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## Case Report

# Complete testicular infarction secondary to epididymoorchitis and pyocele

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## ABSTRACT

Epididymoorchitis is a relatively common urologic condition involving the scrotum which presents with unilateral pain and swelling. It is typically treated with antibiotics but can progress to complications such as scrotal pyocele. Global testicular infarction is an exceedingly rare but devastating complication of epididymoorchitis. Grey scale and color Doppler ultrasound demonstrate testicular hypovascularity with subsequent hypoechoic changes of the testicular parenchyma. Scrotal MRI shows T2 hyperintense changes through the testicle with nonenhancement of the testicular parenchyma post contrast, consistent with infarction. The cause of global infarction in epididymitis is uncertain but may be due to mixed arterial and venous insufficiency. This case illustrates a 41-year-old male that developed acute left testicular pain. Initial ultrasound showed an enlarged left testicle with hyperemia. The patient's symptoms progressed and a scrotal MRI demonstrated a lack of left testicular enhancement consistent with global infarction, as well as an adjacent pyocele.

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## Case report

A 41-year-old male presented with sudden onset left groin pain. He reported progressively worsening pain which radiated to the left leg with associated testicular swelling and erythema. Vitals were pertinent for a fever of 39.5°C. Physical exam revealed an erythematous and indurated left hemiscrotum with tenderness to palpation. The patient's CBC showed a leukocytosis of 30.18 cells/ $\mu$ L.

Initial work up began with a scrotal ultrasound which showed an enlarged and heterogeneous left testicle with hy-

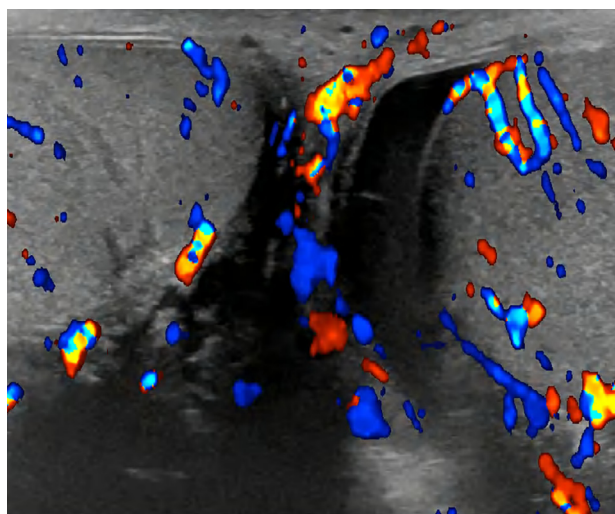
peremia (Fig. 1). The patient was admitted and started on ceftriaxone. Urine culture on hospital day 2 showed *Escherichia coli*.

The patient continued to have severe left testicular pain despite treatment with antibiotics. A repeat ultrasound performed on hospital day 2 demonstrated a pyocele with reduced flow to the left testicle (Fig. 2). Antibiotics were changed to ciprofloxacin and metronidazole on hospital day 5. The patient continued to have severe pain and a scrotal MRI was performed on hospital day 10. The MRI showed lack of left testicle enhancement with surrounding pyocele (Figs. 3–5). Followup ultrasound performed on hospital day 11 showed

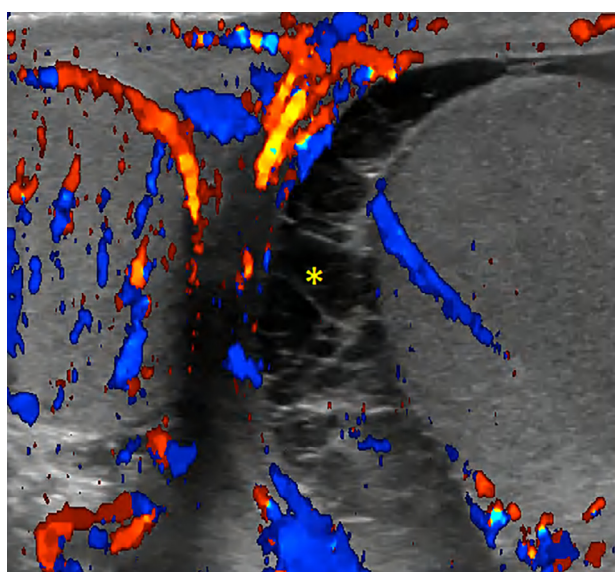
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**Fig. 1 – Transverse scrotal ultrasound with Doppler shows hyperemia to the left testicle with surrounding inflammatory fluid.**

