rectum should undergo manual reduction. Conservative management is appropriate in selected patients. Treatment should be directed at the underlying cause. After treating the underlying cause, conservative management is usually successful. Cases of difficult reduction and patients with recurrent episodes are less likely to respond to conservative measures [16].

Surgical treatment is reserved for patients who do not improve with conservative management or suffer from complicated rectal prolapse (e.g. recurrent rectal prolapse, painful episodes, ulceration, rectal bleeding) [17].

The present study added a modification to the Gant–Miwa approach by performing three stays sutures (absorbable suture material, polyglycolic acid) passed separately to plicate the mucosa from the dentate line to the end of the anal mucosal prolapse at 3, 7, and 11 o'clock positions.

Patients and methods

The study was conducted after obtaining approval from the local ethical committee of Benha University and written fully informed patient consent. It included 60 children with rectal mucosal prolapse (mean age 3.6 ± 1.2 years) from Benha University Hospital who were suitable candidates for surgery during the period between October 2012 and March 2014. A prospective, randomized trial was conducted to compare surgical treatment outcomes of rectal mucosal prolapse in children using the modified Gant–Miwa approach (group A; *N* = 30 cases) with management outcomes using the modified Thiersch's prolene stitch (group B; *N* = 30 cases) (Table 1 and Graph 1); the study population consisted of 33 (55%) female and 27 (45%) male children (Graph 2).

Inclusion criteria

The children included in this study were suffering from rectal mucosal prolapse resistant to conservative measures (such as treatment for constipation or diarrhea, treatment for parasitic infestation and intestinal infections, correction of malnutrition, and prevention of the wrong squatting position) or from complicated rectal mucosal prolapse (e.g. painful episodes, ulceration, rectal bleeding).

Exclusion criteria

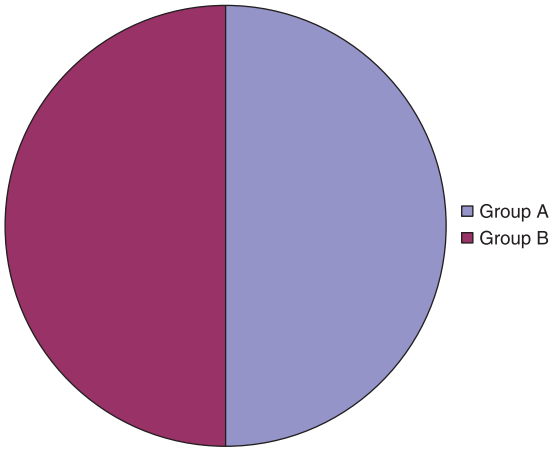
Children suffering from complete rectal prolapse or who were unfit for general anesthesia were excluded from this study.

All children were subjected to the following: full history taking to ascertain the number of prolapses and possibility of its reduction; a clinical examination [a general one performed in a meticulous way, including airways, vital signs, back, abdominal and skeletal examination (body weight), for determining fitness for surgery, and a local examination to detect the type of prolapse as well as for determining whether the patient was suffering from a partial prolapse of the rectal mucosa and the submucosa (but not the entire wall) (protrusion from the anus for more than 1.25–3.75 cm) or from a complete prolapse of the entire wall (protrusion more than 3.75 cm), with such

Table 1 Distribution of cases

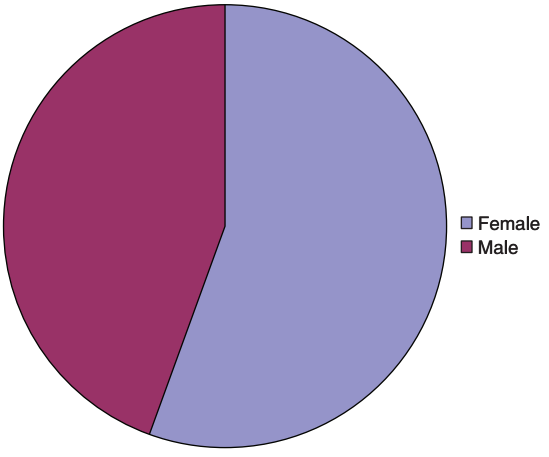
Groups	Group A [*N* (%)]	Group B [*N* (%)]
	30 (50)	30 (50)
Approach	Modified Gant–Miwa	Modified Thiersch's

Graph 1



Distribution of cases.

