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ORIGINAL ARTICLE

To Study the Outcome of Posterior Sagittal Anorectoplasty in Anorectal Malformations

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ABSTRACT

Aim: To assess the effectiveness of posterior sagittal anorectplasty for the repair of anorectal malformations in terms of postoperative complications and functional outcomes.
Study design: Descriptive prospective study.
Place and duration of study: Sahiwal Teaching Hospital, Sahiwal. From 1st January 2016 to 31st December 2019.
Methodology: Forty-two children with high/intermediate anorectal malformations, who underwent posterior sagittal anorectoplasty, were included in the study. Patients with low variety anorectal malformations, recto vestibular/ano vestibular fistula, persistent cloaca and patients with sacral dysraphism, spinal dysraphism, myelomeningocele spina bifida occulta and menifesta were excluded. Demographic information included age, gender, weight, type of anorectal malformation, type of surgery performed, operation time and hospital stay. Immediate post-operative complications were also noted. Bowel habits, constipation and faecal incontinence were evaluated in all patients during the follow up period.
Results: Thirty-one **(**73.80%) were males and 11(26.19%) were females and mean age was 1.72 years. The mean weight at the time of operation was 11.00 kg. High variety anorectal malformations were 14(33.33%) and intermediate were 28(66.66%). Rectourethral fistula 25(59.52%) was most common variety seen in males. Recto bulber urethral fistula in 17(40.47%) and recto prostatic urethral fistula in 8(19.04%) patients were seen. Anal agenesis without fistula 7(16.66%) was most common anomaly in females. Overall complication rate was 15(35.71%). Constipation 11(26.19%) was most common post-operative complication. True fecal incontinence was seen in 3(7.14%) patients. Strong and effective squeeze of anal sphincter was seen in 39 (92.85%) patients and satisfactory bowel habits were present in 37 (88.08%) patients.
Conclusion: Posterior sagittal anorectplasty is a useful procedure in the management of high/intermediate anorectal malformations, precise identification and reconstruction of muscle complex result in good anatomical and functional outcome. Immediate post-operative complication rate is also low.
Keywords: Anorectal malformations, Posterior Sagittal Anorectoplasty, Postoperative complications, Functional outcomes

INTRODUCTION

Anorectal Malformation (ARM) is one of the most common congenital intestinal anomalies with an incidence of 1 in 4000 to 5000 births and a slightly higher prevalence in boys[1]. It has a wide spectrum of pathoanatomic abnormalities, from minor defects to complex malformation such as persistent cloaca and from isolated anomaly to associations with urogenital, cardiac, oesophageal atresia, gastrointestinal, vertebral, and limb anomalies[2,3].

Anorectal malformations have been treated since antiquity. The first description of anorectal malformation (ARM) repair dates back to the second century AD by Sorano. Although it was unsuccessful, the first surgical attempt was made in 1783 by performing an inguinal colostomy. Various methods of surgical repair have evolved from first anoplasty by Amussat in 1835, to an abdominal perineal pull through in which bowel was pulled down close to the sacrum and through the puborectalis sling.[4] Then the first time posterior sagittal approach was used in 1980 and it allowed the direct exposure of this complex anatomic area.[5] Posterior sagittal anorectoplasty, which was introduced by Pena and de Vries in 1980, is now widely accepted as a standard surgical procedure for the management of anorectal malformations and many published studies have shown better functional outcome and low complication rate after posterior sagittal anorectoplasty[6,7,8]. Despite its widespread use, poor functional outcomes are still reported after posterior sagittal anorectoplasty[9].

Traditionally, posterior sagittal anorectoplasty is performed as multistage procedure – temporary diversion colostomy in neonatal period, posterior sagittal anorectoplasty followed by colostomy closure. With the advancement in neonatology, anaesthesiology, and surgical expertise, pediatric surgeons are increasingly focusing on primary posterior sagittal anorectoplasty in neonates. Primary posterior sagittal anorectoplasty performed at birth, without preceding colostomy is safe and feasible[10].

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Laparoscopically assisted anorectal pull through was first reported by Georgeson et al in 2000[11]. Due to the minimal invasive nature of laparoscopically assisted anorectoplasty, it provides better cosmetic results, rapid recovery, less pain and shorter hospital stay[12]. Several concerns remain, whether it has better functional outcomes compared with posterior sagittal anorectoplasty[13-15].

With the evolution of surgical techniques, outcome of patients with anorectal malformations has improved. However, decision regarding the choice of approach and procedure depends on the settings, infrastructure and surgical expertise. In our settings, we do traditional posterior sagittal anorectoplasty in patients with high and intermediate variety of anorectal malformations. This study was carried out to evaluate the procedure in terms of postoperative complications and functional outcomes.

