TRENDS IN THE INCIDENCE, CLINICAL PRESENTATION, AND MANAGEMENT OF TRAUMATIC RUPTURE OF THE CORPUS CAVERNOSUM

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Background: Recent observations in our hospital of apparent increase in frequency prompted a revisit to the subject of fracture of penis.

Materials and Methods: In a retrospective review, patients' age, marital status, and causal activities; clinical presentations; methods of management; operative findings; and postoperative complications were analyzed for changing trends. Literature was also reviewed briefly.

Results: Nineteen episodes of penile fracture in 18 patients exceed the previous incidence by more than 58%. Most were due to noncoital causes (73.7%); more unmarried people (31.6%) were affected. Most presented with the classic symptoms/signs, and tears were repaired by degloving through subcoronal incisions; one was treated conservatively. The higher morbidity observed was attributed to higher rates of hematoma and wound infections, probably enhanced by poor hemostasis and early persistent, postoperative erections. Painful erections, painful coitus, and deformities, however subsided within weeks, with no long-term ill effects.

Conclusion: The incidence of penile fracture, postoperative hematoma, and infections has increased; about 32% of the patients were unmarried. The prominence of masturbation as a cause of penile fracture and increased ratio of noncoital to coital causes are highlighted. Degloving through subcoronal incisions remains an acceptable method of approach for repair in line with cultural practices in Saudi Arabia. (*J Natl Med Assoc.* 2004;96:229–233.)

Key words: trends ♦ rupture ♦ corpus cavernosum ♦ fracture ♦ penis

INTRODUCTION

Most reports about traumatic rupture of corpus cavernosum, otherwise known as penile fracture, usually lay emphasis on its rarity or uncommon occurrence[1-5]. This may be due to the sporadic nature of the reports in the world literature. While the uncommon occurrence may be true for most individual centers which only see a few cases per year, it does not necessarily reflect the true situation in the world. A Medline search of the literature reveals that there has been a steady increase in the number of reported cases in world literature from approximately 30 cases in 1975 to 100 in 1988 and 200 cases in 1996. The Japanese medical literature also revealed rising interest in the subject, with observations that between 1930 and 2002, a total of 231–240 cases of penile fractures were reported in two review publications[6]. In another study recently, a Medline search revealed that between 1935 and 2001, there were 183 publications on the subject worldwide, involving 1,331 cases of penile fracture[7]. These reports show a rising trend which may be an indication of greater interest in reporting or else reflect actual

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Table 1. Patient Characteristics/ Clinical Presentations

Patient Characteristics	Present Study Number of Patients (%) (N=19)	El Malik et al. (1997)[4] Number of Patients (%) (N=12)
Marital Status		
Married	11 (57.9)	9 (75)
Married unaccompanied	1 (5.3)	1 (8.3)
Unmarried	6 (31.6)	2 (16.7)
No information	1 (5.3)	—
Causative Activity		
Sexual intercourse	4 (21.1)	7 (58.3)
Masturbation	8 (42.1)	—
Fall/roll-over	5 (26.3)	—
Undetermined	2 (10.5%)	5 (41.7)
Clinical Presentation		
Cracking sound, local pain, swelling and deformity	15 (78.9)	12 (100)
Cracking sound, local pain, swelling, and detumescence	4 (21.1)	7 (58.3)
Palpable Defect	4 (21.1)	12 (100)
Ecchymosis	19 (100)	—

increase in incidence of this problem.

While most centers have reported relatively few cases, a few have, however, reported relatively large numbers in their series[8-11]. Among these, Zargooshi stands out with a very large series involving 172 cases of penile fracture from a center in Iran[11].

Although most of the reports on fractured penis are said to come from the Mediterranean region[7], publications on the subject have a worldwide distribution. A previous report from the Assir Central Hospital revealed that there were 12 incidents of penile fracture involving 11 patients in an eight-year review of emergencies in the department of urology[4].

Recent impressions suggest an increasing number of fresh cases of this trauma presenting in our department. This observation is the basis for a revisit to the subject in an effort to try and detect any new trends in incidence, clinical presentation, and management of this condition, and to examine the possible factors responsible for such changes.

PATIENTS AND METHODS

Records of the department's emergency admissions, including the operating room registers and the medical charts of the patients, were scrutinized over the period April 1995 to October 2002. The eight-year period to March 1995 was covered by the previous publication[4]. All clinical records pertaining to patients admitted with the diagnosis of penile fracture were scrutinized with regard to age, nationality and marital status. Details of the predisposing activities, modes of presentation, and physical findings were also extracted from the patients' records. These included details of relevant investigations and their results, management methods, operative findings, duration of hospital stay and postoperative complications. For purposes of discussion, complications encountered within the immediate postoperative period up to one week from surgery were regarded as early complications. Those occurring after one week but less than six weeks were regarded as medium-term; complications occurring after six weeks of surgery were regarded as long-term complications.

