Penile Fracture: Abuse of Erect Penis, Concomitant Urethral Injuries and Outcome of Surgical Management- A Case Series

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ABSTRACT

The erect penis can be fractured by blunt trauma, commonly vigorous sexual intercourse or forced flexion. Forced flexion is a self-inflicted or self-abused injury, and concomitant urethral injury is reflective of the application of excessive force to the organ. We aim to describe the aetiology and concomitant urethral injuries corroborative of these observations and the outcome of surgical management in our institution.18 consecutive patients with Penile Fractures managed by the Urology Department of our institution over 14 years (-2008-2021) were retrospectively studied for demographic characteristics, time to presentation, etiologic mechanism, clinical features, surgical technique, findings at exploration and complications. All patients underwent immediate surgical exploration and repair. The mean age of the patients and time to presentation were 35±9.2 years and 124.4±200.6 hours, respectively. 38% (7) of injuries were self-inflicted(taaqhandan) while one (5.5%) was caused by partner abuse. Concomitant urethral injuries occurred in 44.3% of patients (33.1% and 11.2% for the sexual and nonsexual groups, respectively). Three patients (16.5%) demonstrated tricorporeal fractures; one (5.5%) of these resulted from forced flexion (self-abuse). 94.4% (17) of patients reported satisfactory voiding and erectile functions in the follow-up period. Vigorous sexual intercourse, partner and self-abuse resulted in severe penile fractures, with high percentage of concomitant urethral injuries, describable as, "Abuse of the erect penis." Immediate surgical repair demonstrated fewer complications and excellent functional outcomes.

Keywords: Penile fracture, Forced flexion, Abuse of erect penis, Urethral injury, Case series

INTRODUCTION

Penile fracture (PF), the quintessential urological emergency, is defined as a rupture in the tunica albuginea of the corpora cavernosa of an erect penis sequel to blunt trauma.[1-3] The erect penis is a potential high-pressure organ sustained by one of the toughest fibrous tissues in the body, the tunica albuginea (2 mm thick in the flaccid state).[4] Thus, a buckling force impact readily elevates the intracavernosal pressure above the tensile strength (1500 mmHg) of the thinned tunica (0.25 mm), and like a blown beyond its capacity, it bursts or ruptures.[5] PF may occur by simple misfortune or as a result of sexual athleticism.[6-7] Coitus is supposed to be consensual and performed in a dignifying manner, but when fraught with coercion, vigour, fellatio, and machoism, perhaps aided by performance-enhancement drugs, injuries are inevitable, and abuse has been implicated as the underlying causative factor .[8-9] An abuse of something is the use of that thing in a way that is harmful or wrong.[10] This is corroborated by the French description of PF as a "faux pas du coit", which means 'wrong step of coitus' and is synonymous with a blunder or indiscretion during intercourse. [11] Forced flexion or 'Taqhaandan', a well-known cause of PF, is regarded as a self-inflicted or self-abused injury. [12-13] Other causes include rolling over in bed during sleep and falling on an erect penis. These varied causes could be categorized broadly into sexual and nonsexual mechanisms. [1,12] The incidence of synchronous urethral injury relates largely to the aetiology of PF, with sexual mechanisms accounting for the bulk of such injuries.[14-16] In the last four decades, there has been a paradigm shift in the

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approach to the management of PF, from conservative to early surgical repair, resulting in better outcomes in most series. [17-20] However, a few authors have recorded high complication rates especially as it relates to late surgical treatment in patients who present late (>24 hours from the time of injury), usually due to reluctance resulting from shame and embarrassment of the condition. [3,13,21]

Our focus in this study is to describe the aetiology(and highlight the abuse component), clinical presentation, synchronous urethral injuries and outcome of early and late surgical management. Consideration of the "abuse factor" in the aetiology of PF should prompt the initiation of sexual health education programs to prevent PF in vulnerable groups.

MATERIALS AND METHODS

All patients with PF managed by the Urology Department of the University of Uyo Teaching Hospital between 2008 and 2021 (14 years) were retrospectively reviewed, after research and ethics committee approval. Data from the patient records were extracted and stored on a designed study proforma. Such data included demographic details, presenting complaints and duration, etiologic mechanisms, local examination findings, and findings at surgical exploration including concomitant urethral injuries and postoperative complications. The operative protocol consisted of surgical access to the site of injury by either a degloving subcoronal incision or a direct incision over suspected hematoma or both, and the use of absorbable polyglactin sutures for repair in all cases. All patients underwent immediate surgical intervention upon presentation.