Graph 2



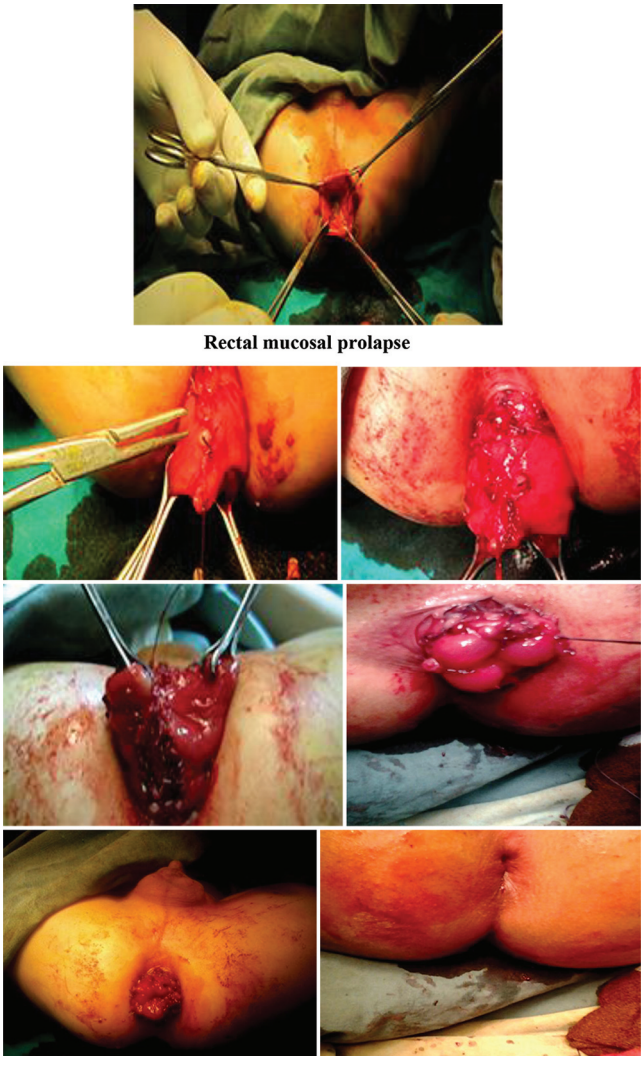
Sex distribution.

children being excluded]; and routine preoperative laboratory tests such as complete blood count, blood sugar level, and renal function tests.

Operative procedures

Both techniques in this study were implemented with the child under general anesthesia, in lithotomy position. In the modified Gant–Miwa approach traction was applied of the rectal mucosa through the anus, following Babcock's method; then three vertical stays sutures (absorbable suture material, polyglycolic acid) were passed separately to plicate the mucosa from the dentate line to the end of the anal mucosal prolapse at 3, 7, and 11 o'clock positions; this was followed by another mucosal plication using multiple transverse separate submucosal stitches that were arranged in lines (2-mm intervals) around the artery forceps grasping the rectal mucosa without incising the mucosa until the rectal mucosa was shortened and reduced; finally the three stays sutures were tied. All patients undergoing this procedure were categorized under group A (Fig. 1) [18]. In the modified Thiersch's prolene or nylon stitch technique, a 0.5-cm-long vertical incision in the midline at 1 cm anterior to the anal verge at 12 o'clock position and another 0.5-cm-long incision at 1 cm posterior to the anal verge in the skin and subcutaneous tissue at the 6 o'clock position were made. Then a zero nylon suture attached to a big curved needle (⅓rd circle, 50 mm) was introduced into the anterior incision subcutaneously backwards around the anal verge on one side, the tip of which emerged from the posterior incision. The needle was pulled out, and introduced into the same incision going anteriorly, subcutaneously, around the anal verge on the other side of the anus until the needle appeared from the anterior incision. The suture was tied over the terminal phalanx of the little finger of the assistant and was removed after 1–4 months. All children who underwent this procedure were categorized under group B (Fig. 2) [11,12,19].

