

**Research Article**

**Does MRI help in retaining potency in fracture penis?**

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**Abstract**

**Introduction:** Penile fracture is a rare but urological emergency which requires expedite surgical treatment for restoration of potency. This condition remains under-reported due to ethical and psychological reasons. Diagnosis of penile fracture is mainly based on clinical features. MRI of the penis is an expensive test that is not always superior to clinical examination or ultrasound. However, it shows many of the important structures and in particular the high-resolution T (2) sequences show the glans, corpora and the tunica albuginea well. Our aim was to review whether MRI helped in early diagnosis and thereby helping in restoring potency.

**Material and methods:** From May 2009 to October 2013, 6 patients with fracture penis were treated at our institute. Mean age of patients was 32.83 years, range from 24 to 43. All the patients presented after 6 hours of injury.

**Results:** Patients who presented early had good IIEF score at three months compared to those who presented late. MRI helped in diagnosing the fracture in two cases, which would have otherwise been treated conservatively.

**Conclusions:** Rupture of the corpus cavernosum is a rare condition and is generally diagnosed by clinical findings. Emergency surgical exploration and treatment is the best guarantee of good functional and cosmetic result.

**Keywords:** MRI, Fracture Penis, Erectile Dysfunction

**1. Introduction**

Penile fracture is the *disruption of the tunica albuginea with the rupture of the corpus cavernosum*. The injury is usually unilateral. Most fractures occur distal to the suspensory ligament. It can occur in any age group. Most commonly it happens during sexual intercourse in unnatural positions, secondly due to self manipulation. Most of the time proper history is not given by the patient due to the sensitiveness of situation. If the patients are treated early, chances of restoring erectile function is high. The aim of this study was to assess the role of MRI in the management of fracture penis.

**2. Materials & Methods**

This is a prospective study conducted in the Department of Urology, Yenepoya Medical College, Mangalore from May 2009 to October 2013. 6 cases of fracture penis were treated during the period.

A detailed history and physical examination was carried out. Patients were in the age range of 24 to 43 years (Table 1). None presented within 6 hrs of pain or injury. Three patients reported snap while having intercourse and one patient developed pain and swelling following masturbation. History was not very satisfactory in two of the six patients. International Index of Erectile Function-5 (IIEF-5) score was recorded in all the patients, both preoperatively and three months post operatively. After the physical examination, patients were subjected to ultrasound & MRI. Ultrasound could detect the lesion in only 4 of the six patients. All patients were subjected to surgery after MRI confirmed the lesion.

**2.1 Ultrasound Findings**

Ultrasound scan demonstrated loss of continuity of the tunica albuginea in four cases. It detected subcutaneous edema in all the 6 cases, but in two cases it failed to demonstrate the tear. One case of the 4 cases was initially reported to have inconclusive evidence of tear, but later confirmed on reevaluation to have a tear.

**2.2 MRI findings**

Magnetic Resonance (MR) imaging examination was performed with a 0.4 T unit MR imaging scanner (Hitachi, Aperto, and Tokyo, Japan). Fast spin-echo T1- and T2-weighted axial, sagittal and coronal images were obtained. In addition axial Short STIR (Short tau inversion recovery) sequences were studied. MR imaging parameters for T1-weighted images were; Time of Repetition (TR), 285 ms and Time of Echo(TE), 13ms, and for T2 weighted images; TR, 3616 ms, TE,100 ms. Section thickness was 6 mm with 1 mm inter slice gap and an acquisition matrix of 256 × 19.

MRI scan of penis identified exact location of loss of continuity of tunica albuginea in all of the 6 cases. It also showed the extent of subcutaneous edema in all cases. Assessment of corpus spongiosus, urethra and dorsal vessels was possible. (Figure 1: Coronal T2-weighted image demonstrating disruption of the left posterolateral tunica albuginea with minimal extension into the left corpora cavernosa). There was no urethral injury in any of the cases.

**2.3 Operative Procedure**

A *circumferential subcoronal incision* was made, with penile degloving. Evacuation of the hematoma in the subcutaneous plane was done. The defect in tunica albuginea was repaired with interrupted 3-0 Vicryl sutures. *Artificial erection* was performed at the end of the procedure.

**2.4 Intra -Operative findings**

Intra operatively, all were unilateral tears. 4 of the patients had tear in right posterolateral surface of corpora and two on left. All had transverse tears. MRI had 100% sensitivity in precise localisation of tunica albuginea defect in all 6 cases.

**3. Results**

Post operative period was uneventful. After 3 months of follow up IIEF-5 score (Table 1) in patients who were operated within 15 hrs was maintained at pre operative level compared to those who were operated after 15 hrs.