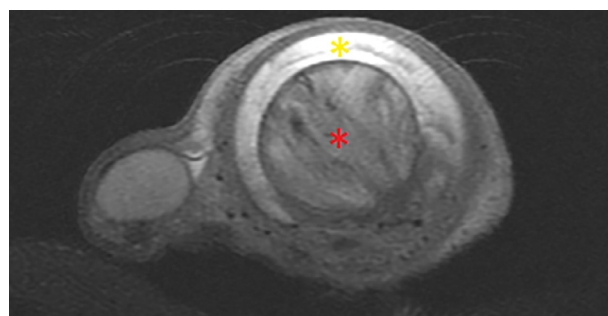


**Fig. 2 – Repeat transverse scrotal ultrasound performed on hospital day 2 shows formation of left pyocele (yellow asterisk) and reduced Doppler flow to the left testicle. (Color version of figure is available online.)**

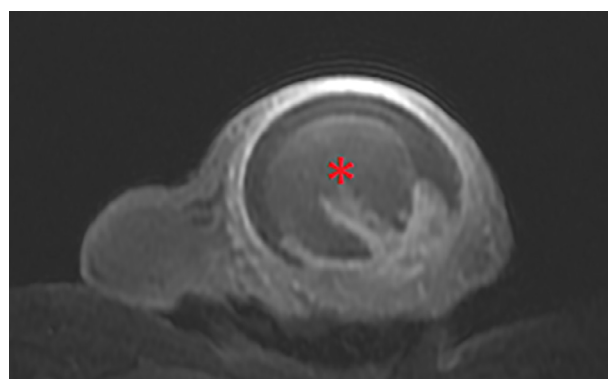
an enlarged left testicle without Doppler flow. On hospital day 12, the patient was presented with orchiectomy as a remaining treatment option. The patient refused treatment and was discharged on hospital day 13.

## Discussion

Epididymoorchitis is a relatively common urologic condition, which presents with unilateral testicular pain and is managed with antibiotics, analgesia, and scrotal support. Al-



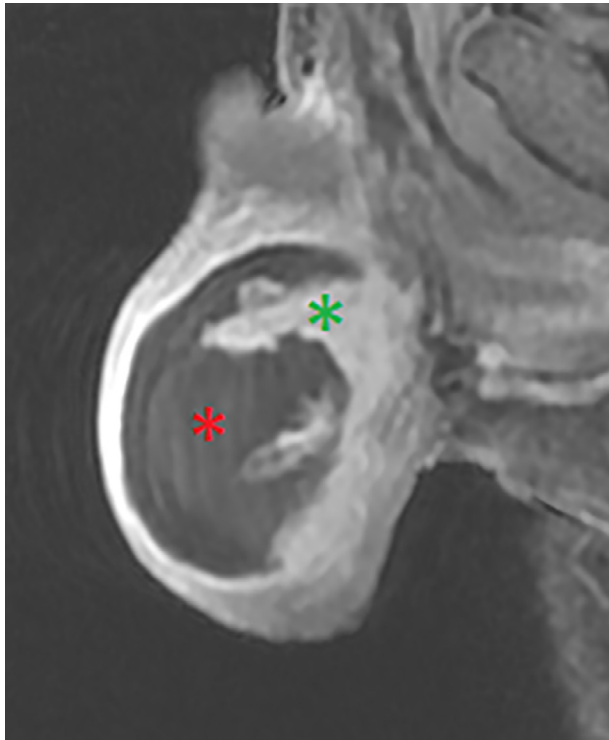
**Fig. 3 – Axial T2-weighted image from scrotal MRI performed on hospital day 10 shows a markedly enlarged left testicle with heterogeneous hyperintense T2 signal consistent with edema (red asterisk). There is an associated left pyocele (yellow asterisk). (Color version of figure is available online.)**



