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CASE REPORT

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A comparative ultrasound evaluation of two cases of prenatal and postnatal hydrocele

Afodun AM[1]*, Quadri KK[2], Ayinde TO[3], Odumeru EA[4], Mukangendo M[5], Okesina AA[6]

Corresponding author:

Afodun Adam Moyosore, Ph.D. Department of Medical Imaging Sciences, School of Health Sciences, College of Medicine and Health Sciences, University of Rwanda.

Department of Radiology, Ultrasound and Doppler Unit, Crystal Specialist Hospital, Dopemu, Lagos, Nigeria.

Email: a.afodun@ur.ac.rw ORCID

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ABSTRACT

Background

Ultrasonography plays a major role in distinguishing extra-testicular and intratesticular abnormalities. A hydrocele of a male fetus characterised by a 'half-moon' hypoechoic fluid rim around the testis was observed. In adults, it is evidenced by serous fluid collection between the parietal and visceral layers of the tunica vaginalis.

Case presentation

A comparative analysis of two cases of in-vitro and in-vivo diagnosis of hydrocele in a woman at 30 weeks of gestation and a 38-year-old male was made. The crux of the report on the prenatal hydroceles' variety showed constancy of unchanged fluid volume, suggesting it to be a non-communicating type. The report is contrary to a communicating variety that enlarges throughout gravidae with possible inguinal hernia. There are few comparative hydrocele case sonograms in literature.

Conclusion

Ultrasound is a safe, reliable, and accurate method for evaluating patients with scrotal diseases, and the approach to dual sono-diagnosis is surgery when unresolved to eliminate spermatic cord compromise.

Keywords

Hydrocele, tunica vaginalis, diagnosis, embroyologic, ultrasound

Background

A hydrocele is a type of swelling in the scrotum that occurs when fluid abnormally collects in the thin superficial sheath surrounding the testicle. Hydroceles can be categorised into non-communicating and communicating [1]. The former is not associated with the patency of the processus vaginalis, while the latter is a direct result of vaginalis [2]. Congenital hydrocele forms due to a patent processus vaginalis; when it occurs in later life, it is often referred to as acquired (non-congenital) hydrocele. The vaginalis is a pouch of the serous membrane covering the testes derived from the external part of the vaginal process of the peritoneum; this in the fetus comes before testicular descent from the lower abdomen into the scrotum. There is sparse literature on the onset of hydrocele [3]. Two types of spermatic-cord hydrocele are recognised: funicular hydrocele, where fluid collects along the cord, and encysted hydrocele, where fluid, or "haem," does not communicate with tunica vaginalis or the peritoneum.

The normal testicular epididymis consists of a tail, body, and head. The head averages 9 mm in size; the epididymal body is 3 mm thick. Other structures are found in the upper testicular quadrant, a Mullerian duct, and the appendix epididymis - a mesonephric remnant [4]. Hydrocele means copious abnormal fluid collection, mainly serous, in the enclosure of the tunica vaginalis.

Accurate radiology diagnosis of scrotal pathologies is challenging because most patients present with similar symptoms. Most imaging scientists prefer to use sonar in the groin region to diagnose the abdomino-scrotal hydrocele.

Case presentation

Case Report I

A 30-week gestational-age male fetus was viewed in utero of a 32-year-old woman who presented for a routine ultrasound at Crystal Specialist Hospital (CSH) Akowonjo-Dopemu, Lagos, Nigeria.

A demonstration of a “half-crescent"-shaped hypoechoic (fluid-filled) area of both testicles was observed, a classic and characteristic diagnosis of hydrocele (Figure 1a). This revealed an LT testicular dimension of 10 x 5 x 7 mm. At birth (39.4 weeks), the neonate had a bilateral hydrocele free of any (congenital) hernia, anatomical torsion, or extensions to the pars abdominalis (Figure 1b).

Case Report II

A 38-year-old negroid male consulted the Department of Urology before being referred to our radiologic division. He is a manual labourer with a body weight of 71 kg and is 180.00cm tall. He is married with no previous history of testicular pain despite working long hours daily. Verbal communication with the patient revealed no incidence of scrotal trauma, testicular torsion, epididymitis, which may sequel or initiate a hydrocele.

