

Clinical Evaluations of Bowel Continence in Post Operative Patients of Distal Large Gut Anomalies and it's Correlation with Anorectal Manometry

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ABSTRACT

Introduction: Anorectal malformation is a common congenital anomaly. Posterior sagittal ano-recto-plasty (PSARP) is an established technique for repair of these anomalies. Many post operative children have defecation disorders in post operative period. Study aimed to evaluate postoperative patients of anorectal malformations clinically and functionally by using scoring system and manometry.

Material and Methods: 33 patients of anorectal malformations underwent PSARP between September 2007 and August 2009. All patients were clinically evaluated for bowel incontinence and underwent anorectal manometry periodically. Results were assessed using Kelly's scoring system.

Results: Out of 33 patients, 16 were male and 17 female. 18 patients were less than 5 years. 15 patients underwent clinical evaluation in less than one and a half years of completion of all stages of surgery. 4 of these patients had Kelly's score less than 3 and other 11, more than 4. Of the remaining 18 who had evaluation after one and a half years of surgery, 5 had score less than 3 and remaining more than 4. Children with high anomalies had higher Kelly's scores. As the age increased there was significant change of basal and max squeeze pressures.

Conclusions: Patients with ARM, who were operated and assessed post operatively with Kelly's score and anal canal basal pressures and max squeeze pressure, had direct correlation.

Keywords: Bowel Continence, Distal Large Gut Anomalies, Anorectal Manometry

functionally by using scoring system and anorectal manometry respectively.

MATERIAL AND METHODS

The present prospective study was conducted in department of surgery of a tertiary care service hospital between September 2007 and August 2009. All 33 patients of Anorectal Malformation who underwent PSARP and in whom all stages of surgery were over were included in the study. The patients who had undergone redo surgery were excluded. The patients were clinically evaluated for bowel continence and underwent Anorectal manometry at 6 months to 2 years after the restoration of continuity surgery. The following information was collected from the patients; consistency of stools, number of stools per day and number of times soiling occurred in a day/week. The anal continence was assessed using the Kelly's scoring system given as below:

Continence	2 = Normal	1 = Occasional escape of feces/flatul,	0 = No control
Soiling	2 = Always clean,	1 = Occasional staining	0 = Always stained
Sphincter squeeze	2 = Strong and effective	1 = Weak and partial	0 = None

Manometry procedure

Single channel water perfuse manometry was used to record mean basal rectal pressure and sphincter squeeze pressure. All procedure were done without any sedation. The following parameters were recorded maximum squeeze pressure, minimum basal pressure, mean basal pressure, maximum basal pressure.

STATISTICAL ANALYSIS

Analysis was done by using SPSS version.12. Categorical data was analyzed by using Chi-square test and P value <0.05 was considered as significant. Analysis of variance (ANOVA-F test) was used to compare mean basal pressure and Max squeeze pressure among different group of patients according to type of surgery, Kelly's score. Coefficient of correlation was calculated to find correlation between two qualitative variables.

RESULTS

There were thirty-three patients, sixteen male and seventeen female. Of them eighteen were less than five years old. Of the

INTRODUCTION

The anal canal extends from the level of pelvic floor to the anal opening¹ Anorectal malformation (ARM) is common congenital anomaly.² The incidence of ARM is approximately 1 in 5000 live births.³ The most common anomaly in male infants is imperforated anus with recto urethral fistula and in female patients, the recto vestibular fistula. Posterior sagittal anorectoplasty (PSARP) as described by Pena⁴ is an established technique for repair of anorectal malformations. We follow the same procedure at our institute. The maintenance of the integrity of the available sphincter muscle is essential for effective control of the faeces after operative repair. Many children suffer from defecation disorders in the post-operative period. These include constipation, soiling, and incontinence.⁵ It is prudent to do objective evaluation of the patient's condition in the post operative period to evaluate the results of surgery. Kelly's⁶ score meets the criterion, but is subjective. We wanted to evaluate if anal manometry could be useful in objectively evaluating the child after construction of the neo-anus. The present study was undertaken in postoperative patients who underwent surgery for anorectal malformation to evaluate them clinically and

