



# Outcome of Muscle Complex Saving PSARP (MCS PSARP): 3 Years Experience in a Tertiary Pediatric Hospital in Bangladesh

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## Abstract

**Background:** Anorectal malformation is one of the most frequently encountered problems in pediatric surgery. A modification in the treatment of anorectal malformation was inevitable over 19<sup>th</sup> and 20<sup>th</sup> century until Devries and Pena proposed PSARP at 1982. Pena proposed a longitudinal incision from tip of the coccyx to the proposed anus which ensures complete visualization of the lower rectal pouch. But it needs to cut the muscle complex posteriorly on the midline. But our proposed technique ensures the placement of the lower rectal pouch in the center of the sphincter system.

**Objective:** To see the outcome of muscle complex saving PSARP in the treatment of high and intermediate variety of anorectal malformation.

**Materials and Method:** Total 31 patients were operated by muscle complex saving PSARP from Jun 2017 to Jun 2020. Intermediate and high variety of anorectal malformation with or without fistula from both sex were included in the study. Every patient underwent muscle complex saving PSARP under general anesthesia.

**Results:** The mean age of the patients were  $29.56 \pm 14.40$  months, ranges from 9 to 52 months. 15 out of 31 patients underwent following MCS PSARP. Among these 15 patients 12 (80%) had good bowel control, 2 (13.33%) had fair and 1 (6.67%) patient had poor bowel control. Mean operation time was  $77.97 \pm 6.78$  minutes.

**Conclusion:** Muscle complex saving PSARP is the modification of Pena's classic PSARP with minimum morbidity. As it ensures direct visualization of the muscle complex and placement of lower rectal pouch in the center of the sphincter which is one of the key factor for low morbidity.

**Keywords:** Muscle complex; PSARP; Anorectal

## Introduction

Anorectal malformation is one of the most frequently encountered problems in pediatric surgery. Before the era of 1835 most of the infant born with anorectal malformations died without any treatment. At 1835 Amussat was the first person to mobilize lower rectum and to perform 1<sup>st</sup> successful anoplasty [1]. In early 19's single stage abdominoperineal or abdominosacroperineal approach was tried for high variety ARM's. In early 80's Devries and Pena invented PSARP (Posterior sagittal anorectoplasty), and it get popularity among pediatric surgeon as it allowed full visualization of the sphincter complex [2]. Day by day PSARP became the gold standard procedure for correction of high and intermediate variety ARM's. Though PSARP was a gold standard procedure for high variety ARM's, still search for procedure with comparatively less morbidity never stopped. Protap et al. [3] proposed sphincter preserving and some other author like Zaem M and Zeim S proposed muscle complex saving PSARP [4]. On this back ground we wanted to see the outcome Muscle Complex Saving PSARP (MCS PSARP) as there is no conducted study in our country.

## Methodology

This was a retrospective study held in the division of pediatric surgery, Dhaka Shishu (children) Hospital, a tertiary level hospital in Bangladesh and in private pediatric specialized hospital from June 2017 to June 2020. Total 31 patients of high and intermediate variety of ARM's were included

