

Sonographic presentation acute hematometra and massive hematocolpos in a pubertal girl: A case report

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ABSTRACT**Background**

Imperforate hymen is an uncommon obstructive congenital anomaly of the female external reproductive channel due to lack of canalization (lower) vaginal plate between the vaginal and urogenital sinus; with a prevalence rate of less < 0.1%. Hematocolpos / imperforate hymen with hematometra often presents as a pelvic mass that compresses the urinary bladder causing acute urine retention and pain.

Case presentation

A 14-year-old presented with lower abdominal pain for 5 months. Patient physical examination revealed normal secondary sexual characteristics with a thickened than normal hymen. She presented with delayed menarche; a physician earlier prescribed analgesic and anthelmintic medication for pain management. After conservative hymenotomy about 360ml of dark-tan haem (blood) was drained in few minutes. Postoperative recovery was uneventful; normal menstruation occurred after 4 weeks.

Conclusion

Diagnosis through physical examination and ultrasound requires vigilance and a high degree of suspicion; virginity sparing is a viable treatment option due to social reasons and religious beliefs.

Keywords

Hematocolpos, hematometra, hymen, ultrasound, virginity

Background

Imperforate hymen as a prevalence of less than 0.1% [1] occurring as a result of partial failure canalization lower-end of the vaginal plate [2]. Oral history, vaginal examination (VE) and sonography with the following indications below diagnoses hematocolpos-hematometra over time:

- Supra-pelvic bulge [1]
- Cyanosis at the lateral vaginal area [3]
- Occasional urinary retention and referred perineal pain [4]
- Secondary and primary amenorrhea [5]

Imperforate hymen occurs sporadically at puberty with secondary hematocolpos (menstrual accumulation in-utero) and hematometra superior to the imperforate hymen [6]. Hemometra or hematometra is the medical condition that involves retention or collection of blood in the uterus [7]. Patients may suffer from low blood pressure and vasovagal reactions due to prolonged accumulation of blood in the uterus (unable to exit) [8]. Most pubertal girls present with amenorrhea, enlargement of the vaginal membrane at introitus and acute lower abdominal pain [9]. If no medical attention is received it may generate hematosalphinx. There is some controversy on the appropriate period for surgical correction, when imperforate hymen becomes symptomatic with generation of large hematocolpos or hematometrium. Collection of menstrual blood in the uterus and vagina is known as hematometra and hematocolpos respectively. Its occurrence in young females may be due to congenital anomaly of the vaginal canal; it's agenesis or formation of a 'blind' hymen.

Obstructed Hemivagina and Ipsilateral Renal Agenesis (OHVIRA) syndrome and imperforate hymen sometimes present with similar features; manifestation in pubertal 'teen' age, or ultrasonic diagnosis in-utero in cases of hydrometrocolpos. When palpated the uterus usually feels bulky to the fingers. Late discovery of imperforate hymen may lead to infection, referred pain, hematometra, hematocolpos and primary infertility [10, 11]. The common age presentation for this condition is during puberty or neonatal period (just after birth) [12,13]. Diagnosis of imperforate hymen can be made during observation by the lack of mucus posterior to the commissure of the labia-majus in newborn females or seeing a protruding hymen after puberty [3]. Early pin-point diagnosis is required for successful management to prevent infections and pain via hematometra and hematocolpos build up.

Imperforate hymen could be misdiagnosed with other malformation such as Obstructive Hemivaginal and Ipsilateral Renal Agenesis (OHVIRA) [14, 15]. A direct anatomical and physiological consequence of imperforate hymen is the filling of inner uterus with menstrual blood. Embryologically in and some newborn; utero-vaginal fluids under control from the mother's estrogen collect in blind vaginal cavity resulting in hydrometra or hydrocolpos [13,16].

Clinical management option for imperforate hymen is based on hymenotomy (excision of hymen) or lunar hymenotomy (hymen preserving surgical procedure) [12, 17]. Either the medico-legal and ethical implications must be well expunged to the young patient and her guardians for informed consent. It should be noted that females with hematometra and hematocolpos are prone to pelvic inflammatory disease (PID), perineal abscess and susceptible to antibiotic drug abuse as a result of stored menstrual blood and obvious hymenal tissue-barrier defect [18-20]. As reported by Liang et al [21] optimal caution must be exercised during hymenotomy under anesthesia to avoid injury to the urethra. A simple imperforate hymen is usually not associated with other birth defects / congenital anomalies.