**Fig. 4 – Axial contrast enhanced T1-weighted image shows global nonenhancement of the left testicle (red asterisk). (Color version of figure is available online.)**

though uncomplicated in most cases, followup is warranted to assess for improvement because complications can occur such as pyocele formation and rarely, global testicular infarction. Complications tend to be more common with urinary tract pathogens, mainly *E. Coli* as opposed to pathogens related to sexually transmitted illnesses [1].

Global testicular infarction following epididymoorchitis is an exceedingly rare, but serious complication with less than 10 cases reported in the literature [2]. More typically, global testicular infarction occurs in the setting of spermatic cord torsion, which causes proximal vascular compromise of the testicular artery. In the case of epididymoorchitis, the cause of global infarction is uncertain but may be due to mixed arterial and venous insufficiency. Venous insufficiency occurs due to edema of the epididymal head with subsequent mass effect upon the testicular veins. This leads to venous congestion and multiple thromboses [2,3]. Additionally, peak systolic velocity measurements of the testicular artery are elevated in epididymitis, suggesting there may also be arterial compromise [4,5]. Another proposed theory is that endothelial damage caused by bacterial endotoxins lead to arterial thrombosis [6,7]. Overall, once there is vascular compromise, the testicle



**Fig. 5 – Sagittal contrast enhanced T1-weighted image demonstrating global non-enhancement of the left testicle (red asterisk), suggestive of infarction with sparing of the epididymis (green asterisk). (Color version of figure is available online.)**

lacks significant collateral blood supply which makes it susceptible to ischemia from end organ occlusion [8].

Ultrasound is the primary modality used to diagnose testicular ischemia. Doppler can assess blood flow to the testicle and epididymis with sensitivity approaching 100% and specificity ranging from 85%-95% [9]. Normal testicles demonstrate symmetric Doppler flow. A relative increase of Doppler flow implies an infectious or inflammatory process, namely epididymoorchitis. Conversely, absence of Doppler flow suggests testicular ischemia. Twisting of the spermatic cord is the most specific imaging ultrasound finding for testicular ischemia. In the absence of spermatic cord twisting, areas of hypoechoic tissue within the testicle combined with absent Doppler flow suggests testicular infarction [10].

Scrotal MRI is a useful supplement to testicular ultrasound if rapidly available for the evaluation of testicular infarction because it can more obviously show lack of perfusion to the testicle [11]. In the setting of testicular infarction, T2-weighted images typically show hyperintense signal diffusely through the testicle, secondary to edema. On contrast enhanced T1-weighted images, hypointense, nonenhancing testicle parenchyma is consistent with infarction. Other complications related to epididymoorchitis, such as pyocele can show increased signal on T2 weighted images and peripheral rim enhancement on T1-weighted images. MRI helps confirm the diagnosis preoperatively for the urologist with specificity approaching 100% [12].

Contrast enhanced ultrasound (CEUS) is another modality that can help confirm the diagnosis of global testicular ischemia in the emergent setting, when standard ultrasound is inconclusive. CEUS can more obviously demonstrate lack of testicular perfusion in difficult cases such as adolescents with small testicles [13]. At our institution, CEUS is not performed in the work up of acute scrotal pain because it is not readily available.