**Table 1: Patient Demographics**

| SL. No. | Age | Time to Presentation | Cause              | Ultrasound Findings | Time to Surgery | Site  | Pre OP IIEF-5 Score | Post OP IIEF-5 score |
|---------|-----|----------------------|--------------------|---------------------|-----------------|-------|---------------------|----------------------|
| 1       | 24  | 7hrs                 | Masturbation       | Inconclusive        | 10 hrs          | Right | 23                  | 22                   |
| 2       | 27  | 18hrs                | Sexual intercourse | Defect Seen         | 25 hrs          | Left  | 21                  | 16                   |
| 3       | 33  | 9.5hrs               | Sexual intercourse | Defect seen         | 12 hrs          | Left  | 21                  | 21                   |
| 4       | 43  | 11hrs                | Not Known          | Defect Seen         | 13.5 hrs        | Right | 18                  | 17                   |
| 5       | 37  | 10 hrs               | Sexual Intercourse | Inconclusive        | 14 hrs          | Right | 22                  | 21                   |
| 6       | 33  | 25 hrs               | Not Known          | Defect Seen         | 40 hrs          | Right | 21                  | 11                   |

**Figure 1: Coronal T2-weighted image demonstrating disruption of the left posterolateral tunica albuginea with minimal extension into the left corpora cavernosa**



**Figure 2: Egg plant deformity**



**4. Discussion**

Penile fracture is defined as the *rupture of the tunica albuginea of the corpus cavernosum* caused by blunt trauma to the erect penis. Vigorous sexual intercourse accompanied with a hit from the female pubis was found to be the main cause of cases in the West<sup>1</sup>. Typically the patient reports a *snap or cracking sound* accompanied by immediate pain and rapid detumescence followed immediately by the development of swelling and angulation<sup>2</sup>. Potential coexisting injuries include those to the penile urethra, corpus spongiosum, or dorsal vein of the penis. The presence of bloodstained urethral meatus, gross hematuria, or inability to urinate should alert to the possibility of concomitant urethral injury.

If the Buck fascia remains intact, the penile hematoma remains contained between the skin and tunica, resulting in a typical eggplant deformity (Figure 2). If the Buck fascia is disrupted, hematoma can extend to the scrotum, perineum, and suprapubic regions.

*Penile ultrasonography, cavernosography, and, recently, magnetic resonance imaging (MRI)* have been reported to be helpful in establishing the diagnosis and localizing the site of the tear, particularly in suspicious cases.

However, ultrasonography depends on the observers' skill and can miss the site of the tunical tear if it is too small or it is full with a clot that renders it indistinguishable from the surrounding normal tunica albuginea<sup>3</sup>. Cavernosography for the diagnosis of tunical rupture has been opposed for being an invasive procedure with risks of infection, priapism, and allergy to iodides<sup>3,4</sup>.

MRI provides better soft-tissue contrast, in addition to achieving high spatial resolution, allowing better definition of images of the male sexual organ, and it can be used to reveal lesions of the corpora cavernosa<sup>5,6</sup>. The high precision of the method allows differentiating vascular sinusoids of the cavernous body from the tunica albuginea, achieving high diagnostic accuracy<sup>5,6</sup>.

MR imaging is the diagnostic modality of choice because it precisely demonstrates the presence, location, and extent of the tunical tear, which manifests as discontinuity of the tunica albuginea<sup>6,7,8</sup>. MR imaging also depicts associated injuries to adjacent structures (i.e., corpus spongiosum, urethra)<sup>6</sup>.

The penis should ideally be scanned in the anatomical position (to prevent confusing kinking of penis) and without intracavernosal agents. The hallmark of a fracture is an interruption of the low-signal tunica albuginea, usually best seen on T2 weighted sequences. However, a T1 spin echo sequence may show the associated haematoma best, and in one small series was the only sequence that showed the fracture well; enhancement was not necessary<sup>7</sup>.

The most commonly reported penile injury is disruption of the *right posterolateral tunica albuginea* involving the mid to distal one-third of the penile shaft, adjacent to the corpus cavernosum<sup>5,6</sup>.

Until the early 1980s, the management of penile lesions had been highly controversial. Many conservative treatments have been employed, such as pressure dressing, cold compress, Foley catheterization, anti-inflammatory drugs, antibiotics, antiandrogens, or sedatives. The drawbacks of conservative treatments include expanded pulsatile hematoma, infected hematoma, abscess formation, severe penile angulation, arteriovenous fistulas, and impotence<sup>9</sup>.

The standard treatment of penile fracture is surgical<sup>10</sup>. MRI before surgery aids to delineate the extent of injury and help direct where the incision should be made<sup>10</sup>. In some cases, MRI may prevent unnecessary surgery if imaging shows only a hematoma rather than a tear of the tunica albuginea<sup>11</sup>.

Most patients recover well after surgical repair, but roughly 10% will have permanent curvature of the penis and some will experience pain during intercourse<sup>12</sup>.

There are also “false” penile fractures in which differential diagnose have to be done. They are usually characterized by gradual detumescence and absence of the cracking sound typically heard in penile fractures. Rupture of the dorsal vein or dorsal artery is the most commonly reported cause, and the consequent condition is indistinguishable from true corporal fracture except by cavernosography. Ruptured dorsal vein should be ligated when encountered during operation but can also be managed conservatively if diagnosed clinically<sup>13</sup>.

## 5. Conclusion

MRI is a promising tool in diagnosis of penile trauma; it precisely demonstrates the presence, location, extent of the injury and aids in deciding the site of incision for repair, thus minimizing the morbidity associated with the injury and repair. If MRI is done at the time of presentation in patients with history and examination suggestive of penile fracture but ultrasound has not picked up the findings, then early surgery is possible as a result the potency can also be restored.

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