

Penile fracture injury: diagnosis, outcome and long-term follow-up in a Cameroon-based population

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Background: The incidence of penile fracture is increasing in sub-Saharan Africa. However, it varies considerably among different geographical areas. Early diagnosis and surgery are central to preventing complications such as erectile dysfunction.

Objectives: This study aims to present the outcomes and long-term follow-up of patients with penile fractures in Cameroon.

Materials and methods: This was a retrospective review of 16 consecutive patients who underwent primary surgical repair following penile fracture between 2012 and 2020. All the patients included were treated at the Yaoundé Central Hospital and followed up for at least six months postoperatively. The mechanism of injury, clinical, paraclinical, and surgery details are presented. The International Index of Erectile Function (IIEF-5) score was used to evaluate erectile function.

Results: A total of 16 patients were enrolled with a mean age of 35 ± 1.65 years. The most common cause of injury was vigorous sexual intercourse in 75% of patients ($n = 12/16$). The “woman-on-top” position occurred in six cases. Ultrasound showed unilateral injury of the corpus cavernosum in 80% of the patients. The location of injury was found in the proximal penis in 87.5% of the study population ($n = 14/16$). Corpora cavernosa injuries were repaired with simple sutures using 3-0 Vicryl through a sub-coronal approach. The IIEF-5 score 12 months after penile fracture was 23 ± 1.13 (range 22–25).

Conclusion: Early clinical and ultrasound diagnosis of penile fractures associated with prompt surgical management through a sub-coronal approach offers a good prognosis with preservation of erectile function.

Keywords: penile fracture, diagnosis, follow-up, Cameroon

Introduction

Penile trauma often occurs in young adults during sexual intercourse. Three types of trauma are described: fracture of the cavernous bodies, strangulation, and amputation. Penile fracture can be defined as a rupture of the tunica albuginea of the corpora cavernosa after blunt trauma to the erect penis.¹ The most common causes are blunt trauma during sexual intercourse, masturbation, unconscious nocturnal penile manipulation, or a fall onto the erect penis.²

The incidence of penile fracture varies considerably among different geographical areas. The largest series are reported from the Middle East and North Africa.³ The triad of classic clinical signs during a penile fracture consists of a cracking sound, rapid detumescence, and penile swelling. It is sometimes associated with a urethral injury. Ultrasound can often identify the exact location of the injury, influencing the surgical approach. Magnetic resonance imaging (MRI) is an accurate diagnostic tool, although it is often unavailable because most cases occur outside regular working hours.¹ The main principle of treatment is early primary repair of the defect in the tunica albuginea. A more conservative approach is not recommended due to the risk of penile abscess, penile curvature, ongoing haematoma, erectile dysfunction, and unrecognised urethral trauma.

In our region, penile fracture has become relatively common in daily practice.⁴ Sharing our experience in this domain can improve the knowledge of risk factors for penile fracture, its various

manifestations, and appropriate treatment thereof. Therefore, this study aims to highlight the features and examine the long-term outcomes of patients managed for penile fracture.

Materials and methods

Following approval by the local ethics committee institution, we conducted a retrospective review of 16 patients who underwent primary surgical repair after a penile fracture between 2012 and 2020. All patients included were treated at the Yaoundé Central Hospital and followed up for at least six months postoperatively. Variables recorded were age, marital status, number of sexual intercourses per day, type of sexual intercourse position, mechanism of penile fracture, time (hours) from injury until surgery, pain level (using the verbal numeric rating scale [VNRS]), oedema, haematoma, voiding dysfunction, penile deviation, and urethral bleeding. We also recorded findings from an ultrasound when performed. Patients' sexual function was evaluated six months postoperatively using the International Index of Erectile Function (IIEF-5) questionnaire.

