Penile fracture (FP) is an uncommon condition that is defined as the disruption of the tunica albuginea with rupture of the corpus cavernosum caused by trauma to the erect penis. True incidence is probably higher than reported as many patients do not seek medical attention due to embarrassment or fear. Immediate surgical repair has low morbidity, short hospital stay, rapid functional recovery, and no serious long-term sequela. Early surgical repair within 48 hours is associated with a good outcome.

**Introduction:** Penile fracture (FP) is characterised by disruption of the tunica albuginea with rupture of the corpus cavernosum caused by trauma to the erect penis. True incidence is probably higher than reported as many patients do not seek medical attention due to embarrassment or fear. Immediate surgical repair has low morbidity, short hospital stay, rapid functional recovery, and no serious long-term sequel. Early surgical repair within 48 hours is associated with a good outcome.

**Materials and Methods:**

This study was performed at a tertiary care urological centre in South India catering to around 40000 urological patients per year. Patients operated for FP from January 2010 to April 2015 were included from institutional database and were followed up for outcomes and complications. The mode of presentation, mechanism of injury, time to presentation, intraoperative findings and post-operative complications were recorded. Follow up assessment included assessment for penile deformity and erectile function using International Index of Erectile Function-5 (IIEF) score at 3 and 6 months postoperatively and urinary symptoms using International Prostate Symptom Score (IPSS) was performed.

**Results:**

Mean (± SD) age was 33.8 ± 19.2 years. Etiology of FP included vigorous sexual intercourse in 10 (43.5%), self-inflicted injury on erect penis in 7 (30.4%), accidental trauma to or fall on erect penis in 4 (17.4%) and during rolling over the bed in 2 (8.7%) patients. Median time from injury to presentation was 10 hours. Urethral injury was noted in 4 (17.4%) patients and immediate repair was done. Excluding the patient with delayed repair, the mean total IIEF 5 Score was 12.72 at 3 months and 18.36 at 6 months repair. Only the patient who presented 15 days after FP had ED. Patients with urethral injury had no post-operative urinary symptoms. Immediate surgical intervention has low morbidity, short hospital stay, rapid functional recovery, and no serious long-term sequel. Early surgical repair within 48 hours is associated with a good outcome.

**Keywords:**

Penile fracture, diagnosis, operative details, erectile function, urinary symptoms.
Operative details and length of hospitalization (LOH)
We used a subcoronaldeglomering incision in our patients after spinal or general anesthesia. Right corpus injury was noted in 13 (56.5 %) and left corpus injury in 7 (30.4 %) patients. Bilateral corporal tears were observed in 3 (13.1%) patients. Urethral injury was noted in 4 (17.4%) patients. Location of urethral injury was distal bulbular urethra in 2 (50%) and mid bulbular urethra in 2 (50%) patients. Two (66.7%) patients with bilateral corporal tears had urethral injury. For FP patients underwent primary repair using 4-0 vicryl interrupted sutures. Patients with urethral injury underwent primary repair of the urethra at same time as repair of the tunica with interrupted 5-0 polydioxanone sutures over a 14 French silicone coated latex urethral catheter. The median (IQR) LOH was 3 (4) days after surgery for FP. The patient with delayed presentation (>15 days) had a prolonged LOH of 8 days due to wound infection on third postoperative day.

Follow-up
Out of 23 patients, 17 (73.9%) patients were available for follow up. The median (IQR) follow up period was 24 (12) months and 16 (94.1%) patients reported achieving adequate erection for intercourse without ED. None of the patients reported voiding dysfunction or deformity of the penis. Excluding the patient with delayed repair, the mean total IIEF 5 Score was 12.72 at 3 months and 18.36 at 6 months repair. Patients with urethral injury had no post-operative urinary symptoms. Only the patient who presented 15 days after FP had moderate ED. Including this patient, the mean total IIEF 5 score was 13.4 at 3 months and 19.4 at 6 months (Fig. 4). The mean (± SD) IPSS was 7.2 ± 4.1. The mean maximal flow rate was 25.1 ml/sec (25-32 ml/sec) at 6 months after repair. Patients with urethral injury had no post-operative urinary symptoms. Only the patient who presented 15 days after FP had moderate ED. Including this patient, the mean total IIEF 5 score was 13.4 at 3 months and 19.4 at 6 months (Fig. 4). The mean (± SD) IPSS was 7.2 ± 4.1. The mean maximal flow rate was 25.1 ml/sec (25-32 ml/sec) at 6 months after repair.

DISCUSSION
The first documented report of FP dates back to more than 1000 years. ‘FP occurs due to buckling injury caused during vigorous sexual intercourse when the rigid penis slips out of the vagina and strikes the perineum or pubis’. Diagnosis of FP is based on the typical history of popping followed by rapid detumescence, acute swelling, pain and penile deformity. ‘Patients delay coming to the hospital due to fear and embarrassment’. 