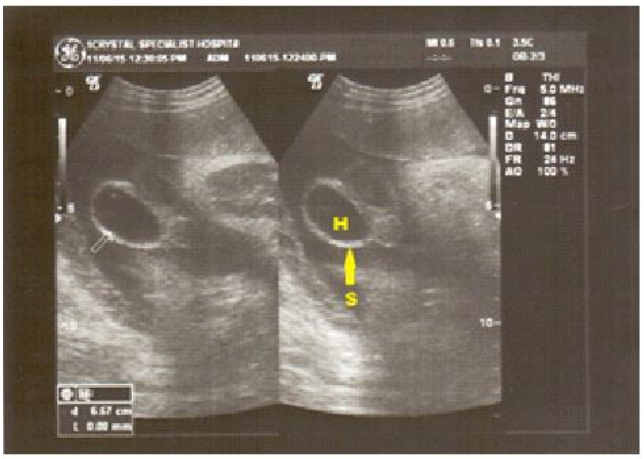

Figure 1a

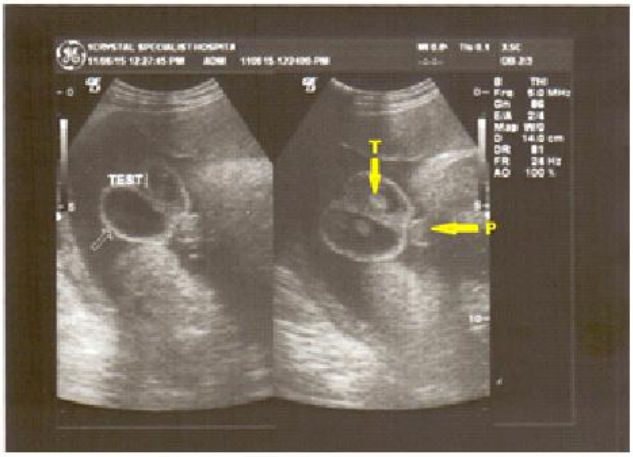

Figure 1b

Figure 1a: Idiopathic/primary hydrocele (H), transverse scan section of the scrotum (S) showing ‘half-moon’ anechoic fluid collection in the testis with homogenous echo texture.

Figure 1b: Transverse section of a chronic hydrocele with panoramic exposure and median penis (P). In-situ bilateral testicles (T) show internal echo reverberation and scrotal liquid extending into the sagittal plane

There was no recent history of haematuria, melena, or dysuria. On physical examination and gloved palpitation, a large (simple) scrotal hydrocele extending laterally to the medial thigh region was observed, and scrotal swellings revealed cross-fluctuation. He was in minimal pain and mostly non-tense in demeanour (however, he was not satisfied with the cosmetic image of his scrotum during intimacy). Although hydroceles usually present as painless masses causing no life-threatening consequences, they may lead to sexual dysfunction in a few cases.

As demonstrated by ultrasound (Figures 2a, 2b), the testicular volumes were approximately 37 ml on the left and 24 ml on the right side. The normal (control) is depicted in Figure 3.

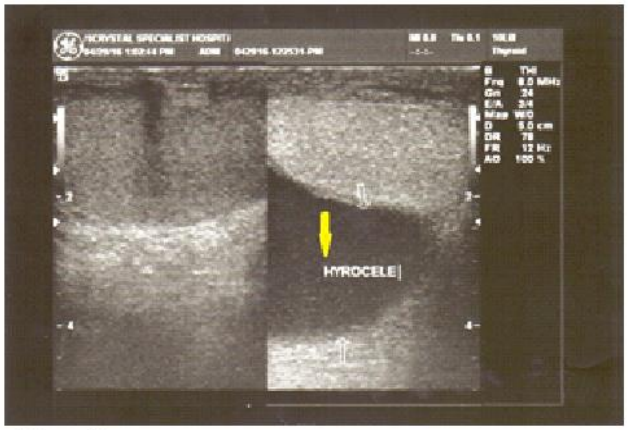

Figure 2a

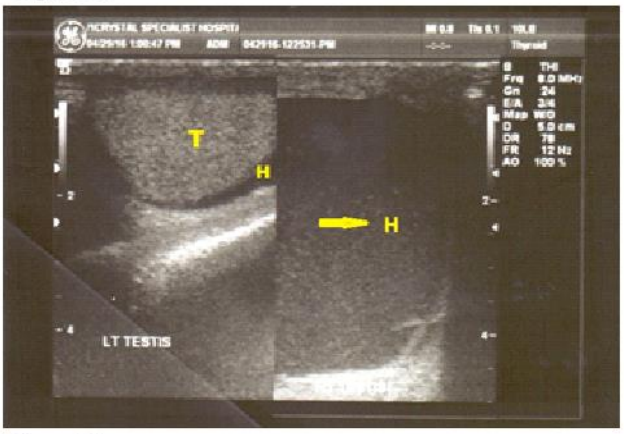

Figure 2b

Figure 2a: Ultrasound image of hydrocele (arrowed) sac free of internal septum with slight indented pressure pushing the right testis laterally. Note the mediastinum of the testis along the longitudinal plane.

