

Research Article

Relationship of Fecal Incontinence to High Type Anorectal Malformation Post Posterior Sagittal Anorectoplasty Based on Pena Score at Dr. Hasan Sadik in Hospital

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Abstract

Background: Anorectal Malformation (AMR) is a spectrum of congenital abnormalities which can be classified as low type and high type. In the high type of AMR the sensory receptors is believed to be absent, because it is located in the distal anal canal. Postero Sagittal Anorectoplasty (PSARP) in high type AMR is usually done by massive dissection causing many blood vessels and nerves to be severed which could impair the outcome of bowel function. Assessment of the outcomes of actions requires standards that can be used worldwide. Pena provides a specific methodology of long-term evaluation. The purpose of this study was to determine the prognosis of fecal incontinence, soiling, constipation or urinary incontinence in patients after PSARP. By knowing the outcome after PSARP, we can prepare further therapy for the patient.

Methods: This study was an analytical observational study with a cross-sectional design focused on patient with high type ARM in Pediatric Surgery Division Hasan Sadikin General Hospital during 5.5 years period. The score was obtained by interviewing the patient parents, using modified Pena score.

Results: Through modified Pena scoring, there are no significant correlation ($P=0.145$) between Pena scoring and high type AMR. Significance were considered if p value is greater than 0.05.

Conclusion: PSARP results at high type AMR did not significantly affect postoperative outcome using Pena scoring.

Keywords: Anorectal malformations; High type anorectal malformations; Posterior sagittal anorectoplasty; Pena score

Introduction

Anorectal Malformation (AMR) is a congenital abnormality which the anus fails to open normally towards the perineum that can be classified as low type and high type based on the terminal connection of the colon to the levator muscles of the pelvic floor [1]. AMR has a wide spectrum of defects, which can be mild, uncomplicated with a good prognosis of function, to more severe malformations involving the genitourinary system with a poor prognosis for bowel and voiding function [2]. Posterior sagittal anorectoplasty (PSARP) was introduced by Pena and de Vries in 1982, as an option for surgery in patients with AMR [1,2].

Many studies have found that faecal incontinence is the most common impaired outcome of surgery in high type AMR [2]. In high type AMR there are no sensory receptors, because it is located in the distal part of the anal canal [3]. In the PSARP procedure for high type AMR, massive dissection is usually performed which causes a lot of disconnection of blood vessels and nerves.

Defecation disorders in children can lead to psychological and

social problems as well as poor quality of life [4]. Children sometimes experience anxiety, sadness and depression [5]. By knowing the outcome of surgery, we can implement strategies to improve the patient's quality of life, so as to reduce negative outcomes due to abdominal dysfunction and improve the psychological development of patients.

Assessment of the outcomes of the PSARP procedure is to assess the quality-of-life patients, and a standard is needed that can be used throughout the world [6]. Basically, scoring has 3 (three) functions: prediction, evaluation, and description. There are several scorings from 1960 like Scott's score, then several other scores such as Kelly's score, Holschneider's score, Wingspread's score, Rintala's score. Pena provides a specific methodology of long-term evaluation based on experience. At the time of evaluation, the patient was not given any other medical treatment. There are 4 (four) parameters evaluated: (1) voluntary defecation, (2) soiling or involuntary passing of small amounts of feces, (3) constipation, (4) urinary incontinence.

Research on fecal incontinence using Pena scoring is not widely use. Therefore, researchers are interested in conducting research on the outcomes that become the long-term quality of life expectations of MAR suffers after PSARP.

Materials and Methods

This research is an analytic observational study with a cross-sectional design, and then correlation analysis was carried out. The target population for this study was children with high-type AMR who had undergone PSARP and colostomy closure in the Pediatric Surgery ward at Dr. Hasan Sadikin Hospital with time period January 2017 to April 2022.

The sample was 38 patients, which were divided based on age, sex

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and type of fistula at high- type AMR. The scoring used is modified Pena scoring with a final score of 1-11 (Table 1) [7].

Table 1: Modified Peña score [7].