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Received Date: 05 Jan 2021

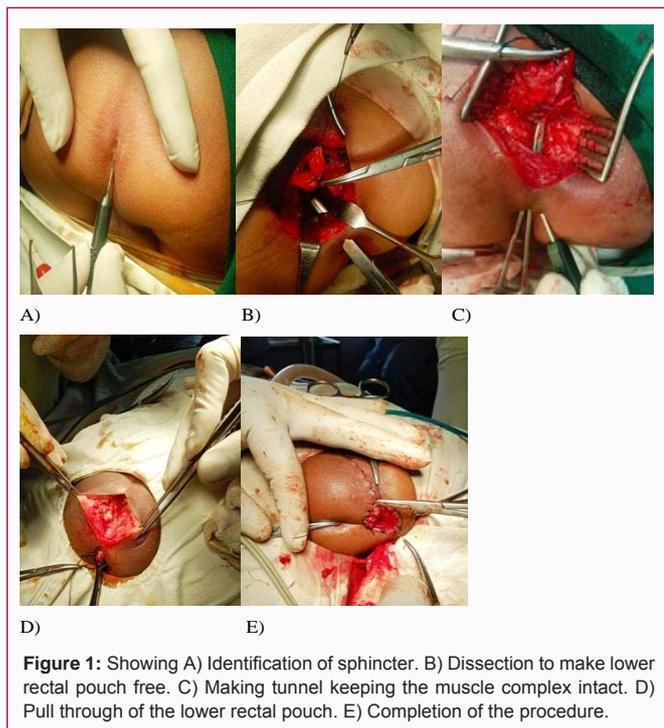
Accepted Date: 19 Feb 2021

Published Date: 22 Feb 2021

### Citation:

Md. Sabbir Karim, Mahmud K, Islam N, Parvin S, Reza J, Dilshad UH. Outcome of Muscle Complex Saving PSARP (MCS PSARP): 3 Years Experience in a Tertiary Pediatric Hospital in Bangladesh. Clin Surg. 2021; 6: 3078.

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in the study. Patients with complete and partial sacral agenesis, rectovesicle fistula and pouch colon syndrome were excluded from the study. Preoperative work out included USG of whole abdomen, Echocardiogram, X-ray of the lower spine and distal cologram with water soluble dye to detect other anomalies and to confirm the type of ARM. Informed written consent was obtained from each patient regarding the operative procedure and its risks.

## Surgical Technique

All patients were operated under general anesthesia. After induction of anesthesia an age appropriate bi channel silicon Foleys catheter was introduced. Patients were placed in prone position. Before starting incision the area of the sphincter was identified by nerve stimulator. We used midline longitudinal incision extending from the tip of the coccyx to 1 cm proximal to proposed anal site. The incision was deepened to expose the coccyx. After removal of the periosteum coccygectomy was performed.

Presacral fascia was opened followed by mobilization of the rectal pouch in the Waldeyer's fascia. The blind rectal pouch was detached from the surrounding tissue by blunt finger dissection. The rectal pouch was attached with the lateral pelvic wall by a thick fibrous ligament with middle hemorrhoidal artery. After achieving hemostasis this thick fibrous lateral ligaments were excised to make the blind rectal pouch free. The blind rectal pouch was opened in the midline longitudinally. Fistula with urethra or vagina was identified by probing. Fistula was separated initially by submucous later by full thickness bowel dissection. Fistula tract was closed with absorbable suture in two layers. The rectum was then mobilized by dissecting the perirectal tissue to achieve adequate length to ensure tension free anastomosis (Figure 1).

Then a small skin incision was made over the skin of previously identified sphincter. Incision should start from the centre of the sphincter and extended on both anterior and posterior direction. The size of the incision would be age appropriate Hager's dilator size.

Then a tunnel was made within the sphincter by blunt dissection which would occupy the dissected rectum.

The dissected rectum was delivered through the tunnel and fixed with the surrounding perirectal tissue by 6 anchoring suture with absorbable suture material. Then anoplasty was done by absorbable suture and wound was closed in layers. A silicon catheter was kept in situ for 2 weeks in case of patients with fistula.

## Post-Operative Management

In our series all the patients were with primary colostomy. Oral diet started on the next day of operation. Intravenous antibiotics were continued up to 3<sup>rd</sup> POD. Oral oxybutynin was used to prevent catheter induced problems. Patients were discharged on 3<sup>rd</sup> to 5<sup>th</sup> the POD depending upon the condition of the patient. Catheter was removed on 14<sup>th</sup> POD in case of patients with fistula. All the patients were put under regular anal dilatation with age appropriate Hager's dilator and continued up to 6 months. Colostomy was closed in 15 patients after 2 to 3 months of MCS PSARP.