Case presentation

A 14-year-old girl experienced consistent lower abdominal pain for 5 months. There was occasional incidence of fatigue, vomiting and nausea; she had not menstruated; which necessitated her to visit a physician at Crystal Specialist Hospital, Dopemu-Akowonjo Lagos. Abdominal examination by our clinician revealed supra-pelvic firmness, tender on palpation with little mobility and dull acoustic percussion. Oral history indicated no incidence of previous menstruation. Imperforate hymen was noted on perineal observation with a continuously protruding (introitus) vaginal membrane. A referral was made for ultrasound scan which revealed a bulky non-gravid uterus (Figure 1), heterogenous in echotexture and containing capsulated fluid (with low level internal echoes); independent and expert second-opinion concluded on a diagnosis of hematometrium and hematocolpos. Patient-guardian consent was sought and obtained for case documentation and ethical approval was granted by Crystal Specialist Hospital, Lagos in line with the 1975 Helsinki Declaration on patient rights. However, the patient declined photographic imaging of the perineal area to capture the imperforate hymen; a female chaperone was actively involved. Our young subject and guardian were counseled about the risks of "deflowering" during the surgical operation before opting for virginity-preserving hymenotomy. Information from the theatre revealed lateral edges of the hymen were excised according to the description of Temizkan et al [22]. Due to delayed diagnosis about 360 mls of menstrual blood had formed as hematocolpos and hematometra (H) Figure 1. The blood in the uterus due to hematometra was drained by cervical dilation. Our young patient sometimes had episodes of urinary retention. Lower abdominal ultrasound showed a 2.8cm diameter anechoic collection in-utero and at the upper vaginal cavity suggestive of hematocolpos and hematometra. She had a pulse rate of 72 bpm, blood pressure of 112/70 mmHg and afebrile to touch on general examination. On physical examination she had developed secondary sexual anatomical features (firm breasts and

pubic hair) tenderness was noticed in the lower abdominal and supra-pubic area. No known history of STIs.

The lateral retracted tissue-flaps were later oversewn by the surgeon (in our facility) with sutures to prevent more blood loss and prevent hymen closure. The hymen appeared bulging at introitus.

Dark reddish-brown blood (360ml) with sticky and odiferous consistency was collected in the kidney dish after central hymenal excision in the surgical theatre. Trans abdominal sonography revealed a bulky uterus with an anechoic patch 28mm x 30mm in the corpus (Figure 1). Prior perineal observation revealed a bulging dark-red imperforate hymen with evidence of cyanosis. No active bleeding seen at time of examination. After confirmatory diagnosis, a gynecologist used a vicryl 2.0 suture to minimally trim the edges of the hymen to prevent defloration. A urethral catheter was inserted during the surgical procedure. Her post-operative recuperation was uneventful after 48 hours admission; she was rescheduled for gynecological review in 5 weeks.

The patient's hymenotomy was conducted under influence of general anesthesia; postoperative sonography revealed a greatly diminished uterine size (Figure 3). Both ovaries were normal in size (anatomically). Cyclic supra abdominal pain is a common complaint.

Postoperative recovery was normal; operating surgeon advised warm-water perineal sit-baths and douching to aid healing follow-up information revealed normal menstrual outflow after 4 weeks. Operating surgeon later prescribed Paracetamol (500mg thrice daily) and Augmentin (625mg twice daily) for six days. An alternate procedure [23] that abandons surgical treatment altogether involves insertion of Foley's catheter.

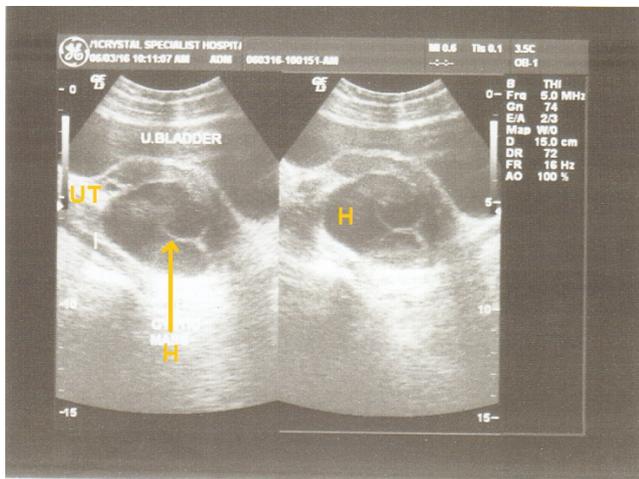


Figure 1: Perioperative ultrasound scan shows a bulky uterus 80 x 56mm: L & AP diameter. Note the blood-filled uterine cavity mimicking a gestational sac. Observe the uterine fundus and blood clot (H) in the central region about 34mm in circumferential diameter. Evidence of non-exteriorization of menstrual flow; uniform myomeric

echotexture in the corpus, with anechoic trapped fluid. Hematocolpos and Hematometra (H) in a longitudinal scan 1.2cm left of the pubic symphysis.

