

**DIAGNOSIS AND SURGICAL MANAGEMENT OF ANTERIOR ECTOPY OF THE
ANUS IN GIRLS**

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Abstract

Anterior ectopy of the anus (AEA) is a congenital anomaly predominantly affecting girls, characterized by anterior displacement of an otherwise normally functioning anus. Diagnosis is frequently delayed due to absent functional disturbances in early childhood. This study aimed to evaluate surgical outcomes and optimize management strategies for AEA in girls. A retrospective analysis of 20 girls surgically treated over a 10-year period was conducted. The anococcygeal index (ACI) was used for diagnosis. Three surgical techniques were employed: Stone's anoplasty (n=5), Rissoli's levatorplasty (n=8), and modified Rissoli's operation with posterior sagittal anoproctoplasty (n=7). Satisfactory anatomical restoration was achieved in all patients. The modified technique demonstrated superior outcomes in patients with concurrent coccygeal agenesis. Rehabilitation duration ranged from 6 months to 2 years. Early surgical correction of AEA is indicated, with technique selection guided by associated anomalies.

Keywords: anterior ectopy of the anus; anococcygeal index; surgical correction; coccygeal agenesis; perineal reconstruction; pediatric surgery.

Introduction. Anterior ectopy of the anus (AEA) is a congenital anomaly in which the anus is located in a more anterior position than normal, closer to the external genitalia, while the anal canal, sphincter apparatus, and anorectal function remain structurally intact [1, 2]. This condition predominantly affects girls and is considered one of the more common minor anorectal malformations encountered in pediatric surgical practice [3, 4]. Despite its relative frequency, AEA remains widely underdiagnosed, primarily because the majority of affected children do not exhibit overt defecatory disturbances during infancy and early childhood [2, 5].

The clinical significance of AEA extends beyond its anatomical abnormality. The shortened perineal body in affected girls predisposes them to recurrent urogenital infections, including vulvovaginitis, urethritis, and cystitis, owing to the close proximity of the anus to the vaginal introitus and urethral meatus [3, 6, 7]. Furthermore, an anteriorly displaced anus may contribute to chronic constipation due to the altered relationship between the levator ani muscles and the anal canal, which compromises the normal anorectal angle [4, 8]. In the long term, women with uncorrected AEA face an elevated risk of perineal injury during vaginal delivery, including third- and fourth-degree perineal tears, as well as potential fecal contamination of the birth canal, which may predispose neonates to necrotizing enterocolitis [2, 9, 10].

The anococcygeal index (ACI), first described by Reisner et al. [1], is the most widely accepted objective tool for diagnosing anterior displacement of the anus. It is calculated as the ratio of the distance from the posterior vaginal fourchette to the center of the anus (A) divided by the distance from the posterior vaginal fourchette to the tip of the coccyx (T). In girls, the normal ACI value is 0.46 ± 0.08 , and values below 0.34 are considered indicative of anterior ectopy [1, 11].

Surgical management of AEA remains a subject of debate. While some authors advocate conservative management in the absence of significant symptoms [4, 12], others recommend

early surgical correction to prevent the cumulative urogenital and obstetric complications that manifest later in life [2,6,13]. Various surgical techniques have been described, including Stone's anoplasty involving complete mobilization and reimplantation of the anal canal [14], and Rissoli's anterior levatorplasty, which repositions the anus without full sphincter mobilization [5, 15]. However, the optimal surgical approach, particularly in patients with associated anomalies such as coccygeal agenesis, has not been fully established.

The aim of this study was to evaluate the outcomes of three surgical techniques for AEA in girls and to propose a modified operative approach for cases complicated by coccygeal agenesis, with the ultimate goal of improving long-term functional outcomes and preventing late complications.

Materials and Methods. A retrospective analysis was conducted of 20 girls diagnosed with AEA who underwent surgical correction over a 10-year period at the Department of Pediatric Surgery, Tashkent Pediatric Medical Institute. Among these patients, 7 (35%) had concomitant coccygeal agenesis. The age distribution was as follows: 10 patients (50%) were aged 6-12 months, 8 patients (40%) were aged 1-3 years, and 2 patients (10%) were aged 3-6 years.