All the patients were followed up for at least 3 months after closure of the stoma. During follow up continence was judged in child over 3 years of age with "international Krickenbeck classification" [5]. According to the classification voluntary bowel movement, soiling and constipation were regarded as the main postoperative parameters to evaluate the success of the operation. Voluntary bowel movement was defined as feeling an urge to defecate, the capacity to verbalize this feeling and the ability to hold the bowel movement. Soiling was classified into three grades: Grade 1, occasionally soiling (up to one or twice per week); Grade 2, soiling every day, but no social problems; Grade 3, constant soiling with social problems. Three grades were proposed for constipation. Grade 1 was defined as constipation manageable by changes in diet, grade 2 requires laxatives and grade 3 constipation is resistant to laxatives and diet.

## Result

During the study period of 3 years we operated 31 children with high and intermediate variety of ARM's with or without fistula. Among the study populations (n=31) 20 patients 64.5% were male and 11 patients (35.5%) were female. 70.97% of the study populations that is 22 patients had other associated anomaly, predominantly cardiac anomaly.

The mean age of the patients were 29.56 months with standard deviation 14.40 months. Regarding operation time mean  $\pm$  SD was  $77.97 \pm 6.78$  min. 15 patients (48.4%) of our study group underwent colostomy closure within the specified study period. Among these 15 patients 12 (80%) had good bowel control, 2 (13.33%) had fair bowel control and 1 (6.67%) had poor bowel control according to Krickenbeck classification. Rest of the 16 patients with colostomy had moderate to good anal reflex after stimuli (Table 1 and Figure 2).

## Discussion

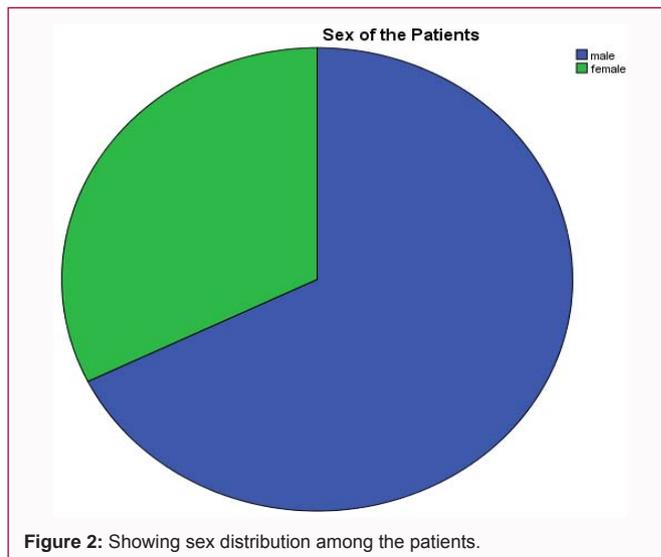
Anorectal malformation is one of the most frequent diseases in pediatric surgery. Incidence is 1 in 5,000 live births. Complications of operations are widespread [6,7]. The most troublesome complication is fecal incontinence which causes a lot of social and psychological distress to the affected child and his or her family. One third of the patients of high and intermediate variety anorectal malformation suffer from some sort of fecal incontinence [8]. To make the bowel continent we need to fix the anus within the sphincter with minimum