Subdomains	Grade	Score
Voluntary bowel movements	Feeling of urge	3
	Capacity to verbalize	2
	Hold the bowel movement	1
Soiling	No	0
	Occasionally (once or twice per week)	1
	Every day, no social problem	2
	Constant, social problem	3
Constipation	No	0
	Manageable by changes in diet	1
	Requires laxatives	2
	Requires enema	3
Urinary incontinence	No	0
	Mild dribbling/wetness day and night	1
	Complete incontinence	2

Results

The description of the characteristics of the study subjects is explained in Table 2. The patient's age has an average of 4.53 ± 2.239 years. Gender was dominated by 28 male patients or 73.7%. The age of the anastomosis was dominated by the age <3 years as many as 29% or 76.3%.

Table 2: Overview the Basic Characteristics of Patients.

Variable	N=38
Age	
Mean ± Std	4.53 ± 2.239
Median	4
Range (min-max)	3.00-14.00
Sex	
Male	28 (73.7%)
Female	10 (26.3%)
Anastomose age	
<3 years old	29 (76.3%)
≥ 3 years old	9 (23.7%)

For categorical data, it is presented by number/frequency and percentage, while for numerical data; it is presented by mean, median, standard deviation and range.

Table 3 describes the fistula of high-type AMR. The most fistulas were rectourethral fistulas with 18% or 47.4%, and the least were cloaca with 35 or 7.9%.

Table 3: Description of High-Type AMR Fistula.

Variable	N=38
Fistula	
Without fistula	7 (18.4%)
Rectourethra	18 (47.4%)
Rectovesica	4 (10.5%)
Vestibuler	6 (15.8%)
Cloaka	3 (7.9%)

For categorical data, it is presented by number/frequency and percentage, while for numerical data; it is presented by mean, median, standard deviation and range.

Table 4 provides an overview of Pena's scoring. For fecal incontinence, it has median value 2.00. For soiling it has median value 2.00. For constipation has a median value 1.00. For urinary incontinence, it has median value 0.00.

Table 5 shows the results of the statistical analysis of the ETA correlation test between fecal incontinence variables with high MAR fistula types, soiling with high MAR fistula types, constipation with high MAR fistula types, and urinary incontinence with high MAR

fistula types. After going through the test, the Guilford criteria can be used to determine the closeness of the relationship.

Table 4: Pena Scoring Result.

Variable	N=38
Faecal incontinence	
Mean ± Std	1.89 ± 0.831
Median	2
Range (min-max)	1.00-3.00
Soiling	
Mean ± Std	1.55 ± 0.555
Median	2
Range (min-max)	1.00-3.00
Constipation	
Mean ± Std	0.95 ± 0.324
Median	1
Range (min-max)	0.00-2.00
Urinary incontinence	
Mean ± Std	0.47 ± 0.762
Median	0
Range (min-max)	0.00-2.00

For categorical data, it is presented by number/frequency and percentage, while for numerical data; it is presented by mean, median, standard deviation and range.

Table 5: Correlation Analysis of Pena Scoring with High-type AMR Fistula.

Variable	Correlation	R	P Value
Correlation faecal incontinence with type of fistula	ETA	0.3	0.18
Correlation soiling with type of fistula	ETA	0.368	0.076
Correlation constipation with type of fistula	ETA	0.369	0.075
Correlation urinary incontinence with type of fistula	ETA	0.167	0.589

Note: the significance value of $p < 0.05$. The **sign indicates statistically significant or significant. r: correlation coefficient.

The R value for the correlation of fecal incontinence with the high-type AMR fistula showed that there was an insignificant correlation with a positive correlation direction and a very small (not close) of 0.300 ($p = 0.180$).

The R value for the correlation of soiling with the high-type AMR fistula shows that there is an insignificant correlation with a positive correlation direction and a small (not close) of 0.368 ($p = 0.076$).

The R value for the correlation of constipation with the high-type AMR fistula showed that there was an insignificant correlation with a positive correlation direction and a small (not close) of 0.369 ($p = 0.075$).

The R value for the correlation of urinary incontinence with high-type AMR fistula showed that there was an insignificant correlation with a positive correlation direction and a very small and negligible value of 0.167 ($p=0.589$).

For analysis of categorical data in Table 6. Comparison of Pena scores based on the high-type AMR fistula was tested using the Kruskal Wallis statistical test, namely the Pena score. The statistical test results in the research group above obtained information on the value of $P=0.145$ ($P>0.05$) on the Pena score variable, which means that there was no statistically significant difference in the proportion between the Pen score variables.

For analysis of ordinal data in Table 7, the comparison of Pena scores based on the age of the anastomosis was tested using the Mann Whitney statistical test, namely the Pena score. The statistical test results in the research group above obtained information on the value

Table 6: Comparison of Pena Scores Based on the High-Type AMR Fistula.