Following locoregional anaesthesia, broad-spectrum antibiotics were administered parenterally. A standardised skin preparation was done, and a transurethral catheter (TUC) was inserted. If no urethral injury was present, the TUC was removed at the end of the surgery. The primary surgical approach consisted of a circular sub-coronal incision, followed by degloving of the cutaneous and subcutaneous penile tissues, allowing localisation of the fracture site through Buck's fascia. The latter was opened, and the haematoma

was evacuated. Cavernous bodies were repaired with simple sutures using 3-0 polyglactin (Vicryl). An artificial erection was created using 0.9% normal saline. The procedure was concluded by applying a semi-compression bandage after wound closure. All patients received a standard regimen of oral antibiotics for five days, as well as an antiandrogen for two weeks, to avoid erections. We recommended sexual abstinence for at least three months post-surgery.

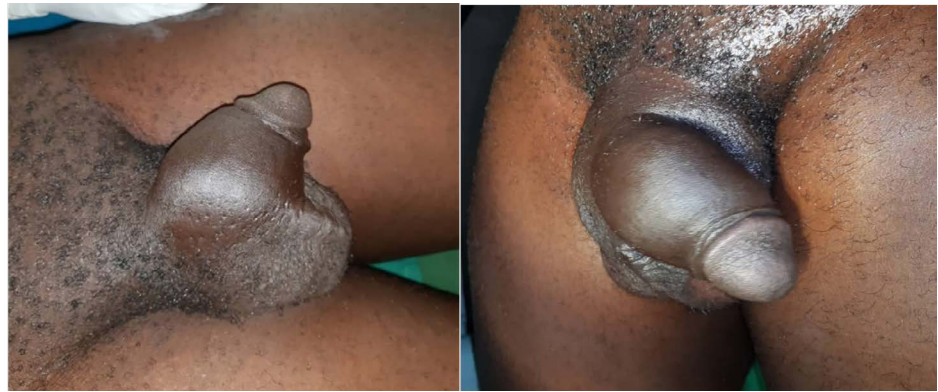


Figure 1: Penile fracture injury, swelling, and left penile deviation

Results

A total of 16 patients were enrolled in the study. Of the patients, 62.5% ($n = 10$) were married. The mean age was 35 ± 1.65 years (range 22–48 years). The average time for consultation after trauma was four hours (range 1–6 hours). The most common cause of injury was vigorous sexual intercourse in 75% of patients ($n = 12/16$). In all cases, there was consensual heterosexual vaginal intercourse. The most common sexual position during intercourse was the “woman-on-top” position in six cases, followed by the rear entry position in four cases, and the missionary position in two cases. The total number of sexual intercourses on the day of penile trauma was two (range 1–3).

Two patients (12.5%) experienced penile fracture during masturbation, and one patient during unconscious nocturnal penile manipulation. Another patient had a penile fracture from urination during a nocturnal erection.

All patients described pain, a “cracking” sound, rapid detumescence, and deviation of the penis immediately after the injury (Figure 1). The average pain was graded as 7/10 (range 5/10–8/10) using the VNRS. Of the 16 men with penile fractures, 25% (four patients) had associated urethral injury. Penile ultrasound was performed in 15 of the 16 patients (Figure 2), showing unilateral corpus cavernosum injury in 80% of patients ($n = 12$). Anatomically, the proximal penis was injured in 87.5% of men ($n = 14$), with the mid-penis ($n = 1$) and distal penis ($n = 1$) each injured in 6.7% of the cases, respectively (Table I).

Most patients (93.75%, $n = 15/16$) underwent surgery via a circular sub-coronal incision. All patients were operated on within 10 hours following penile fracture. The duration of surgery varied between two and three hours. Intraoperative findings revealed injury of the unilateral corpus cavernosum in 75% of patients ($n = 12/16$) (Figure 3). All penile fractures were transverse. The location of injury was found in the proximal penis in 87.5% of the study population ($n = 14/16$) and in the mid-penis and distal penis in 6.25% of patients, respectively. Four patients had an associated urethral injury, of which three patients (18.75%) had bilateral injury of the corpora cavernosa, and one patient (6.25%) had a unilateral fracture of the corpus cavernosum. These four patients underwent primary urethral anastomosis. The mean duration of hospitalisation was 10 ± 5 days (range 5–21 days).