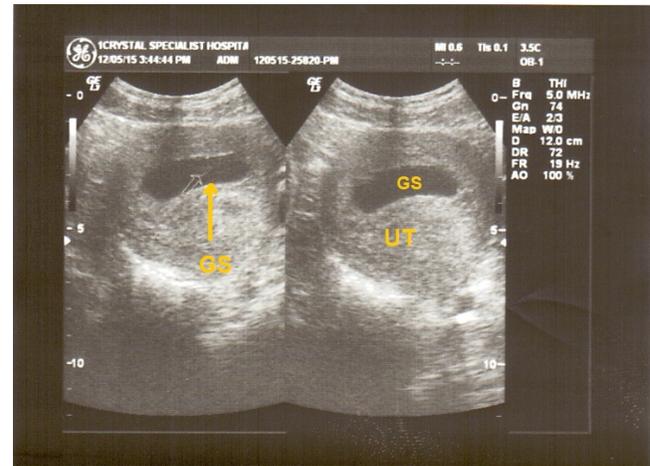


Figure 2: A random gravid anteverted uterus (6 weeks + 2 days GA) containing a gestational sac (GS) with characteristics of a Missed Abortion (due to poor sonopenic) decidua-reaction. It should not be confused with acute hematometra in Figure 1, they have similar sonographic appearance.

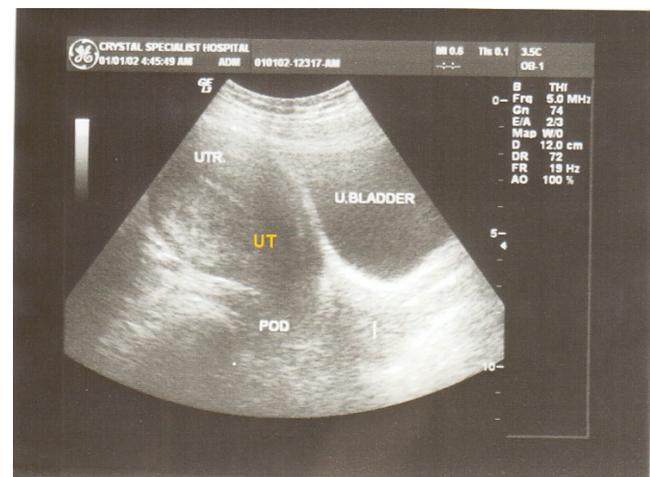


Figure 3: Follow-up (control) sonogram; 3 months post-surgery transabdominal ultrasound with a 3.5MHz transducer showing a normal anteverted uterine (UT) cavity free of tissue scarring (L x AP: 71 x 48mm); note the well distended urinary bladder and echogenic (central) endometrial plate in the corpus.

Discussion

Pelvic ultrasonography showed the (superior part) vagina as an echo-free cylindrical structure (Figures 1 and 3) with protruding fornix, in rare cases hematosalpinx may accompany this type of finding. It can be argued that