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How to cite this article: Manu Arora, AK Gupta, Viking Bhanoo. Clinical evaluations of bowel continence in post operative patients of distal large gut anomalies and it's correlation with anorectal manometry. International Journal of Contemporary Medical Research 2017;4(1):194-196.

fifteen patients who underwent clinical evaluation less than one and a half years after completion of all stages of surgery, four had a score less than 3 and 11 had more than 4. Similarly of the 18 in whom evaluation was done after one and a half years, 5 had a score less than 3 and 13 more than 4. Longer duration after surgery did not change the Kelly's score. There were 20 patients of ARM. Of the 15 of HARM (High Ano Rectal Malformation), 4 had a Kelly's score less than 3 and 11 above 4. All the 5 cases of LARM (Low Ano Rectal Malformation) had a Kelly's score more than 4 (Table 1). This was statistically significant. The children with higher anomalies had poorer Kelly's score. The consistency of stools improved with passage of time after all stages were complete. At 6 months after surgery 9 patients (27%) had firm stools, whereas at one year 21 patients (63%) had firm stools. This again was statistically significant. The difference in the number of stools passed per day among those who were observed at interval of 6 months and 1 year was statistically not significant. Observational improvement was noted though. At six months ten patients had more than three stools per day, this reduced to four at one year. The difference in frequency of soiling observed at interval of one year was statistically significant. ($\chi^2=8.47$, $P<0.05$) (Table 2). Table 3 shows mean basal pressure among cases according to the site of ARM. 5 cases those who had Low ARM, mean basal pressure was 51.8 ± 14.36 while 15 cases who had high ARM mean basal pressure was 27 ± 13.89 . ANOVA was applied to see whether the difference is statistically significant or not. It was found that the difference was statistically significant. ($F=3.34$, $P<0.05$). The max squeeze pressure among cases according to the site of ARM was measured. Five cases who had Low ARM had max squeeze pressure 70 ± 11.92 while 15 cases who had high ARM max squeeze pressure was 42.43 ± 20.59 . ANOVA was applied to see whether the difference is statistically significant or not. It was found that the difference was not statistically significant. There was positive correlation between age of the study and mean basal pressure. Coefficient of correlation was $r=0.44$ which was statistically significant. Similarly there was also positive was $r=0.45$ which was statistically significant. As the age increased there was increase in the mean basal pressure and Max Squeeze pressure in the study group. Comparison was done between Kelly score and mean basal pressure in the studied population. The mean basal pressure among 9 cases that had Kelly's score 6 was 38 ± 13.7 while in the cases that had Kelly's score 0 the mean basal pressure was 12.5 ± 3.53 . ANOVA test suggested that the difference was statistically not significant ($F=2.25$, $P<0.05$). Table 4 compares Kelly's score and max squeeze pressure in the study cases. The max squeeze pressure among 9 cases that had Kelly's score 6 was 72.78 ± 16.52 , while among 2 cases that had Kelly's score 0 the max squeeze pressure in the study cases. The max squeeze pressure among 9 cases that had Kelly's score 6 was 72.78 ± 16.52 , while among 2 cases that had Kelly's score 0 the max squeeze pressure was 24 ± 8.48 . ANOVA test suggested that the difference was statistically very highly significant ($F=7.73$, $P<0.0001$).

DISCUSSION

The literature reports that ARM is more common in males but in our small sample size, the cases were equally distributed between the two sexes.⁷ This is possibly owing to small

Disease	Total Kelly's Score		Total
	1-3	4-6	
High ARM	4	11	15
Low ARM	0	5	5
Total	4	16	20

Table-1: Kelly score in ARM according to severity

Bowel habits at	Soiling/day	
6 th month	NIL	13
	More than one	20
1 year	NIL	19
	More than one	14

Table-2: Duration after restoration soiling/day

Site of ARM	N	mean Basal (cmH2O) Mean \pm SD
High ARM	15	27 ± 13.89
Low ARM	5	51.8 ± 14.36

