ABSTRACT
Objective: This study aimed to evaluate and analyse the usefulness of the lateral incision approach in patients of the fractured penis.
Subjects and Methods: The patients were prospectively assessed between 2006 and 2012. The diagnosis was achieved by history and clinical examination in 67 patients while as Ultrasound (US) was performed in 4 cases and retrograde urethrocystogram was performed in 5 patients with suspicion of urethral injury.
Results: All the patients underwent surgical exploration within 24 hours of admission. Lateral incision approach was used in all of the 67 patients in whom defect could be located using Rolling Sign technique. However, three patients needed to be converted to conventional degloving technique owing to failure of locating defect. Four patients needed radiological techniques to determine the site of defect and corresponding lateral incision.
Conclusions: Penile fracture is an entity of eminently clinical diagnosis; management should be surgical and immediate, avoiding thus complications related to erectile dysfunction. We recommend lateral incision technique for surgical repair of the fractured penis due to simplicity, early recovery, minimal complications and cosmesis.

KEYWORDS Penis, Fracture, lateral technique

INTRODUCTION
Penile fracture is described as the traumatic rupture of the tunica albuginea with corresponding corpora of an erect penis. It typically occurs when the engorged penile corpora are forced to buckle and literally “pop”. Most common cause being blunt sexual trauma. Penile fracture patients describe immediate detumescence, severe pain, and swelling. Majority of cases can be diagnosed from the history and physical examination alone. However, radiographic studies may also be required to arrive at a final diagnosis. Prompt surgical exploration involving evacuation of hematoma and corporal repair is the most efficacious therapy.

Our study was conducted over a period of 6 years in a tertiary care hospital, 85 patients presented with penile fracture during this period. After following study protocols, 67 patients were included in our study. The main aim was to operate patients with penile fracture with lateral incision technique, analyzing its advantages, as well as finding cosmetic and functional outcomes of same. We also aimed to know about the cause of penile fracture in our part of the world.

MATERIAL AND METHODS
In the period between January 2006 and January 2012, 85 patients with a clinical diagnosis of penile fracture were admitted in our Department. However, only 67 patients were enrolled after following the exclusion criterion set for the study, which included:

- presentation more than 24 hours,
- refusal to treatment,
- refusal to provide a detailed history (Our study also aimed to know the aetiology of penile fracture in our part of the world).
Most cases were recently married.

was followed by repair of a defect; all corpora cavernosa lesions

The primary diagnostic assessment was based on clinical history

and physical exam. Out of 67 patients, only 35 gave a history

of hearing a clicking or cracking sound. The thorough clinical

examination was done in all patients. The detailed local exam-

ination was carried, and in the majority of cases we noticed

localised penile swelling, discolouration, and deviation toward

the opposite side of the fracture, often termed as an “eggplant

deformity”. In all patients, “Rolling Sign” was performed to

elicit which includes detecting the site of the corporal tear. It is

used to describe a firm, immobile hematoma, which is palpable

as the penile skin is rolled over it. It was positive in 53 patients.

In case of any doubt, radiological aids were used. An ul-

trasound scan was used in 4 cases, and retrograde urethra-

cystogram was performed solely in 5 cases in whom urethral

injury was suspected. The urethral injury was suspected in pa-

tients with penile fracture having blood at meatus or urinary

retention or both.

SURGICAL TECHNIQUE

All 67 patients were operated under spinal anaesthesia in the

supine position. Using local examination, the site of rupture was

marked. However, in 4 cases, an ultrasound was used for the

same purpose. Bladder catheterisation was routinely performed,

this helped in the lateral incision procedure and avoided any

iatrogenic injury to the urethra. Five cases of suspected ure-

thral injury underwent retrograde urethra-cystogram before the

procedure. Out of 5, three patients had urethral injuries.

The surgical technique used consisted of a lateral incision

at the site of rupture marked before incision. The size of the

incision was variable depending on the size of the hematoma.

On an average, the incision length varied from 1.5 to 2cms. The

size of hematomas was variable, most of them were in the range

of 3-5cm. The first step was to evacuate the hematoma. This

was followed by repair of a defect; all corpora cavernosa lesions

were treated by interrupted vicryl 3-0 sutures. However, in 3

patients, we had to convert to conventional degloving technique
due to inability in locating the site of fracture after initial lateral

incision. Furthermore, one patient had a bilateral corporal injury,

but we were able to manage him with two lateral incisions. Three

patients had associated urethral injuries which were primarily
corrected with interrupted absorbable vicryl 5-0 sutures over
the indwelling catheter, but in these patients, incision had to be
extended.

