Alteration in the etiology of penile fracture in the Middle East and Central Asia regions in the last decade; a literature review

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Abstract

Penile fracture is a well-recognized, relatively uncommon medical condition and its etiology differs according to geographic area. In this review article, we evaluated literature reported in the past decade, aiming to verify whether there has been any change in the etiology of this condition. A literature review was done for studies published in the past 10 years and focusing on the etiology of penile fracture. Inclusion criteria comprised articles in English language, of sample size more than 10 patients and originating from the Middle East and Central Asia. Data relating to the studied population, etiology of penile fracture, clinical presentation, investigations, management, and outcome was analyzed. One thousand six hundred and twenty-nine patients from 21 original articles were included in the study. The mean age ± standard deviation of the patients was 33.3 ± 3.23 years. Etiologies of penile fracture were vigorous sexual intercourse, manual bending of erect penis, vigorous masturbation, rolling over in bed and blunt trauma in 41%, 29%, 10%, 14% and 6% patients, respectively. Treatment choices were surgery and conservative, in 1580 (95%), 83 (5%) patients, respectively. A higher incidence of complications was found in conservatively treated patients. As a conclusion, in the last 10 years, vigorous sexual intercourse was the commonest etiology of penile fracture in the Middle East and Central Asia regions. Surgery remains the preferred treatment option for patients diagnosed with penile fracture.

Key Words: Etiology, middle east, penile fracture

INTRODUCTION

Penile fracture is defined as the traumatic rupture of the corpus cavernosum, with or without the corpus spongiosum, secondary to blunt trauma of an erect penis. Penile fracture is nearly always reported with a sudden popping or cracking sound associated with an immediate detumescence, local pain and bluish discoloration of a deviated penis. Previous studies demonstrated that the typical history and physical examination of the genital area can be sufficient to make a diagnosis rendering imaging studies unnecessary. In some well-designed studies, advanced diagnostic tools such as ultrasonography (USG) and magnetic resonance imaging (MRI) were not performed at all.

Conservative treatment as advised by Albucasis, one millennium ago, was the mainstay of treatment until newer studies...
recommend early repair of the fractured corpus cavernosum because of superior functional and cosmetic results. The surgical repair of penile fracture was first described by Fetter and Gartmen in 1936. Early surgical intervention with closure of the tunica albuginea is currently the standard of care in European and American guidelines for penile fracture. Because of the scientific verification, penile fracture treatment has been shifted from a conservative approach to early surgical repair. Although the etiologies of penile fracture are almost always similar worldwide, the percentages differ depending on the geographic region.

Data from United States, reports a total of 1,043 hospital admissions with penile fracture in 1-year, and the condition was most frequently attributed to “vigorous sexual intercourse” (30–60%). On the other hand, studies from Middle East found self-inflicted injury to be the most common cause of penile fracture. This study investigates reported penile fracture etiologies from Middle East and Central Asia aiming to verify whether geographic differences exist. Additionally, preoperative evaluation, surgical management, and its association with long-term sexual functions were evaluated.

MATERIALS AND METHODS

A literature review was done using the search engines “PubMed” and “Cochrane Library” to identify articles published within the period 2003 and 2014. Two authors independently performed a search using the keywords “penile fracture” and “etiology.” Results were filtered for language (English), duration, and human subjects. A total of 182 articles were identified and were meticulously investigated for inclusion and exclusion criteria. Studies originating from Middle Eastern and Central Asian countries were chosen, and articles with a sample size of less than ten patients were excluded. Primary aim of this study was investigating the etiology of penile fracture; secondary aims were obtaining information on diagnostic tools and management modalities of penile fractures in retrieved articles.

RESULTS

A total of 21 articles met the inclusion criteria defined above. Four articles were excluded because of duplication of data. Six articles originated from Turkey, 6 from Egypt, 3 from Iran, 2 from India, one from Qatar, one from Tunisia, and one from Bangladesh. The total number of patients was 1663; their mean age ± standard deviation was 33.3 ± 3.23 years. Analysis of the etiologies of penile fracture revealed that vigorous sexual intercourse was reported in 41%, manual bending of erect penis in 29%, vigorous masturbation in 14%, blunt trauma in 6% and rolling over in bed in 10% [Figure 1]. In 1518 (91.3%) patients, the diagnosis of penile fracture was made by clinical presentation only; while radiological investigations were utilized in 145 (8.7%) patients. Penile USG was most commonly used (79.5%), followed by retrograde urethrogram (20%), cavernosography (5.6%) and MRI (2.8%). Penile fractures were treated surgically in 1580 (95%) and conservatively in 83 (5%) of patients. Injury to the urethra and dorsal vein was reported in 64 and 44 cases, respectively [Table 1]. Ninety percent of patients were followed; the mean period of follow-up was 33.8 months. A comparison of complications between surgically and conservatively treated patients is shown in Table 2.

