

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 \pm 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

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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.^[1] 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.^[2,3] 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.^[4] In some well-designed studies, advanced diagnostic tools such as ultrasonography (USG) and magnetic resonance imaging (MRI) were not performed at all.^[2,5]

Conservative treatment as advised by Albucasis, one millennium ago, was the mainstay of treatment^[6] until newer studies

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recommend early repair of the fractured corpus cavernosum because of superior functional and cosmetic results.^[7-9] The surgical repair of penile fracture was first described by Fetter and Gartmen in 1936.^[10] Early surgical intervention with closure of the tunica albuginea is currently the standard of care in European and American guidelines for penile fracture.^[3] Because of the scientific verification, penile fracture treatment has been shifted from a conservative approach to early surgical repair.^[11,12] Although the etiologies of penile fracture are almost always similar worldwide, the percentages differ depending on the geographic region.^[5,11,13,14] Data from United States, reports a total of 1,043 hospital admissions with penile fracture in 1-year;^[15] and the condition was most frequently attributed to “vigorous sexual intercourse” (30–60%).^[11,16] On the other hand, studies from Middle East found self-inflicted injury to be the most common cause of penile fracture.^[2,17-19] 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 \pm 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 I]. In 1518 (91.3%) patients, the diagnosis of penile fracture was made by clinical presentation only; while radiological investigations were utilized

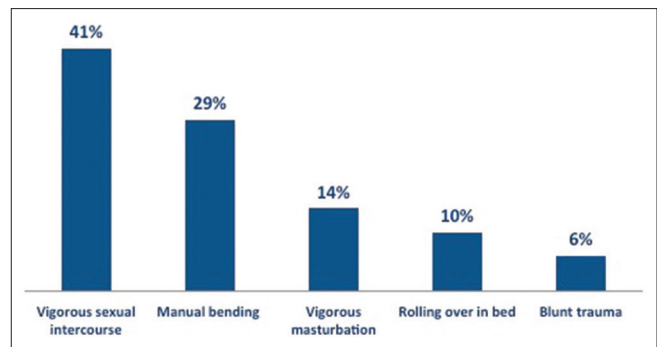


Figure 1: Reported aetiologies of penile fracture ($n = 1663$)

in 145 (8.7%) patients. Penile USG was most commonly used (79.5%), followed by retrograde urethrography (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 I]. 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.^[20] 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.^[21] 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.^[22] 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.^[5] Until recently, this etiologic difference has been adopted by the medical literature.^[11] However, there has been a shift in etiology, in the same region, towards vigorous sexual intercourse that became the number one cause [Figure I] of penile fracture in contrast to previous comments.^[11]

The change in penile fracture etiology could be attributed to the technological advancements of the century. Particularly in the

Table 1: Details of surgically managed cases

	Surgery (no)	Location of injury, %				Other injuries, %			Mean size of tear (cm) NR
		Unilateral	Bilateral	Right	Left	Urethra	DV	CS	
Yapanoglu <i>et al.</i> ^[2]	42	88	12	57.1	30.9	-	9.5	-	1.8
Zargooshi <i>et al.</i> ^[5]	362	99.2	0.8	65	35	-	2.7	-	1-3
Gamal <i>et al.</i> ^[6]	56	89.3	10.7	NR	NR	5.3	-	-	0.5-1 (35.7) 1-2 (60.4) 2-4 (3.9)
Acikgoz <i>et al.</i> ^[14]	56	94.6	5.3	58.9	37.5	7.1	1.7	-	NR
Al Ansari <i>et al.</i> ^[17]	114	80.2	12.3	57.9	22.8	4.3	6.1	0.8	NR
Bhuiyan <i>et al.</i> ^[18]	23	NR	NR	NR	NR	30.4	-	-	2
Ateyah <i>et al.</i> ^[19]	33	NR	NR	20	NR	-	9	-	1.8
Agarwal <i>et al.</i> ^[24]	15	NR	NR	NR	NR	26.6	-	-	NR
Penbegul <i>et al.</i> ^[27]	32	30	0	16	14	-	6.2	-	2
El-Assmy <i>et al.</i> ^[29]	180	88.3	2.7	56	32	10	8.8	-	NR
Derouiche <i>et al.</i> ^[33]	10	100	0	60	40	100	-	-	2.4
Ghilan <i>et al.</i> ^[35]	24	22	2	NR	NR	8.3	-	-	1.5
Kozacioglu <i>et al.</i> ^[36]	56	98.2	0	NR	NR	-	1.8	-	2.3
Gedik <i>et al.</i> ^[37]	101	96.1	3.9	41.6	54.5	1.9	-	-	<1 (13.1) 1-2 (65.4) 2-4 (15.9) >4 (5.6)
El Atat <i>et al.</i> ^[38]	300	99.6	0.4	60	39.6	1.6	-	-	1.9
Moslemi <i>et al.</i> ^[39]	82	93	2.3	55.8	37	2.4	4.8	-	0.4-3
Wani <i>et al.</i> ^[40]	52	100	0	33	54	-	-	-	NR
Ozorak <i>et al.</i> ^[41]	21	NR	NR	NR	NR	NR	NR	NR	NR
Raheem <i>et al.</i> ^[42]	12	NR	NR	NR	NR	100	-	-	NR
El-Taher <i>et al.</i> ^[43]	9	89.9	11.1	NR	NR	-	-	-	2.05
Total	1580	84.5	4.2	48.4	36.1	24.1	5.62	0.8	

DV: Dorsal Vein, CS: Corpus spongiosum, NR: Not reported

Table 2: Comparison of outcome of reported penile fracture cases

	Surgical (n=1498) (n, %)	Conservative (n=57) (n, %)	P
Erectile dysfunction	27 (1.8)	20 (35)	0.001
Penile deviation	41 (2.7)	15 (26)	
Nodules	374 (24.9)	2 (3.5)	
Painfull erection/intercourse	19 (1.2)	1 (1.7)	

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,

penile curvature, palpable nodules and painful erection and/or intercourse have been shown to be significantly higher in patients managed conservatively [Table 2].

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.^[31] 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.^[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%).^[2,5,15] 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.

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