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Original Article

Management of Anorectal Malformations: A Five-Year Experience from a Tertiary Care Center of Southern Iraq

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ABSTRACT

Background: Anorectal malformations are frequently observed congenital anomalies in pediatric surgical patients, affecting the gastrointestinal tract. The purpose of this study is to examine the prevalence, demographic characteristics, types, and modes of presentation of anorectal malformations in our society. Additionally, we aim to estimate the presence of associated anomalies and postoperative complications.

Methods: A retrospective study was conducted on all cases of anorectal malformations admitted to our pediatric surgery center between December 2017 and December 2022. A total of 104 patients were included in the study. The study examined information related to demographics, clinical presentation, and treatment outcomes.

Results: The incidence of anorectal malformations was 1.029 per 5000 live births, with a male to female ratio of 2:1. Early presentations, occurring within the first 3 days of life, were observed in 85.5% of male patients and 37.1% of female patients. A history of prematurity was found in 14.5% of male patients and 20% of female patients. The most common type of anorectal malformation in male patients was rectourethral fistula (63.8%), while in female patients, it was rectovestibular fistula (65.7%). Associated anomalies were present in 41.3% of patients, with genitourinary anomalies being the most common (10.6%). Initial treatment included an initial colostomy and posterior sagittal anorectoplasty in 87 (83.7%) patients, while only 16.3% of patients underwent minimal anoplasty. Postoperative complications were reported in 47% of patients, with constipation being the most prevalent (45.2%), followed by incontinence (37.5%).

Conclusion: Anorectal malformations are quite common in our society, with boys being affected nearly twice as often as girls. Unfortunately, the diagnosis in female patients is often delayed. Additionally, a high incidence of associated anomalies has been recorded. Constipation is the most frequently observed late complication. However, the majority of patients do experience acceptable outcomes in terms of continence.

Keywords: Anorectal malformations, Anorectoplasty, Imperforate anus, Incontinence

Introduction

Anorectal malformations (ARM) are the most common congenital anomaly of the gastrointestinal tract in pediatric surgical patients. The incidence of ARM in live babies is estimated to be between 1 in 2000 and 1 in 5000. This condition affects both males and females equally, with a ratio of 1 to 1(1). Its severity varies from minor lesion to more complicated anatomical anomaly (2-5).

The exact cause is still unknown but multifactorial factors have been implicated, including both genetic and environmental factors (6). The type of fistula depends on the sex of the newborn, with a rectourethral fistula affecting males and a rectovestibular fistula in females (7). Associated malformations are prognostically significant and they are present in 45-65% of neonates with anorectal malformations. These

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malformations include urogenital, cardiac, vertebral, spinal and gastrointestinal abnormalities in the majority of the cases (8-11).

The usual surgical choice for high anorectal malformations correction involves colostomy followed by closure later on (7). Sometimes, in specific cases, the operation done in one session, similar to low malformations (12). De Vries and Pena initiate Posterior Sagittal Anorectoplasty in 1982, which thereafter became the principal surgery of both high and intermediate malformations. (13, 14) Globally, 75% of all patients have voluntary bowel movement after repair, half of these still soil their underwear. Constipation is also a major common sequelae (15). The fecal and urinary incontinence may persist even after an excellent anatomic repair, mainly due to associated congenital problems (16).

The main objective of this study is to investigate the occurrence, characteristics, and methods of presentation of anorectal malformations in Iraqi society. Additionally, we aim to estimate the frequency of associated anomalies and postoperative complications.

Methods

A retrospective study was conducted on all patients with anorectal malformations who were admitted to the pediatric surgery center at Basrah Children Specialty Hospital from December 2017 to December 2022. Written informed consent was obtained from each patient's family. The medical records of 104 patients with anorectal abnormalities were reviewed. The study examined information such as age, sex, gestational age, types of abnormalities, associated anomalies, presentations, treatment options, and outcomes. The anorectal malformations were categorized according to the Krickenbeck classification, with a separate analysis for male and female patients (8, 17). Follow up period of the patients was a minimum of 5 years.

Categorical variables were presented as counts and percentages. Fisher's exact test was utilized to assess differences in categorical data. A p-value less than 0.05 was considered as indicative of a statistically significant difference. Statistical analysis was made using SPSS version 23 software.

