

Original Research

## OUTCOMES OF SURGICAL MANAGEMENT OF FRACTURE PENIS: EXPERIENCE FROM A TERTIARY CARE HOSPITAL IN BANGLADESH

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### ABSTRACT

**Background:** Penile fracture is an emergency and uncommon presentation to the urology department. Immediate surgical repair can be a standard of care for patients with penile fracture.

**Objective:** The study was conducted to evaluate the outcome of surgical repair of the fractured penis.

**Methods:** This quasi-experimental study was conducted from Jan 2017 to Dec 2018 in the urology department of Dhaka Medical College Hospital, Bangladesh. Thirty-five patients with fractures of the penis were included in this study. After proper evaluation, surgery was performed under spinal anesthesia. Follow up was scheduled at 6<sup>th</sup> week, 3<sup>rd</sup> month, and 6<sup>th</sup> month. We used validated questionnaires of the 'International index of erectile function (IIEF-5)' for married and 'Single question self-report (SQSR)' for unmarried patients to evaluate postoperative erectile function.

**Results:** Total 35 patients completed three follow up. The mean age of patients was 36.4 years, and 88% of them were married. The most common triggers were for vigorous sexual intercourse (68.5%) followed by history of rolling over in bed with erect penis (20.0%). Per-operative findings were: rupture of tunica albuginea (100%); rupture of corpora cavernosa on the right (65.7%). After 6<sup>th</sup> month, 28 patients (80%) were able to maintain their normal erectile function. However, seven patients developed erectile dysfunction, of which 4 had a mild form, and 3 had mild to moderate form erectile dysfunction. All patients complained of pain during or after intercourse, but the pain has gradually subsided with time.

**Conclusion:** Immediate surgical exploration and repair of fracture penis can offer complete recovery of sexual and voiding functions.

**Keywords:** fracture penis, surgical management, Bangladesh

### BACKGROUND

Penile fracture is an emergency condition, incidence 1 in 175000 cases, to the urology department ([Koifman, Barros, Júnior, Cavalcanti, & Favorito, 2010](#)). Penile fracture is defined as "rupture of the tunica albuginea of the corpora cavernosa caused by trauma to the

erect penis. In western countries, the injury typically occurs during sexual intercourse" ([Al-Shaiji, Amann, & Brock, 2009](#); [El Housseiny, El-Tholoth, Mohsen, Hekal, & El-Assmy, 2010](#); [Montorsi et al., 2010](#)). Another triggering factor is the abrupt bending of the erect penis

which occurs during masturbation ([Ateyah et al., 2008](#); [Zargooshi, 2000, 2009](#)). Penile fractures are usually caused by “taqaandan” or “forcefully bending the erect penis to achieve detumescence” in middle eastern countries ([Ateyah et al., 2008](#); [Zargooshi, 2009](#)). Men who are in their fourth and fifth decades affected predominantly ([Lee et al., 2008](#)).

A normal penis is protected by its natural genital mobility. However, an erect penis is prone to injury when intracavernous pressure increases abruptly ([Miller, 1996](#)). When the penis in its erect state, penile fracture can represent the example of blunt injury ([Penson, Seftel, Krane, Frohrib, & Goldstein, 1992](#)). Patients with penile fractures are reluctant to seek immediate medical care due to embarrassment ([Aaronson & Shindel, 2010](#)). The site of penile injury mostly occurs around the mid-shaft or base region ([Hinev, 2000](#)). Patients usually present with a history of a cracking sound, penile pain, swelling, and haematuria ([El-Assmy, El-Tholoth, Mohsen, & Ibrahiem, 2010](#)). The diagnosis of a penile fracture can be clinically determined. Patients commonly present with distinct changes in colour and shape of a normal penis ([Al-Shaiji et al., 2009](#)). However, the identification of the injury site can be difficult if penile fracture presents with small tears, haematoma, and angulation ([Yacobi, Tsivian, & Sidi, 2007](#)). The use of ultrasonography (USG) can be useful to detect the size and sites of the hematoma ([Bhatt, Kocakoc, Rubens, Seftel, & Dogra, 2005](#)).

