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Frequency and outcomes of associated anomalies in anorectal malformation in children

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Abstract---Background and Aim: Anorectal malformations (ARMs) are frequently occurring abnormalities in newborns. The occurrence of these issues is due to prenatal dysmorphogenesis affecting the cloaca and urorectum, leading to a significant medical concern. The present study aimed to determine the incidence and outcomes of associated abnormalities in Children with Anorectal Malformations. Patients and Methods: This retrospective case series study was conducted on 46 anorectal malformation children in the department of Pediatric Surgery, Mardan Medical Complex, Mardan - Pakistan from January 2021 to December 2022. Anorectal malformation children requiring surgical intervention were enrolled. Demographics details, anorectal malformations, specific types, and associated congenital anomalies were recorded. Results: Of the total 46 anorectal malformation children, there were 30 (65.2%) male and 16 (34.8%) females. A fistula was detected in 35 out of 46 cases, constituting 76.1% of the total

cases examined. The prevailing type of fistula identified was rectourethral 34.3% (n=12), with rectovestibular fistula following closely at 31.4% (n=11). The most frequently occurring associated anomaly was cardiac, observed in 39.1% (n=18) of cases, followed by urological anomalies, which were present in 30.4% (n=14) of the cases. Conclusion: The present study found that anorectal malformation associated with functional outcomes mainly rely on the condition's severity. Children suffering from low anorectal malformations typically experience favorable functional outcomes; however, long-term soiling is a probable complication.

Keywords---anorectal malformation, anomalies, outcome, children.

Introduction

Anorectal malformations (ARMs) are common congenital anomalies in pediatric surgery, occurring in approximately 1 in 2000 to 1 in 5000 live births. Extensively documented in medical literature, ARMs often coexist with various other congenital abnormalities, affecting systems such as genitourinary, spinal, cardiovascular, gastrointestinal, craniofacial, and others [1, 2]. Anorectal malformations have been a major concern for pediatric surgeons globally [3]. Attention has been focused on the multiple congenital anomalies in ARM patients such as urologic, vertebral, genital anomalies, and neurologic [4, 5]. The morbidity and mortality rate increases with co-existing of these anomalies [6]. In the majority of cases, children are diagnosed with anorectal malformations after birth and often have accompanying anomalies, primarily affecting urological, cardiac, and musculoskeletal systems [8]. A retro-urethral and recto-vestibular are the most fistulae among male and females in the majority of cases [9].

Anomalies such as ectopic anus, anal atresia, pouch colon, and cloacal malformation are frequently associated with anorectal malformations. Certainly, many of the associated anomalies with anorectal malformations can be severe and more reliant on outcomes among children [10, 11]. The associated anomalies in anorectal malformations can indeed have a profound impact on the child's overall health and long-term outcomes. Therefore, it is vital to effectively manage and address these associated conditions, as they are crucial components of providing comprehensive care to children with anorectal malformations [12]. This comprehensive approach is essential to ensuring the best possible outcomes and quality of life for these patients. There is a scarcity of data regarding anomalies associated with anorectal malformation in a local setting. Therefore, anorectal malformation associated anomalies among children were investigated in the present study.

Methodology

This retrospective case series study was conducted on 46 anorectal malformation children in the department of Pediatric Surgery, Mardan Medical Complex, Mardan - Pakistan from January 2021 to December 2022. Anorectal malformation children requiring surgical intervention were enrolled. Children who

were transferred out of the hospital and those for whom there was insufficient follow-up information were excluded. Demographics details, anorectal malformations, specific types, and associated congenital anomalies were recorded. The anorectal malformation children with fistulas were managed by standard protocol. This protocol included a multistage surgical approach. Posterior Sagittal Anorectoplasty (PSARP) and divided sigmoid colostomy was the initial standard procedure performed. This structured approach aimed to address the condition effectively and provide optimal care for the patients. Data analysis was done using SPSS version 27. Mean and standard deviation was used to express the numerical variables where number and percentages described the qualitative variables.

Results

Of the total 46 anorectal malformation children, there were 30 (65.2%) male and 16 (34.8%) females. A fistula was detected in 35 out of 46 cases, constituting 76.1% of the total cases examined. The prevailing type of fistula identified was rectourethral 34.3% (n=12), with rectovestibular fistula following closely at 31.4% (n=11). The most frequently occurring associated anomaly was cardiac, observed in 39.1% (n=18) of the cases, followed by urological anomalies, which were present in 30.4% (n=14) of the cases. Figure-1 represents the distribution of different types of fistulae. Various surgical interventions are illustrated in Figure-2. Figure-3 depicts the frequency of other associated anomalies. Surgical complications of children following intervention are shown in Figure-4.