Ethical approval

The institutional review board of Al-zahraa college of medicine-university of Basrah approved the study (IRB No. E/S 25)

Results

A total of 104 patients with anorectal malformations were treated at Basra Children Specialty Hospital's pediatric surgery tertiary center over a five-year period. Of these patients, 69 were male and 35 were female. During the study period, there were a total of 505,151 live births, resulting in an incidence rate of 1.029 cases per 5,000 live births. The incidence rate was higher in males (1.3/5000) compared to females (0.7/5000). The male to female ratio was 2:1 (Figure 1). Most male patients (85.5%) were observed within the first three days of life, while only 37.2% of females were seen within the same period. This difference is statistically significant ($p<0.001$) (Table 1). A history of prematurity was present in 10 male patients (14.5%) and 7 female patients (20%) ($p=0.473$).

In male patients, the most prevalent type of anorectal malformation was imperforate anus with rectourethral fistula, accounting for 63.8% of cases. The next most common type was imperforate anus with perineal fistula, making up

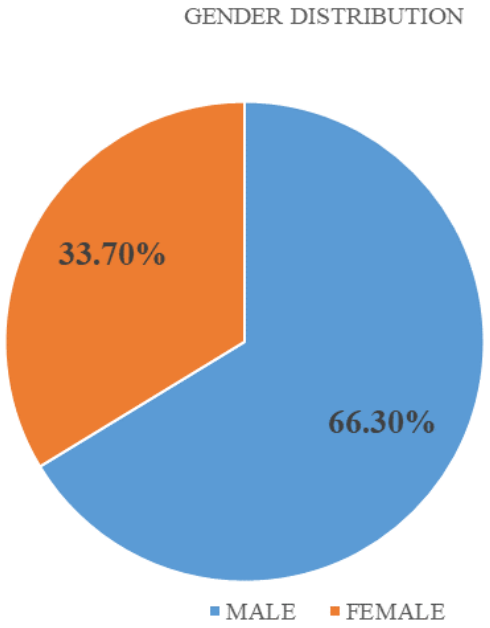

Figure 1. Gender distribution of anorectal malformations

Table 1. Age presentation of patients with anorectal malformations (P <0,001)

Age	Male (n=69)	Female (n=35)	Total (n=104)
	N (%)	N (%)	N (%)
≤ 3 days	59 (85.5)	13 (37.1)	72 (69.2)
4 -30 days	9 (13)	11 (31.4)	20 (19.2)
> 30 days	1 (1.5)	11 (31.4)	12 (11.5)

Table 2. Type of the anorectal malformation according to the gender

Type of the anorectal malformation	Male (n=69)	Female (n=35)	Total (n=104)
	N (%)	N (%)	N (%)
Imperforate anus with recto-perineal fistula	10 (14.5)	3 (8.6)	13 (12.5)
Imperforate anus with recto-urethral fistula	44 (63.8)	NA*	44 (42.3)
Imperforate anus with recto-vesical fistula	9 (13)	NA	9 (8.7)
Imperforated anus without a fistula	6 (8.7)	5 (14.3)	11 (10.6)
Imperforate anus with recto-vestibular fistula	NA	23 (65.7)	23 (22.1)
Persistent cloaca	NA	4 (11.4)	4 (3.8)

*Non applicable

Table 3. Frequency of the associated anomalies

Type of the anomaly	N	%
Genitourinary anomalies	11	10.6
Cardiovascular anomalies	8	7.7
Esophageal atresia (four of them with tracheoesophageal fistula)	5	4.8
Down syndrome	5	4.8
Limb anomalies	4	3.8
Spinal (2 spina bifida and 1 meningomyelocele)	3	2.9
Head anomaly (2 hydrocephaly and 1 microcephaly)	3	2.9
Cleft lip and palate	2	1.9
Abdominal wall defects (1 omphalocele and 1 Prune belly syndrome)	2	1.9
Total	43	41.3

14.5% of cases. Among female patients, the most frequent type was imperforate anus with vestibular fistula, accounting for 65.7% of cases. The second most common type in females was imperforate anus without fistula, which accounted for 14.3% of cases (Table 2).