Figure 2b: Transverse ultrasonic image of the left testis (T). Homogenously diffuse tissue and marked associated hydrocele (H). No internal septum is seen in the split section of the B-mode -sonogram. High-frequency sonar shows uniform echotexture with the triangular-shaped epididymal head at the superior testicular pole.

The average anatomic dimension of an adult testis is around 5.2 x 3.0 x 2.1 mm, and it has uniform echogenicity. While adult hydrocele is mostly asymptomatic, some can lead to infertility (via chronic oligospermia). In our case, scrotal ultrasound revealed bilateral subclinical varicoceles, with sonographic evidence of increased testicular microlithiasis. No culture or post-scan seminal analysis was ordered.

Discussion

Natural scrotal hydroceles resolution is investigated in line with the principle of De Renzo and Barone [5], a time-dependent therapy: the "Just wait and see" principle (Figure 1). Most urologic schools of thought opt for the fairest healing and minimal post-operative complications.

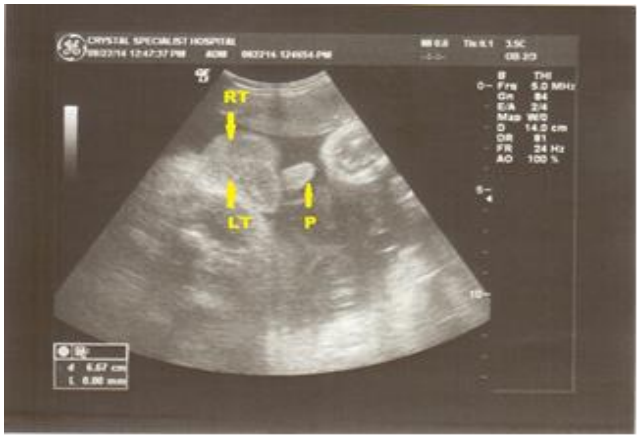

Figure 3: Normal (control) anatomy, a lateral view showing the penis (P), right (RT) and left (LT) testicles respectively

Ultrasound scans aid in the correct diagnosis of different minor and major congenital malformations and pinpoint perineal observation. Clinicians have declared the existence of a 'one-way' valve-like shutter mechanism (in the persistent processes vaginalis) that, when infected and compromised, can be a source of hydrocele.

Since bilateral communicating hydrocele was noted, surgical intervention is a significant treatment option for this condition. Some urologists recommend 9 months of age to prevent testicular dysmorphic sequelae. Even though cysts (distinct from hydrocele) often incidentally occur in middle-aged men above 42, they are usually single and average about 14 mm in diameter. Six months of follow-up after parturition showed a resolution in Case I (Figures 1a, 1b), with no evidence of recurrence or complications.

No (extra or intra) testicular macrocalcification was seen. A congenital case (report I, Figures 1a and 1b) emanates from a patent processus vaginalis, allowing peritoneal fluid to enter the swollen and often painless scrotum. In acute prolonged hydrocele, combined sclerotherapy and aspiration have proved successful, as surgical management remains a viable option in advanced-aged patients.

Hydrocele is a commonly diagnosed scrotal pathologic swelling affecting about 1% of adult males. It involves bilateral testicles in an estimated 8% of cases, causing no complications. However, cases with a volumetric increase in size and exudate infection may result in infertility, Fournier's gangrene, testicular ischaemia, venous rupture, and pyocele [6]. Other studies [7] showed patients with acute hydrocele may have total or partial spermiogenesis. Histologically, hydroceles testicles have features of interstitial fibrosis, cellular deposition at the basement membrane, and disorganisation of spermatogenic cells.