Complete testicular infarction is a rare but serious complication following epididymoorchitis. Clinicians must monitor the patient for symptomatic improvement. If symptoms persist despite appropriate antibiotic therapy, ischemia should be considered since testicular ischemia can still develop after the initial presentation of epididymoorchitis. Repeat scrotal ultrasound and if rapidly available, MRI should be obtained to confirm ischemia and initiate surgical management before global infarction.

#### REFERENCES

- [1] Chia D, Penkoff P, Stanowski M, Beattie K, Wang AC. Testicular infarction and rupture: an uncommon complication of epididymo-orchitis. *J Surg Case Rep* 2016;2016(5). doi:10.1093/jscr/rjw077.
- [2] Yusuf G, Sellars ME, Kooiman GG, Diaz-Cano S, Sidhu PS. Global Testicular Infarction in the Presence of Epididymitis. *J Ultrasound Med* 2013;32(1):175–80. doi:10.7863/jum.2013.32.1.175.
- [3] Hourihane DO. Infected infarcts of the testis: a study of 18 cases preceded by pyogenic epididymoorchitis. *J Clin Pathol* 1970;23(8):668–75. doi:10.1136/jcp.23.8.668.
- [4] Brown JM, Hammers LW, Barton JW, et al. Quantitative Doppler assessment of acute scrotal inflammation. *Radiology* 1995;197(2):427–31. doi:10.1148/radiology.197.2.7480687.
- [5] Aziz ZA, Satchithananda K, Khan M, Sidhu PS. High-Frequency color doppler ultrasonography of the spermatic cord arteries. *J Ultrasound Med* 2005;24(7):905–9. doi:10.7863/jum.2005.24.7.905.
- [6] Adriaansen J, Post M, Groot Sd, et al. Secondary health conditions in persons with spinal cord injury: a longitudinal study from one to five years post-discharge. *J Rehabil Med* 2013;45(10):1016–22. doi:10.2340/16501977-1207.
- [7] Vordermark Jonathan S, Favila Marcial Q. Testicular necrosis: a preventable complication of epididymitis. *J Urol* 1982;128(6):1322–4. doi:10.1016/S0022-5347(17)53482-5.
- [8] Pathmarajah T, Abdelhamid M, Tenna AS, Paton DJW, Hockley JA, Jansen S. Acute global testicular infarction post-EVAR from cholesterol embolisation can be mistaken for torsion. *EJVES Short Rep* 2017;35:11–15. doi:10.1016/j.ejvsr.2017.03.002.
- [9] Alkhori NA, Barth RA. Pediatric scrotal ultrasound: review and update. *Pediatr Radiol* 2017;47(9):1125–33. doi:10.1007/s00247-017-3923-9.
- [10] Kalfa N, Veyrac C, Lopez M, Lopez C, Maurel A, Kaselas C, et al. Multicenter assessment of ultrasound of the spermatic cord in children with acute scrotum. *J Urol* 2007;177(1):297–301. doi:10.1016/j.juro.2006.08.128.
- [11] Acar T, Efe D. Is contrast-enhanced MRI efficient in testicular infarction mimicking testicular tumor on scrotal ultrasound. *Turk J Emerg Med* 2016;15(4):192–3. doi:10.1016/j.tjem.2015.03.001.

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- [12] Watanabe Y, Nagayama M, Okumura A, Amoh Y, Suga T, Terai A, et al. MR imaging of testicular torsion: Features of testicular hemorrhagic necrosis and clinical outcomes. *J Magn Reson Imaging* 2007;26(1):100–8. doi:[10.1002/jmri.20946](https://doi.org/10.1002/jmri.20946).
- [13] Cokkinos DD, Antypa E, Kalogeropoulos I, Tomais D, Ismailos E, Matsiras I, et al. Contrast-enhanced ultrasound performed under urgent conditions. Indications, review of the technique, clinical examples and limitations. *Insights Imaging* 2013;4(2):185–98. doi:[10.1007/s13244-012-0209-5](https://doi.org/10.1007/s13244-012-0209-5).