



Partial tear of penile suspensory ligament on magnetic resonance imaging: A case report

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ABSTRACT

A 37-year-old man presented with pain and abnormal erectile angle following trauma during sexual intercourse. A diagnosis of partial tear of penile suspensory ligament (PSL) was made on magnetic resonance imaging (MRI). Conservative management of the tear was failed and the patient remained symptomatic. Persistent abnormal erectile angle and MRI findings necessitated surgical repair which resulted in a favorable outcome and patient satisfaction.

1. Introduction

Suspensory ligament of the penis is a triangular-shaped structure that firmly adheres the pubic symphysis to the tunica albuginea of the corpora cavernosa and consists of three parts. The fibro-fatty superficial part of the suspensory ligament named as the fundiform ligament, is attached to the upper edge of pubic symphysis and is thought to be the inferior extension of the Scarpa's fascia. Distally, it encircles and attaches to the tunica albuginea of the corpora cavernosa.^{1,2} In the middle, the suspensory ligament proper splits around the dorsal deep vein of penis and then merges with the tunica albuginea of the corpora cavernosa. The arcuate sub-pubic ligament which lies posterior to suspensory ligament proper and appears denser, is located between the inferior rami of pubis and the hilum of the penis.^{1,3} The main functions of suspensory ligament of penis are to maintain the penis near the pubic bone as well as to stabilize the penis at a specific angle during erection which is needed for optimal vaginal sexual intercourse.^{1,4} Anteriorly it covers the neurovascular bundle of penis which is responsible for innervation and erectile function.³

The most common mechanism of injury to the suspensory ligament is when there is forced downward pressure on the erected penis during sexual intercourse particularly when followed by a lateral movement.⁵ Tear of the suspensory ligament which is exceedingly rare in clinical practice often results in erectile dysfunction as well as penile instability and changes the angle of erection to a more ventral plane. Physical

examination and ultrasound are insensitive methods in the diagnosis of tear of PSL.⁵ Detailed anatomic information that is provided by MR imaging has been used efficiently in this regard.

2. Case summary

A 37-year-old man presented to our emergency department 4 hours after penile trauma while engaging in vigorous sexual vaginal intercourse. The injury occurred during the woman on top position when the erect penis suffered a sudden downward (toward the legs) pressure. The patient reported that he heard a distinct popping sound at the base of the penile shaft followed by sudden onset of pain. On physical examination, areas of ecchymosis were present on the superior aspect of base of the penile shaft. There was no gap in the intervening area between the pubic symphysis and the base of the shaft. No sign of significant swelling or hematoma were present and erection was still possible. Ultrasound with Doppler was performed and demonstrated normal findings. Due to equivocal physical findings and normal ultrasound examination, MRI was performed to rule out penile fracture. MRI demonstrated intact tunica albuginea and the penis was not fractured. However, an area of signal abnormality was evident in the central part of penile suspensory ligament (PSL) suggestive of partial tear (Fig. 1). Owing to a partial type of tear of the PSL, a decision was made to manage the patient conservatively and surgical repair was not performed. The patient was discharged and advised against having sexual activity for the duration of 6

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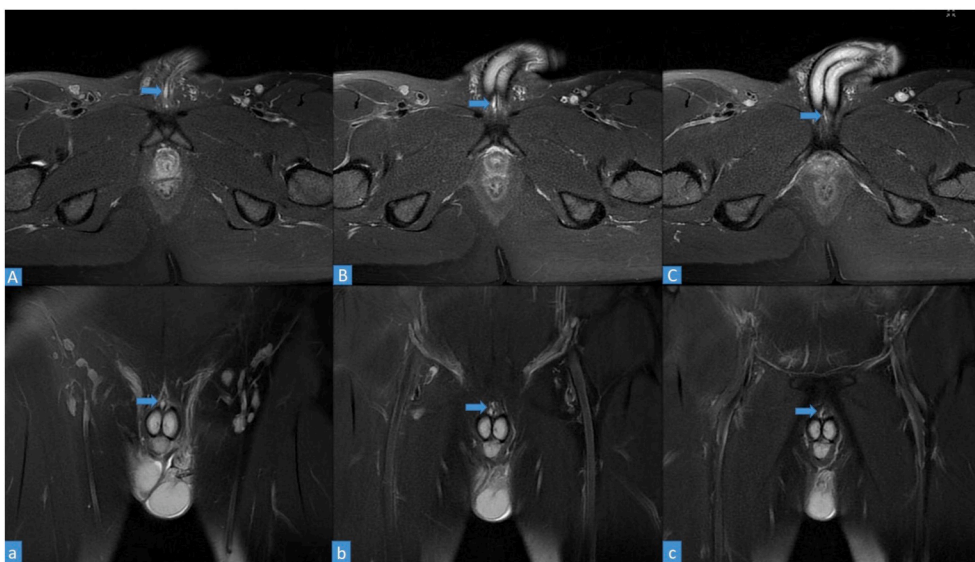


Fig. 1. A 37-year-old man who presented to the emergency room with acute penile trauma underwent MR examination. Axial (A,B,C) and coronal (a,b,c) T2 PROPELLER images are shown. Linear high T2WI signal abnormality (fluid signal) is seen in the central part of suspensory ligament fibers (arrow), peripheral fibers of PSL which appear low signal are intact. Findings are consistent with partial disruption of PSL.

