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Functional Outcome of Anorectal Malformations in a Tertiary Care Hospital in Bangladesh

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Abstract **Original Research Article**

Background: The survival of anorectal malformation (ARM) patients has increased in the last ten years due to advances in newborn care and surgical methods for ARM patients. As a result, the current therapy of ARM patients is centred on functional results following definitive surgery. ***Aim of the study:*** The purpose of this study was to determine the type of ARM and measure functional outcomes, such as voluntary bowel movement (VBM), soiling, and constipation, in our patients following final surgery using the Krickenbeck classification. ***Methods:*** The current study is a cross-sectional study to retrospectively review medical records of ARM patients who underwent a definitive surgery at TMSS Medical College, Bogura, Bangladesh from 01 January 2022 to 31 December 2022 in which 45 cases were included. All collected data was entered into a Microsoft Excel Work Sheet and analyzed in SPSS 11.5 using descriptive statistics. ***Results:*** A total of 40 paediatric patients underwent hypospadias surgery. Of these, 38 (95%) cases were investigated. Most common type of hypospadias was coronal type (26.3%). Most of our patients did not have any associated urogenital problem (63.2%) and the most common associated anomaly was microphallus (7.9%). Most common surgical techniques was tabularized incised plate (65.8%). Most of our patients did not have any postoperative complications (52.6%) and most common complications was urethrocutanous fistula (31.6%). the presence of severe chordee (AOR=3.09; 95% CI 1.21-7.54; p=0.013) was significantly associated with postoperative problems. ***Conclusion:*** Functional outcomes of ARM patients in our institution are considered relatively favourable, with more than half of children showing VBM and just a small number of kids suffering from soiling and constipation. The frequency of VBM may be connected to birth weight and gender, but not ARM type, whereas soiling and constipation did not appear to be related to birth weight, gender, or ARM type. A multicenter investigation is needed to compare our findings with those of other centres.

Keywords: Anorectal malformation, Functional outcomes, Voluntary bowel movement.

INTRODUCTION

Anorectal malformations (ARMs) are a group of illnesses that afflict both sexes [1]. ARM is a frequent congenital defect in neonates caused by an interruption in the caudal descent of the urorectal septum to the cloacal membrane. It affects about one out of every 4,000-5,000 live newborns [2]. ARM can be classified using the Krickenbeck classification [2]. The survival of ARM patients has increased in the last ten years due to advancements in neonatal care and surgical methods for ARM patients. As a result, the current therapy of ARM patients focuses on functional results after definitive surgery [3-6]. Several grading systems have been established to measure these functional outcomes following surgery, however the results were mixed [3-6]. The Krickenbeck classification was created in order to define the ARM diagnostic classification system, surgical procedure category, and functional results of ARM patients following surgery [7]. According to the Krickenbeck classification, the functional results of ARM patients following definitive surgery include VBM, soiling, and constipation [7]. Furthermore, the Krickenbeck scoring system has been routinely used to

assess functional outcomes in children with Hirschsprung disease following surgical operations [8].

METHODOLOGY

The current study is a cross-sectional study to retrospectively review medical records of ARM patients who underwent a definitive surgery at TMSS Medical College, Bogura, Bangladesh from 01 January 2022 to 31 December 2022 in which 45 cases were included. The data was presented as a percentage (%). The Fischer Exact test was used to examine the relationships between clinical variables and functional outcomes in ARM patients following surgery, with a p-value of <0.05 considered significant. The estimated power of this investigation was 0.71 when the proportions of two independent samples were compared. To compare two independent groups on a dichotomous categorical outcome, odds ratios with respective 95% confidence intervals were generated. All statistical analysis was done using in SPSS 11.5.