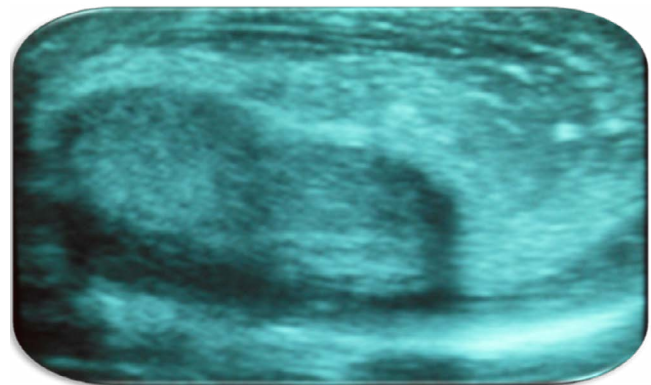


Figure 2: Penile ultrasound showing left corpus cavernosum rupture

Table I: Features of patients treated for penile fracture

Information	Value	Range/percentage
Age	35 years	(22–48)
Time to presentation after injury	4 hours	(1–6)
Time between penile fracture and surgery	9 hours	(7–24)
VNRS pain severity	7/10	Minimum: 5/10 Maximum: 8/10
Swelling	16	100%
Cracking sound	16	100%
Diagnosis by ultrasound	15	100% sensitivity
Surgical approach	Sub-coronal: 15 Longitudinal: 1	93.75% 6.25%
Location of injury	Proximal: 14 Middle: 1 Distal: 1	87.5% 6.25% 6.25%
Urethral injury	4	25%
Urinary retention	4	25%
Dysuria	4	25%
Urethral bleeding	4	25%
IIEF-5	23 ± 1.13	22–25

IIEF-5 – International Index of Erectile Function, VNRS – verbal numeric rating scale

The median duration of follow-up was four years (range 1–8 years). The IIEF-5 score 12 months after penile fracture was 23 ± 1.13 (range 22–25). One patient complained of discomfort during ejaculation. Another patient had wound dehiscence. One patient had a penile nodule during erection. The four patients with associated urethral injury underwent uroflowmetry with an average maximum flow rate of 13.6 ± 1 ml/s.