**Table 1:** Study period of 3 years.

Pt. no	Age	sex	Clinical type	Associated anomaly	Continence
1	37 m	M	Recto bulbar fistula	VSD	Good
2	48 m	M	High without fistula	Distal penile hypospadias	Good
3	38 m	M	Recto prostatic fistula	No	Good
4	49 m	F	High without fistula	PDA	Poor
5	37 m	M	Recto bulbar fistula	No	Good
6	15 m	M	Recto bulbar fistula	ASD, Polydactylee	Not judged
7	52 m	F	Recto vaginal fistula	No	Good
8	37 m	M	Recto bulbar fistula	Cleft palate	Good
9	47 m	M	Intermediate, No fistula	PUJO	Fair
10	44 m	M	Recto prostatic fistula	No	Good
11	22 m	F	High, No fistula	TOF	Not judged
12	43 m	M	Recto bulbar fistula	ASD, PDA	Good
13	44 m	M	Recto bulbar fistula	No	Good
14	19 m	M	Intermediate, No fistula	UDT	Not judged
15	17.5 m	F	High, No fistula	PFO	Not judged
16	12 m	F	Recto vaginal fistula	Uni lateral cleft lip	Not judged
17	39 m	M	Recto prostatic fistula	ASD	Good
18	41.5 m	F	Recto vaginal fistula	No	Good
19	47 m	M	No fistula	Cleft palate	Fair
20	17.5 m	F	Recto vaginal	VSD	Not judged
21	46 m	M	High, No fistula	No	Fair
22	14 m	F	No fistula	PFO, Syndactylee	Not judged
23	11 m	M	Recto bulbar fistula	No	Not judged
24	19 m	M	Recto prostatic fistula	Mid penile hypospadias	Not Judged
25	24 m	F	Intermediate, No fistula	Small bowel atresia	Not Judged
26	18 m	M	Recto prostatic fistula	VSD, PDA	Not Judged
27	9 m	M	High, No fistula	No	Not judged
28	10.5 m	F	Recto vaginal fistula	ASD	Not Judged
29	11.5 m	F	Recto bulbar fistula	ASD	Not judged
30	20 m	M	High, No fistula	VSD, UDT	Not judged
31	27 m	M	Rectobulbar fistula	Club hand	Not judged

injury to the sphincter. To avoid injury to the sphincter Stephen initially tried to adopt transverse sacral incision, later on Kiesewetter [9] followed him. They pulled the lower rectal pouch through a blind tunnel which did not always ensure the lower rectum within the sphincter. Rehbein [10] also tried to avoid injury to the sphincter by a retroethral tunnel, but it has the same draw back like Kiesewetter [9].

Later on PSARP was introduced by Pena and De Vreis [2] and got popularity among the pediatric surgeon worldwide. Our procedure was a modification of Pena's procedure. Here, we kept the muscle complex intact, created a tunnel through the center of the muscle complex and pulled the lower rectum through the tunnel. This ensured placement of the lower rectal pouch within the center of the sphincter. In our series mean age of the patients were 29.56 months with standard deviation 14.40 months. Among the study populations 64.5% were male and 35.5% were female. This result was near similar with the result of Shahjahan et al. [11].

**Figure 2:** Showing sex distribution among the patients.

Regarding other associated congenital anomaly, 22 out of 31 patients (70.97%) had other associated anomaly, predominantly cardiac anomaly. This result was also similar with the result of Shahjahan et al. [11].

Mean operation time of our series was  $77.97 \pm 6.78$  min. This data was almost similar with the study of Pratap et al. [3] and Maher Zaiem and Feras Zaiem [4].

Kubota and Suita [12] at 2002 showed that even cutting the sphincter muscle in the midline was associated with decrease in amplitude on EMG of external anal sphincter. In our procedure there was scope to preserve the sphincter intact which facilitates better fecal control. For the same perspective of keeping the sphincter mechanism intact, Pratap et al. [3] and Eltayeb and Sehata [13] introduced Sphincter saving anorectoplasty. In this procedure they used a soft guide wire to be introduced through the center of the sphincter muscle under image control. They used that guide wire to make a tunnel to pull through the functional bowel. But in our procedure advantage was direct visualization of the muscle complex and allows creation of the pathway through the muscle complex funnel.

In our series patient less than 3 years of age, continence was not judged. However we have judged continence in 15 patients and good continence was found 12 patients (80 %) according to Krikenbeck classification. Two patients (13.33%) had fair bowel control and 1 (6.67%) had poor bowel control. This result was near similar with the result of Protap et al. [3], Eltayeb and Sehata [13] and also similar with the result of Zaiem and Zaiem [11]. Patients with fair bowel function were having some sort of constipation and were managed by dietary modifications and lactulose.

## Conclusion

Muscle complex saving PSARP is easy to perform and a modification of classic PSARP. It has relatively low morbidity and can be an alternate of classic PSARP.

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