MATERIALS AND METHODS

This prospective descriptive study conducted in the Department of Paediatric Surgery, Sahiwal Teaching Hospital, Sahiwal, from 1st January 2016 to 31st December 2019 after permission from Ethical Committee. A total of 42 children with high/intermediate anorectal malformations were included. Age ranged from nine months to five years. All patients were managed previously with temporary diversion colostomy in neonatal period. Patients with low variety anorectal malformations, female patients with recto-vestibular/ anovestibular fistula., patients presented with persistent cloaca, sacral dysraphism, spinal dysraphism, myelomeningocele and spina bifida occulta and menifesta were excluded. Pre-operative assessment was done with history, clinical examination and lab investigations. A thorough examination was particularly performed to evaluate the perineal anatomy and sacral defects. Distal loopogram was performed in all patients to evaluate the anatomy of distal loop. Abdominal sonography and plain X-ray spine were advised to assess associated anomalies. Echocardiography was performed only in selected cases. Distal loop preparation was carried out with normal saline. Antibiotics, ceftriaxone and

metronidazole were started 24 hours before surgery and continued postoperatively for five days. Posterior sagittal anorectoplasty was performed according to the basic principles of posterior sagittal approach, as described by de Vries and Pena. Anal dilatation started two weeks after repair. Divided descending colostomy was closed once desired anal size was reached, usually six to eight weeks after posterior sagittal anorectoplasty. Variables studied included age, gender, weight, type of anorectal malformation, type of surgery performed, operation time and hospital stay. Patients were classified according to international classification of anorectal malformations, into types (high and intermediate) and subtypes. Immediate post-operative complications were also noted. Bowel habits (feeling of urge, capacity to report urge, ability to hold back), constipation and faecal incontinence were evaluated according to Krickenbeck classification. Bowel habits were assessed in children above three years of age. Sphincter was assessed according to Kelly's clinical score. The patients were followed in outdoor patient department till they became toilet trained. Minimum follow up period was one year.

All patients were operated under general anaesthesia with endotracheal intubation. Urinary catheter was inserted preoperatively. Patient was placed in prone position with elevated pelvis. An electrical stimulator was used to elicit muscle contraction and site of new anus was identified. Midsagittal skin incision, leaving equal amount of muscle on both sides, was given. The incision exposed the subcutaneous tissue, parasagittal fibers, muscle complex and levator muscle. The sphincter mechanism/muscle complex was divided. The deep pelvic fascia was opened and rectal pouch was identified. Two silk sutures were placed in the posterior rectal wall and rectal pouch was opened longitudinally between the sutures. Once the fistula was identified, separation of rectal pouch was performed by sharp dissection. Initially followed submucosal plan, then the dissection became full rectal wall thickness. Rectum was separated completely from urethra, staying close to the rectal wall. Rectourethral fistula was closed in two layers. Tapering of rectum was performed whenever it was needed. Then rectum was pulled down within muscle complex and standard anoplasty was performed. Wound closed in layers. Statistical analysis was performed using SPSS version 24. Student t test was applied and $p<0.05$ considered as significant

RESULTS

There were 31 (73.80%) males and 11(26.19%) females and age ranged from 0.75–5 years with mean age was 1.72 years. The mean weight at the time of operation was 11.00kg (range 8.5-18kg). Duration of surgery ranged from 80-110 min (mean 88.50min). Average hospital stay was 5.64 days (range 4-9 days). High variety anorectal malformations were 14 (33.33%) and intermediate were 28(66.66%). Rectourethral fistula 25(59.52%) was most common variety seen in males. Recto bulbar urethral fistula in 17(40.47%) and recto prostatic urethral fistula in 8(19.04%) were recorded (Table 1).

Table 1: Types and sub types of anorectal malformations

Gender	High variety	Intermediate variety
Male	10 (23.80%)	21 (50.00%)
Female	4 (9.52%)	7 (16.66%)
Types of male anorectal malformations		
Type	**Sub-type**	**No. (%)**
High variety	Recto vesical fistula	2(4.76%)
	Recto prostatic urethral fistula	8(19.04%)
Intermediate Variety	Recto bulbar urethral fistula	17(40.47%)
	Anal agenesis without fistula	4(9.52%)
Types of female anorectal malformations		
High variety	Rectal Atresia	1 (2.38%)
	Anorectal agenesis without fistula	3 (7.14%)
Intermediate Variety	Anal agenesis without fistula	7 (16.66%)

Overall complication rate was 15 (35.71%). Constipation was reported in 11(26.19%) patients and was most common post-operative complication. Soiling was seen in 2(4.76%) patients of constipation with fecal impaction. True fecal incontinence was seen in 3(7.14%) and mucosal prolapse in 4(9.52%) patients (Table 2). Strong and effective squeeze of anal sphincter was seen in 39 (92.85%) patients. Voluntary bowel habits were assessed in 35 children who were above three years of age and satisfactory bowel habits were present in 30(85.71%) patients (Table 3).