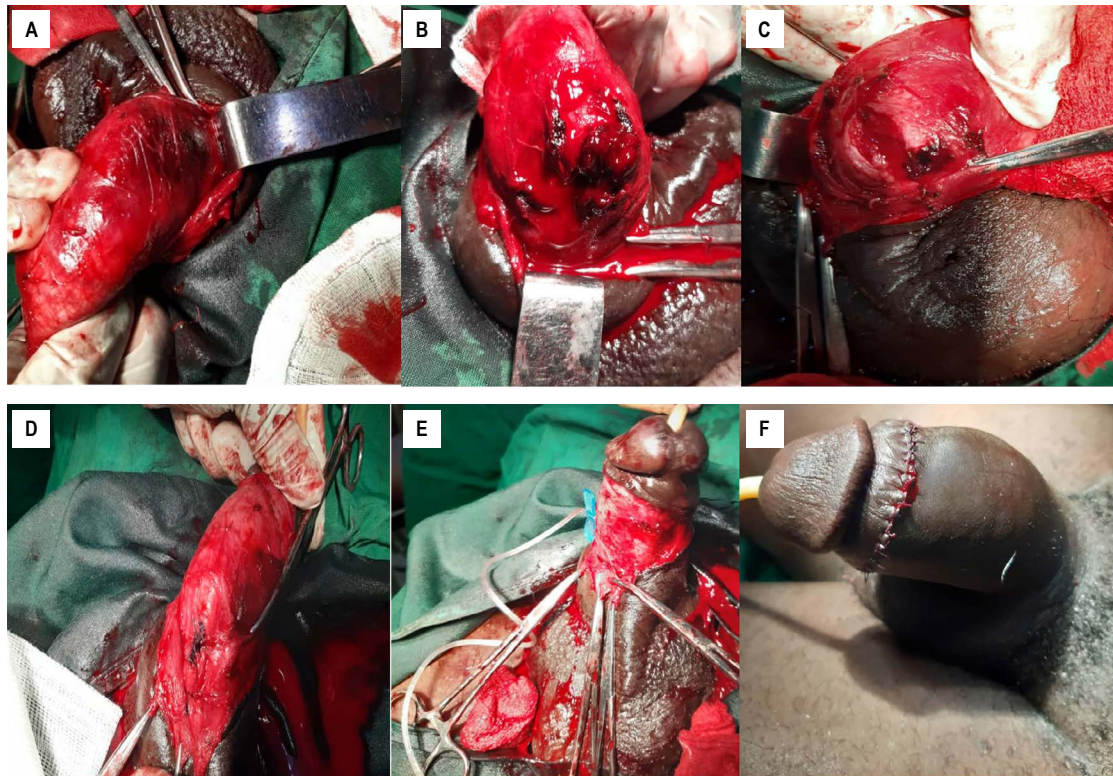


Figure 3: Surgical procedure

A – dark Buck's fascia, B – haematoma, C – transverse rupture of left corpus cavernosum, D – suture of corpus cavernosum, E – erection test, F – sub-coronal closure

Discussion

Penile fractures can occur at any age. According to the literature, age varies from 12 to 82 years, peaking in the fourth decade.⁴⁻⁶ Although the Middle East and North Africa have reported more cases of penile fracture, the number of reported cases in sub-Saharan Africa is increasing. A few case series have been reported in Benin, Togo, Burkina Faso, and Senegal.^{5,7-9} The increased frequency of cases observed in our environment is probably due to a better knowledge of the pathology and its management by urologists.

Vigorous sexual intercourse is the major cause of penile fracture. This can be attributed to a change in sexual behaviour reinforced by audio-visual programmes widely broadcasted by both traditional media and modern telecommunications tools. Our results are consistent with those from other studies in sub-Saharan Africa and Western countries.^{4,5,8,10} In contrast, our aetiology differs from the Middle East and North African regions, where masturbation is the leading cause of penile fracture.^{3,10,11}

The position of both partners during sexual intercourse can promote penile fracture. In this regard, Garaffa et al.¹ argue that penile fracture is usually the consequence of excessive ventral angulation that occurs when the penis hits the female pelvis during enthusiastic sex. The sexual position during coitus is variably described in the literature. Some authors report that during sexual intercourse in a standing position, the woman can suddenly fall, causing an acute angulation of the penis. Moreover, reverse coitus (in which the woman lies on top of the man) is another described position responsible for penile fracture.^{3,10}

In our study, penile fracture occurred most often during the rear penovaginal intercourse position. In a study carried out in Rio de Janeiro, Brazil, Barros et al.¹² assessed the relationship between sexual position and penile fracture severity in 90 patients. They found that the most common sexual positions at the time of injury in 37 cases (41%) occurred with the “doggy-style” position, followed by 23 cases (25.5%) with the “man-on-top” position, and nine cases (10%) with the “woman-on-top” position. The study's conclusion revealed that the “man-on-top” and “doggy style” positions demonstrated more associations with bilateral fractures of the corpus cavernosum and urethral injuries.

Some of our patients had a penile fracture during micturition or sleep. However, the patients did not clearly explain the exact mechanism of injury in these cases. This can be explained by our milieu in which patients' sex lives are personal and private. Nonetheless, a misleading history of penile fracture mechanism is also reported by Eke in a large series of 183 publications where 1 331 cases were reported between 1966 and 2001.¹⁰

The literature on penile fractures unanimously recognises that its diagnosis is essentially clinical.^{3,8,10} The main signs encountered in our series were pain, a “cracking” sound, and rapid detumescence of the penis. The VNRS is a pain screening tool commonly used to assess pain severity at the time using a scale from 0 to 10. The patients in our series experienced severe pain after injury (7/10). Consequently, it is justified to use the term “fracture” to describe the violent and painful rupture of the corporal bodies. We also found swelling and deviation of the penis described as an “eggplant deformity” or “aubergine sign” (Figure 1).¹⁰ In four of our reported cases, the penile fracture was associated with a urethral injury. The

classical signs of penile urethral injury (acute urinary retention and urethral bleeding) were present. This association can be found in 10–33% of cases.^{1,2}

