International Journal of Impotence Research (2017) 29, 207–209

www.nature.com/ijir

ORIGINAL ARTICLE

Relationship between sexual position and severity of penile fracture

R Barros[1,2], L Schulze[1,2], AA Ornellas[1,2], L Koifman[1,2] and LA Favorito[1,2]

The objective of the study was to evaluate the relationship between the sexual position and severity of penile fracture (PF). We studied 90 patients with PF. The mechanism of injury and the sexual position was assessed. We divided our sample by the etiology of the fracture in six groups: (a) masturbation or penile manipulation; (b) 'man-on-top' position; (c) 'doggy style' position; (d) 'woman-on-top' position; (d) blunt trauma; and (e) 'rolling over' fracture. We used the χ^2-test for contingency analysis of the populations under study ($P < 0.05$). The patient's age ranged from 18 to 66 years (mean 39 years). Investigation of the injury mechanism identified sexual trauma as the main etiological factor, involved in 69 cases (76.5%). The sexual position at the time of injury varied, with 23 cases (25.5%) occurring in the 'man-on-top', 37cases (41%) in the 'doggy style' and 9 cases (10%) in the 'woman-on-top'. We do not observe differences between the severity of the PF between the 'doggy style' and 'man-on-top' ($P = 0.9595$), but the 'doggy style' had more severity of PF when compared with 'woman-on-top' ($P = 0.0396$) and penile manipulation ($P = 0.0026$). The 'man-on-top' and 'doggy style' positions showed more associations with bilateral fractures of the corpus cavernosum and urethral lesions.

International Journal of Impotence Research (2017) **29,** 207–209; doi:10.1038/ijir.2017.24; published online 29 June 2017

INTRODUCTION

Penile fracture (PF) is a rare urologic emergency, defined as the rupture of the tunica albuginea of the corpus cavernosum (CC) caused by blunt trauma to the erect penis.[1,2] It can have either sexual or non-sexual etiology. Sexual intercourse and masturbation are the primary sexual causes, while non-sexual injury mechanisms can include rolling over in one's sleep (rolling in bed) during nocturnal penile tumescence, penile manipulation to tuck the penis into the clothes and 'thagaandan,'which is the forceful bending of the erect penis to achieve penile detumescence.[3]

PF has a rather typical clinical presentation. Patients report hearing a snap sound followed by pain, penile detumescence, and late apparition swelling, hematoma and penile deformity known as 'eggplant deformity'.[4] As the hematoma expands, deviation of the penile shaft occurs on the opposite side of the ruptured tunica albuginea. In the presence of associated urethral injury, happens in 1–38% of cases, findings as urethral bleeding, hematuria and difficulty voiding may be observed.[5,6]

As the clinical picture is rather characteristic, additional diagnostic testing is usually not needed. However, imaging tests such as magnetic resonance imaging and ultrasonography of the penis have shown a significant role in the evaluation of equivocal cases of PF.[7,8] To prevent late complications, immediate surgical treatment to correct the defect in the tunica albuginea.[1–5,9–11]

While there have been studies on the etiology and treatment of PF,[1,12,13] the relationship between the sexual position and PF severity has not been clearly addressed in the literature.[14,15] Therefore, this study was designed to assess the severity of injuries involving the CC or with urethral involvement.

We hypothesized that the sexual position had a direct impact on the severity of the PF, and tested this hypothesis by evaluating the clinical findings of 90 patients with PF. The study aimed to review our institutional experience with PF, through an evaluation of epidemiological data, clinical presentation, trauma mechanisms and operative findings in relation to the sexual position.

PATIENTS AND METHODS

The experimental protocol described below was approved by the ethical committee for human experimentation of our university, and the study was carried out in accordance with the ethical standards of the hospital's institutional committee on human experimentation.

We retrospectively assessed the data of 95 patients with a clinical diagnosis of PF who had been admitted to our facility between January 2006 and July 2016. Our institution employs 17 urologists and is the biggest urologic emergency department in Rio de Janeiro, a metropolitan area with more than six million inhabitants. A protocol form was completed upon admission of the patients, and their medical records were systematically reviewed to extract the epidemiological data, history and clinical presentation, etiology and operative findings. A primary diagnostic assessment was performed based on their clinical history and physical examination, with complementary imaging methods such as ultrasonography of the penis used only in doubtful cases. When urethral injury was suspected due to the presence of urethral bleeding, hematuria or difficulty voiding, a retrograde urethrography was performed.

The injury mechanism and the sexual position were assessed. We asked the patients about the etiological factor and their sexual position when the PF occurred. We divided our sample into six groups based on the etiology of the fracture: (a) masturbation or penile manipulation; (b) 'man-on-top' position; (c) 'doggy style' position; (d) 'woman-on-top' position; (d) blunt trauma; and (e) 'rolling over' fracture. Five patients refused to provide data on the mechanism of injury and were therefore excluded from the study.