Mechanism of injury
Sexual intercourse (46%) followed by masturbation (18%) and rolling over the bed on an erect penis (8.2%) were the commonest reported causes of FP. ‘In our population, we observed that FP during sexual intercourse (43.5%) was the commonest etiology followed by injury during self-manipulation (30.4%). Agarwal et al reported that 88% developed FP during sexual intercourse while Nawaz et al reported that 40.8% patients developed FP during self-manipulation and sexual intercourse (28.46%).’ We observed bilateral corporal tears in 13.1% patients while other authors have observed 2.2 – 8.4% bilateral corporal tears.

Clinical presentation and diagnosis
An eggplant deformity occurs due to localized penile swelling, discolaration and deviation of penis to the contralateral side of tunical tear. ‘If the Buck fascia is intact, the penile hematoma remains contained between the skin and tunica. If Buck fascia is disrupted then the hematoma can extend to the scrotum, perineum, and superpubic regions.’ The mean age of our patient population was 33.8 years which was similar to that (31.3 years) reported by Ghilan et al. ‘Other authors have reported mean ages as low as 25 yearsand as high as 36 years. ‘Clinical examination accurately diagnosed FP and predicted cavernosal tear. Ultrasonography did not influence patient management in our patients, as also observed by other investigators. Magnetic resonance imaging is highly accurate in defining tunical tears but unnecessarily delays definitive treatment. It is also expensive and not universally available.

Urethral injury
We observed urethral injury in 4 (17.4%) patients and it was similar to that reported by Agarwal et al. ‘Only 1 patient (9.1%) had urethral injury in a series of 11 patients reported by Ibrahim et al. Based on a meta-analysis, 5.6% patients presented with urethral bleed but 6.1% had urethral injury and hence absence of urethral bleed does not exclude urethral injury.’ A higher incidence of urethral injury has been reported from the USA and Europe (20%). In our series, only 2 out of 4 (50%) patients had urethral bleed. We did not perform routine preoperative urethrography or urinalysis in our patients. Microscopic hematuria has been shown to be indicative of urethral injury in some studies, however the yield is less and it is time consuming. ‘There is no consensus on performing preoperative urethrography in patients with suspected urethral injury.’ It has been reported that urethrography is not mandatory in these patients as the location of urethral injury is almost always close to the site of corporal tear. Desouche et al have reported that they perform suprapubic cystotomy in patients with suspected urethral injury. ‘We did not perform suprapubic cystotomy in our patients and none of them had postoperative complications. Kamadar et al have reported the use of intraoperative flexible cystoscopy to rule out urethral injury. Our patients with urethral injury underwent primary repair of the urethra at same time as repair of the tunica with good postoperative outcome. We observed that 2 out of 3 patients (66.7%) with bilateral corporal tears had urethral injury. Phillips et al had reported 100% association of bilateral corporal tears with urethral injury as also observed by Pavan et al.’

Operative details and LOH
Aman et al recommended early emergency surgery for easy tissue handling and to minimize complications. ‘Even in patients with FP presenting as late as 1 week, repair of the defect is recommended.’ We also observed that early repair was successful and even in the patient who presented late (15 days). The median hospital stay in our study was 3 days and compared favorably with Agarwal et al at 2 days. ‘According to the meta-analysis LOH ranged from 1 – 21 days and the mean LOH was 3.5 days for FP repair versus 5.2 days for conservative management of FP. We performed immediate repair for all patients presenting to our institute. The protocol for managing FP has evolved from a conservative approach in initial days to immediate surgical exploration in the modern day even in patients with delayed presentation. The most commonly used technique is a subcoronaldeglomering incision followed by evacuation of hematoma and repair of the tunical tear with absorbable or non-absorbable sutures.’

Erection adequate for sexual intercourse
We observed that 93.5% had adequate erection for sexual intercourse which was almost similar to 92.2% reported by Ibrahim et al. ‘While Nawaz et al observed that only 64.96% patients had adequate erection for sexual intercourse, Agarwal et al and Ghilan et al observed that erectile function returned in all patients (100%) adequate for penetration.’

CONCLUSION
Immediate surgical intervention has low morbidity, short hospital stay, rapid functional recovery, and no serious long-term sequel. Early surgical repair within 48 hrs is associated with a good outcome.

Legends to figures
Fig 1: Egg-plant deformity of fracture penis
Fig. 2: Intraoperative repair of the rent in the tunica

Fig. 3: Repaired rent in the tunica

Fig. 4: IIEF score at 3 and 6 months after penile fracture repair based on time to presentation

REFERENCES