Grasping the pathogenesis depends on the causative factor (e.g., trauma, obstruction, or inflammation) of its initial onset. In agreement with a similar case [8], a plausible explanation for the genesis of Case II (Figures 2a and 2b), adult hydronephrosis [1], could be attributed to iatrogenic

disruption of testicular lymphatics post-hernia-repair surgery. In Case II, when acquired hydrocele occurs in the superior and polar quadrants of the scrotum, physical examination and palpitation should extend to the supra-pubic region to rule out or exclude an abdomino-scrotal origin. Several mechanisms are suggested to explain the pathophysiology of non-reducing, 'permanent' hydrocele, but the exact mechanism is unclear. From our sonograms, a plausible theory would be increased spiked pressure in the scrotal region, which leads to compression and lateral pushing of the distal-end hydrocele sac - the so-called One-Way-Valve-Effect (OWVE) [9]. In cases that warrant surgical excision for hydrocele management and correction, a scrotal approach [under spinal anaesthesia for adults and general anaesthesia for children] [2] is the best. Still, other urologists prefer inguinal access due to the anatomical and safety implications. Local anaesthesia is discouraged due to the possibility of referred pain from the traction of the spermatic cord as a result of haemostatic body temperature changes. Data [10] involving sclerotherapy (6% of 15 ml of aqueous phenol, analgesic: 1% lidocaine to inhibit fluid reaccumulating) after fluid aspiration from testes are unsatisfactory because of the high probability of reoccurrence and the technicality of the procedure.

This will automatically and ultimately lead to compromised drainage and the accumulation of fluid produced by the tunica vaginalis into the lymph. Testicular oedema subsides with time, and hydroceles features are clearly distinct from scrotal wall cellulitis. The neonate case in question excited multidisciplinary interest amongst the general surgeon, urologist, radiologist, and andrologist.

Conclusion

Young males with retractile testis do not need surgical intervention but need regular ultrasound evaluation and follow-up until they are teenagers. Testicular volume decreases may warrant orchiopexy. High-resolution sonography is, without doubt, an 'arrowhead' in evaluating scrotal disease. Optical magnification (due to size) may be needed in further surgical procedures on the spermatic cord to preserve testicular lymphatics. This makes 'lymphatic sparing' during varicocele surgery and herniorrhaphy a point of note. The comparative evaluation and detection underscore the value of sonar to neonatologists and obstetricians. Hydrocelectomy and simple scrotal exploration are advised. We recommend evaluating hydrocele as an aetiology in patients presenting with idiopathic infertility, demonstrating the need for future studies examining the effect of (acute) hydrocele on male fertility, especially in bilateral cases.

Abbreviations

Crystal Specialist Hospital (CSH), One Way Valve Effect (OWVE)

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Authors' contribution

a. Study planning: AAM, QKK, OAA
b. Case report: AAM, OEA, ATO
c. Follow up: AAM, MM, ATO
d. Interpretation: AAM, MM, QKK
e. Manuscript writing: AAM, QKK, MM, OEA
f. Manuscript revision: AAM, OAA, ATO
g. Final approval: AAM, ATO, QKK, OAA, OEA, MM
h. Agreement to be accountable for all aspects of the work: AAM, QKK, ATO, OEA, MM, OAA

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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

Consent was sought and obtained from both patients in accordance with the 1975 Helsinki Declaration on patient rights, and ethical approval was granted by the committee of Crystal Specialist Hospital (CSH). 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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Author information

[1]Dr. Afodun Adam Moyosore, Ph.D. Department of Medical Imaging Sciences, School of Health Sciences, College of Medicine and Health Sciences, University of Rwanda.

Department of Radiology, Ultrasound and Doppler Unit, Crystal Specialist Hospital, Dopemu, Lagos, Nigeria.

[2]Quadri Khadijah Kofoworola, M.Sc., Physiology, Scientist,

Department of Physiology, College of Medicine, University of Lagos
[3]Dr. Ayinde Taofeek Olanrewaju, MBBS, Ph.D., Senior Lecturer, Department of Physiology, Faculty of Basic Medical Sciences, University of Ilorin
[4]Dr. Odumeru Adeyemi Emmanuel, Ph.D., Senior Lecturer, Department of Medical Imaging Sciences, School of Health Sciences, College of Medicine and Health Sciences, University of Rwanda.
[5]Mukangendo Mecthilde, M.Sc., MPH., Head/ Department of Medical Imaging Sciences, School of Health Sciences, College of Medicine and Health Sciences, University of Rwanda
[6]Dr. Okesina Akeem Ayodeji, Ph.D., Senior Lecturer, Department of Clinical Medicine and Community Health, School of Health Sciences, College of Medicine and Health Sciences, University of Rwanda

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