All the patients underwent surgical treatment immediately after diagnosis. The standard technique used in our institution and performed by all staff is, as previously described,[4] circular subcoronal incision and degloving of the penis followed by debridement and synthesis of the

[1]Souza Aguiar Municipal Hospital, State University of Rio de Janeiro, Rio de Janeiro, Brazil and [2]Urogenital Research Unit, State University of Rio de Janeiro, Rio de Janeiro, Brazil. Correspondence: Professor LA Favorito, Hospital Municipal Souza Aguiar and Urogenital Research Unit, State University of Rio de Janeiro, Avenida 28 de Setembro 77 Fundos, 104/201—Tijuca, Rio de Janeiro 20271-320, Brazil.
E-mail: lufavorito@Yahoo.com.br
Received 11 February 2017; revised 24 March 2017; accepted 20 May 2017; published online 29 June 2017

Table 1. Relationship between the sexual position and the kind of penile lesion found during the surgical exploration.

Etiology/sexual position (N/%)	*Unilateral CC lesion*	*Bilateral CC lesion*	*Unilateral CC lesion and urethra*	*Bilateral CC lesion and urethra*
Penile manipulation (16/17.7%)	15	0	0	01
Blunt trauma (02/2.2%)	02	0	0	0
'Rolling over' (03/3.3%)	03	0	0	0
'Man-on-top' (23/25.5%)	15	02	01	05
'Woman-on-top' (09/10%)	08	0	0	01
'Doggy style' woman (34/37.7%)	23	06	01	04
'Doggy style' gay (03/3.3%)	01	01	0	01
Total (90/100%)	67 (74.4%)	09 (10%)	02 (2.2%)	12 (13.3%)

Abbreviation: CC, corpus cavernosum.

injury with simple interrupted sutures of 3-0 polyglactin. Urethral injuries are repaired with simple interrupted sutures of 5-0 polyglactin placed under a Foley catheter. Postectomy is routinely performed in all uncircumcised patients. Bilateral rupture of the CC, with or without associated urethral transection, was classified as severe.

For our contingency analysis of the population under study, we used the χ^2-test ($P < 0.05$) as calculated with the Graph Pad Prism software (La Jolla, CA, USA).

RESULTS

The patients' age ranged from 18 to 66 years (mean 39 years). Time elapsed between trauma and hospital admission ranged from 1 h to 10 days (mean 28 h).

In the clinical presentation were hematoma (100%), detumescence (82.3%), a snapping sound (80.1%), pain (65.1%), urethral bleeding (10.1%) and acute urinary retention (0.88%). All of the patients who presented urethral bleeding or acute urinary retention had experienced some degree of urethral injury. Although diagnosis was reached from the patient's clinical history and physical examination in the majority of cases, ultrasonography of the penis was performed in 16 (17.7%) doubtful cases, and 5 (5.5%) patients with suspected urethral injury underwent retrograde urethrography. Diagnostic confirmation was achieved in all cases. Investigation of the injury mechanism identified sexual trauma as the main etiological factor, involved in 69 cases (76.5%). Penile manipulation was responsible for 16 cases (17.7%), rolling over for 3 cases (3.3%) and blunt trauma for 2 cases (2.2%). The exact sexual position at the time of injury varied, with 23 cases (25.5%) occurring in the 'man-on-top' position, 37cases (41%) in the 'doggy style' position and 9 cases (10%) in the 'woman-on-top' position. Most of the patients ($n = 87$) identified as heterosexual, and all the patients for whom the etiology was sexual intercourse ($n = 66$) reported vaginal penetration when the trauma occurred. Regarding the sexual position reported by the patients, 'doggy style' was the most common, representing with 34 cases (51.5%), followed by 'man-on-top' in 23 cases (34.8%) and 'woman-on-top' in 9 cases (13.6%). Three patients identified as homosexual, and all three reported the 'doggy style' position.

The location of the PF was in the mid shaft in 76 cases (80%) and in penoscrotal junction in 19 cases (20%). Unilateral CC lesion was the most frequent injury observed in this study (67 cases—74.4%). Bilateral lesion of the CC occurred in 9 cases (10%), including 7 in the 'doggy style' position and 2 in the 'man-on-top' position. We observed bilateral lesion of the CC associated with urethral lesion in 12 cases (13.3%). Among these 12 cases, 5 occurred in the 'doggy style' position and 5 in the 'man-on-top' position. Unilateral lesion of the CC associated with urethral lesion only occurred in 2 cases (2.2%), including 1 in the 'doggy style' position and 1 in the 'man-on-top' position.

