PARTIAL CERVICO-VAGINAL APLASIA WITH FUNCTIONAL ENDOMETRIUM: A CASE REPORT ON A SIMPLE RECANALIZATION TECHNIQUE FOR OUTFLOW RECONSTRUCTION IN LOW-RESOURCE SETTINGS

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ABSTRACT

A 13- year- old girl presented with cyclical pelvic pain and primary amenorrhea, revealing a rare complex cervicovaginal hypoplasia with hematometra. Diagnosis was confirmed through clinical examination, ultrasound, and MRI, emphasizing the importance of rectal examination when vaginal inspection was inconclusive. Surgical management involved a novel, cost-effective Foley catheter technique that combined an abdomino-vaginal pull-through with two-phase stenting (using a gauze mold and a balloon catheter) to establish neocervicovaginal patency. Initial drainage of 500 mL hematometra was achieved, but adhesions required reintervention with balloon stenting and psychiatric support for compliance. This case highlights three key innovations:[1] a modified approach for low-resource settings, a structured adhesion prevention protocol, and integrated psychosocial care-addressing gaps in adolescent gynecological management.[2,3] The technique has a minimally invasive nature, and dynamic stenting outperformed traditional methods (e.g., McIndoe vaginoplasty), aligning with ACOG's multidisciplinary care guidelines. Challenges included the risk of restenosis, requiring vigilant follow-up. This case and approach offer a practical, holistic solution for complex Müllerian anomalies, emphasizing diagnostic precision, surgical adaptability, and psychosocial support in pubertal patients. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

KEYWORDS: *Pelvic Pain, Cervicovaginal Hypoplasia, Müllerian Ducts*

INTRODUCTION

The presence of a patent vaginal and cervical canal is necessary for menstrual blood to exit the uterus. Aberrant development of the Müllerian ducts and urogenital sinus during embryogenesis can lead to congenital reproductive tract anomalies, occurring in approximately 7% of females.[1] Among these, a rare variant involves segmental malformation of the Müllerian system, characterized by cervical agenesis with preserved uterine function, with an estimated incidence of 1:80,000-100,000 live births. Clinically, it often occurs alongside partial or complete vaginal aplasia, which happens in 1 in 4000 births.[2,12] These structural abnormalities may involve any level from the hymen to the uterus, potentially causing outflow obstruction. The retention of menstrual blood often results in hematocolpos or hematometrocolpos, usually presenting with cyclical pelvic pain despite primary amenorrhea. Patients often experience progressive, severe abdominal pain that requires urgent evaluation. Accurate diagnosis depends on a patient's history, a thorough physical examination including perineal inspection and rectal assessment, and careful interpretation of ultrasound and MRI results.[3,4] These steps are crucial for distinguishing between various obstructive causes and determining the appropriate surgical treatment. Our case is unique because it involves a rare variant of Müllerian anomaly management. We illustrate how a modified Foley catheter approach can address both anatomical obstruction and adhesion issues. It highlights the

importance of clinical examination skills, accurate imaging interpretation, and integrated psychiatric care to tackle challenges related to postoperative self-dilatation compliance in adolescents, a topic rarely documented in adolescent gynecology.