Conservative treatment (non-operative) was practiced to manage the fracture of the penis until the 1970s. It included “the urethral catheterization, compression bandages, and consistent cooling, combined with anti-inflammatory, anti-erectile, antibiotic and analgesic therapy” ([El-Assmy, El-Tholoth, Mohsen, & El Housseiny, 2011](#)). However, this conservative treatment showed the occurrence of acute and chronic complications, such as infections, abscesses, penile deformity, fistula, pulsatile diverticulum, persistent hematoma, and decreased turgidity in patients with penile fracture ([El-Assmy et al., 2010](#)). Moreover, around 50% of patients who underwent

conservative management can experience complications such as palpable nodule, penile curvature, and erectile dysfunction (ED) ([Bella, Sener, Foell, & Brock, 2007](#)). Therefore, immediate surgical exploration is the new approach to manage penile fracture and considered to be the standard of care. The surgical repair showed to be beneficial than conservative management of penile fracture due to exquisite long-term results in good clinical settings ([Gamal et al., 2011](#); [Ralph et al., 2010](#)).

However, there is a lack of currently available studies in South East Asia, such as Bangladesh, regarding the management of patients with fracture penis. This study is conducted to investigate the outcome, i.e., the erectile and voiding function of surgical repair in patients of a fractured penis.

## METHODS

### *Study Design*

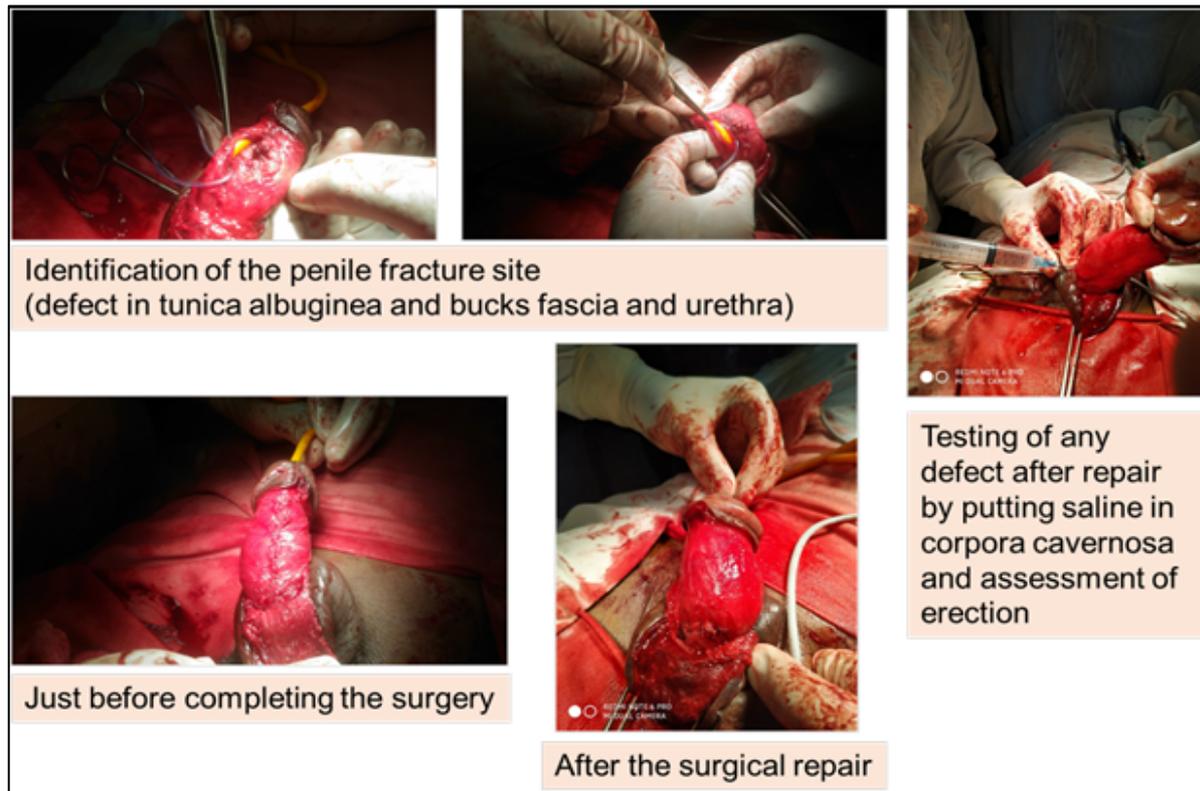
This quasi-experimental study was conducted in the department of urology of Dhaka Medical College Hospital (DMCH), Dhaka, Bangladesh, from the period of January 2017 to December 2018. The patients with suspicion of the fractured penis were admitted through the emergency department to the urology ward were included in the study.