Complete rupture of the urethra was associated with bilateral injury of the CC in 100% of the cases. We did not observe differences between the severity of the PF in the 'doggy style' position and in the 'man-on-top' position ($P = 0.9595$), although the 'doggy style' position showed more severe PF than the 'woman-on-top' position ($P = 0.0396$) and penile manipulation ($P = 0.0026$). The 'man-on-top' position caused more severe PF than penile manipulation ($P = 0.0053$). However, it showed no difference with the 'woman-on-top' position ($P = 0.0560$). We did not observe differences in the severity of the PF between the 'woman-on-top' position and penile manipulation ($P = 0.6363$). Table 1 shows the relationship between the sexual position and the kind of PF lesion found in the surgical exploration.

DISCUSSION

While PF is an uncommon urologic emergency, its incidence may be underestimated, as some patients may be too embarrassed to seek medical attention from emergency rooms.[1,16] This fact coupled with the detail that we are a reference hospital in which we attend patients from different locations, which causes some patients to travel long distances, were the main factors responsible for the long time lapse observed in this study between the occurrence of the trauma and hospital admission, which ranged from 2 h to 3 weeks (mean: 12 h).

The literature has reported several causes of PF in different regions of the world. While the most common etiology in Western countries is sexual intercourse,[9,10] in Eastern countries, there is a higher incidence of cases associated with penile manipulation due to the practice of 'thagaandan,' in which the patient bends the distal portion of the penile shaft while holding the proximal part in place to achieve forced detumescence.[6,12] This may be attributed to a lack of scientific knowledge about the genital anatomy in that population. As many patients believe that the penis has a bone structure or cartilage, and that these are responsible for erections, they may try to manipulate their penises and make them snap-like fingers.[12] In an Iranian study carried out by Zargooshi,[13] PF was caused by 'thagaandan' in 76.4% of cases. Other causes such as masturbation, falling on an erect penis and rolling in bed have also been reported in previous studies.[16,17]

The incidence of urethral injury associated with PF was reported to be only 3% in the countries of the Persian Gulf, as compared with 20–38% in the United States and in Europe.[1] This discrepancy is likely explained by the fact that most cases of PF in the Persian Gulf are caused by penile manipulation. Moslemi[3] found only 2 (2.3%) cases of urethral injury associated with bilateral rupture of the CC among a total of 86 patients, while penile manipulation was the trauma mechanism in 56% of the cases. Zargooshi[6] described a similar incidence of urethral injury in Iran (that is, 3% of penile trauma cases). In our study, urethral injuries were observed in 14 (15.5%) cases, as the main etiology was sexual intercourse, which was involved in more than 75% of cases. Furthermore, bilateral CC injuries were found in 21 (23.3%) patients, and complete rupture of the urethra was associated with

bilateral CC injury in 100% of the cases. It seems that in countries such as Brazil and the United States, where sexual intercourse represents the main cause of PF, the incidence of urethral injury is higher, as intercourse is usually associated with high-energy traumas causing bilateral CC involvement.

This may occur during more vigorous sexual intercourse, when the penis hits the pubis or the perineum, or when the partner is on top. A retrospective study showed that the 'woman-on-top' position represented a major risk off PF, as the female partner usually controls the movements, and she may inadvertently land the entire weight of her body on the erect penis if it slips out of the vagina.[15] However, in the aforementioned study, as well as others, the authors did not find a correlation between the PF etiology and the penile findings from the surgical exploration.

By contrast, the sexual positions most often associated with PF in our study were the 'doggy style' (41%) and 'man-on-top' (25.5%) positions. The 'woman-on-top' position was the cause of PF in only 10% of cases. It is practically impossible to explain why these patients in our study were preferentially in these positions. Concerning the relationship between these positions and more serious injuries, we can speculate that when the man is in a dominant position and very excited, intercourse can become extremely vigorous, triggering greater impact at the time of trauma when the penis slips out of the vagina and hits against the perineum or pubic symphysis.

The study revealed that certain positions were more frequently associated with severe PF (bilateral rupture of the CC, with or without associated urethral transection). There were 23 cases (25.5%) of severe PF, and more than 50% of them involved the 'doggy style' position. The 'doggy style' position was most frequently associated with complex PF, second only to the 'man-on-top' position. In our sample, the 'woman-on-top' position showed a low incidence (only 10%), and no significant association with the severity of the PF.