Table-3: Comparison of Site of ARM and mean Basal (cmH2O) in study group

Total Kelly's Score	n	Max Squeeze (cmH2(O)) Mean \pm SD	F Value	P Value
0	2	24 ± 8.48		
1	2	29.5 ± 21.92		
3	5	51.8 ± 7.88	7.73	<0.0001
4	6	51.83 ± 12.94		
5	9	61.78 ± 9.13		
6	9	72.78 ± 16.52		

Table-4: Comparison of Total Kelly's score and Max Squeeze (cmH2O)

sample size. Billur Demirogullari⁸ reported bowel function score increased with rising patient age. In our study a trend was seen towards better score. A longer duration of follow up would perhaps demonstrate a statistically significant result. The patients with high ARM had lower Kelly score as compared to those with low ARM. The difference was statistically significant.⁹ Patients with low-type lesions are more likely to be continent, while patients with high-type lesions had more problems with continence because a functional internal sphincter is absent in high-type lesions. The difference in consistency among those who have completed six months and those who had completed one year post surgery was compared. The difference was significant; more patients had formed stools at one year of age. Although the number of stools passed at one year was less than the number passed six months after surgery, the difference was not statistically significant. Perhaps a longer follow up would bring out a significant difference. The soiling instances did improve after one year after restoration and the improvement was significant ($\chi^2=8.47$, $p<0.05$). Mean basal pressure difference between LARM and HARM cases was statistically significant ($F=3.34$, $p<0.05$). The present study findings are consistent with other study findings.^{10,11} Maximum squeeze pressure of 5 cases of LARM was 70 ± 11.92 while 7 cases of HARM maximum squeeze pressure was 42.43 ± 20.59 . It was found that difference was statistically significant. There was positive correlation between the age of the study

group and mean basal pressure. Coefficient of correlation was $r=0.45$, which was statistically significant. Similarly there was also positive correlation between age of the study group and max squeeze pressure. Coefficient of correlation was $r=0.45$, which was statistically significant. As the age increased there was increase in the mean basal pressure and max squeeze pressure among the study group.¹¹ Comparison of Kelly's score and mean basal pressure (cmH₂O) in study group. The mean basal pressure among 9 cases that had Kelly's score 6 was 38 ± 13.7 , while among cases that had Kelly's score 0 the mean basal pressure was 12.5 ± 3.53 . This difference was found to be statistically significant. Thus Kelly's score correlated well with anal manometry.¹² Results show that anorectal manometry is a useful test to evaluate the patients operated by PSARP due to the existence of a relationship between the manometric results and degree of fecal continence. Nagasaki.¹³ reported that in the "good" group, i.e. Kelly's score 5-6, resting pressure of the anal canal was as high as in the normal children, and the frequency of contraction waves in the anal canal was the same as in normal children. In the present study it was found that as the Kelly's score increased, the basal pressure also increased. The max squeeze pressure among 9 cases that Kelly's score was 6, was 72.78 ± 16.52 , while among 2 cases that the Kelly's score was 0 had max squeeze pressure 24 ± 8.48 . It was found that the difference was statistically very highly significant ($F=7.73$, $p<0.0001$). Alberto Pena.¹⁴⁻¹⁶ stated that there was direct correlation between anal canal pressure and Kelly's score in patients with both high and low anomalies; Kelly's score of 6,5,4,3 and less had pressure between 60-75, 45-59, 30-44. 15-29 and less than 15 cm of H₂O respectively. Our study matches the study findings of above studies, that if Kelly's score improves, there is increase in max squeeze pressure. We noted that as the duration of the restoration after surgery increased, the frequency of soiling significantly reduced and consistency of stools improved. The patients with Low ARM had higher mean basal pressure as compared to high ARM. The age of the patient had positive correlation with the mean basal pressure and max squeeze pressure. In addition the patients who had high Kelly's score, the Max squeeze pressure was high.

CONCLUSION

In post operative patients Kelly's scores, basal anal canal pressures and max squeeze pressure had direct correlation. Patients with higher Kelly's scores had higher anal canal pressures. Patients with low ARM had higher mean basal pressures as compared to high ARM patients. Our study matches the study findings of other studies

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 24-12-2016; **Published online:** 05-02-2017