DISCUSSION

The incidence of penile fracture is likely underreported in the medical literature. Although it is initially regarded as a relatively rare injury, the actual frequency is not as rare as has been claimed. The circumstances that accompany this injury may lead to embarrassment resulting in a delay or avoidance of seeking medical treatment. A review by one investigator identified more than 1600 cases in the world literature, with more than half of those cases originating from Mediterranean countries. The etiology of penile fracture has long been known to differ among various geographic areas. In the United States, the majority of cases result from sexual intercourse, usually from thrusting the erect penis against the symphysis pubis. On the contrary, reports from Mediterranean and Middle eastern countries indicate manual bending of the penis during erection as the major cause of penile fracture. This is attributed to cultural beliefs or to lack of sexual education in this region as evidenced by the widespread practice of “Taqaandan,” forceful application of pressure to hide the erect penis, in countries of the middle east. Until recently, this etiologic difference has been adopted by the medical literature. However, there has been a shift in etiology, in the same region, towards vigorous sexual intercourse that became the number one cause [Figure 1] of penile fracture in contrast to previous comments.

The change in penile fracture etiology could be attributed to the technological advancements of the century. Particularly in the
last decade, the number of Internet users and access to explicit web pages increased, this might have resulted in exposing the watchers to different new sexual positions and techniques. Some authors have described certain sexual positions that can predispose to penile fracture, such as the “female on top” position. This theory gained popularity possibly due to abnormal angulation of the erect penis when pushed against the female perineum.\(^{23}\) Although the above-mentioned scenario has a good physical reason, any type of ‘vigorous sexual intercourse’ can lead to penile fracture. To our knowledge, unfortunately, there is no detailed literature on intercourse positions at time of penile fracture. We believe that further studies are needed to determine which style (s) are considered risky.

As described earlier, recent studies provide convincing evidence that penile fracture diagnosis is primarily based on clinical presentation.\(^{11,17,24}\) In uncertainty, additional examinations such as USG or MRI can be used for diagnostic confirmation.\(^{25}\) In some studies, the authors’ diagnosis was mostly based on MRI.\(^{25}\) Abolyosr et al. evaluated 14 patients by emergency MRI using a surface coil. In their study, patients were placed in the supine position, the penes were fixed with tape against the abdominal wall to allow placement of the surface coil on top.\(^{25}\) Sagittal T2-weighted spin-echo images were used as a “scout” with subsequent axial and coronal T2-weighted fast-spin-echo images.\(^{25}\) They concluded that MRI was able to accurately detect the fracture location and provided useful information in planning surgery. Despite its technical accuracy, MRI may be impractical for the diagnosis of penile fracture in the emergency setting.\(^{26}\) The diagnosis of penile fracture was made by clinical presentation in 91.7% out of 1629 cases.

Surgical repair of penile fracture became favorable after several studies demonstrated that long-term complications were decreased to as low as 1% in surgically treated patients. In the last 10 years, conservative treatment has been abandoned because of associated complications, which include hematoma, abscess formation, severe penile angulation, arterial-venous fistulas, and most importantly ED.\(^{2,3,7}\) On long-term follow-up studies, most patients were able to maintain their erectile function without penile curvature or deformity after immediate surgery.\(^{7,8}\) Due to early recovery and short hospital stay after surgery, Penbegul et al. confirmed that patients treated surgically have no evidence of depression or anxiety following penile fracture.\(^{27}\) Complications such as erectile dysfunction,
Delayed surgical repair has been also described due to socioeconomic or personal reasons in different studies.\(^{[28,29]}\) Although most urologists do recommend an immediate surgical repair, in rare cases it was reported that some patients elect to delay surgery because of a personal reason usually related to the occurrence of the condition.\(^{[30]}\) In small centers with less experience, the authors sometimes intentionally delay surgery especially with a complex presentation coupled with diffused penile edema.\(^{[31]}\) Additionally, some authors believed that early repair could further increase the risk of operative complications particularly if the site of the tear could not be accurately localized.\(^{[32]}\) However, such assumption is mainly related to less experience surgical management of penile fracture. Scientific information regarding penile fracture surgery states that regardless of the type or site of incision, if proper dissection is carried down to the hematoma, the fractured area can be exposed allowing easy differentiation of the corpora and evaluation of nearby structures.\(^{[3,5,17,32]}\) In rare occasions, although the history and examination resembles penile fracture, the fractured area indeed cannot be located. In these cases, an artificial erection with normal saline or methylene blue is advisable. These cases may be due to rupture of superficial dorsal vein of the penis and soft tissue during sexual activity, leading to a clinical picture that is very similar to penile fracture.\(^{[3,13,17]}\) Although radiologic diagnostic tools help, the exact diagnosis of these conditions can be verified by surgical exploration. In 2.7% of patients, dorsal vein injury was the only abnormality found during surgical exploration.