In previous studies, sexual intercourse was the most important etiological factor associated with PF.[14] In his experience of 21 patients with PF, Nason *et al.*[11] reported that the 'woman-on-top' position was involved in 13 cases. However, the author did not consider the correlation with the types of penile lesions.[11] Among the 21 patients studied by Tijani *et al*.,[18] sexual intercourse was the etiological factor in 11 cases, with the 'woman-on-top' position involved in 8 of them. As in other papers, however, the authors did not show the correlation between the sexual position and the kind of PF. In a recent meta-analysis, the authors showed that the sexual position did not have an impact on the relative risk of PF.[16]

Therefore, the present study was the first to consider the association between the sexual position and the PF severity. We found that the 'doggy style' and the 'man-on-top' positions were more frequently associated with bilateral fractures of the CC and urethral lesions.

Therefore, when these positions are reported as causes of the trauma, complex injuries should be suspected.

The main limitations of our study lay in its retrospective nature and in the unequal distribution between the six groups studied.

CONCLUSION

In this study, sexual activity, particularly, sexual intercourse, was the most common cause of PF, with injuries most often caused by the 'man-on-top' and the 'doggy style' positions. These positions showed more associations with bilateral fractures of the CC and urethral lesions.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1 Muentener M, Suter S, Hauri D, Sulser T. Long-term experience with surgical and conservative treatment of penile fracture. *J Urol* 2004; **172**: 576–579.
2 Morey AF, Dugi DD III. Genital and lower urinary trauma. In: Kavoussi LR, Novick AC, Partin AW, Graig AP (eds). *Campbell-Walsh Urology*, 10th edn. WB Saunders: Philadelphia, PA, USA, 2012, pp 2507–2508.
3 Moslemi MK. Evaluation of epidemiology, concomitant urethral disruption and seasonal variation of penile fracture: a report of 86 cases. *Can Urol Assoc J* 2013; **7**: 9–10.
4 Koifman L, Cavalcanti AG, Manes CH, Filho DR, Favorito LA. Penile fracture-experience in 56 cases. *Int Braz J Urol* 2003; **29**: 35–39.
5 Fergany AF, Angermeier KW, Montague DK. Review of Cleveland Clinic experience with penile fracture. *Urology* 1999; **54**: 352–355.
6 Zargooshi J. Penile fracture in Kermanshah, Iran: report of 172 cases. *J Urol* 2000; **164**: 364–366.
7 Mydlo JH, Hayyeri M, Macchia RJ. Urethrography and cavernosography imaging in a small series of penile fractures: a comparison with surgical findings. *Urology* 1998; **51**: 616–619.
8 Murray KS, Gilbert M, Ricci LR, Khare N, Broghammer J. Penile fracture and magnetic resonance imaging. *Int Braz J Urol* 2012; **38**: 287–288.
9 Koifman L, Barros R, Júnior RAS, Cavalcanti AG, Favorito LA. Penile fracture: diagnosis, treatment and outcomes of 150 patients. *Urology* 2010; **76**: 1488–1492.
10 Hatzichistodoulou G, Dorstewitz A, Gschwend JE, Herkommer K, Zantl N. Surgical management of penile fracture and long-term outcome on erectile function and voiding. *J Sex Med* 2013; **10**: 1424–1430.
11 Nason GJ, McGuire BB, Liddy S, Looney A, Lennon GM, Mulvin DW *et al.* Sexual function outcomes following fracture of the penis. *Can Urol Assoc J.* 2013; **7**: 252–257.
12 Zargooshi J. Penile fracture in Kermanshah, Iran: the long-term results of surgical treatment. *BJU Int* 2002; **89**: 890–894.
13 Zargooshi J. Sexual function and tunica albuginea wound healing following penile fracture: an 18-year follow-up study of 352 patients from Kermanshah, Iran. *J Sex Med* 2009; **6**: 1141–1150.
14 Pavan N, Tezzot G, Liguori G, Napoli R, Umari P, Rizzo M *et al.* Penile fracture: retrospective analysis of our case history with long-term assessment of the erectile and sexological outcome. *Arch Ital Urol Androl* 2014; **86**: 359–370.
15 Reis LO, Cartapatti M, Marmiroli R, de Oliveira EJ Jr., Saade RD, Fregonesi A. Mechanisms predisposing penile fracture and long-term outcomes on erectile and voiding functions. *Adv Urol* 2014; **2014**: 768158.
16 Amer T, Wilson R, Chlosta P, AlBuheissi S, Qazi H, Fraser M *et al.* Penile Fracture: a meta-analysis. *Urol Int* 2016; **96**: 315–329.
17 Taha SA, Sharayah A, Kamal BA, Salem AA, Khwaja S. Fracture of the penis: surgical management. *Int Surg* 1988; **73**: 63–64.
18 Tijani KH, Ogo CN, Ojewola R, Akanmu NO. Increase in fracture of the penis in south-west Nigeria. *Arab J Urol* 2012; **10**: 440–444.