Variable	AMR Type					P Value
	Without fistula N=7	Rectourethra N=18	Rectovesica N=4	Vestibuler N=6	Cloaka N=3	
Score						
3	0 (0.0%)	7 (38.9%)	0 (0.0%)	3 (50.0%)	2 (66.7%)	0.145
4	3 (42.9%)	3 (16.7%)	0 (0.0%)	2 (33.3%)	0 (0.0%)	
5	0 (0.0%)	3 (16.7%)	1 (25.0%)	1 (16.7%)	0 (0.0%)	
6	1 (14.3%)	0 (0.0%)	2 (50.0%)	0 (0.0%)	0 (0.0%)	
7	2 (28.6%)	3 (16.7%)	0 (0.0%)	0 (0.0%)	1 (33.3%)	
8	1 (14.3%)	2 (11.1%)	1 (25.0%)	0 (0.0%)	0 (0.0%)	

For ordinal categorical data, the p-value is calculated based on the Kruskal Wallis test. Significance value based on the value of $p < 0.05$.

of $P=0.613$ ($P > 0.05$) on the Pen score variable. It can be explained that there was no statistically significant difference in the proportion between the Pena score variable in the anastomosis age group.

Table 7: Comparison of Pena Scores by Age of Anastomosis.

Variable	Anastomosis Age		P Value
	<3 years old N=29	≥ 3 years old N=9	
Score			
3	8 (27.6%)	4 (44.4%)	0.613
4	7 (24.1%)	1 (11.1%)	
5	4 (13.8%)	1 (11.1%)	
6	2 (6.9%)	1 (11.1%)	
7	5 (17.2%)	1 (11.1%)	
8	3 (10.3%)	1 (11.1%)	

For numerical data, the p value is tested by the Mann Whitney test. Significance value based on the value of $p < 0.05$.

Discussion

This research is an analytic observational study with a sample of patients with high MAR. The patient's postoperative outcome was assessed by a scoring system according to Pena, with a scoring value based on a modification of Pena [7].

The characteristics of the research sample data based on gender in both groups were dominated by boy 73.7% compared to girl 26.3%. These results are consistent with the data on the incidence of MAR, which affects more to the boy [8].

The most common age of patients when colonic anastomosis was performed was age <3 years old as many as 29 or 76.3%, and >3 years old as many as 9 or 23.7%. Closure of the stoma is performed once the desired dilator size has been achieved [9]. Once the correct size is achieved, the colostomy can be closed, which is usually 8 to 12 weeks after reconstruction. The age of the anastomosis is related to the time the patient begins toilet training. Initiating training later than 32 months of age is associated with urge incontinence [10]. Age indicates a child's readiness for toilet training, indicating that training before 27 months of age provides little benefit.

Assessment by scoring is used for clinical phenomena, such as the degree of incontinence or pressure of the anal sphincter [6]. In principle, scoring should serve three functions: prediction, evaluation over time, or description over time. Peña suggests a specific methodology for evaluating long-term outcomes according to experience personal. Four parameters were evaluated: Defecation, Soiling, Constipation and Urinary Incontinence. This is a scoring with practical questions and includes urinary incontinence [7].

In this study, 4 patients were found with a score of 8, the patients had not been able to hold their stools and they still complained of soiling every day. The results of the scoring are due to several factors, such as abnormal voluntary sphincter muscles and the absence of the anal canal. Constipation rarely occurs in this study, because constipation is usually caused by a megarectum which occurs more

frequently in low-type AMR. Urinary incontinence is rare, because in this study sacral abnormalities were excluded from the inclusion criteria.

In this study, the authors faced several limitations that could affect the conditions of the research conducted. These limitations included the researchers not performing the function of the anal sphincter objectively through manometry examination to ensure there was no disturbance in anorectal sensation due to damage after surgery. Limited sampling because the telephone number contained in the medical record is no longer contactable.

Conclusion

From the results of the research and hypothesis testing, the conclusions of this study were: There were no significant results between the occurrence of fecal and urinary continence with a high-type AMR based on the Pena score.

Ethical Clearance

The study was approved by The Research Ethics Committee of Dr. Hasan Sadikin General Hospital Bandung with document number LB.02.01/X.6.5/290/2022.

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