RESULT

A total of 45 medical records of ARM patients were reviewed, including 30 (66.7%) males and 15 (33.3%) females. The majority of the 35 patients (77.8%) had a normal birth weight. There were the most no fistula 18 (40.0%), followed by rectourethral fistula 12 (26.6%), perineal fistula 9 (20.0%), vestibular fistula 4 (8.9%), and rectovesical fistula 2 (4.4%) (Table 1). The VBM was achieved in 53.3% of patients, but soiling and constipation rates were 11.1% and 8.9%, respectively (Table 2). Patients with normal birth weight had a higher frequency of VBM than those with low birth weight, with an odds ratio (OR) of 9.4 (95% CI: 1.0-86.9; p = 0.04), while male patients had better VBM than females (OR = 3.9; 95% CI: 1.0-15.6), which was nearly significant (p = 0.09). However, VBM was not linked with ARM type (p = 0.26) (Table 3). Furthermore, there were no relationships between gender, birth weight, and ARM type and soiling or constipation, with p-values of 1.0, 1.0, and 0.87; and 0.57, 1.0, and 0.94, respectively (Table 3).

Table-1: Baseline characteristics of 45 individuals with anorectal malformations following definitive surgery

Characteristic	Total n (%)
Gender	
Male	30 (66.7)
Female	15 (33.3)
Birth weight	
Normal birth weight	35 (77.8)
Low birth weight	10 (22.2)
ARM type	
Perineal fistula	9 (20.0)
Rectourethral fistula	12 (26.7)
Rectovesical fistula	2 (4.4)
No fistula	18 (40.0)
Vestibular fistula	4 (8.9)

Table-2: Functional outcomes of 45 patients with anorectal malformations following final surgery according to the Krickenbeck classification

Functional outcome	Total n (%)
Voluntary Bowel Movement	
Yes	24 (53.3)
No	21 (46.7)
Soiling	
Yes	5 (11.1)
Grade 1	3 (6.7)
Grade 2	2 (4.4)
Grade 3	0
No	40 (88.9)
Constipation	
Yes	4 (8.9)
Grade 1	3 (6.7)
Grade 2	1 (2.2)
Grade 3	0
No	41 (91.1)

Table-3: The relationship between features and voluntary bowel movement, soiling, and constipation in 45 anorectal malformation patients after definitive surgery

Characteristics	Total n (%)	VBM (voluntary bowel movement)		P-value	Odds ratio (95%CI)	Soiling		p-value	Odds ratio (95%CI)	Constipation		P-value	Odds ratio (95%CI)
		Yes	No			No	Yes			No	Yes		
Gender													
Male	30 (66.7)	19	11	0.09	3.9 (1.0-15.6)	26	4	1	1.8(0.2-18.3)	28	2	0.57	0.4 (0.05–3.1)
Female	15 (33.3)	5	10			14	1			13	2		
Birth weight													
Normal birth weight	35 (77.8)	22	13	0.04*	9.4 (1.0–86.9)	31	4	1	0.8 (0.07–7.9)	32	3	1	0.5 (0.04–6.2)
Low birth weight	10 (22.2)	4	6			9	1			9	1		
ARM type													
Perineal fistula	9 (20.0)	5	4			8	1			8	1		
Rectourethral fistula	12 (26.7)	8	4			10	2			11	1		
Rectovesical fistula	2 (4.4)	0	2	0.26	N/A	2	0	0.87	N/A	2	0	0.94	N/A
No fistula	18 (40.0)	10	8			16	2			16	2		
Vestibular fistula	4 (8.9)	1	3			4	0			4	0		
ARM type													
Perineal fistula	9 (20.0)	5	4	1	0.8 (0.2–3.9)	8	1	1	1.1 (0.1–11.5)	8	1	1	1.5 (0.1–16.9)
Others	36 (80.0)	20	16			32	4			33	3		
ARM type													
Rectourethral fistula	12 (26.7)	8	4	0.18	3.0 (0.7–13.5)	10	2	0.59	2.1 (0.3–14.9)	11	1		
Others	33 (73.3)	15	18			30	3			30	3	1	1.0 (0.09–10.4)
ARM type													
Rectovesical fistula	2 (4.4)	0	2	0.21	6.4 (0.3–140.6)	2	0	1	1.3 (0.06–31.5)	1	1		
Others	43 (95.6)	24	19			38	5			40	3	1	1.7 (0.07–40.5)
ARM type													
No fistula	18 (40.0)	10	8	1	1.2 (0.3–3.9)	16	2	1	0.9 (0.1–6.1)	18	0	1	1.4 (0.2–11.3)
Others	27 (60.0)	14	13			24	3			23	4		
ARM type													
Vestibular fistula	4 (8.9)	1	3	0.32	0.3 (0.02–2.7)	4	0	1	0.7 (0.03-14.8)	2	2	1	0.9 (0.04–19.1)
Others	41 (91.1)	23	18			36	5			39	2		