A detailed history was retained regarding the cause, time of trauma, history of bleeding per urethra, medication history, co-morbid conditions of the patient. Clinical examination was performed by trained medical doctors that includes evaluation of penile swelling, site of the tear, presence of penile deviation, evaluation of blood at the urethral meatus, and haematuria. After proper evaluation and diagnosis of the fractured penis, surgical exploration was considered. Before the surgical intervention, proper counseling regarding the surgical details, its outcome, and subsequent possible complications were explained. Data were collected by trained medical officers working in the department of urology of DMCH.

### *Clinical Management of the Penile Fracture*

After taking the informed written consent from a patient, surgical exploration was performed under the spinal anesthesia. First, the fracture site was identified through a degloving sub-coronal penile incision. The haematoma was evacuated, the site of tunical defect was identified, the tear in corpora cavernosal and the associated urethral injury was assessed (Figure 1). In the case of tear, the corpora cavernosal was repaired with absorbable polyglactin

(vicryl) 3-0 suture with interrupted inverted knots. At the same time, with concomitant urethral injury, the defect was closed with absorbable polyglactin 4-0 suture material. Intraoperative artificial erection was routinely induced after repair with normal saline to assess the erection and any leakage. A per-urethral catheter was introduced in each patient after spinal anesthesia and kept in situ for three days except in the case of urethral lesion, where the catheter was kept for 14 days.



Courtesy: Department of Urology, Dhaka Medical College Hospital, Dhaka, Bangladesh

**Figure 1** Surgical repair of penile fractures

Patients were asked to abstain from any sexual activity for at least six weeks after the surgery. Postoperative follow up was scheduled at six weeks, three months, and six months after the surgery.

### *Operational Definition and Measurements*

We used standard validated tools such as the 'International index of erectile function (IIEF-5)' for and 'Single question self-report (SQSR)' to assess the married and unmarried patients, respectively, to evaluate their follow-up status.

Voiding status was evaluated using the 'international prostate symptom score (IPSS)' tool. The penile examination was carried out to record complications like penile deviation, nodule formation. All patients were interviewed to complete the IPSS questionnaire for the assessment of erectile function and voiding function.

### *Statistical Evaluation*

Descriptive statistics were used to explore the data. Mean, and standard deviation (SD) were

used to present continuous variables, while numbers (n) and percentages (%) were used for the categorical variables. All data analyses were performed using Stata 13.0.

#### *Ethical Approval*

This study was approved by the Institutional Review Board of Dhaka Medical College Hospital. This hospital is operated under the Ministry of Health and Family Welfare of Government of Bangladesh. We obtained written informed consent from the patients for the inclusion in the hospital registry, and strict confidentiality was maintained in preserving the data. Furthermore, to use the hospital data, anonymous data approval was taken from the director of the hospital.

## RESULTS

#### *Participant's Characteristics*

Forty-three patients were admitted to the urology department. Among 43, four did not agree for surgical repair, and five didn't come for regular follow up. Hence, 35 patients were included in the study. The mean age of the patient was 36.4 years (Table 1). Patients in their fourth decade of life were affected predominantly. Four patients were unmarried. The most common triggering factor was vigorous sexual intercourse followed by forcible flex of the erect penis while rolling over in bed. The typical characteristic crack sound was present in 54.28% cases (n=19) followed by pain in 80% cases and swelling of the penis with a deviation in 91.43% (n=32).

**Table 1** Patient's Age Group, Mode of Injury and Clinical Presentation

Characteristics	Numbers of patients	Percentage
<b>Age group (years)</b>		
20-30	4	11.4%
30-40	18	51.4%
40-50	10	28.5%
50-60	3	8.5%
Mean $\pm$ SD	36.4 $\pm$ 8.2	
<b>Marital status</b>		
Married	31	88.6%
Unmarried	4	11.4%
<b>Mode of injury</b>		
Vigorous sexual intercourse	24	68.5%
Rolling over in bed with the erect penis	7	20.0%
Masturbation	1	2.8%
Taqaandan maneuver	3	8.5%
<b>Clinical presentation</b>		
Pain	28	80.0%
Haematoma	32	91.4%
Swelling	32	91.4%
Crackling sound	19	54.2%
Detumescence	35	100%
Urethral bleeding	4	11.4%
Penile deviation	28	80.0%

SD: Standard Deviation

#### *Per-operative Findings*

Meantime of occurrence of fracture penis to surgery was 10.26 $\pm$  2.3 hours (Table 2). Thirty-two patients underwent surgery, and three patients were treated conservatively. Tear in tunica albugenia was present for all patients with a varying number of the tear in corpora cavernosal (right 65.7% and left 25.7%).