The patients were followed up for one year, during which erectile function status using the single question self-report of erectile dysfunction[22], and observed urinary symptoms for those with urethral injuries, were documented. The data were analysed with IBM SPSS version 20 software. This case series has been reported in line with the PROCESS Guideline 2020.[23]

RESULTS

A total of 18 subjects were reviewed, with a mean age of 35.7 ± 9.2 years (range 20-54). Ten (56%) of them were between the ages of 30 and 39. Fifty percent of patients (9 each) presented equally early (<24 hours) and late (>24 hours). The time interval from injury to presentation ranged between 1-720 hours (mean 124.4± 200.6). Eight fractures (44.4%) were of sexual (heterosexual, coitus) while 10 (55.6%) were of nonsexual aetiology (Table 1). Four of those in the former group occurred during extramarital sexual escapades in the doggy position, while seven (70%) of the latter were caused by forced flexion of the erect penis(self-abuse)—3 of these occurring in married men who were cohabiting with their partners at the time of injury. The clinical presentation consisted of a crackling sound, penile pain, swelling and wound, urethral bleeding, voiding difficulties, egg-plant deformity, and penile eclipse due to scrotal swelling (Table 1).

There was a preponderance of left corpora cavernosal ruptures in 44.4% of patients, with an equal number of patients (44.3%) demonstrating concomitant urethral injuries. One of these was an isolated corpora spongiosum-urethral injury (Table 2). He presented with massive scrotal swelling that required suprapubic cystostomy to divert urine, and multiple scrotal incisions to drain the haematoma. Three (3) of the urethral injuries were severe (tricorporeal fractures) with complete transection and separation of urethral ends: one of these was a married man who abused his erect penis while the second was sustained during vigorous heterosexual coitus combined with forced flexion by an uncooperative partner (obviously an abuse by partner - Figure 1). He required flap interposition to bridge the gap. This represented the most severe injury recorded in this series, with a positive history of poorly treated gonococcal urethritis. There were two (2) cases of urethral involvement in the nonsexual group, one of which was a tricorporeal injury. One patient had subtunical rupture of the right corpora

cavernosa demonstrating subtunical hematoma and intact tunica albuginea.

Postoperative complications included painful erections (1 patient), urethral stricture (1 patient), distal penile skin necrosis (2 patients) which healed with daily honey dressings, and penile curvature in one late presenter. In the follow-up period, all patients reported satisfactory erectile function, and there were no urinary complaints in 7 of the 8 patients with concomitant urethral injuries.

Table 1: Summary of clinical findings

Variables	**Mean (range)**	
Age (years)	37.5 (20-54)	
Time to presentation (hours)	124.4 (1-720)	
Marital Status	**N (%)**	
Married	9 (50)	
Single	9 (50)	
Categorized time to presentation	**Sexual (No, %)**	**Nonsexual (N,%)**
Early (< 24 hours)	3, 16.6	6,33.3
Late (> 24 hours)	5,27.7	4,22.2
Etiologic mechanism	**No. (%)**	
Sexual	**8 (44.4)**	
Man-on-top (with spouse)	4(22.2)	
Doggy (with mistress)	3(16.6)	
Man-on-top + forced flexion by partner	1(5.5)	
Non-Sexual	**10(55.5)**	
Forced flexion	7(38.8)	
Rolling over in bed during sleep	2(11.1)	
Falling on an erect penis	1(5.5)	
Clinical Presentation	**No. (%)**	
Crackling Or Popping Sound	16(88.8)	
Penile Pain	17(94.4)	
Detumescence	18(100)	
Swelling	18(100)	
Penile wound	1(5.5)	
Urethral bleeding	6(33.3)	
Scrotal swelling	9(50)	
Difficulty voiding	3(16.6)	
Egg-Plant deformity	15(83.3)	
Penile eclipse	1(5.5)	
Post-operative complications	**No. (%)**	
Early - distal penile skin necrosis	2(11.1)	
Late - pain during erection	1(5.5)	
Urethral stricture	1(5.5)	
Mild penile curvature	1(5.5)	
Erectile dysfunction	0	