Bladder catheter was maintained for 12 hours after the surgi-
cal procedure in routine cases. In patients with urethral injury,
an indwelling catheter was kept for 7-10 days. Penrose #1 drain
was placed in all patients having large hematomas. The drain
was withdrawn before hospital discharge.

RESULTS

All 67 patients were operated under spinal anaesthesia in the

supine position. Sixty-four patients were successfully operated
with lateral technique. In 3 patients we had to convert lateral
technique to conventional degloving technique due to inability
in locating the site of rupture through the small lateral incision.
In all these 3 cases, rupture was found on the same side but
away from the marked site. Average blood loss was about 28ml
and average operating time was 43.4 minutes.

Most patients were discharged after 3-4 days except for five
patients who needed to stay longer. 3 of them were those who
had associated urethral injury and the other two developed local
infections.

Follow up could be done only for six months due to non-
compliance on the part of patients. Only 62 patients followed.
During that period, among these 62 we found no major issue
regarding flap necrosis, sensory loss over glans and impotence
as seen with the conventional degloving procedure. We did not
find any patient developing chordee or scar over the shaft of the
penis.

DISCUSSION

Penile fracture is a relatively uncommon condition which in-
volves traumatic rupture of the penis. The condition was first
published in 1924 [1] but remains less reported as often patients
do not seek medical attention due to embarrassment or fear. Al-
though the most common cause is due to the pressure of blunt
sexual trauma, some other causes have also been associated with
it. It is considered as a urological emergency [2]. Surgical explo-
ration with repair of rupture is the mainstay of treatment. The
different approaches are available including distal circumferen-
tial degloving incision, as advocated by McAninch [3] to lateral

Table 1 Causes Of penile fracture as per history.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Masturbation</td>
<td>29</td>
<td>Masturbation most commonly involved rubbing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>erect penis with some hard surface like bed.</td>
</tr>
<tr>
<td>2. Vaginal Intercourse (Woman on Top)</td>
<td>27</td>
<td>Most cases were recently married.</td>
</tr>
<tr>
<td>3. Vaginal intercourse (Missionary Position)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4. Trauma to an erect penis</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5. Attempted anal intercourse (Without lubrication)</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 Information regarding the operative procedure.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of patients operated</td>
<td>67 patients</td>
</tr>
<tr>
<td>Type of anaesthesia</td>
<td>Spinal</td>
</tr>
<tr>
<td>Position</td>
<td>Supine</td>
</tr>
<tr>
<td>Location Of fracture Site Preoperatively</td>
<td>In 63 patients</td>
</tr>
<tr>
<td></td>
<td>Ultrasound was used in 4 cases for preoperative location.</td>
</tr>
<tr>
<td>Catheterisation before the procedure</td>
<td>62 patients</td>
</tr>
<tr>
<td></td>
<td>5 patients had suspected urethral injuries. Only 3 had a urethral injury.</td>
</tr>
<tr>
<td>Lateral incision</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>1 patient had bilateral cavernosal injury.</td>
</tr>
<tr>
<td>Conversion to degloving technique</td>
<td>3 patients</td>
</tr>
<tr>
<td></td>
<td>The marked site did not reveal fracture on the lateral incision.</td>
</tr>
<tr>
<td>Blood loss</td>
<td>28 ml</td>
</tr>
<tr>
<td></td>
<td>Average</td>
</tr>
<tr>
<td>Operative time</td>
<td>43.4 minutes</td>
</tr>
<tr>
<td></td>
<td>Average</td>
</tr>
</tbody>
</table>

Table 3 Operative findings of patients.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Lesion</th>
<th>Percentage</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Corpus cavernosum only</td>
<td>94.02%</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td>Urethra and corpus cavernosum</td>
<td>4.47%</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Bilateral cavernosal injuries</td>
<td>1.49%</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4 Complications and follow up.

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients who followed after discharge</td>
<td>62</td>
</tr>
<tr>
<td>Prolonged hospital stay</td>
<td>5</td>
</tr>
<tr>
<td>Flap necrosis</td>
<td>0</td>
</tr>
<tr>
<td>Impotence</td>
<td>0</td>
</tr>
<tr>
<td>Sensory loss over glans</td>
<td>1</td>
</tr>
<tr>
<td>Chordee formation</td>
<td>0</td>
</tr>
<tr>
<td>Scar issues</td>
<td>0</td>
</tr>
</tbody>
</table>