#### *Follow Up Status*

In the present study, patients were advised to follow up at 6 weeks, 3<sup>rd</sup> month, and 6<sup>th</sup> month (Table 3). After the 6<sup>th</sup> month, 28 patients (80%) were able to maintain their normal erectile function. However, seven patients developed erectile dysfunction, of which 4 had a mild form, and 3 had mild to moderate form erectile dysfunction.

**Table 2** Time from Injury to Operation and Per-Operative Finding

Characteristics	No. of Patients	Percentage
<b>Time of injury to surgery (hours)</b>		
< 6 hours	6	17.2%
6-12 hours	21	60.0%
> 12 hours	8	22.8%
Mean $\pm$ SD	10.26 $\pm$ 2.3	
<b>Per-operative findings</b>		
Tunica albugenia tear	35	100%
Corpora cavernosal tear		
Right	23	65.7%
Left	9	25.7%
Bilateral	3	8.6%
Urethral injury	4	11.4%

SD: Standard deviation

**Table 3** Evaluation of Erectile Function using IIEF-5 and SQSR Questionnaires Following Surgery

Contents	Six weeks	3 <sup>rd</sup> month	6 <sup>th</sup> month
	n (%)	n (%)	n (%)
<b>International index of erectile function (IIEF-5)</b>			
Normal (22-25)	22 (62.8%)	24 (68.6%)	24 (68.6%)
Mild ED (17-21)	7 (20.0%)	4 (11.4%)	4 (11.4%)
Mild-moderate ED (12-16)	2 (5.7%)	3 (8.6%)	3 (8.6%)
Moderate ED (8-11)	0	0	0
Severe ED (5-7)	0	0	0
<b>Single question self-report (SQSR)</b>			
Non impotent	4 (100%)	4 (100%)	4 (100%)
Minimally impotent	0	0	0
Moderately impotent	0	0	0
Completely impotent	0	0	0

ED: Erectile dysfunction | IIEF-5 for married (n=31) | SQSR for unmarried (n=4)

Table 4 showed that four patients had associated urethral injury, which was incomplete and repaired with 4-0 round body polyglactin suture. Among four patients one

had mild symptoms at 6<sup>th</sup> month according to IPSS score, and the ultrasonogram revealed no post-void residual, and uroflowmetry showed normal findings.

**Table 4** Evaluation of Voiding Function After Surgical Repair of the Urethra (n=4)

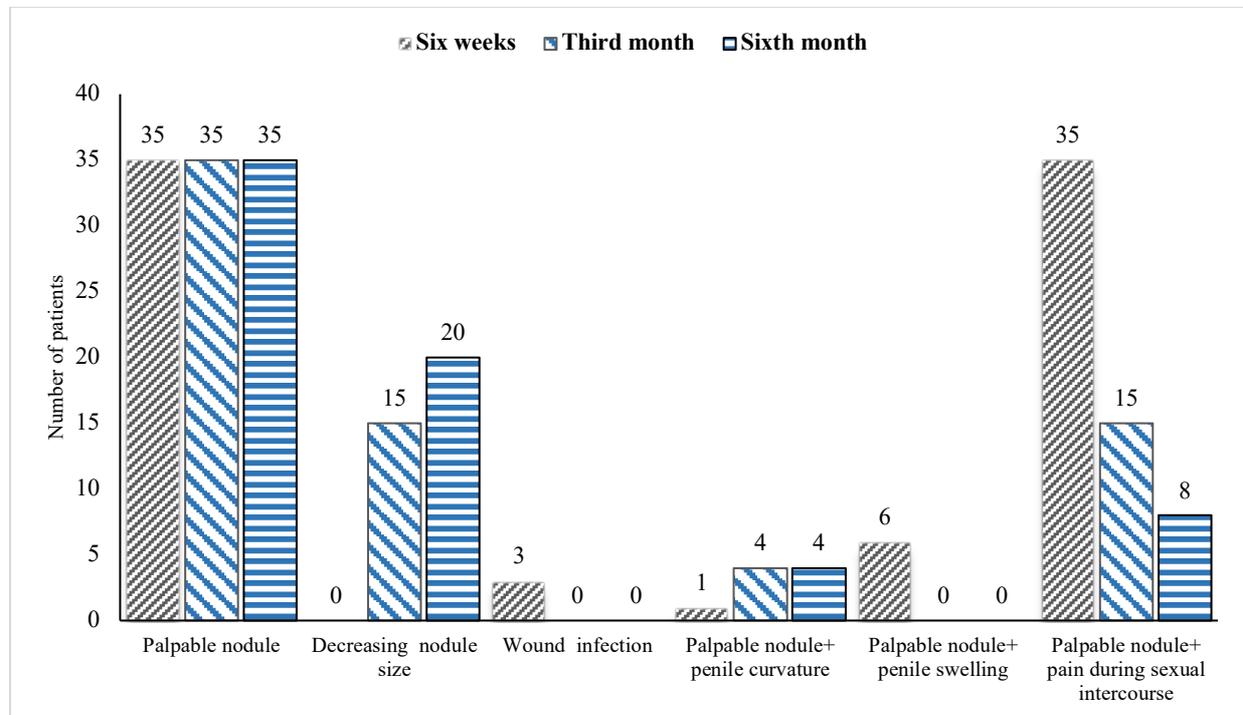
Contents	6 <sup>th</sup> week	3 <sup>rd</sup> month	6 <sup>th</sup> month
	n (%)	n (%)	n (%)
<b>International prostate symptom score (IPSS)</b>			
No symptoms	2 (50.0%)	3 (75.0%)	3 (75.0%)
Mild symptom (0-7)	2 (50.0%)	1(25.0%)	1(25.0%)
Moderate symptoms (8-19)	0	0	0
Severe symptoms (20-35)	0	0	0
<b>Ultrasonography</b>			
KUB+ prostate region	Normal No PVR	Normal No PVR	Normal No PVR
<b>Uroflowmetry</b>			
Q-max (15-20 ml/sec)	2 (50.0%)	1(25.0%)	1(25.0%)
Q-max (> 20 ml/sec)	2 (50.0%)	3 (75.0%)	3 (75.0%)