Although penile fracture is defined as the rupture of corpus cavernosum, it may be associated with tears of the corpus spongiosum in 10–22%.\(^{[3]}\) Interestingly, the incidence of urethral injury is significantly higher in the United States and Europe (20%) than Eastern world countries and the Mediterranean region (3%).\(^{[2,5,17]}\) In recent years, Derouiche et al. demonstrated that preoperative radiographic investigations such as urethrogram were unnecessary for suspicious urethral involvement in penile fracture cases.\(^{[33]}\) Others advocate flexible cystoscopy in the operating room before inserting the Foley catheter.\(^{[34]}\) Moreover, according to a review article, retrograde urethrography may be skipped before surgical exploration, even in cases with suspected urethral injury.\(^{[24]}\) Surgical exploration can confirm and treat urethral injury as corpus spongiosum injury almost always occurs at the same level of the corpora cavernosal injury, false negative results will ordinarily be recognized during early surgical exploration, avoiding the later urethral stricture.

CONCLUSION

In summary, penile fracture is a condition diagnosed almost always through clinical findings, mainly the patients’ history and physical examination. This review demonstrated that “vigorous sexual intercourse” has the highest percentage in the etiology of penile fracture according to the literature published in the Middle East and Central Asia in the last decade. Guidelines and recently published literature strongly recommend immediate surgical treatment of penile fracture because of less morbidity and early return of sexual activity.