CASE PRESENTATION

A thirteen-year-old unmarried girl, accompanied by her mother, arrived at the Gynecology and Obstetrics outpatient department of a tertiary care public facility. She reported severe lower abdominal pain lasting one week, which did not improve despite analgesics prescribed by her primary care physician. Notably, she also noted experiencing cyclical pelvic pain over the past five months without the onset of menstruation. On examination, her secondary sexual characteristics matched Tanner stage 3. Abdominal palpation showed a soft-to-firm, globular uterine mass measuring 16–18 weeks, with mild tenderness. External genitalia inspection revealed a blind-ending vagina with a pinkish membrane and a shallow hymenal dimple, without bulging. Her rectal exam demonstrated a tense, globular mass anteriorly in the upper rectum, suggestive of a distended mass at the uterocervical region consistent with hematometra and ruling out haematocolpos. The hormonal profile confirmed normal endocrine function. Ultrasound of the abdomen showed an anteverted, enlarged uterus (7.3 × 12 cm) with a cystic, echogenic endometrial cavity indicating hematometra. Both ovaries appeared normal (right: 3 × 1.9 cm; left: 3.2 × 1.5 cm), and renal ultrasound revealed no abnormalities. Pelvic MRI confirmed hematometra, showing T1/T2 hyperintense collections in the uterine and upper cervical regions, with a narrow lower segment ending in focal stenosis or aplasia (Figure 1). A non-contrast CT revealed a distended uterus (5.6 × 13 cm) with hypo-dense fluid (40–50 HU) in the endometrium, leading to myometrial thinning and bladder compression. During initial vaginal surgical exploration under anesthesia, the narrow vagina was dilated and canalized using Hegar dilators #6 and #7, following removal of a thin septum and para-vaginal tissue with fine dissection. The upper part of the vagina was completely blind, with no cervical opening detected. Subsequently, an abdominal approach was performed. The uterus was found to be enlarged, and a transverse incision was made in the lower uterus. No properly formed cervix or cervical os was identified; only a peritoneal layer was palpable. A combined approach was then undertaken. The uterus was distended (16-week size) with normal adnexa. A 2 cm semi-lunar incision was made at the distal uterine segment, and a 24-gauge Foley catheter was threaded via the pull-through technique to establish uterovaginal continuity. About 500 mL of old, chocolate-colored blood was drained. The catheter was left in place for 28 days to stent the neocervical opening, and a gauze-wrapped syringe mold served as a vaginal dilator. At one month, vaginal patency allowed for 3-4 cm digital insertion. However, the patient returned at three months with recurrent pain due to vaginal adhesions despite a patent cervical os. Adhesiolysis and Hegar dilation were performed under sedation, and a 5 cc balloon-tipped Foley catheter was placed vaginally for two weeks to prevent re-adhesion (Figure 2), along with short-term antibiotics to prevent pelvic infection. Initially, it was challenging to encourage the adolescent girl to perform self-manual dilatation, but psychiatric and parental counseling emphasized diligent use of vaginal dilators, resulting in satisfactory patency on follow-up. The patient still requires long-term monitoring to evaluate outcomes.

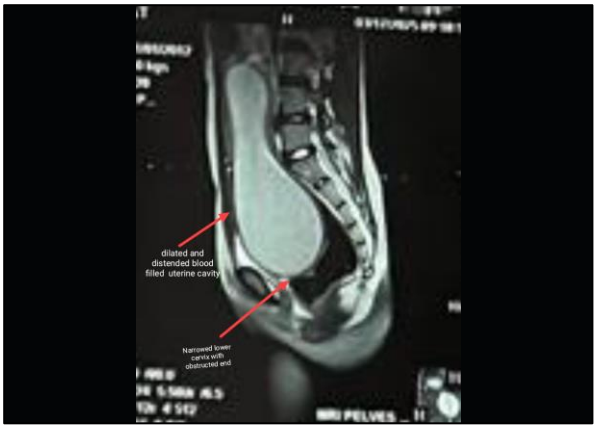

Figure 1: T2-weighted MRI shows hematometra (Arrow A) with myometrial thinning and hematocervix terminating in focal stenosis/narrowing/hypoplasia at the lower end (Arrow B), diagnostic of outflow obstruction.

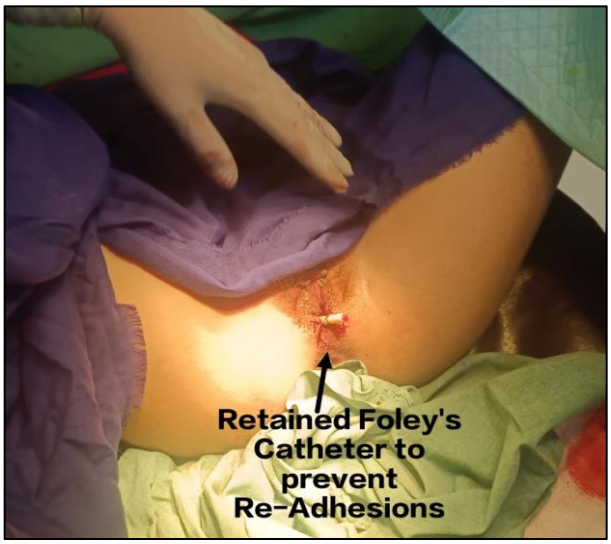

Figure 2: Foley Catheter Acting as a Stent to Maintain Patency and Prevent Adhesion Recurrence