KUB: Kidney urinary bladder | PVR: Post-void residual

### Post-operative Complications

Table 5 represented the complications that usually occur after the surgical correction of a fractured penis. All the patients developed palpable nodules, and the size of the nodule gradually decrease in size with time. Around 3 cases were presented with wound infection,

which was treated with antibiotic therapy. Four patients had developed mild penile curvature which did not interfere with sexual intercourse. All patients complained of pain after intercourse in six weeks, but the pain has gradually subsided with time.



**Figure 2** Complications following surgical repair of fracture penis (n=35)

### DISCUSSION

Most of the published series of the fractured penis is reported in the middle east, and the practice of “taqaandan” is the main cause of the fracture ([El-Assmy et al., 2011](#); [Zargooshi, 2009](#)). The mechanism of maximum fractures was reported due to sexual misadventure. Taqaandan is not common in many countries, such as Bangladesh. In western countries, sexual intercourse with the female on top accounts for most cases of penile fracture. Despite the causation and type of injury, surgical intervention is now considered to be the standard of care. Immediate repair of the tunica albuginea is recommended for managing a fractured penis ([Gamal et al., 2011](#); [Gómez, Romero, Villacampa, Tejido, & Diaz, 2012](#)).

In this study, all the patients showed penile haematoma and swelling and gave the typical history of fracture penis. In different literature, a cracking sound was reported in 48–100%, while the pain was present in 50–100% of patients ([Kamdar, Mooppan, Kim, & Gulmi, 2008](#); [Mydlo, 2001](#)).

In the study, four patients (11.42%) complained of per urethral bleeding immediately after a fracture. This kind of concomitant urethral injury has been reported in 0–3% of cases in Eastern countries and up to 30% in the western world. This clear difference has been attributed to the aetiology of the penile fracture in different geographical areas ([Kamdar et al., 2008](#)). It is widely accepted that the diagnosis of penile fracture is mainly based on the clinical

history and physical examination ([Sawh, O'leary, Ferreira, Berry, & Maharaj, 2008](#)). Some literature showed evidence about the use of high-resolution ultrasound, MRI, or cavernosography for diagnosing fracture penis. However, imaging should not replace the clinical assessment of penile fracture. It can take time and delay surgical exploration in the emergency setting. In this paper, we didn't use any USG or imaging investigation other than clinical confirmation by history and examination of the affected penis. Most of the patients who participated in this study came through the emergency department, and surgical intervention was done immediately after admission.

Surgical exploration to manage a penile fracture has previously shown controversial because earlier reports favoured the conservative approach. These approaches included the application of cold compresses, advice to take antiandrogens to suppress erections, and the use of anti-inflammatory agents to overcome infection ([Ghilan, Al-Asbahi, Ghafour, Alwan, & Al-Khanbashi, 2008](#)).