clinical manifestation of imperforate hymen varies from initial incidental finding to urinary retention, referred bladder pain, urinary tract infection (UTI), primary amenorrhea, recurring constipation and (anterior) protruding hymen [24]. In agreement with the postulation of Schorge et al [30]; cervical stenosis may prove a complication of overt resection to the cervical os, presenting features will depend on the rate of obstruction. Magnetic Resonance Imaging (MRI) and ultrasonography are two radiological modalities excellent in the diagnosis of hematometrium [25, 8]. There are few reports gross hematometra caused by imperforate cervix in post-menarcheal females with uterine dielphys. Hematometra (Figure 1) and stenosis of the cervix should be basic alternate diagnosis when reviewing pelvic bulges and recent complaints of secondary amenorrhea. Contrary to what some medical researchers speculate in literature, we are not convinced about the phenomenon indicating 'hematocolpos of unknown origin'. Retained secretions and menstrual blood disturbed the uterus to form hematocolpos and hematometra resulting in supra-pelvic tension. It should be noted that a pair of Hagar dilators may be useful when dealing with stenotic cervix. Diagnosis of imperforate hymen is simple and uncomplicated but can be missed due to rarity of the condition and inadequate gynaecological examination. Hydrometrocolpos occurring with a vaginal atresia may be part of a wider syndromic conditions namely Mckusick-Kaufman syndrome (hydrometrocolpos from vaginal blockage, ventricular deformations and polydoctyly) [26]. Embryologically, theories abound on the genesis; such as excessive estrogen hypersecretion prenatally (or postnatally) with subsequent mucus secretion by (uterine) cervical glands [27]. Perforation of the hymen usually occur during embryonic period [28], while the vagina forms from the sinovaginal bulb and uterovaginal canal [28] at around 11 weeks GA. Formation of the urogenital sinus, paramesonephric and mesonephric ducts are separate with marched paracrine role in hymen genesis. A malformation known as Herlyn-Werner-Wunderlich (HWW) syndrome may be a result of any structural malrotation of the earlier stated anatomical structures [29, 30].

Imperforate hymen (not photographed) is a rare congenital malformation of the vagina with close association with hematocolpos (Figure 1). It may be associated with Mullerian abnormalities but others argue on its close association with urinary tract abnormalities. One of the risks with simple hymenotomy procedure is the risks of false recurrence due to tissue adhesion under perineal thermal region therefore, stents and catheters must be used to maintain potency of the cervix.

Treatment for most Mullerian abnormalities and imperforate hymen is through surgery with optimal priority given to hymen-preserving / virginity-sparing techniques. In several cultures there is widespread desire for virginity before marriage consummation [22]. Acute blood volume

can accumulate additionally in the fallopian tube causing a secondary infection to ultimately obstruct the oviduct. From our case-report chronic hematometrium/ hematocolpos can be misdiagnosed as a Missed Abortion (Figure 2) if the sonographer is inexperienced; nonetheless a simple *b*HCG may be required. On the issue of prevention and recurrent cervical stenosis; gynaecologists have devised specialized copper IUDs [8]. Imperforate hymen is undoubtedly an uncommon congenital malformation that obstructs the vaginal channel leading to mucal and cyclic blood accumulation. Other medical conditions related to secondary amenorrhea should be ruled out; physical examination and sonography points hematometra secondary to cervical stenosis. Early identification and surgical correction of this disorder may help prevent hematometra complications such as uterine retrogression and primary infertility. An alternative is weekly in-situ draining for hematocolpos, however grave risks of infection exist despite 'safer' virginity sparing perception.

Conclusion

Though imperforate hymen is a rare congenital perineal anomaly, awareness of such conditions in pubertal girls would dispel traditional superstitious beliefs and psychologically prepare patients for hymenotomy procedures. Early diagnosis of imperforate hymen in pubertal girls correlated with a good outcome; thorough examination of neonates at birth is of critical importance. Virginity sparing surgery is a viable management option due to ethical, religious and social reasons.

Abbreviations

Anterior-Posterior (AP), Intra-Uterine Device (IUD), Herlyn-Werner-Wunderlich Syndrome (HWW), Human Chorionic Gonadotrophin (HCG), Obstructed Hemivagina and Ipsilateral Renal Agenesis (OHVIRA), Sexually Transmitted Infection (STI), Urinary Tract Infection (UTI), Vaginal Examination (VE)

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Authors' contribution

- a. study planning: AAM, UVO, QKK, AO
- b. case report: AAM, QKK, UVO
- c. follow up: AAM, UVO, QKK
- d. interpretation: AAM, WJ, MRJ, AO
- e. manuscript writing: AAM, QKK
- f. manuscript revision: AAM, WJ, MRJ
- g. final approval: AAM, UVO, QKK, MRJ, AO, WJ
- h. agreement to be accountable for all aspects of the work: AAM, UVO, QKK, MRJ, AO, WJ

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Availability of data and materials

Figures of this case report are available as part of the article, and no additional image files are required.

Consent for publication

In line with the 1975 Helsinki Declaration on patient right's consent was sought and obtained from the patient, ethical approval was granted by the committee of Crystal Specialist Hospital. No patient name-tag or any form of confidential personal information is compromised in this manuscript; a copy of the approval letter is available on demand by the editor.

Competing interests

None, declared.

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