The diagnosis of penile fracture/rupture of the corpus cavernosum was made mostly on clinical grounds involving the history of trauma associated with pain during sexual activity or phallic manipulation, and clinical findings of hematoma, ecchymosis, and phallic deformity. Radiological investigations, such as cavernosography, were performed

Table 2. Penile Fracture: Operative Findings

	Number of Patients in This Study (%)	Number of Patients El Malik et al. (1997)[4] (%)
Tunical Tear		
Right side	11 (57.9)	9 (75)
Left side	7 (36.8)	3 (25)
Undetermined	1 (5.3)	—
Position of Tear		
Proximal tear	11 (57.9)	9 (75)
Mid-shaft tear	5 (26.3)	2 (16.7)
Distal tear	2 (10.5)	1 (8.3)
Undetermined	1 (5.3)	—

only when the diagnosis was not so obvious. Ultrasonography, although advocated by some, was not usually done in our center. Coagulation profile was performed in all cases to rule out other causes of bleeding and/or any coagulopathy. The time between the traumatic experience and presentation at the emergency room was documented for each case, including the surgical approach and technique.

Complications following the repair were noted during the follow-up period, which was limited in most patients to a maximum of three months. Patients were followed up and evaluated in the outpatient clinic one week after discharge from hospital. Further evaluations were carried out at one-month intervals for three months. No patient reported after three months.

The findings in the present study were compared with findings in a previous study from our department, covering similar grounds[4]. Our results were analyzed and their reliability tested with the SPSS 9.0 statistics program for Windows; EpiCalc 2000, version 1.02, was used to compare the means and proportions.

RESULTS

There were 20 incidents of suspected penile fracture during the seven-and-a-half years of the study (April 1995 to October 2002), involving 18 patients, all of whose records were traced and documented. One patient reporting with hematuria was excluded from further analysis because rupture of the corpus was not confirmed after appropriate investigations. He was found to have urethral contusion inflicted during self-instrumentation for sexual satisfaction. The remaining 19 incidents of penile fracture represented an increase of more than 58% over the previous eight-year period ($p=0.002$). In two of these, trauma occurred twice, three and four years respectively, after the previous event. Each occurrence was counted as an episode of fracture and recorded as an entity.

The patients' ages ranged 20–56 years, with a mean age of 35.6±12.6 years. This did not represent a significant change from the previous study. More than 63% of the patients were under 40 years of age. Sexual intercourse, masturbation, and falls/ roll-over injuries were identified as the cause of trauma among our patients (Table 1). Only four of the 19 injuries occurred during coitus (21.1%). This differs significantly from previous findings, where more than 58% of injuries were related to intercourse[4] ($p<0.05$) (CI=95%). Twelve of the 19 injuries (63.2%) were of noncoital etiology, with eight (42.1%) attributed to masturbation. Masturbation as a cause of penile fracture has therefore gained in prominence over the last report from this center[4]. Five injuries were due to fall/roll-over injuries to the erect penises (26.3%). The causal activity in two patients could not be determined beyond doubt. One of these denied knowledge of the causative activity; the other, a sexual pervert in prison, merely claimed to have had some "manipulation".

Seventeen of the 19 patients (89.5%) were Saudi nationals, while the remaining two (11.8%) were of Sudanese nationality. The previous study did not consider patients' nationalities[4]. Twelve of the 19 patients were married at the time of trauma (63.2%), one of them a migrant worker living away from his wife; the six unmarried men (31.6%) were all students of Saudi nationality. The marital status

Table 3. Penile Fracture: Duration of Stay and Complications

Duration of Stay 2–14 Days (Mean: 4.4)	
Complications	**Frequency (%) (N=19)**
Early (<14 days)	
Hematoma/penile edema	6 (31.6)
Infection (E. coli)	4 (21.1)
Medium-Term (>14 days to six weeks)	
No complication	6 (31.6)
Painful coitus	3 (15.8)
Deformity/mild deviation	2 (10.5)
Deformity with painful coitus	2 (10.5)
Short follow-up (No complaints)	5 (26.3)

was not stated in one patient (5.3%) (Table1). The differences in marital status between the two studies are not statistically significant (p=0.2).

At presentation, all 19 patients reported to have experienced cracking sound with pain, hematoma, swelling, ecchymosis, and penile deformity, but only four of these (23.5%) had palpable defects on examination (Table 1). The interval between injury and presentation at the hospital varied from 30 minutes to 14 days, with a mean of 1.4 days. Two outliers in this subset of patients presented after one and two weeks, respectively. The former was treated surgically, while the latter was managed conservatively with supportive antibiotic and anti-inflammatory therapy. The short period of follow-up precluded further comments regarding long-term complications. All other patients were treated surgically by degloving through subcoronal incisions.