*No = Number

Table 2: Summary of injury location and urethral involvement

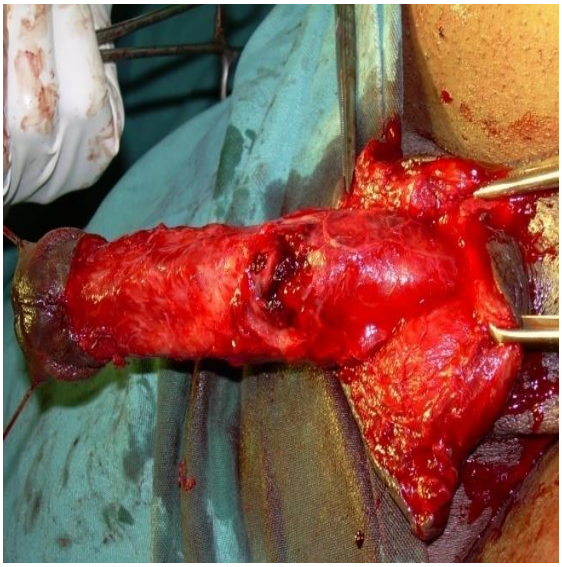
Mechanism of Injury	Right Corpora Cavernosum	Left Corpora Cavernosum	Bilateral Corpora Cavernosa	Urethral Involvement	Isolated Urethral Injury
Sexual	3	2	2	5	1
Nonsexual	3	6	1	2	-
Total Number (%)	6 (33.6)	8 (44.4)	3 (16.8)	7 (38.8) *	1 (5.5) *

*Total urethral involvement – 44.3%

A

C

B



A) TYPICAL EGG-PLANT DEFORMITY
B) TRICORPOREAL FRACTURE EXPOSED
C) POST-OPERATIVE REPAIR APPEARANCE

Fig. 1: Penile Fracture Caused by Partner Abuse

DISCUSSION

Penile fracture (PF) is an uncommon but increasingly reported urological emergency and one that attracts enormous interest, partly because of the application of the nomenclature 'fracture' to an organ that has no bone[3]. It refers to the traumatic rupture of the tunica albuginea of an erect penis. It occurs most commonly in young men in the 20-50 years age bracket. This can be attributed to the higher erectile potency of the youth resulting from robust and efficient vascular channels of the corpora cavernosa.[6] Additionally, youths are indisputably, randy, with a penchant for the utilization of sex-enhancing drugs and display of sexual prowess.[24] Our data corroborate these observations: an age range of 20-54 years (mean 35.7± 9.2) with a peak age incidence of 30 – 39 years in 56% of patients, and a few consenting to the use of sex stimulants.

The mechanism of injury is categorized into sexual and nonsexual etiologies.[1] The sexual mechanism relates to the application of force during the act such that when the penis slips out of the vagina, and upon attempted re-entry, the mistaken strike on the partner's perineum generates a buckling force that ruptures the organ.[16] This is the most common mechanism in the Western world, where the attitude towards heterosexual coitus is liberal and permissive.[6,25]. On the other hand, nonsexual etiologies predominate in the Eastern Muslim world.[2,17,18,26] The practice of "Taqhaandan" or forced flexion which has its highest prevalence in Iran, consists of the individual holding and stabilizing the proximal shaft with one hand and bending the distal shaft with the other hand to achieve forced detumescence.[16] Our data demonstrate a 'mixed' aetiology with a slight preponderance of nonsexual causes in 56.6% of cases over the sexual mechanisms in 44.4% of subjects. This is similar to a report from our region by Salako et al.[27] in which nonsexual mechanisms were the main aetiology but contrasts with findings by Ekeke[28] and Ogbetere,[24] from the same region, in which PF was related to sexual intercourse in 81% and 92.3% of cases, respectively. In Eastern countries where the practice of taqhaandan is rife, it has been postulated that culture and single status, rather than geographic region, are the major influencing factors.[13] Our data partially support this postulate: 7 (38.9%) cases were the result of forced flexion or taqhaandan- in South-South Nigeria! In contrast, however, three of these (42.8%) were married men cohabiting with their spouses at the time of injury. Therefore, we surmise that beyond culture, marital status or geographic region, the individual's attitude towards his erect penis is paramount. Many are not able to manage the "pressure of unwanted or ill-timed tumescence" and therefore abuse it. An abuse of something is the use of that thing in a way that is wrong or harmful. There are three reports describing PF resulting from husband abuse by wife[8], misunderstanding during oral sex[25], and rape during a robbery incident.[9] These connote abuse of the erect penis by the partner. Taqhaandan or forced flexion which has been described as self-inflicted.[12-13] should be regarded as self-abuse of the erect penis. Our study recorded one (1) and seven (7) cases of partner and self-abuse respectively.