REFERENCES

1. Garaffa G, Raheem AA, Ralph DJ. Penile fracture and penile reconstruction. Curr Urol Rep 2011;12:427-31.
2. Yapanoglu T, Aksoy Y, Adanur S, Kabadabay O, Ozturk G, Oz bey I. Seventeen years’ experience of penile fracture: Conservative vs. surgical treatment. J Sex Med 2009;6:2058-63.
3. Lynch TH, Martinez-Piñeiro L, Plas E, Serafetinides E, Türkeri L, Santucci RA, et al. EAU guidelines on urological trauma. Eur Urol 2005;47:1-15.
4. Morey AF, Dugi DD. Genital and lower urinary tract trauma. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. Campbell-Walsh Urology. Philadelphia: Saunders; 2011. p. 2507.
5. 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;6:1141-50.
6. Al-Zahrawi AK. On fracture of the female pudenda and of the pubic bone and of the male organ. In: Martin S, Spink GL, editors. Albucasis on Surgery and Instruments. 1st ed. Berkeley: University of California Press; 1973. p. 770.
7. Ibrahim el-HI, el-Tholoth HS, Mohsen T, Hekal IA, el-Asmy A. Penile fracture: Long-term outcome of immediate surgical intervention. Urology 2010;75:108-11.
8. Gamal WM, Osman MM, Hammady A, Aldahshouy MZ, Hussein MM, Saleem M. Penile fracture: Long-term results of surgical and conservative management. J Trauma 2011;71:491-3.
9. El-Asmy A, El-Tholoth HS, Abou-El-Gharr ME, Mohsen T, Ibrahim EH. Risk factors of erectile dysfunction and penile vascular changes after surgical repair of penile fracture. Int J Impot Res 2012;24:20-5.
10. Fetter TR, Gartner E. Traumatic rupture of penis. Case report. Am J Surg 1938;32:371-2.
11. Al-Shaiji TF, Amann J, Brock GB. Fractured penis: Diagnosis and management. J Sex Med 2009;6:3231-40.
12. Ralph D, Gonzalez-Cadavid N, Mirone V, Perovic S, Sohn M, Usta M, et al. Trauma, gender reassignment, and penile augmentation. J Sex Med 2010;7:1657-67.
13. Koliman L, Barros R, Júnior RA, Cavalcanti AG, Favorito LA. Penile fracture: Diagnosis, treatment and outcomes of 150 patients. Urology 2010;76:1488-92.
14. Aickgoz A, Gokce E, Asci R, Buyukalpelli R, Yilmaz AF, Sarikaya S. Relationship between penile fracture and Peyronie’s disease: A prospective study. Int J Impot Res 2011;23:165-72.
15. Aaronson DS, Shindel AW. U.S. national statistics on penile fracture. J Sex Med 2010;7:3226.
16. Haas CA, Brown SL, Spirnak JP. Penile fracture and testicular rupture. World J Urol 1999;17:101-6.
17. Al-Ansari A, Talib RA, Shamsoodini A, Hayati A, Canguven O, Al Naimi A. Which is guilty in self-induced penile fractures: Marital status, culture or geographic region? A case series and literature review. Int J Impot Res 2013;25:221-3.
18. Bhuiyan ZH, Khan SA, Towhid MH, Islam MF. Personal series with clinical review of fracture penis. Mymensingh Med J 2007;16:187-90.
19. Aleayah A, Mostafa T, Nasser TA, Shaeeer O, Hadi AA, Al-Gabbar MA. Penile curvature, palpable nodules and painful erection and/or intercourse have been shown to be significantly higher in patients managed conservatively [Table 2].
fracture: Surgical repair and late effects on erectile function. J Sex Med 2008;5:1496-502.
20. Cendron M, Whitmore KE, Carpinelli V, Kurzweil SJ, Hanno PM, Snyder HM, et al. Traumatic rupture of the corpus cavernosum: Evaluation and management. J Urol 1990;144:987-91.
21. Eke N. Fracture of the penis. Br J Surg 2002;89:555-65.
22. Zargooshi J. Penile fracture in Kermanshah, Iran: The long-term results of surgical treatment. BJU Int 2002;89:890-4.
23. Mohaputra TP, Kumar S. Reverse coitus: Mechanism of urethral injury in male partner. J Urol 1990;144:1467-8.
24. Agarwal MM, Singh SK, Sharma DK, Ranjan P, Kumar S, Chandramohan V, et al. Fracture of the penis: A radiological or clinical diagnosis? A case series and literature review. Can J Urol 2009;16:4568-75.
25. Abolyosr A, Moneim AE, Abdelatif AM, Abdalla MA, Imam HM. The management of penile fracture based on clinical and magnetic resonance imaging findings. BJU Int 2005;96:373-7.
26. Maurice MJ, Spirnak JP. The impracticality of MRI for the diagnosis of atypical penile fracture in the emergency setting. Emerg Med J 2014;31:421-2.
27. Penbegul N, Bez Y, Alat M, Bozkurt Y, Sancaktutar AA, Soylemez H, et al. No evidence of depression, anxiety, and sexual dysfunction following penile fracture. Int J Impot Res 2012;24:26-30.
28. Nasser TA, Mostafa T. Delayed surgical repair of penile fracture under local anesthesia. J Sex Med 2008;5:2464-9.
29. el-Assmy A, el-Tholoth HS, Moshen T, Ibrahim el-HI. Does timing of presentation of penile fracture affect outcome of surgical intervention? Urology 2011;77:1388-91.
30. Cummings JM, Parra RO, Boullier JA. Delayed repair of penile fracture. J Trauma 1998;45:153-4.
31. Naraynsingh V, Ramdass MJ, Thomas D, Maharaj D. Delayed repair of a fractured penis: A new technique. Int J Clin Pract 2003;57:428-9.
32. Hatzichristodoulou G, Dorostewitz A, Gschwend JE, Herkommer K, Zanti N. Surgical management of penile fracture and long-term outcome on erectile function and voiding. J Sex Med 2013;10:1424-30.
33. Derouiche A, Belhaj K, Hentati H, Hafisia G, Slama MR, Chebil M. Management of penile fractures complicated by urethral rupture. Int J Impot Res 2009;20:111-4.
34. Kamdari C, Mooppan UM, Kim H, Gulmi FA. Penile fracture: Preoperative evaluation and surgical technique for optimal patient outcome. BJU Int 2008;102:1640-4.
35. Ghilan AM, Al-Asbah WA, Ghafoor MA, Alwan MA, Al-Khanbashi OM. Management of penile fractures. Saudi Med J 2008:29:1443-7.
36. Kozacioglu Z, Degirmenci T, Arslan M, Yuksel MB, Gunlucsoy B, Minareci S. Long-term significance of the number of hours until surgical repair of penile fractures. Urol Int 2011;87:75-9.
37. Gedik A, Kayan D, Yamis S, Yilmaz Y, Bircan K. The diagnosis and treatment of penile fracture: Our 19-year experience. Urol Trauma Acil Cerrahi Derg 2011;17:57-60.
38. El Atat R, Sfaxi M, Benslama MR, Amine D, Ayed M, Mouelli SB, et al. Fracture of the penis: Management and long-term results of surgical treatment. Experience in 300 cases. J Trauma 2008;64:121-5.
39. 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:E572-5.
40. Wani I. Management of penile fracture. Oman Med J 2008;23:162-5.
41. Özoğuz A, Hoşcan MB, Oksay T, Güzel A, Kosar A. Management and outcomes of penile fracture: 10 years’ experience from a tertiary care center. Int Urol Nephrol 2014;46:519-22.
42. Raheem AA, El-Tatatwy H, Eissa A, Elbahnasy AH, Elbendary M. Urinary and sexual functions after surgical treatment of penile fracture concomitant with complete urethral disruption. Arch Ital Urol Androl 2014;86:15-9.
43. El-Taher AM, Aboul-Ella HA, Sayed MA, Gaafar AA. Management of penile fracture. J Trauma 2004;56:1138-4.