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When Pain Unveils Obstruction: Imaging Diagnosis of Hematometrocolpos Due to Vaginal Atresia

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Abstract **Case Report**

Hematometrocolpos is a medical condition characterized by the accumulation of menstrual blood (hematometra) in the uterus and the vagina (colpos), due to an obstruction that prevents the normal outflow of menstrual blood, often seen in conditions such as congenital anomalies, or other obstructive issues. Symptoms may include abdominal pain, cramping, and, in some cases, a palpable pelvic mass. Treatment usually involves addressing the underlying obstruction and draining the accumulated blood. Without early diagnosis and treatment, complications such as tubal adhesion, pelvic endometriosis, and infertility can occur. We report the case of a young girl in whom an hematometroclpos was incidentally discovered following complaints of an abdominal pain

Keywords: Vaginal atresia, hematometroclpos, menarch, abdominal pain.

INTRODUCTION

Vaginal atresia is a rare congenital abnormality of the female reproductive tract due to a failure of canalization in the urogenital sinus [1]. It may lead to the development of hematometrocolpos which refers to the dilatation of the vagina and the uterus, with retained menstruations due to an imperforate hymen, congenital lower vaginal atresia, or a complete transverse vaginal septum. Patients typically report primary amenorrhea with cyclic monthly abdominal and pelvic pain or a pelvic mass. It can also result in urinary tract obstruction, leading to urinary retention and acute renal and urinary infection [2]. Imaging, particularly ultrasound and MRI, plays a crucial role in the diagnosis of hematometrocolpos by providing detailed visual information about the anatomical and pathological conditions of the uterus and vagina and guiding management strategies.

CASE REPORT

A 15-year-old girl, whom was already operated on for anorectal malformation (anal atresia) at birth; was referred to our department with severe abdominal pain that has been ongoing for 2 weeks not relieving on symptomatic treatment. She has not attained menarche and is having cyclical pain for the last 1 year. Upon interrogation, the patient also reported a history of recurrent urinary infection and she stated that she never had a menstrual period or any vaginal bleeding. On examination, her secondary sexual characteristics were well-developed. External genitalia showed a vaginal opening.

Abdominal ultrasound showed hematometrocolpos on the right hemiuterus with a rudimentary left horn on probable distal vaginal agenesis **[figure 1]** associated to a diverticular bladder with major bilateral ureterohydronephrosis **[figure2].**

Magnetic resonance imaging (MRI) of whole abdomen and pelvis confirmed the finding of hematometrocolpos in a unicornuate uterus with a rudimentary contralateral uterus, associated to a vaginal atresia, showing uterocervical retention with high signal intensity on T1 and T2 without enhancement after gadolinium injection indicating blood with no visualization of the vaginal cavity [Figure 3 and 4]. Our case could be classified as U4a, C0, V4 of ESHRE/ESGE classification.

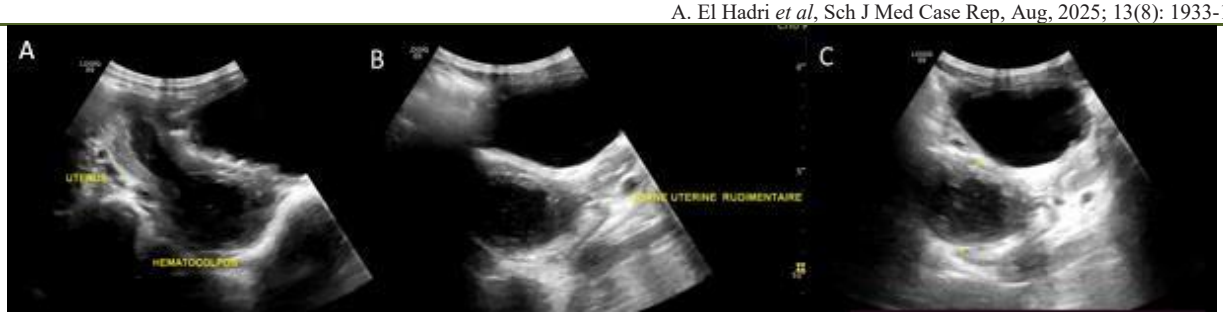

Figure 1: Pelvic ultrasound in longitudinal section (A) showing a distended appearance of the proximal portion of the vagina with a non-vascularized, anechoic endoluminal retention on color Doppler, along with a truncated appearance of the distal portion. (B) Visualization of a rudimentary left uterine horn with fluid retention. (C) Distended right uterine horn, continuous with the vagina, containing fluid with a hematic appearance