Figure 1



Modified Gant–Miwa approach.

Figure 2

Modified Thiersch's prolene stitch.

Outcome items

Postoperative outcomes included incidence of anal discharge (soiling), as noted by the parents in the underwear of the child, constipation – that is, difficulty in defecation or fecal impaction during the first 6 weeks – and recurrence after removal of Thiersch's stitch after 4 months.

Statistical analysis

Data were analyzed using SPSS version 16 (Bristol University, Bristol, UK). Qualitative data are presented as numbers and percentages and compared between groups using *Z*-tests. *P*-values greater than 0.05 were considered insignificant; *P*-values less than 0.05 were considered statistically significant; and *P*-values less than 0.01 were considered highly statistically significant.

Results

The basal data of the two groups did not differ significantly. This study included 60 children; the number of patients was the same in the two groups (30 cases in each group) with a mean age of 3.6 ± 1.2 years. Indications for surgery were failed conservative measures or complicated partial rectal prolapse. Types of reduction of rectal prolapse were spontaneous, manual, or irreducible (Table 2 and Graph 3). All patients were fit for surgery. None of the patients were lost to follow-up, and data collection was complete.

The postoperative recurrence rate was significantly lower in children of group A [*N* = 1 case (3.3%)] compared with children of group B [*N* = 5 cases (16.6%); *P* = 0.0002; Table 3 and Graph 4).

Anal discharge in group A was significantly higher than in group B. This was known by observing the child's underwear for soiling, especially during the first 2 weeks (anal discharge: 11.3 ± 0.7 vs. 3.7 ± 0.2; *P*<0.05), after which there was no significant difference between the two groups (2.1 ± 0.3 vs. 1.9 ± 0.6; *P*>0.05; Table 4 and Graph 5).

As regards constipation, there were significantly fewer complaints by parents of children in group A compared with group B especially during the first week (2.0 vs. 9.0 cases; *P*<0.05; Table 5 and Graph 6).

In group A, two patients who developed constipation responded well to rectal enema and mild laxatives; however, among the nine patients in group B who developed constipation, six responded well to rectal enema and mild laxatives, whereas three patients did not respond to this conservative treatment and required their stitch to be opened and redone on a bigger-sized finger or dilator (Table 6and Graph 7).

Table 2 Types of reduction of partial rectal prolapse

Spontaneous [*N* (%)]	Manual [*N* (%)]	Irreducible [*N* (%)]
43 (71.7)	13 (21.6)	4 (6.7)

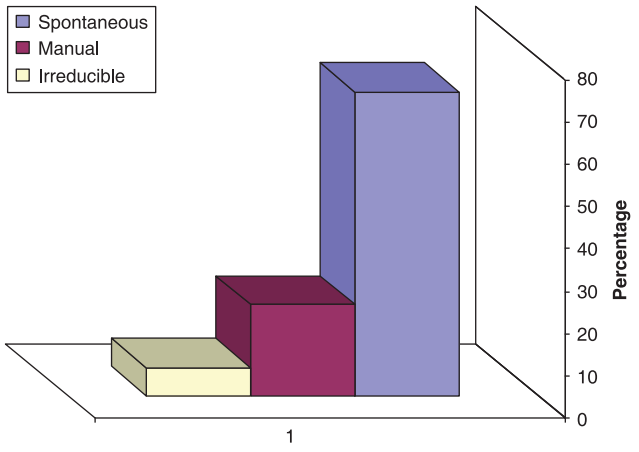
Table 3 Recurrence rate

Group A [*N* (%)]	Group B [*N* (%)]	*t*-value	*P*-value
1 (3.3)	5 (16.6)	4.496	0.0002 (high significance)