incision directly over the hematoma site [4] or a combination of both. Our study focussed on the lateral incision technique directly over the hematoma. However, before discussing in detail about the management of penile fractures, a brief description of anatomy and physiology is a must. The penis is the male sex organ, made up of three expandable erectile tissues -two corpora cavernosa and one corpus spongiosum along the length of the penis. These formations are made of a sponge-like tissue containing trabeculae, irregular blood-filled spaces. The tunica albuginea is the fibrous envelope of the corpora made of extensible tissue; Bucks fascia lies superficial to it. Penile erection or penile tumescence is a complex interaction of psychological, neural, vascular and endocrine factors. As a result of these factors nitric oxide (a vasodilator) levels to rise in the trabecular arteries and smooth muscle of the penis causing an increase in the arterial inflow to the penis resulting in enlargement of erectile bodies longitudinally and transversely. This causes a physical state of the penis to change from being flaccid to an erect state. Tunica albuginea thins from 2 mm to 0.25-0.5 mm, stiffens and loses elasticity. Due to this venous stiffness return is impeded and penile tumescence is maintained during male erection. The penile fracture usually occurs when an erect penis undergoes sudden trauma or abnormal bending. This causes a 0.5-4cm transverse tear in tunica albuginea, which is markedly thinned and stiff in erect state. Subsequently, the corresponding corpus cavernosa is injured as well, resulting in hematoma formation, ecchymosis and swelling. If Bucks fascia remains intact, these findings are limited to the penile shaft but if it is violated the ecchymosis may be noticed over perineum, scrotum and lower abdominal wall—“Butterfly Pattern”. Furthermore, one or both corpora may be involved, and concomitant injury to the penile
urethra may occur. Urethral trauma is more common when both corpora cavernosa are injured [5]. In such cases, an additional clinical finding of blood at meatus may be noticed.

The true incidence of penile fracture may not be known as many patients do not seek medical attention due to embarrassment or fear[6,7]. In our study, we had 87 admissions with penile fracture over a period of 6 years. It is higher but is by previous studies that more than 50% cases have been reported from Muslim countries, our place being Muslim majority state[8]. Vaginal intercourse and aggressive masturbation are the most common causes[9]. A recent study conducted in Brazil in 2014 reported that woman on top positions caused the most significant risk with the missionary position being the safest[10]. In Middle Eastern countries, the penile fracture has been associated with the practice of “Taghaadan” meaning “to click”. This is done to achieve detumescence and involves bending the top part of the erect penis while holding the lower part of the shaft in place until a click is heard and felt[11]. As compared to the majority of studies we found masturbation more common cause than vaginal intercourse (women on top). Rare causes included like trauma to erect penis, anal intercourse. However, the practice of Taghaadan is not common in our society.

The diagnosis of penile fracture is based on history, local physical features like penile swelling, deviation of the penis, positive rolling sign for locating the site of rupture. Recently, imaging modalities like cavernosography, ultrasonography (USG) and magnetic resonance imaging (MRI) can be used to identify penile fractures. Although soft tissue details in multiple planes are shown best by MRI, from a practical aspect, USG scores over MRI regarding cost, availability and time consumed for the procedure[12]. In our study, we used USG for four patients for locating the site of the fracture. The ideal management of penile fractures requires prompt surgical treatment including the evacuation of the hematoma, identification of the tunica injury, local corpora debridement, closure of the tunica lacerations, and ligation of any disrupted vasculature[8]. The most common surgical procedure involves a distal circumferential degloving incision, exposing the entire tunica bilaterally, facilitating diagnosis and repair of coexisting urethral and contralateral injuries[13]. However, studies reveal that this procedure is often associated with increased neurovascular injury and skin necrosis[14,15]. As such some studies advocate a less invasive lateral incision directly over the hematoma site4,14,15. Our study was based on the same principle, and all patients were operated by the lateral incision technique although some of them needed conversion to the conventional technique. We found quite useful as it had decidedly fewer complications like neurovascular or skin necrosis. However, we found that lateral technique has its flip side like failure to locate the site of fracture and urethral repair is more difficult than with conventional technique. We did not notice any patient with scar issues or chordee formation.

CONCLUSION

Our study reveals that the lateral incision technique is quite useful for both surgeons as well as the patient. For the surgical point of view, it is easy procedure involving minimal dissection. For the patient; he is less likely to have neurovascular and skin necrosis-like complications.

Our study has many shortcomings. What it is not a comparative one and patient follow up is only six months. Also, we do not have pictures of the procedure as the hospital got submerged in floods and all pictures were lost.

COMPETING INTERESTS

The authors declare that they have no competing interests.

FUNDING

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REFERENCES