Trauma and reconstruction

Spontaneous testicular silicone prosthesis rupture, a rare event

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ABSTRACT

Testicular prostheses are utilized to improve cosmetic outcomes and reduce the psychological impact of native tissue loss particularly related to trauma, neoplasm, or malignancy. Implant rupture is usually related to trauma and spontaneous prosthesis rupture is a rare event. We report a case of an incidental spontaneous rupture in an asymptomatic patient status post orchiectomy and silicone gel filled prosthesis insertion for left cryptorchidism. The role of imaging has become increasingly important for evaluating implant integrity. By recognizing the imaging characteristics associated with implant rupture, radiologists can aid in early complication detection prior to the onset of clinical symptoms.

Introduction

Modern medicine has made great strides in developing a variety of cosmetic prostheses to enhance the appearance and functionality of the human body. In addition, prostheses have helped to reduce the psychological impact of native tissue loss particularly related to trauma, neoplasm, or malignancy. Imaging has become increasing important for evaluating implant integrity. Radiologists are often asked to perform and interpret images to assess for prosthesis complication. Imaging of breast implant rupture has been extensively discussed in literature; however, similar complications can arise with implants in alternate locations such as testicular prostheses.

Testicular prostheses were developed in the 1940s with the first commercially available device arising in the 1970s consisting of a silicone shell filled with silicone gel. The silicone shell with gel implant was most commonly used up until the 1990s, at which time it was discontinued due to the well-documented complications seen with silicone breast implants, particularly the effects of silicone gel leakage and autoimmune disorders.¹ Now, testicular prostheses consist of three types of devices including saline filled prosthesis, silicone elastomer implant and coloplast soft solid implant. The focus of our report is on the silicone elastomer implant.

Complications from testicular implantation are rare but similar to those of any surgical procedure including infection, post-operative hematoma, wound dehiscence, discomfort, or pain. Spontaneous implant rupture is extremely rare and the case below is even more intriguing as the spontaneous rupture was noted incidentally.

Case presentation

A 56-year-old man with hepatic fibrosis, elevated estradiol levels and gynecomastia presented for an outpatient scrotal ultrasound to assess the etiology of elevated estradiol levels given history of left cryptorchidism status post left orchiectomy and prosthesis placement during childhood. Scrotal ultrasound revealed a normal right testicle and an intracapsular rupture of the left testicular prothesis with internal separation echoes and collapsed envelope (Fig. 1). Sonographic findings were unexpected as the patient denied any pain, inguinal fullness or known trauma related to the scrotum and implant site when asked prior to the exam.

Discussion

Prosthesis rupture is typically a result of preceding trauma presenting with scrotal deformity and/or inflammatory changes such as swelling, pain, and erythema.² Spontaneous prosthesis rupture is an extremely rare event. To our knowledge, spontaneous rupture of a testicular prosthesis in the absence of any clinical signs or symptoms has not been previously reported.

Complications with breast silicone gel implant are more frequent and have been extensively described in the literature. Assessment for testicular prosthesis rupture is based on imaging findings seen on MRI and ultrasound in silicone gel filled elastomer breast implants.³ Our discussion focuses on ultrasound as this was the only modality performed on our patient. On ultrasound, an intact silicone gel implant depicts a well-defined polymer shell with an anechoic center containing

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A fibrous capsule develops over time after prosthesis placement to form a capsule-shell complex with the inner polymer shell. The capsule-shell complex appears as a tri-laminar line at the peripheral aspect of the implant depicting the outer surface of the capsule, the fusion of the inner and outer surfaces, and the inner surface of the elastomer shell. Visualization of a normal tri-laminar line on ultrasound indicates that the implant is intact (Fig. 2). Intracapsular rupture occurs when free silicone extrudes from the compromised elastomer shell complex but remains confined to the fibrous capsule which can produce local clinical symptoms. The “stepladder” sign occurs when silicone gel causes the elastomer shell to fold on itself and produce thin echogenic lines coursing parallel to the ultrasound probe surface. The stepladder sign was present on our exam indicating intracapsular rupture (Fig. 3).

Silicone gel breast implants are associated with spontaneous rupture rates of 9–12% at 8 years post implantation. Spontaneous rupture of a testicular prosthesis is rare and has only been reported twice in the literature with both cases presenting with clinical symptoms. The low incidence of spontaneous testicular prosthesis rupture may be due to the location and relative mobility of the prosthesis. Literature suggests that spontaneous intracapsular rupture likely corresponds with a longer time interval between native testis removal and prosthesis placement and is the sequela of chronic intermittent trauma. Additionally, the lack of reported cases of asymptomatic testicular implant rupture may be attributed to the fact that scrotal ultrasounds are typically performed on symptomatic patients while breast imaging is a screening tool recommended yearly in patients over 40. Implant, regardless of intra or extracapsular rupture, should be removed in order to prevent the development of inflammatory changes of the surrounding tissue and locoregional lymph nodes which can lead to the clinical manifestations...
of scrotal pain and ilioinguinal neuralgia.\textsuperscript{1} In most documented cases, patients were referred to Urology for implant removal to alleviate and prevent progression of symptoms. Unfortunately, our patient was lost to follow up and urology referral was not pursued.

**Conclusion**

Spontaneous rupture of a testicular implant is rare with few documented cases in the literature. Our case differs as the spontaneous rupture was diagnosed incidentally solely on imaging without clinical suspicion. The role of imaging has become increasingly important for evaluating implant integrity. By recognizing the unique imaging characteristics associated with implant rupture, radiologists can aid in early complication detection prior to the onset of clinical symptoms.

**Consent**

Not applicable.

**Declaration of competing interest**

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**References**

1. Phan QB, Koulaïdis N, Duperron C, Mourey E, Michel F, Cormier L. Management of testicular silicone gel-filled prosthesis rupture: case report of a rare event and a review of the literature. *Case Rep Urol*. 2016;2016, 2824802. https://doi.org/10.1155/2016/2824802.

2. Yahyavifar-Firooz-Abadi N, Menias CO, Bhalla S, Siegel C, Gayer G, Katz DS. Imaging of cosmetic plastic procedures and implants in the body and their potential complications. *AJR Am J Roentgenol*. 2015;204(4):707–715. https://doi.org/10.2214/AJR.14.13516.

3. Seiler SJ, Sharma PK, Hayes JC, et al. Multimodality imaging-based evaluation of single-lumen silicone breast implants for rupture. *Radiographics*. 2017;37(2):366–382. https://doi.org/10.1148/rg.2017160086.

4. Baek WY, Lew DH, Lee DW. A retrospective analysis of ruptured breast implants. *Arch Plast Surg*. 2014;41(6):734–739. https://doi.org/10.5999/aps.2014.41.6.734.

5. John T, Fordham M. Spontaneous rupture of testicular prosthesis with external leakage of silicone—a rare event. *J Urol*. 2003;170(4):1306. https://doi.org/10.1097/01.ju.0000087615.35085.c9.

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Fig. 3. Sonographic findings of the “stepladder sign” for intracapsular rupture. The silicone gel escapes, causing the elastomer shell to fold on itself and produce thin echogenic lines coursing parallel to the ultrasound probe surface.