Table 4 Anal discharge assessment by observation

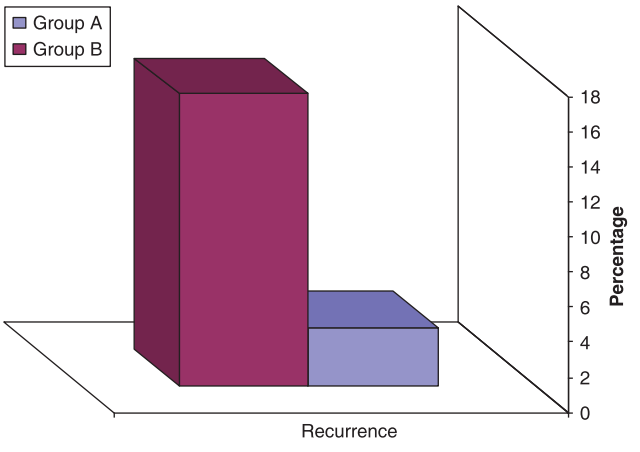
Anal discharge	Group A	Group B	*P*-value
First 2 weeks	11.3 ± 0.7	3.7 ± 0.2	<0.05 (significant)
After that	2.1 ± 0.3	1.9 ± 0.6	>0.05 (nonsignificant)

Graph 3



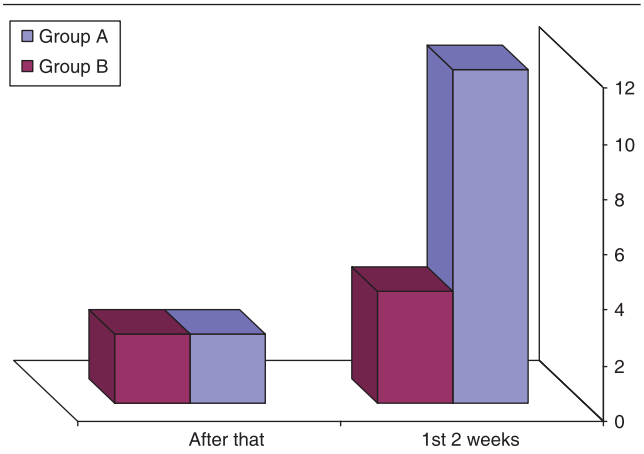
Type of reduction of rectal prolapsed.

Graph 4



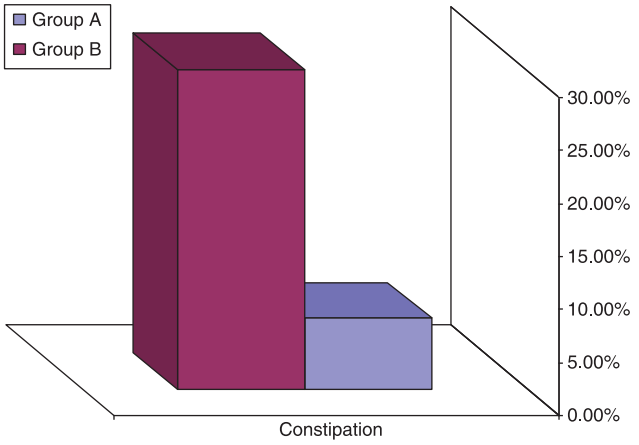
Recurrence rate.