DISCUSSION

The ESHRE/ESGE classification system categorizes cervical aplasia into four distinct subtypes: (1) cervical external os obstruction, (2) cervical agenesis, (3) cervical atresia, and (4) cervical cord or fragment. Both the American Fertility Society (1988) and ESHRE/ESGE classification systems further classify congenital vaginal atresia as either complete or partial. Additionally, the Embryological-Clinical Classification System delineates these anomalies into complete and segmental types based on developmental patterns.[5,6,7] Our patient's presentation-featuring functional endometrium with cervical hypoplasia and absent os, proximal vaginal aplasia, and distal vaginal hypoplasia-represents a complex variant within this spectrum. These malformations typically require surgical intervention to establish uterovaginal continuity, thereby facilitating hematometra drainage and preventing endometriosis secondary to retrograde menstruation.[8] This case of primary amenorrhea caused by a complex Müllerian anomaly offers important clinical lessons. The rectal examination proved valuable when vaginal inspection was inconclusive, effectively distinguishing between hematometra and hematocolpos and demonstrating that basic clinical skills remain essential despite the availability of advanced imaging technologies. Our management strategy introduces an innovative Foley catheter technique with three distinct advantages: its minimally invasive approach reduces surgical risks, the use of inexpensive and widely available equipment makes it practical for resource-limited settings, and dynamic stenting maintains patency more effectively than static dilators. This approach represents a significant improvement over traditional methods, such as McIndoe vaginoplasty or laparoscopic-assisted canalization, providing a balanced solution between complex reconstruction and conservative treatment, while specifically targeting the challenges of cervical os obstruction. The 24-gauge Foley catheter served dual purposes—initially creating cervicovaginal continuity through pull-through traction and later preventing restenosis via balloon stenting-showcasing its versatility, especially in low-resource environments where conventional approaches may be unsuitable.[9,10] To our knowledge, only a single reported case has been found in the literature where a Foley catheter was used for recanalization, confirming its viability as a practical solution for outflow tract reconstruction in cervical atresia.[11] This technique emphasizes cost-effectiveness and technical reproducibility, especially valuable in resource-limited settings.[11] Our case study is also consistent with ACOG guidelines, which recommend a multidisciplinary approach to care and nonsurgical neovaginal creation through progressive perineal dilation with dilators, as we initially did.[12] This patient requires long-term follow-up given the ongoing clinical debate regarding optimal management. While some gynecologists prefer conservative outflow tract restoration to relieve pain and maintain menstrual drainage, others advocate hysterectomy as a definitive treatment to prevent future serious complications-including cervicovaginal restenosis, chronic pelvic inflammation, sepsis, and secondary endometriosis resulting from obstructed menstrual flow due to restenosis-a rationale favored by many practitioners. However, current evidence remains limited regarding surgical efficacy, sustained cervical patency, and prevention of stenosis. Additional case reports are critically needed to evaluate long-term anatomical outcomes (cervicovaginal patency) as well as functional results (sexual and reproductive health) in these complex cases.[13,14]

CONCLUSIONS

This case provides valuable clinical perspectives for addressing complex Müllerian anomalies in pediatric and adolescent gynecology practice. Future long-term studies are needed to assess anatomical and functional outcomes, the therapeutic potential of this simple, readily available Foley technique, and to identify any associated complications, thereby optimizing management strategies for these challenging cases.

CONFLICT OF INTEREST: None

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AUTHORS CONTRIBUTION

Naheed Parveen - *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval*

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Erum Samreen Siddiqui - *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval*

Sakeena Ahmed – *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval*

Nadia Shoukat - *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval*

The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.