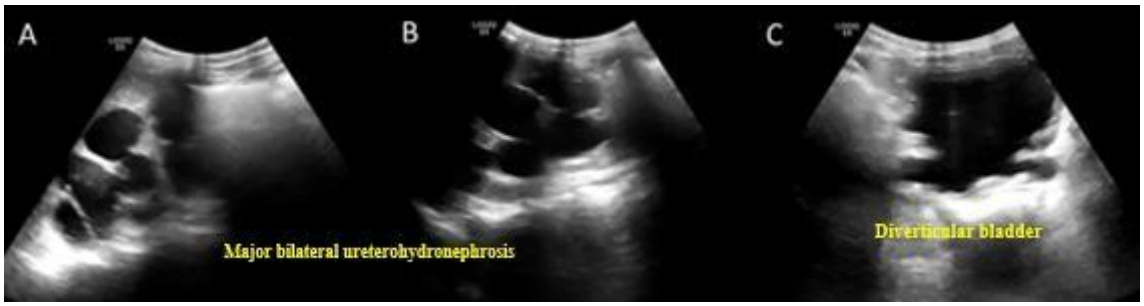

Figure 2: Abdominopelvic ultrasound in longitudinal (A, B) and transverse (C) sections showing major dilation of the renal pyelocaliceal cavities bilaterally, with anechoic content (A, B), and a diverticular bladder (C)

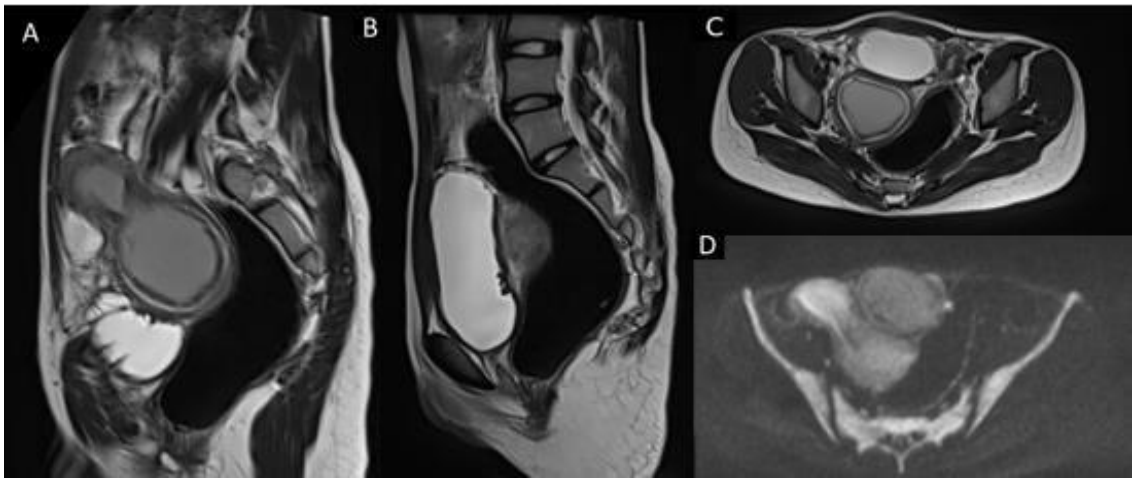

Figure 3: Pelvic MRI in axial and sagittal slices in T2 sequence (A, B, C) and diffusion sequence (D): Demonstration of a right uterine horn communicating with a dilated cervix, showing hematometra with identification of a rudimentary left uterine horn containing a small hematometra

Absence of identification of a vaginal cavity.

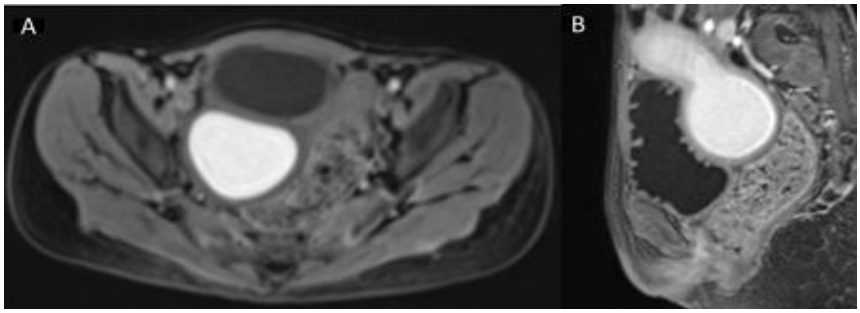

Figure 4: Pelvic MRI in axial and sagittal slices in T1 FAT SAT sequence without (A) and with (B) gadolinium injection. showing hemorrhagic uterocervical retention with high signal intensity on T1 without enhancement after gadolinium injection

The patient was transferred to the pediatric surgery department for surgical management.