Sixteen of the 18 patients so treated had proximal and midshaft tears (Table 2). The duration of hospital stay ranged from two to 14 days with a mean of 4.4±2.4 days.

One questionable urethral injury was not confirmed by cavernosogram, urethrogram, or urethroscopy. Follow-up ranged between one week and three months, with 13 patients (68.4%) followed up for four weeks to three months.

The complications encountered in this series are listed in Table 3. Thirteen patients experienced short periods of mild complications which subsided within two months (Table 3). A few experienced painful coitus in the first two weeks. This did not interfere with intercourse in the medium- and long term. In fact some of the patients resumed intercourse in as little as two weeks following repair. In five patients (26.3%), the follow-up period was limited to less than four weeks due to patient default. Impotence was not reported as a complication in the series. Two patients had recurrent fractures three and four years, respectively, from their first injuries.

The study recorded four patients (21.1%) with E. coli wound infections despite adequate preoperative and postoperative antibiotic cover, usually with cefoxitin. Six patients (31.6%) had residual hematoma or persistent penile edema following repair (Table 3).

DISCUSSION

Although penile fracture is commonly reported as rare, reports from various regions of the world indicate that it is gaining in prominence in recent times.[7,9,10,17,18] In this report, 19 incidents of penile fracture were identified, compared to 12 in a previous study from this department[4]. This represents an increase of more than 58% over the previous eight-year period, a highly significant observation (p=0.002). In addition, there is a two-fold increase in the number of unmarried persons with this trauma in this series (Table 1).

The proportion of noncoital to coital injuries is high, particularly among unmarried students. Casual observations indicate that young heterosexual men seem to be getting married later in life than was previously the case, probably for economic reasons, thus increasing the period of abstinence. This probably explains in part the prominence of masturbation as a causal activity in this study. Extramarital affairs are prohibited by law in Saudi Arabia. Although total compliance with the law cannot be guaranteed in any society, there is no recorded evidence that this has played a role in the etiology of this condition. In this polygamous society with overwhelming male dominance, concealment of their married status for fear of disclosure to their wives appears highly improbable. However, El-Sherif et al. had also reported a high incidence of noncoital injuries in their series among Qatari patients[12].

There was no case with urethral injury in this study. El-Sherif et al. also had a low incidence of urethral injuries and attributed it to high incidence of noncoital injuries[12], although other reports have not linked this to any causal activity[13]. There is as yet no plausible explanation as to why urethral injury should preferentially occur in association with coital penile fracture than with noncoital activities.

Only two patients in this series had cavernosography to clear doubtful clinical diagnosis, one of which

confirmed a tunical tear. Our department uses a standard approach of degloving through subcoronal incisions for the repair of the tunical tears[4]. Few centers have advocated a direct incision over the hematoma, claiming that this approach is less traumatic and less prone to complications, such as skin necrosis and wound infections[3], which have been recorded in up to 66% of patients treated by degloving in one series[14] but not in this series or that of El Malik et al.[4]

Technical factors, such as poor hemostasis, rather than the surgical approach may have played a role in the high rates of postoperative hematoma, residual penile edema, and infection observed (Table 3), since more senior residents now perform this procedure than in the previous series. This calls for improvement in surgical technique rather than a change of surgical approach, as suggested by Naraynsingh et al.,[14] to bring about the desired improvement. The reasons previously advanced for the preference of the subcoronal incision in this environment, however, remain valid[4]. The high incidence of early postoperative erections may also have contributed to the apparently high incidence of hematoma. Response to systemic diazepam was generally poor.

The apparent high rate of late presentations to the hospital is attributable to two outliers who presented after seven and 14 days, respectively. Only 13 of the 19 patients were followed up for periods up to three months, the duration of which was considered adequate for reasonable conclusions to be drawn. The only patient in this series who inevitably had conservative treatment had not been followed up for long enough to warrant further comments. Six of 13 patients (46.2%) had no complications. Complications in the remaining seven patients (53.8%) whose follow-up was considered adequate included penile deformity, painful erections/coitus, or both; but these were mild and temporary in nature.

Nonoperative treatment of penile fracture results in 10–20% incidence of penile deformities.[15,16] Other long-term complications, such as arteriovenous fistula, have also been reported[17] but not encountered in our series. Though surgical repair is generally preferred, nonsurgical management does not invariably result in complications[17]. It has, however, been reported that normal erectile functions can be maintained after conservative treatment of penile fracture[17].

CONCLUSION

In conclusion, the incidence of penile fracture in this hospital has increased significantly by more than 58% over the previous eight years. The reason for this is not immediately obvious but may be related to the high incidence of masturbation among unmarried men. The number of unmarried men with this trauma has also increased. The higher morbidity observed was attributed to higher rates of hematoma and wound infections, probably enhanced by poor hemostasis and early persistent, postoperative erections, unresponsive to diazepam. The greater numbers of senior residents performing the operations recently is probably a factor in the higher numbers of complications observed.

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