Diagnosis was established through clinical examination of the perineum. The position of the anus was assessed, and the anal reflex was elicited to confirm the presence and function of the external anal sphincter surrounding the ectopic anus. Digital rectal examination confirmed adequate rectal lumen and sphincter tone in all patients. The anococcygeal index (ACI) was calculated for each patient by measuring the distance from the posterior vaginal fourchette to the center of the anus (A) and dividing it by the distance from the posterior vaginal fourchette to the tip of the coccyx (T), expressed as $ACI = A/T$. An ACI value less than 0.34 confirmed the diagnosis of anterior ectopy. Patients with coccygeal agenesis additionally underwent plain pelvic radiography, ultrasonography, and magnetic resonance imaging of the pelvic floor.

Three surgical techniques were employed based on clinical findings: (1) Stone's anoplasty (n=5): Through a transvaginal approach, the distal rectum with its intact sphincter complex was mobilized over a length of 3-4 cm. A circular skin incision (diameter 2 cm) was made at the site of normal anal position, and a subcutaneous tunnel was created through which the mobilized anal canal was transposed and sutured to the skin edges. The vaginal wound was closed primarily. (2) Rissoli's anterior levatorplasty (n=8): A semilunar incision was made on the anterior semicircumference of the ectopic anus, 2 cm from the anal verge. The anterior rectal wall was dissected without disrupting the sphincter. The anterior portions of the levator ani muscles were identified, mobilized, and sutured together anterior to the rectum, thereby displacing the anus posteriorly to its normal position. Perineal and vaginal wounds were closed in a longitudinal fashion. (3) Modified Rissoli's operation with posterior sagittal anoproctoplasty (n=7): This technique, performed in patients with coccygeal agenesis, included the standard anterior levatorplasty combined with posterior reinforcement of the levator defect. The rectococcygeal muscles were strengthened using continuous Π -shaped sutures anchored to the distal end of the agenetic coccyx. Following posterior repair, the standard anterior levatorplasty was completed.

Postoperative rehabilitation included a structured protocol initiated one month after surgery, consisting of regular anal bougienage, electrostimulation of the anal sphincter, training enemas, and administration of laxatives and physiotherapeutic procedures as needed for constipation management.

Results. The mean age at surgery was 16.2 ± 10.4 months. All 20 patients presented with an ACI value below 0.34, confirming anterior displacement of the anus. The mean ACI was 0.28 ± 0.05 . In all operated patients, the perineal body (skin bridge) between the anus and the vaginal fourchette measured less than 0.5 cm, and in 5 cases (25%) the skin bridge was absent entirely, with the vaginal vestibular mucosa transitioning directly into the anal mucosa.

Clinical examination revealed that functional defecatory ability was largely preserved; however, mild constipation was the predominant presenting complaint. The primary reason for medical consultation in most cases was parental concern regarding the abnormal position of the anus rather than significant functional disturbance. The delayed presentation was attributed to the absence of severe defecatory dysfunction in early infancy.

The distribution of surgical procedures and their outcomes are summarized in Table 1. Stone's anoplasty (n=5) achieved adequate anatomical repositioning; however, transient fecal incontinence was observed in all 5 patients (100%), necessitating prolonged rehabilitation for up to 12 months. This complication was attributed to disruption of blood supply and innervation during complete mobilization of the distal rectum and sphincter complex. Additionally, the levator ani muscles remained in their original lateral position relative to the relocated anus, limiting their functional contribution in the postoperative period.

Rissoli's anterior levatorplasty (n=8) successfully repositioned the anus to its normal location without sphincter disruption. However, 3 patients (37.5%) experienced postoperative constipation attributed to relative constriction of the anal canal during posterior displacement. Functional recovery was achieved within 3–6 months of rehabilitation.

The modified Rissoli's operation with posterior sagittal anoproctoplasty (n=7), performed exclusively in patients with coccygeal agenesis, yielded the most favorable anatomical and functional outcomes. The posterior reinforcement of the levator defect prevented the development of an acute anorectal angle and maintained adequate rectal support. All 7 patients required extended rehabilitation of 1–2 years; however, satisfactory anorectal function was ultimately restored in all cases.

Following adequate rehabilitation, normal anorectal function was restored in all 20 patients. No cases of wound infection, dehiscence, or recurrent ectopy were observed during the follow-up period.