Most of the patients in our series underwent a penile ultrasound. In all cases, the site of injury was adequately demonstrated. The similarity between the ultrasound description of the lesions and the operative findings was an asset in identifying and repairing the injuries. According to our review, this 100% ultrasound sensitivity is higher than reported by Spiesecke et al.,¹³ who found a sensitivity of 71.4%. They compared MRI and ultrasound in diagnosing penile fractures and showed that MRI had a better sensitivity for locating the fracture site (91.9%). However, the specificity of MRI was lower (90.6%) than ultrasound (100%). In countries with limited resources, such as Cameroon, where MRI is not widely accessible, ultrasound seems to be a reliable alternative diagnostic tool. Undergoing penile ultrasound did not delay management and facilitated accurate diagnosis. The only case that did not have an ultrasound occurred when the imaging department was closed. We agree with Kati et al.⁴ that ultrasound is widely accessible, inexpensive, rapid, and non-invasive.

The fact remains that history and clinical examination are the cornerstones for penile fracture diagnosis.⁴ Nevertheless, imaging finds its place in situations where the patient arrives late, sometimes not even remembering the circumstances of the occurrence of penoscrotal oedema. Gupta et al.¹⁴ evaluated the role of ultrasound during penile fracture and found that misdiagnosis can cause a delay in surgery and increase long-term sequelae. They concluded that when patients arrive late, an ultrasound examination can help establish the diagnosis by demonstrating the site and extent of tunica albuginea disruption.¹⁴ This emphasises that early clinical diagnosis and prompt surgical exploration remain the gold standard when a patient presents with a penile fracture.

Of the 16 patients, 15 surgical procedures were performed through circumferential, sub-coronal incisions, with degloving of the penile shaft. This appears to be the most preferred approach according to most case series on penile fractures.^{8,11,15} The first case in our series was done through a lateral longitudinal incision. Subsequently, we preferred the coronal incision because of its advantages: good exposure, satisfactory cosmetic appearance, and no recorded complications. Several authors report the same observation, although complications such as neurovascular lesions and necrosis have been described.^{10,15}

Classically, cavernous lesions are transverse and unilateral in penile fractures.^{9,10,16} We found a majority of proximal corpora cavernosa injury, which compares with cases reported by some authors. This can be explained by the mechanism of the injury.^{3,11,15} Ateyah et al.¹¹ published a series of 30 cases and found proximal lesions in 75.8%. This finding could be explained by the relation of the type of trauma that induced the penile fracture, which was acute penile bending by hand (lateral trauma) in their study. This differs from axial trauma during sexual intercourse.¹¹

The surgery duration varied between two and three hours. To avoid tension on the sutures made on the corpora cavernosa, all patients

received an antiandrogen to limit erections. The mean duration of hospitalisation was 10 ± 5 days (range 5–21 days). The injury had a significant psychological impact on most patients. Therefore, the patients preferred an extended hospital stay to ensure complete management of their condition. Complications following penile fracture depend on the severity and location of the lesion. The major complications are erectile dysfunction and penile curvature. For those with urethral injury, urethral stricture can occur.

In a short series of six cases reviewed in Lomé, Togo, Kpatcha et al.⁸ found a case of severe erectile dysfunction (IIEF-5 score 11) after 46 months of follow-up. There was no severe erectile dysfunction in our series, although the time between injury and surgery reached 24 hours for some patients. It is known that erectile dysfunction in such cases is due to a vascular insult. Moreover, the size of the study population is insufficient to draw conclusions regarding the long-term evolution following penile fracture.

Conclusion

Our series demonstrated that among Cameroonian patients, early clinical and ultrasound diagnosis with early surgical management through a sub-coronal approach provides safe and effective management of penile fractures without erectile dysfunction at one year of follow-up. Our data is consistent with other cases reported in the literature.

Conflict of interest

The authors declare no conflict of interest.

Funding source

None.

Ethical approval

Ethical approval was obtained from the University of Yaoundé I Faculty of Medicine and Biomedical Sciences Institutional Ethical Review Board.

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