Graph 5



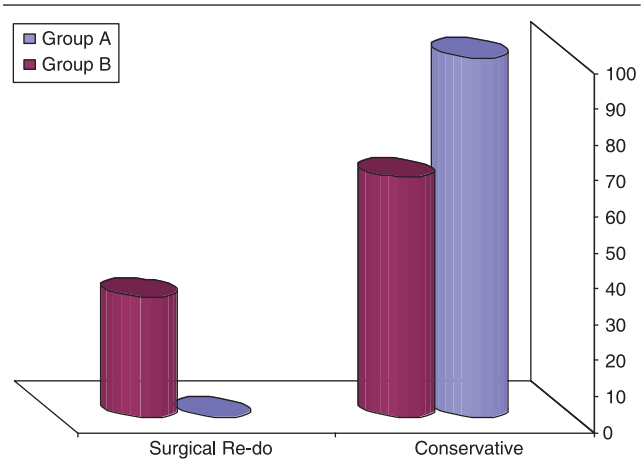
Anal discharge assessment by observation.

Graph 6



Constipation (difficult defecation) during the first week.

Graph 7



Constipation management.

Discussion

Treatment depends on many individual factors, such as the age of the person, the severity of prolapse, and whether or not other pelvic abnormalities are present (such as prolapsed bladder). Patients who present with a prolapsed rectum should undergo manual reduction. Conservative management is appropriate in selected patients. Treatment should be directed at the underlying cause. After treating the underlying cause, conservative management is usually successful. Cases of difficult reduction and patients with recurrent episodes are less likely to respond to conservative measures [16].

Surgical treatment of rectal prolapse has unpredictable results, regardless of the approach. Perineal operations are safer than abdominal ones but carry a higher likelihood of recurrence of the prolapse. Functional results probably depend more on the initial severity of the disorder than on the type of operation. Surgical correction of rectal prolapse should be performed through the anus, as this procedure is less stressful on the body [20].

Perianal sutures placed subcutaneously and mucosal plication all act to create a mechanical barrier to contain the prolapse and provoke an inflammatory response on the perirectal tissues to generate a fibrosis rather than a toneless sphincter [21,22].

The present modified Gant–Miwa procedure by three stays sutures (absorbable suture material, that is, polyglycolic acid) passed separately to plicate the mucosa from the dentate line to the end of the anal mucosa at 3, 7, 11 o'clock; that finally tied after original Gant–Miwa procedure gave more support to the rectum that led to improvement; success rate (97.8%) in addition to importance of original Gant–Miwa procedure that induce more broad fibrous ring than the Thiersch's operation with a success rate of 71–92% [18].

The Thiersch's operation or sling procedure uses synthetic materials to create a perianal sling to support the rectum. It has a success rate of about 85–93%. This procedure is a good choice for children because

Table 5 Constipation (difficult defecation or fecal impaction) during the first week

Groups	Constipation [*N* (%)]	Total number of cases	*P*-value
Group A	2 (6.6)	30	<0.05 (significant)
Group B	9 (30)	30	

Table 6 Constipation management

Groups	Group A [*N* (%)]	Group B [*N* (%)]
Conservative	2/2 (100)	6/9 (66.7)
Surgical redo	0/2 (0)	3/9 (33.3)

it can be done with self-absorbing sutures to provide temporary relief of symptoms until the base pathology is managed [23].

Perianal sutures of Thiersch's operation provoke an inflammatory response on the perirectal tissues to generate a narrow fibrous ring; therefore, it is considered a palliative procedure as it does not cure the prolapse itself. In contrast, the modified Gant–Miwa procedure cures the prolapse with good functional results, and with overall patient satisfaction [24].

Both procedures can be performed with minimal morbidity and short hospital stay, often in an outpatient setting, with no mortality and almost no serious complications [21,22].

Conclusion

The present study concluded that the modified Gant–Miwa operation is a successful approach in children with rectal mucosal prolapse who are nonresponders to conservative treatment to decrease early postoperative morbidity, especially constipation and recurrence, to a great extent ($P = 0.0002$) during the follow-up period compared with modified Thiersch's stitch. Thus, incidences of surgical redo due to complications were also fewer, although the modified Gant–Miwa approach was associated with more anal discharge especially during the first 2 weeks.

Acknowledgements

Conflicts of interest

None declared.

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