DISCUSSION

We can demonstrate that patients with normal birth weight have better VBM than those with low birth weight. VBM is influenced by proper innervation and function of the pelvic floor, rectum, and anal spinchter. Malnutrition is linked to low birth weight [9]. These problems may be associated with insufficient innervation and improper function of the pelvic floor, rectum, and anal spinchter, resulting in poorer VBM in ARM newborns with low birth weight compared to those with normal birth weight. In line with these findings, a recent study discovered that increases in survival in ARM patients rose with birth weight [10]. Furthermore, the innervation, pelvic floor, rectum, and anal sphincter do not function adequately in patients with ARM due to anatomical defects or difficulties after reconstruction surgery [2]. Some paediatric surgeons with limited resources may dilate the perineal/vestibular fistula to improve the survival of ARM infants with extremely low birth weights [11]. Gender and VBM did not have a significant relationship (Table 3; p = 0.09). This conclusion is similar with a recent study that found no link between gender and functional outcomes in ARM patients [12]. Several hypotheses, however, have been presented to explain the disparity in functional results between male and female patients: 1) improper anoplasty (i.e. limited rectum dissection) in female infants due to a concern of perforating the vagina; and 2) female patients less openly discussed their intestinal function with their families, resulting in intestinal management failure [13, 14]. Furthermore, we discovered no link between ARM type and VBM. It differed from a prior study that revealed that individuals with perineal fistula had the highest functional results, while those with bladder neck fistula had the worst [14]. It has been claimed that lower ARM lesion results in better functional outcomes than larger ARM lesion [2, 14]. The negligible relationship between ARM type and VBM in our study could be attributed to the low power of our investigation (0.71). These facts should be considered while interpreting our findings. We also discovered no link between gender, birth weight, ARM type, and soiling or constipation. Interestingly, patients with ARM with lower lesion had a higher risk of constipation, whereas those with higher lesion have a higher chance of faecal incontinence [2]. Sensation, voluntary muscle control, and bowel motility are all elements that influence faecal continence [2]. Patients with lower lesion may have a continence as high as 90%, whereas those with larger lesion may only have a 10% continence [16]. Previous research suggested that certain traits, such as normal sacrum/spine structure, a healthy buttock crease and anal dimple, specific forms of ARM, and the lack of a sacral mass, are good predictors of better outcomes in ARM patients [14]. Although the patients may have an ARM type with a good prognosis, incontinence and constipation are unavoidable sequelae [17]. Furthermore, constipation can occur as a result of the continuous dilation of the rectal pouch, resulting in insufficient peristaltic and failure of stool evacuation. In addition to sphincter muscle problems, chronic constipation can cause soiling due to overflow pseudo incontinence. The majority of our patients (66.7%) were males with normal birth weight (77.8%). It was consistent with earlier data, in which males made up 55-71% of ARM cases [1, 11, 18, 19]. It is thought that ARM individuals frequently present with normal birth weight. It should be highlighted that our study did not

account for additional factors that could influence the functional results of ARM patients following definitive surgery, such as related abnormalities, sacrum/spine architecture, sacral ratio, surgical methods, and comorbidities [2, 14, 20]. Furthermore, because it is a straightforward, practical, and useable approach, we recommend that paediatric surgeons use the Krickenbeck classification during their practise to establish the type of ARM and the functional outcomes after surgery. The Krickenbeck classification also makes different surgical treatments more comparable to one another.

Limitation of the study:

This study had a single focal point and small sample sizes. Additionally, the study was completed in a very condensed amount of time. Therefore, it's possible that the study's findings don't accurately capture the overall situation in the nation.

CONCLUSION & RECOMMENDATION

Functional outcomes of ARM patients in our medical center are considered relatively favorable with more than half of children showing VBM and just a small number of kids suffering from soiling and constipation. Furthermore, the frequency of VBM may be connected to birth weight and gender, but not ARM type, whereas soiling and constipation did not appear to be related to birth weight, gender, or ARM type. A multicenter investigation is needed to compare our findings with those of other centers.

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