Table 2: Post-operative complications

Complication	No.	%
Wound infection	3	7.14
Anal stenosis	7	16.66
Mucosal prolapse	4	9.52
Constipation	11	26.19
Fecal incontinence	3	7.14

Table 3: Assessment of constipation, incontinence and sphincter

Variable	No.	%
Constipation		
Grade 1 (manageable by change in diet)	2	4.76
Grade 2 (requires laxatives)	8	19.04
Grade 3 (resistant to laxatives & diet)	1	2.38
Incontinence		
Grade 1 (occasionally, once or twice a week)	1	2.38
Grade 2 (every day, no social problem)	1	2.38
Grade 3 (constant, social problem)	1	(2.38
Sphincteric function		
Strong and effective squeeze	39	92.85
Week and partial squeeze	2	4.76
No contraction	1	2.38

DISCUSSION

Anorectal malformations are very common and complex congenital anomalies with lot of anatomical variations. The management of anorectal malformation has been a cause of major concern to pediatric surgeons all around the world. Despite the advances in surgical techniques, children with anorectal malformations have to face the challenges of bowel, bladder, and sexual dysfunction and psychosocial problems. Numerous operations have been devised for treatment of anorectal malformations. The ultimate aim of surgery is to reconstruct the functional and anatomically aesthetic neo-anal canal and anorectum. Posterior sagittal anorectoplasty enables the paediatric surgeons to assess the distal rectal pouch along with any associated fistulas. It also involves the precise identification and reconstruction of muscle complex around neo-anus. This study documents our experience of this technique.

Slight male preponderance is reported in majority of the published literature[16-18]. However, in this study a significant male preponderance was seen. Exclusion of recto vestibular fistula and persistent cloacal from this study may the reason. However similar findings have been reported in some studies conducted in Pakistan.[19,20] Some social factor, like gender preference, may be the reason. Female anorectal malformations may be under reported. In our study high variety anorectal malformations were 14(33.33%) and intermediate were 28(66.66%). In another study high anorectal malformations accounted for 33 (34.4%), intermediate 15(15.6%) and low types were 48(50%)[18]. Rectourethral fistula, 25 (59.52%) was the most common variety seen in males. This finding of our study is consistent with published literature[18,19,21]. Overall complication rate was 15(35.71%) in the present study. Similar complication rate, 11(33.33%) reported in one study.[18] Most of the complications were minor and settled with conservative measures. Wound infection was present in 3(7.14%) patients. High overall wound infection, 28(31%) was reported in one study. Nineteen patients (21%) had superficial and 9(10%) deep wound dehiscence.[22] Patients of single stage primary posterior sagittal anorectoplasty were also included in this study. Low wound infection rate in our study may be due to the presence of colostomy in all patients. Seven patients (16.66%) developed anal stenosis which was managed conservatively with periodic dilatation. Osagie[18] reported

anal stenosis in 3(9%) patients. All patients responded to closely supervised anal dilatation.

The functional outcomes are subjective symptoms and difficult to interpret. The evolution of different classifications and scoring systems has further increased the difficulty in comparing the functional results. On the other hand, functional outcomes do not depend only on the surgical technique. Perianal innervation, rectal motility and development of muscle complex and pelvic floor muscles also play vital role. Studies of anorectal function after posterior sagittal anorectoplasty have shown varying results. Constipation was the most common functional disorder observed in our study. Eleven patients (26.19%) developed constipation, 2(4.76%) grade 1 and managed with diet modification and toilet training, 8(19.04%) grade 2 and were treated with laxatives and 1(2.38%) grade 3 constipation required rectal irrigation and fecal evacuation. Other studies also reported constipation as the most common complication in patients who underwent posterior sagittal anorectoplasty[21,23,24]. Fecal incontinence is most significant long-term problem after anorectal surgery and occurred in 3(7.14%) patients in this study, two patients with rectovesical fistula and one with recto prostatic urethral fistula. None of the patients had urinary incontinence.

In this study, 30(85.71%) patients were able to achieve voluntary bowel habits. Pena and Hong[25] reported that 75% of patients achieved voluntary bowel movements[8]. De Varies reported that 46(73%) patients showed good anorectal function. Results from a study by Sukarnjanaprai[24] also showed that 37(68.3%) had good voluntary bowel habits. The results of our study are comparable with the recent studies.

CONCLUSION

Posterior sagittal anorectoplasty is an appropriate procedure in the management of high/intermediate anorectal malformations. Precise identification and reconstruction of muscle complex results in good anatomical and functional outcome. Immediate post-operative complication rate is also low. In the skilled hands it is safe and effective procedure.

Conflict of interest: Nil

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