PF has a distinctive clinical presentation justifying its choice as mainstay of diagnosis: a 'quartet' of symptoms consisting of crackling or popping sound, followed by pain, detumescence and swelling. Ecchymosis and deviation to the side opposite the fracture complete the classic appearance known as 'egg-plant deformity' or aubergine sign. Urethral injuries usually present as urethral bleeding, difficulty voiding, presence of blood at external urethral meatus and scrotal swelling (Table 1).

Our data recorded a high rate of associated urethral injuries: 44.3% in a small cohort of 18 patients. The incidence of synchronous urethral injury ranges between 3-58%.[2,15-16,29] The higher figures are recorded when PF is of sexual aetiology as intercourse is associated with high-energy traumas which may result in bilateral cavernosal involvement and an inevitable complete urethral transection in 100% of cases.[30] Bilateral cavernosal injuries without

urethral involvement have, however, been reported[31]. The lesser figures are recorded when PF is of nonsexual aetiology. Our data reflect these patterns to a larger extent: 6 of 8 urethral injuries were of sexual origin (2 associated with bilateral cavernosal ruptures), while 2 were of nonsexual mechanism. However, one of the latter groups was associated with bilateral cavernosal injury and demonstrated complete transection of the urethra. This is very rare and to our knowledge is the first such report in the literature, and it underscores the application of excessive force and self-abuse of the organ. Barros et al, in their report of 18 patients with PF of non-sexual aetiology recorded only 1 (5.5%) partial urethral injury.[12] Additionally, Rahman et al reported penile manipulation as the most common cause of PF in their institution- but recorded no concomitant urethral injury.[32]

Although PF with concomitant urethral injuries has been widely reported, isolated corpus spongiosum-urethral injuries without concomitant corpora cavernosal injuries are rare. It is usually associated with coital trauma.[33-35] Another rare entity of PF reported only once in the literature is a faux pas du coit injuring the erectile tissue without rupturing the tunica albuginea.[7] Our study recorded one each of both rare phenomena.

In the last four decades, there has been a paradigm shift, from conservative to early surgical exploration and repair, in the management of PF. Conservative management consisted of the application of ice packs, compression bandages and penile splints; urethral catheterization; administration of analgesics, antibiotics, fibrinolytic agents and erection-inhibiting estrogens.[3] This was fraught with complications prominent among which was Peyronie's disease. Then came the pioneering work of Meares[36] and Gross et al,[37] in the seventies, which demonstrated fewer complications, and better cosmetic and functional outcomes- with early surgical repair. Thus, this modality was adopted and became popularized in the 1980s when several studies confirmed these findings. However, late presenters (presentation after 24 hours constitutes delayed presentation and thus delayed surgical repair) pose a slightly different patient cohort as some studies have recorded higher complications in them. Jack et al[3] noted long-term sequelae such as painful intercourse, erectile dysfunction, and priapism, in 6-25% of patients. Ansari et al[13] recorded a high incidence of erectile dysfunction in late presenters (18.2%) compared to early presenters (4.1%). Our series is in contrast to these but corroborates several contemporary studies showing no significant difference in outcome between these two groups[18-20,38-39]: 9 cases each, were recorded and erectile, sexual and urinary functions were satisfactory in the follow-up period.

Our data have demonstrated an association between abuse and severity of PF but require a superior level of evidence via prospective studies; these, however, are difficult to conduct with rare entities such as PF.

CONCLUSION

Nonsexual causes of PF predominate in our environment, with severe concomitant urethral injuries associated with taaqhandan, vigorous coitus and husband abuse reflecting abuse of the organ. Severe PF injuries should prompt enquiry into the 'abuse factor.' Post-fracture erectile and urinary functions were not negatively impacted by time to presentation. Sexual health education and enlightenment programs targeting vulnerable groups are desirable to stem the tide of abuse of the erect penis.

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