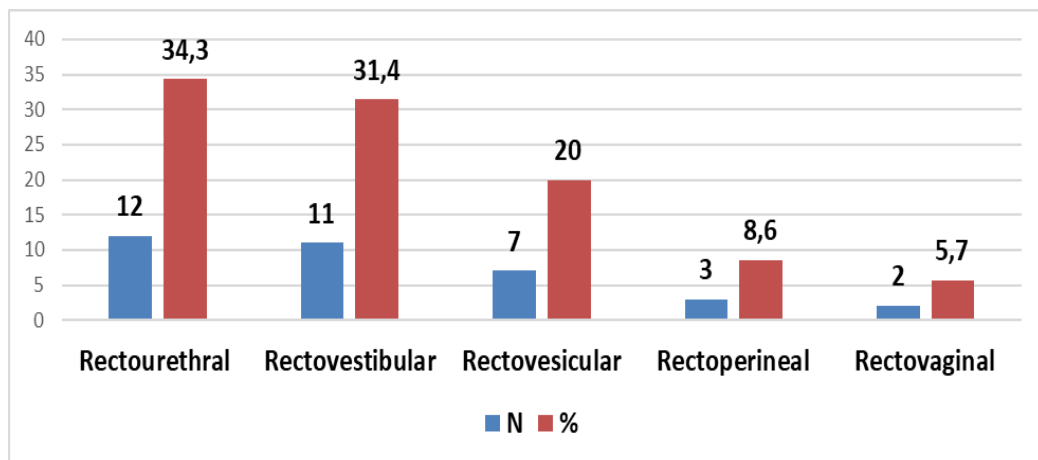


Figure-1 Different fistula associated with anorectal anomalies (N=35)

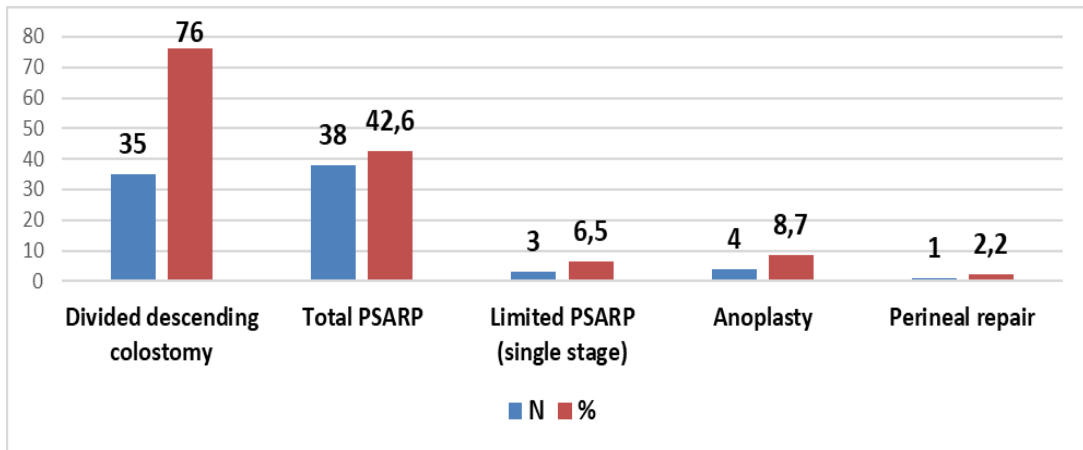


Figure-2 surgical intervention (N=46)

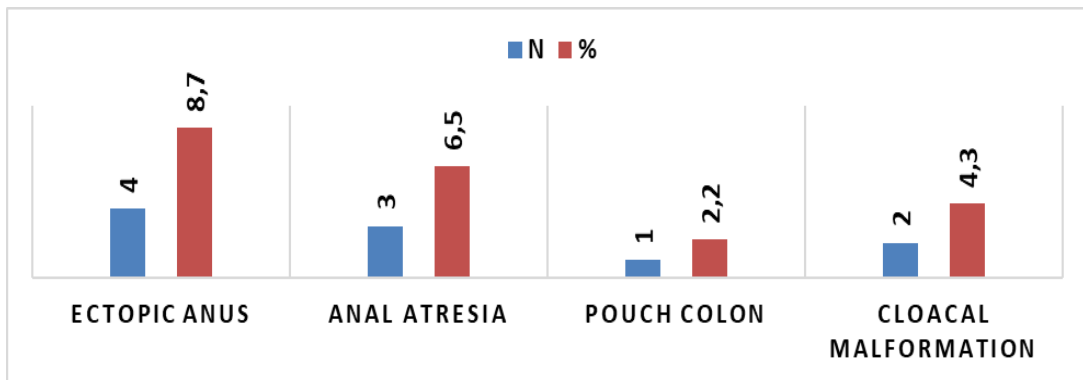


Figure-3 other associated anomalies (N=10)