However, complications such as curved or painful erections, erectile dysfunction, arteriovenous fistula formation, infection, and plaque formation were reported as a long term outcome of conservative management to penile fracture ([Asgari, Hosseini, Safarinejad, Samadzadeh, & Bardideh, 1996](#)). Therefore, it is recommended to explore the suspected penile fractures immediately. Evidence showed that surgical reconstruction results in faster recovery, lower complication rates, and lower incidence of long term penile curvature ([Agarwal et al., 2009](#)).

The debate is going on to decide which treatment is the gold standard surgical approach for penile fracture, and several techniques have been described that found positive outcomes. These techniques include penile degloving ([Mazaris et al., 2009](#)), a direct longitudinal incision over the injury ([Özen, Erkan, Alkibay, Kendi, & Remzi, 1986](#)), an inguinoscrotal approach ([Seftel, Haas, Vafa, & Brown, 1998](#)), a midline incision on the raphe ([Su, Sutaria, &](#)

[Eid, 1998](#)) and a suprapubic approach ([Konnak & Ohl, 1989](#)). The choice of a surgical approach to managing a fractured penis depends on the degree of swelling, location of urethral injury. It also depends on the preference of surgeon and hospital settings. Most surgeons use the degloving, circumferential, sub-coronal incisions to locate and repair the penile fracture ([Kozacioglu et al., 2011](#)). Asgari et al. reported to use the degloving procedure to explore the entire penis ([Asgari et al., 1996](#)). Ateyah et al. used infra pubic incision ([Ateyah et al., 2008](#)) as a surgical exploration. However, in the current studies, all patients underwent surgical correction through sub-coronal degloving incision to exposure to the penile urethra and penis. In some literature, authors reported that the distal third of the penile shaft is most often involved ([Su et al., 1998](#)) in contrast to our study, which showed the involvement of proximal penile shaft followed by mid penile shaft area. Our findings are consistent with a report collected from a previous study ([Ateyah et al., 2008](#)).

We found that four-fifth participants (80%) were able to maintain their normal erectile function, and they were satisfied with their performance. A study reported that 87.5% of patients able to maintain an adequate erection ([Fig, Fig, & Suchak, 2016](#)). 91.6% patients were able to maintain adequate erectile function following surgical correction ([Ateyah et al., 2008](#)). One more study revealed that 82.3% of patients were able to maintain normal erectile function ([Nason et al., 2013](#)). De Luca et al. mentioned that 94.6% of patients were able to maintain a good erection ([De Luca et al., 2017](#)). However, Hatzichristodoulou et al. showed that patients with fracture treated conservatively had significant erectile dysfunction ([Hatzichristodoulou, Dorstewitz, Gschwend, Herkommer, & Zantl, 2013](#)). In this study, we did not apply the conservative approach to treat the patients.

This study reported that four patients (11.4%) had per-urethral bleeding at the time of fracture. It is reported that 30.8% of patients developed voiding dysfunction, of which 50% patients were associated with urethral injury

(Hatzichristodoulou et al., 2013). Another study showed that 16.6% of patients had urethral injury but did not complain about urinary symptoms during follow up (Vig et al., 2016). Another study gave evidence that 27.5% of patients had urethral injury (De Luca et al., 2017) during surgical correction of a fractured penis.

A study showed that 87.5% of patients had palpable nodules, which gradually decreases in size; 16.7 % of patients had nodules with penile swelling (Ateyah et al., 2008). We found that all patients had palpable nodules at the site of the fracture, after surgical correction of a fractured penis. However, the size of the nodules gradually decreased over time. All patients' complaints of pain during sexual intercourse; however, it gradually subsided with time.

## CONCLUSION

Penile fracture is an unusual urological emergency and creates a major psychological trauma for the patients. This study provides evidence to the urologist of Bangladesh as well as in other developing countries so that they can choose the best approach while managing fractures of the penis in resource-poor settings. Adequate history and clinical examination can provide satisfactory ground to diagnose a case. Immediate surgical exploration and repair of fracture penis can offer complete recovery of sexual and voiding functions.

### Acknowledgment

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### Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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Self-funded.

### Authors' Contribution

MSM contributed to conceptualizing and designing the study. MSM, AKMMB, MSA, MTB, SH, MIA, SBZ participated in writing the manuscript. SBZ participated in formatting the manuscript and preparing tables and graphs.

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