Dear Editor,

Penile fracture (PF) is defined as a traumatic rupture of the tunica albuginea of the corpora cavernosa with an estimated incidence of 500–600 cases per year in the USA. Sexual intercourse, masturbation, forced penile manipulation, and rolling over in bed onto the erect penis are considered common causes of this fracture. Based on a meta-analysis obtained from 58 studies across 26 different countries, its incidence and etiology vary according to geographical region, patterns of sexual behavior, marital status, and culture. Reporting of concurrent urethral injury and long-term complications varies between various regions and countries. Presently, data pertaining to this condition are available from the Middle East, Europe, North Africa, as well as North and South America. However, very few studies and those too with a limited number of patients have been reported from the populations of East or Southeast Asia (12 cases reported from Thailand, 11 from Hong Kong, and 6 cases from Malaysia). Our study describes the largest cohort evaluating postoperative outcomes of PF repair.

After the review board’s approval and all patients provided informed consent, we retrospectively reviewed patients with PF from 2009 to 2015. Patients included in the study were those who demonstrated albugineal laceration during surgical exploration or those who were diagnosed clinically and managed with conservative treatment. Basic information and postoperative outcomes including erectile dysfunction, penile curvature, and associated complications were evaluated.

We included 62 cases in the study. The median age was 38 years (Table 1). Etiology was attributed to sexual intercourse in 41 patients (66.1%), turning in or falling from the bed or other trauma to the erect penis in 19 patients (30.6%), and masturbation in two (3.2%) cases. As shown in Table 1, all patients reported pain and subsequent swelling of the penis. Among these, we used a degloving incision for 39 patients and other incisions for 19 patients. All corpus cavernosum injuries were unilateral except in one patient. A tear of the right corpus cavernosum was found in 33 patients (53.2%) and 28 (45.2%) patients showed a left corpus cavernosum tear. Distribution of injuries was as follows: there were 23 (37.1%) proximal injuries, 18 (29.0%) midshaft injuries, and 21 (33.9%) distal injuries. Urethral injury was found in only one case. No serious early postoperative morbidity was observed. One patient demonstrated serious necrosis of his penile skin and underwent a dermatoplasty after 3 months.

Table 1: Patients and injury characteristics

| Variable                                      | Value          |
|-----------------------------------------------|----------------|
| Age (year, with range in parenthesis)         | 38 (19–59)     |
| Season of admission*, n (%)                   |                |
| Spring                                        | 11 (17.7)      |
| Summer                                        | 19 (30.7)      |
| Autumn                                       | 16 (25.8)      |
| Winter                                        | 16 (25.8)      |
| Mechanisms of injury, n (%)                   |                |
| Intercourse                                   | 41 (66.2)      |
| Trauma in erected state                       | 19 (30.6)      |
| Masturbation                                  | 2 (3.2)        |
| Time to presentation (h, mean±s.d.)           | 14.5±13.4      |
| Intervention, n (%)                           |                |
| Surgical                                      | 58 (93.6)      |
| Conservative                                  | 4 (6.4)        |
| Incision, n (%)                               |                |
| Degloving                                     | 39 (67.2)      |
| Other incision                                | 19 (32.8)      |
| Location of injury*, n (%)                    |                |
| Proximal                                      | 23 (37.1)      |
| Mid                                           | 18 (29.0)      |
| Distal                                        | 21 (33.9)      |
| Rupture of the tunica albuginea, n (%)        |                |
| Left                                          | 28 (45.2)      |
| Right                                         | 33 (53.2)      |
| Bilateral                                     | 1 (1.6)        |
| Urethral injury, n (%)                        | 2 (3.2)        |
| Clinical findings, n (%)                      |                |
| Pain                                          | 62 (100)       |
| Swelling                                      | 62 (100)       |
| Cracking sound                                | 34 (54.8)      |
| Hematoma                                      | 44 (70.9)      |
| Urethral bleeding                             | 12 (19.3)      |
| Curvature                                     | 16 (25.8)      |

*P=0.343; **P=0.7. s.d.: standard deviation

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With regard to follow-up, 40 patients could be contacted (Table 2). All patients reported normal erectile function before the PF; however, three (two patients who underwent surgical repair and one patient managed conservatively) among the 40 patients reported newly developed erectile dysfunction after the fracture. Mild new penile curvature, defined as any curvature noticeable to the patient, was seen in three (8.1%) patients who underwent surgical repair. No complications were reported in 35 patients (87.5%), while three patients complained of paresthesia/numbness, and one patient showed nodules along the penile shaft. No patient reported any urinary disorders except the patient who experienced serious necrosis of penile skin.

PF represents a rare urological emergency. To date, the largest series (300 cases) have been reported by El Atat et al. 1 It is recognized that a PF is caused by a sudden rupture of the tunica albuginea due to violent sexual activity, masturbation, or due to involuntary movements in patients at night during the period of spontaneous erection. Generally, intracorporal pressure could rise as high as 1800 mmHg during intercourse, thereby decreasing the thickness of the tunica albuginea to 0.25 mm from the usual 2 mm. Sudden blunt trauma to the erect penis at such a time may easily contribute to rupture.

A large number of studies exist in literature to corroborate that etiology of a PF varies based on geographical region, sexual behavior, marital status, and culture. In the Middle East, the Gulf area, and North Africa, the most frequent cause is forceful manipulation to achieve rapid detumescence related to cultural circumstances. In the USA, the injury is more commonly linked to sexual intercourse when the penis dislodges from the vagina and hits the perineum or pubic bone. Although the majority of injuries in our cohort were linked to sexual intercourse, there seemed to be a much higher proportion of patients reporting direct trauma to the erect penile shaft in the setting of nonssexual situations. An explanation for this could be the sense of shame or embarrassment culturally associated by the Chinese with reporting their self-related sexual issues exhaustively even to doctors. This topic is considered a serious and difficult one and associated with a great deal of privacy, thereby leading to low reporting. In terms of the pattern of injury observed, compared to reports from western countries where bilateral injuries account for 10% of cases, we found only one patient with bilateral injuries.

Diagnosis of PF is primarily based on clinical features. Utility of preoperative imaging in PF patients continues to be debatable owing to cost, delay in surgical intervention, false-negative rates, and its futility in changing clinical decision-making. Generally, ultrasonography can determine the site of the albuginea tear and assist with improved operative planning, especially in patients with larger injuries. Prior studies have indicated that the presence of hematuria, urinary symptoms, and severity of PF appear to be risk factors for urethral injury. In Europe, the urethral injury rate is reportedly as high as 14%–28%, while studies from Iran demonstrate a much lower rate of urethral injury (0–2%). Our data resemble the rates obtained from Iran (rates as low as 3.2%).

To date, prompt surgical repair is a widely accepted and recommended treatment modality owing to favorable long-term results. In our series, one patient with a degloving incision experienced serious complications with necrosis of penile skin. With regard to long-term results, outcomes in the present series were similar to those previously reported in literature. Long-term outcomes after early surgical repair were excellent, with postoperative onset of erectile dysfunction or penile curvature noted in <10% of patients.

**AUTHOR CONTRIBUTIONS**

ZT and LY performed the data collection and analysis, and drafted the manuscript. LRL and FW revised manuscript writing. QW and LY designed this research. YF, SQ and PT contributed to data interpretation. All authors read and approved the final manuscript.

**COMPETING INTERESTS**

All authors declared no competing interests.

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