Table 1

Distribution of surgical procedures and postoperative outcomes in 20 girls with anterior ectopy of the anus

Surgical Technique	n (%)	Postoperative Complication	Rehabilitation Duration	Functional Outcome
Stone's anoplasty	5 (25%)	Transient fecal incontinence (5/5, 100%)	Up to 12 months	Full recovery after rehabilitation

Rissoli's anterior levatorplasty	8 (40%)	Constipation (3/8, 37.5%)	3-6 months	Full recovery after rehabilitation
Modified Rissoli's with posterior anoproctoplasty	7 (35%)	None requiring reoperation	1-2 years	Full recovery after rehabilitation
Total	20 (100%)	–	–	Full recovery in all patients

Discussion. Anterior ectopy of the anus is a frequently overlooked congenital anomaly that poses significant diagnostic and therapeutic challenges in pediatric surgery. Our experience with 20 cases over a decade confirms the observations of Reisner et al. [1] and Leape and Ramenofsky [3] that AEA is often missed during routine neonatal examination because the anus appears morphologically normal and sphincter function is preserved. The delayed diagnosis in our series – with the majority of patients presenting after 6 months of age – underscores the importance of systematic perineal assessment and ACI measurement as part of the standard newborn examination, as advocated by Davari and Hosseinpour [11].

The ACI proved to be a reliable and reproducible diagnostic tool in our study. All patients demonstrated values below the pathological threshold of 0.34, consistent with the diagnostic criteria established by Reisner et al. [1] and validated by Bar-Maor and Eitan [2]. The clinical presentation of mild constipation in our patients aligns with the findings of Herek and Polat [8], who reported a statistically significant association between anterior anal displacement and constipation in children, attributable to the altered biomechanics of the pelvic floor musculature.

Our experience with three different surgical techniques provides valuable insights into the optimal management of AEA. Stone's anoplasty, while achieving satisfactory anatomical correction, was associated with significant postoperative morbidity, including transient fecal incontinence in all treated patients. This finding is consistent with the observations of Hendren [4] and Wakhlu et al. [12], who reported that complete mobilization of the anal canal disrupts the neurovascular supply and displaces the sphincter complex from its muscular support. Based on these outcomes, we discontinued the use of Stone's technique in favor of Rissoli's levatorplasty.

Rissoli's anterior levatorplasty demonstrated clear advantages over Stone's operation by preserving sphincter integrity and neurovascular supply. The occurrence of postoperative constipation in 37.5% of patients treated with this technique is likely related to the narrowing effect of posterior displacement of the anal canal combined with levator plication. Nevertheless, this complication responded well to conservative rehabilitation measures and resolved within 6 months in all affected patients.

A key finding of our study is the recognition that standard Rissoli's levatorplasty may be insufficient in patients with concurrent coccygeal agenesis. In these cases, the absence of the coccyx deprives the pelvic floor of its posterior bony anchor, resulting in inadequate posterior support for the rectum. Exclusive anterior levatorplasty in such patients creates an unbalanced repair that acutely angulates the anorectal junction, predisposing to refractory constipation. Our modified technique, incorporating posterior reinforcement with II-shaped sutures anchored to the

residual coccygeal remnant, addresses this biomechanical deficit and has yielded satisfactory outcomes in all 7 patients. This approach is conceptually aligned with the principles of posterior sagittal anorectoplasty described by Peña and Devries [5], adapted for the specific requirements of AEA with coccygeal agenesis.

The necessity of prolonged postoperative rehabilitation in all operated patients highlights the inherent functional consequences of surgical manipulation of the anorectal complex. Our rehabilitation protocol, encompassing bougienage, electrostimulation, and training enemas, proved effective in restoring normal defecatory function within 6 months for patients without coccygeal agenesis and within 1-2 years for those with this additional anomaly. These findings are consistent with the recommendations of Holschneider and Hutson [15], who emphasized the critical role of structured postoperative rehabilitation in achieving optimal functional outcomes after anorectal surgery in children.

The present study has certain limitations inherent to its retrospective design and relatively small sample size. The absence of a standardized long-term follow-up protocol limits our ability to assess outcomes beyond the rehabilitation period. Future prospective studies with extended follow-up through puberty and into reproductive age are warranted to evaluate the long-term urogenital and obstetric outcomes of early surgical correction of AEA.

Conclusions

1. Anterior ectopy of the anus in girls is an absolute indication for surgical correction, with the optimal timing being early childhood (before 3 years of age) to prevent cumulative urogenital complications and ensure favorable surgical outcomes.

2. Rissoli's anterior levatorplasty is the preferred surgical technique for isolated AEA, offering sphincter-preserving correction with acceptable functional outcomes.

3. In patients with AEA combined with coccygeal agenesis, the modified Rissoli's operation with posterior reinforcement of the levator complex is recommended to achieve balanced pelvic floor reconstruction and prevent refractory constipation.

4. Structured postoperative rehabilitation is essential for restoring normal anorectal function and should be continued for 6 months to 2 years depending on the complexity of the anomaly.

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