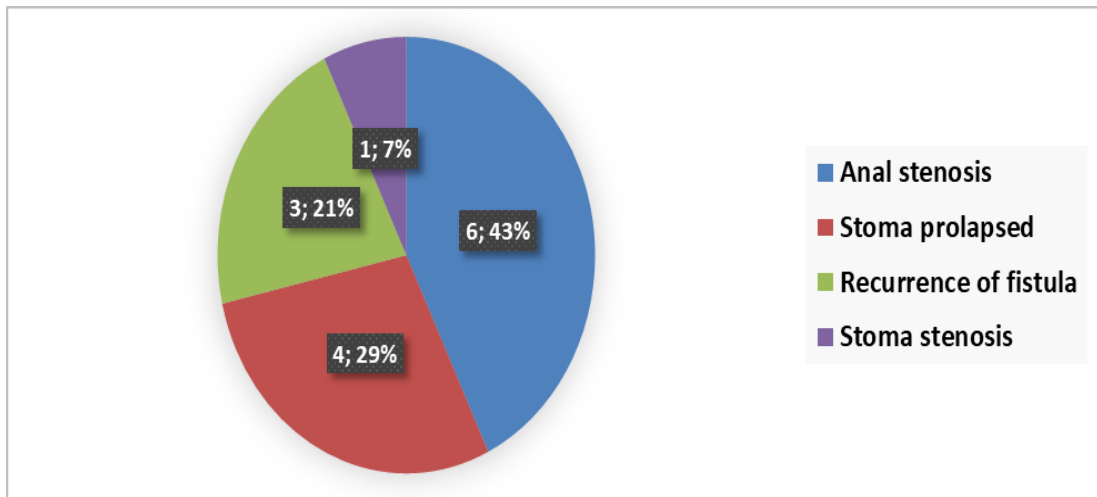


Figure-4 Surgical complications (N=14)

Discussion

This retrospective investigation primarily concentrated on the prevalence and outcome of associated anomalies in anorectal malformation in children and found that the complexity of the malformation, the presence of associated anomalies, and the effectiveness of surgical interventions all play significant roles in determining the functional outcomes and quality of life for individuals affected by anorectal malformations. Low ARM children typically experience favorable functional outcomes; however, soiling is a common long-term complication. There was a higher prevalence of anorectal malformations (ARM) among boys, with a greater number of male subjects, particularly those with high ARM [13, 14].

Vesicoureteral reflux (VUR) was the major genitourinary abnormality among children with a prevalence of 13% which was significantly lower than previously reported 46%-50% range [15-17]. Micturating cystourethrography (MCU) could be the reason for the ultrasonography of abnormal genitourinary children with recurrent UTIs [18]. Low-grade vesicoureteral reflux was potentially missed in this approach without simultaneous upper tract dilatation. However, it's worth noting that previous studies have recognized that naturally resolved low-grade vesicoureteral reflux [19].

An earlier study reported that the prevalence of genitourinary abnormalities decreased with reduction of anorectal malformations complexity. These findings resemble our investigation whereas the decreased prevalence of genitourinary anomalies and increase incidence of rectovesical fistula [20]. Pena's classification system offered the advantage of tracing the blind pouch location and atretic rectal segment mobilization required for sacro perineal procedure [21, 22].

Anorectal malformations and associated syndrome has been observed in earlier studies where vesicoureteral reflux and trisomy were the prevalent abnormalities. The incidence of these associated malformations can vary significantly between studies. One possible explanation for these variations lies in the genetic diversity of the patient populations studied. Majority of cases relate these syndromes to genetic factors which contribute to the observed discrepancies in incidence rates [23]. Genetic factors can significantly influence the prevalence and types of associated malformations seen in individuals with ARM [24].

The prevalence of vertebral anomalies in anorectal malformations individuals has been reported to range from 16.67% to 38.3% in different series [25]. Rollins et al [26] reported the most prominent vertebral anomaly which resembles the findings of an earlier study. It is common to find varying degrees of sacral abnormalities in patients with anorectal malformations. The prevalence of these anomalies highlights the importance of comprehensive assessments and specialized care in individuals with anorectal malformations, given the potential involvement of multiple organ systems [27, 28].

Conclusion

The present study found that anorectal malformation associated with functional outcomes mainly rely on the condition's severity. Children suffering from low

anorectal malformations typically experience favorable functional outcomes; however, long-term soiling is a probable complication.

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