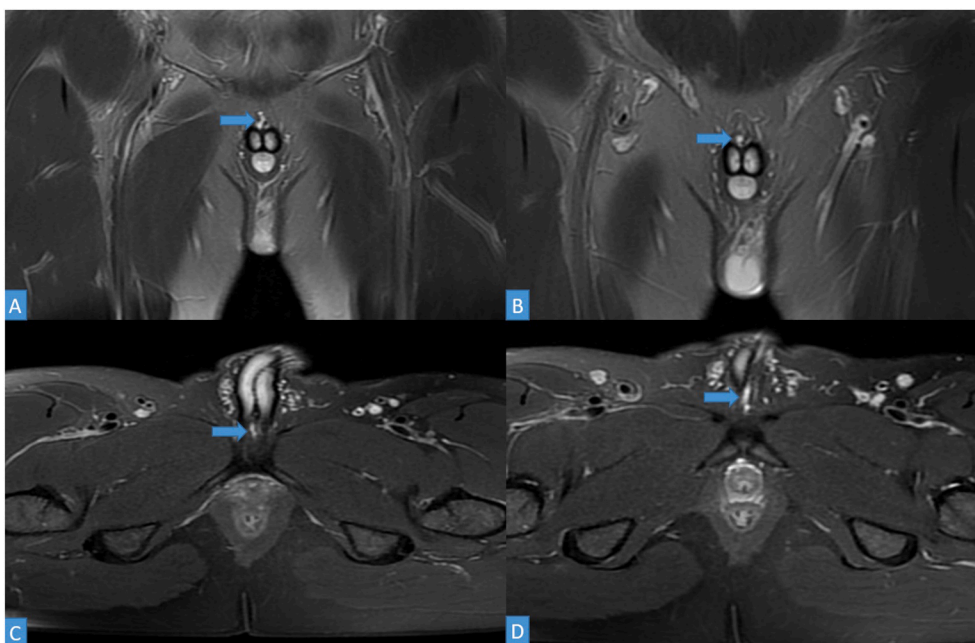


Fig. 2. Follow-up MRI after one year shows linear increased in axial (A,B) and coronal (C,D) T2 PROPELLER images T2WI fluid signal in the central part of suspensory ligament fibers (arrow) without any sign of healing.

weeks. At the one-year follow-up, the patient reported remaining abnormal erectile angle without erectile dysfunction, penile instability, or pain. Subsequently, the patient underwent a follow-up MRI which showed the same area of signal abnormality in the central part of PSL without obvious healing (Fig. 2). Persistent abnormal erectile angle and MRI findings necessitated surgical repair. The surgical repair was done using artificial erection and infra-pubis transverse incision. Non-absorbable sutures were used to reinforce the central torn part of the PSL. The surgical repair resulted in a stable penis without residual curvature and subjective patient satisfaction.

3. Imaging findings and diagnosis

MRI with a protocol consisted of fat-saturated T2 sequences in axial, coronal and sagittal planes (TR = 3000 ms, TE = 53 ms, FA = 160°), as well as axial T1 sequence (TR = 500 ms, TE = 14 ms, FA = 90°) without contrast medium injection was performed. The periodically rotated overlapping parallel lines with enhanced reconstruction (PROPELLER) technique was applied to minimize motion artifact. A surface coil was used and images were obtained in the supine position (Fig. 1). The one-year follow-up MRI was performed with the same protocol and is shown in Fig. 2.

4. Discussion

Disruption of penile suspensory ligament is best appreciated on T2-weighted images as areas of fiber discontinuity and increased signal intensity in normally well-defined low-signal fibers under inferior pubic ramus in the sagittal plane.² In our case, the partial rupture of PSL was best appreciated in axial and coronal planes because in the sagittal plane the area of signal abnormality was missed due to slice gap. Therefore it is imperative for the radiologist to assess for the disruption of PSL on all planes and in every MRI which is requested for the evaluation of penile fracture.

Rupture of the PSL is a serious differential diagnosis to penile fracture. Most cases require surgical repair and functional and cosmetic outcomes of surgery are often favorable, with a reasonably high rate of patient satisfaction.⁵ We decided to surgically repair the partial tear of PSL only after conservative management failed and the patient remained symptomatic. To the best of our knowledge, an established approach for patients with a partial tear of PSL has not yet been made. Through our search in the literature there's no published paper regarding the difference in the outcome of immediate versus deferred repair of PSL. Based on our anecdotal experience including the present case report, it seems sensible to repair all the PSL tears, either partial or complete, at the earliest time possible. This is because it's likely that repeated erections after the injury might prevent healing and results in chronic

inflammation.⁵ The case-report type of our study faces the obvious question of the generalizability of this approach which involves surgical repair of a partial tear of PSL. Therefore, there is a need for a well-established therapeutic strategy for patients with partial tear of PSL, which could be a subject of future investigation.

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