Associated anomalies were observed in 43 (41.3%) patients. Each patient might has more than one anomaly. Genitourinary anomalies were the predominant (10.6%), followed by cardiovascular anomalies (7.7%), and esophageal malformations (4.8%). (Table 3)

A total of 87 patients (83.7%) underwent initial colostomy followed by posterior sagittal anorectoplasty. Only 17 patients (16.3%) received minimal anoplasty. Complications were observed in 49 patients (47%) after the definitive surgery, ranging from simple wound infections to more severe issues such as fecal incontinence. Some patients experienced multiple complications. The most common complication was constipation (45.2%), followed by incontinence (37.5%). Surgical site infection occurred in 13.5% of patients. Two patients required reoperation: one due to repair retraction and the other for recurrent rectourethral fistula (Table 4). A total of 55 patients (53%) had a satisfactory outcome with no significant complications during follow-up.

About 62.5% of patients developed voluntary bowel movement with satisfied sphincter control. Incontinence developed in all male patients with rectovesical fistula and in three out of four female patients with persistent cloaca, while only one (7.7%) patients with perineal fistula developed incontinence (Table 5).

Table 4. Postoperative complications

Complication	N	%
Surgical site infection	14	13.5
Severe skin excoriation	5	4.8
Wound dehiscence	2	1.9
Prolapsed mucosa	5	4.8
Constipation	47	45.2
Incontinence	39	37.5
Soiling/controllable	13	12.5
Recurrence of fistula	1	0.96
Re-operation	2	1.9

Table 5. Frequency of postoperative incontinence according to the type of the anorectal malformation

Type of the anorectal malformation	Incontinence	
	N	%
Imperforate anus with recto-perineal fistula n=13	1	7.7
Imperforate anus with recto-vestibular fistula n=23	6	26.1
Persistent cloaca n=4	3	75
Imperforate anus with recto-urethral fistula n=44	17	38.6
Imperforate anus with recto-vesical fistula n=9	9	100
Imperforate anus without fistula n=11	3	27.3
Total n=104	39	37.5

Discussion

Anorectal malformations are the most common congenital anomaly of the gastrointestinal tract in pediatric surgical patients. ARM are a relatively common problem in our society community with an incidence of approximately one per 5000 live birth, which resembles that recorded by Cassina et al. (18). Male to female ratio was 2:1 which is similar to what was found by Houben et al (19, 20) but less than found by many other studies (21-24), wherein an equal ratio reported.

The majority of patients (88.5%) were diagnosed within the first month of life, with a particularly high rate (69%) in the first three days. These patients were typically identified by their families or through routine physical examinations, often due to symptoms of intestinal obstruction. Only 11.5% of patients were diagnosed after one month, which could be attributed to the passage of bowel movements through perineal or vestibular fistulas, which may go unnoticed by the family. Additionally, there was a higher incidence of early diagnosis in males compared to females, likely due to the prevalence of rectovestibular fistulas in females. This is similar to what was found by Rathod and et al. (25) In female gender, the rectovestibular fistulas was the predominant type (65.7%) which is relatively comparable to others. (21, 26) In addition, the rectourethral fistula predominated in male patients (63.8%) which is higher than the results obtained by other studies (18, 27). Furthermore, 10.5% of patients were imperforate anus without fistula which is higher than reported by Pena (1) but comparable to Houben. (19)

Associated anomalies were found in 41.3% of patients which is higher than what reported by Adejuyigbe et al. (28) but similar to others (8, 27). Genitourinary anomalies were the most common associated anomalies and occurred in 10.6% of patients, this is in line with other studies (26, 28). Cardiac anomalies were reported in 7.7% of patients, which is similar to Gama study (27). Down syndrome was encountered in 5 (4.8%) patients, which is close to other studies. (1, 30).

Constipation was found to be the most frequent complication in this study, occurring in 45.2% of cases. This is consistent with findings from other studies. Approximately 62.5% of patients experienced voluntary bowel movements with satisfactory sphincter control, although some still experienced soiling. It is worth noting that this result is slightly lower than what has been reported in other literature (1, 17, 27).

Limitations

This is a retrospective single center study. A prospective multicenter study with larger sample size is required

Conclusion

Anorectal malformations are quite common in our society, with a higher incidence among males. In the majority of female patients, the diagnosis is made late. The most common type of ARM in females is imperforate anus with vestibular fistula, while in males, it is imperforate anus with rectourethral fistula. There is a high incidence of associated anomalies. For high anorectal malformations, posterior sagittal anorectoplasty is the preferred definitive surgical technique. The most common issue experienced by patients is constipation.

Acknowledgments

None.

Conflicts of interest

The authors of this study declined any competing interests.

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