The postoperative recovery was uneventful and satisfactory.

DISCUSSION

Hematometrocolpos may be caused by several congenital abnormalities or acquired obstruction of the lower female genital tract including imperforate hymen, vaginal or cervical atresia, and a complete transverse vaginal septum [3]. Total or partial isolated vaginal atresia is a rare congenital anomaly representing only 9% of cases of vaginal aplasia. This malformation is secondary to a defect in the development of paramesonephrotic ducts during embryogenesis [4]. The manifestations vary and the first symptom appears around puberty. Normal development of secondary sexual characteristics coexists with primary amenorrhea and the clinical signs are dominated by the presence of cyclic pain, which may be accompanied by a hypogastric mass, the pain is often abdominal sometimes pelvic. Urinary signs due to compression can lead to acute retention, dysuria, and bilateral hydronephrosis [5]. Clinical examination usually confirms the diagnosis; it shows imperforate hymen and a bulging hymen with a bluish discoloration.

Laboratory tests are not useful for differential diagnosis and may even cause confusion, as tumor markers can be elevated. For example, in cases of hematocolpos and hematometra, the tumor marker Ca 125 can be significantly raised [6]. Imaging studies are crucial when the diagnosis is uncertain. A suprapubic ultrasound typically reveals a finely echogenic retro vesical image, with a small, dilated uterine cavity containing liquid in cases of hematometra. Additionally, a hematosalpinx or peritoneal effusion may be detected. Ultrasound is also helpful in identifying uterine malformations and is used to systematically check for renal agenesis, particularly in cases of genital duplication. It can also detect ureteropelvic dilation if urinary tract compression is caused by hematocolpos. MRI, like ultrasound, has the advantage of being safe for a young girl and offers an excellent anatomical analysis of malformations through T2-weighted sequences. T1-weighted sequences can confirm the presence of blood in the vagina and adjacent uterine horn [7,8]. MRI, especially with T2-weighted imaging, effectively reveals blood accumulation in the uterus and the vagina, with blood appearing hyperintense (bright) on T2 sequences. This allows clinicians to accurately identify and assess the size of the blood collections. In contrast, T1 sequences show variable signal intensity for blood depending on its age. Acute blood may appear darker (lower signal), while older blood or clots may appear brighter (higher signal), helping to differentiate the age of the blood. The advantage of MRI lies in its ability to better define the extent and height of vaginal aplasia, which aids in selecting the most appropriate surgical approach. [7].

The management of these patients is surgical, but the appropriate age for intervention remains a topic of debate. We believe that in asymptomatic prepubertal patients, where the diagnosis is incidentally made during an imaging exam conducted for another reason, vaginal reconstruction should be deferred until puberty when a large hematocolpos is formed, but it should be done before the development of hematometra, due to concerns about retrograde menstrual flow and increased pressure on surrounding organs [9]. This approach allows adequate development of vaginal tissue, which facilitates vaginal anastomosis in cases of limited partial forms and reduces the risk of stenosis which is a frequent complication. There is no standardized surgical technique; however, all approaches share the common step of performing a preliminary dissection of the fibrous plane between the bladder and urethra in the front and the rectum behind. This can be done via perineal or mixed perineal-abdominal methods, though there is a significant risk of false passages [10]. When managing limited vaginal aplasia, where the atretic segment is less than 3 cm, the procedure is straightforward and involves direct anastomosis of the vaginal mucosa. In contrast, surgery for more extensive forms is more complex and often requires the use of cutaneous or intestinal grafts skin [11].

If not detected and treated early enough, this condition can lead to serious complications, such as infections, endometriosis, kidney disease, hydronephrosis, and infertility.

CONCLUSION

Hematometrocolpos due to a vaginal atresia remains rare, symptomatology is various, it goes from a simple primary amenorrhea to a pelvic mass often discovered by puberty. In most cases of obstructive vaginal abnormalities, physical examination combined with imaging is sufficient to make the appropriate diagnosis. An organized approach with appropriate diagnosis and management of patients with various anomalies of the vagina helps to improve the prognosis.

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