İstanbul Med J 2018; 19: 14-7
DOI: 10.5152/imj.2018.19981

Original Investigation

Diagnosis and Treatment of Penile Fracture: Analysis of Clinical Characteristics of 45 Cases

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Abstract

Introduction: We investigated the clinical characteristics of patients who underwent penile fracture surgery.

Methods: Between December 2005 and February 2015, a total of 45 patients underwent surgery for repair of penile fracture at our institution. The age and body mass index (BMI) of these patients were recorded along with their medical history and physical examination findings. Moreover, the duration of the operation was noted, and the preoperative International Index of Erectile Function-Erectile Function (IIEF-EF) scores were compared with postoperative scores.

Results: Average age of patients was 41.25±11.78 (20-65) years, and average BMI was 26.36±3.17 (23.67-29.72) kg/m^2. Of the patients, 18 (40%), 16 (35.5%), 5 (11.1%), 3 (6.7%), and 3 (6.7%) cases had the fracture during sexual intercourse, during sleep, with sudden penile maneuvers, during masturbation, and with trauma, respectively. Mean operation time was 38.32±19.74 (20-90) min, and mean hospital stay was 1.28±0.61 (1-3) days. Most of the cases (26/45) were performed under spinal anesthesia. There was only one patient with urethral injury. Mean preoperative IIEF-EF score was 26.12±3.21 (19-30), and mean IIEF-EF score at postoperative 3rd month was 23.37±3.87 (10-27). We found significant differences between preoperative and postoperative scores (p=0.011). Postoperative penile curvature was observed in 2 (4.4%) cases, and painful erection was seen in 2 (4.4%) cases.

Conclusion: Penile fracture requires urgent intervention in the urological practice. The majority of the cases occur during sexual intercourse. Although the management of penile fracture is not complicated, postoperative erectile problems are not rare.

Keywords: Penis, fracture, surgical treatment, erectile dysfunction

Introduction

The penile fracture develops in the corpus cavernosum and/or spongiosum as a result of a blunt trauma or bending that erect penis is subjected to. It is characterized by the accumulation of blood in the corpus cavernosum under the Buck's fascia after the rupture of the tunica albuginea surrounding the corpus cavernosum that provides erection. If the Buck's fascia is also torn, hematoma may spread to the scrotum and perineum through the Colles fascia, and a characteristic butterfly-like appearance may emerge (1). Deep and superficial venous rupture rarely accompanies penile fracture. Penile fracture, which occurs most often during sexual intercourse, may also be due to sudden position changes during masturbation or nocturnal erection (2). Apart from these, falling from the bed during nocturnal erection, striking of an object to the erect penis, and trying to put on pants while the penis is erected are among the other causes reported by the patients (3, 4). An increased pressure in the corpus cavernosum resulting from sudden twisting or squeezing of the penis causes a rupture in tunica albuginea. While rupture is usually seen in single corpus cavernosum, as the severity of trauma increases, ruptures may occur in both corpus cavernosum and/or spongiosum and may affect the urethra (5-7). In 10%-33% of cases, partial or complete corpus spongiosum rupture may be accompanied by urethral trauma, and macroscopic hematuria, voiding difficulties, extravasation of urine, and urethral stricture are seen in these patients in later periods (7-10). The positive predictive value of microscopic hematuria is as low as 50% for urethral injury (11).

Typical presentation of the penile fractures is the fracture sound heard by the patients, sudden onset of severe pain, rapid detumescence, swelling on the fracture side due to hematoma, and deviation toward the side of the fracture line due to ecchymosis (12, 13). An anamnesis and physical examination may be sufficient for diagnosis, but if definite diagnosis cannot be made, ultrasonography, magnetic resonance imaging, or cavernosography may also be performed (4, 14, 15). Retrograde urethrography should also be performed in cases with suspected urethral trauma. In physical examination, swelling and ecchymatic appearance in the penis are typical because the blood in the corpus cavernosum drains under the Buck's fascia as a result of the rupture of tunica albuginea. Currently, although the treatment of penile fractures is surgical repair of tunica albuginea, which should be applied in the early period, there is conservative treatment options described in the literature as well (16, 17).

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This study was presented in 18th Congress of the European Society for Sexual Medicine (February 04-06, 2016, Madrid, Spain).

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Received: 10.06.2016
Accepted: 28.09.2017

Our aim in this study is to retrospectively present the data of the patients who were evaluated for penile fracture and underwent surgical repair in our clinic.

Methods

Between December 2005 and February 2015, the data of 45 patients who underwent surgery due to the diagnosis of penile fracture in our clinics were evaluated retrospectively. The approval for the retrospective study was received from the ethics committee of our hospital. After the patients were admitted to the emergency services, their anamneses were taken, and their physical examinations were performed in detail in the urology clinic. Fracture etiologies were questioned. The spread and location of hematoma, the tunical rupture location and its size if detected, the side of the penile deviation, whether there was urethrorrhagia, and whether there was a problem with urination were examined in the physical examination.

All of the patients were diagnosed through anamnesis and physical examination without any necessity for additional imaging method. Retrograde urethrography was performed in only 1 patient due to urethrorrhagia, and an urethral laceration was seen. Surgical exploration was performed after routine preoperative examinations in patients and after they filled out International Index of Erectile Function Questionnaire-Erectile Function (IIEF-EF). All information related to the surgical procedure to be performed was given to the patients before the operation. The written informed consent forms of the patients were taken from the patients themselves. Preoperative prophylaxis was performed in the patients with broad-spectrum parenteral antibiotics. In all the cases, the penis was degloved toward the radix with a subcoronal circumcision incision. The subcutaneous tissue and fascias were passed. The hematoma was debrided, and the rupture area in the tunica albuginea was detected. No deep dorsal venous rupture was seen in any of the patients. The length of the defect and the corpus it was located in were recorded. A primary closure was performed separately in the tears of tunica albuginea with 3/0 polyglactin sutures. The defect area was found during the operation in the patient in whom the urethral trauma had been detected before the operation. End-to-end anastomosis was performed with 5/0 polyglactin suture over a Foley catheter. A pressure dressing was applied with coban bandage. A Foley urethral catheter was placed during the operation in all patients and was removed the day after operation. The catheter of the patient with urethral trauma was removed for 21 days. The operation and hospitalization durations of the patients were recorded. The patients who were discharged were advised not to have a sexual intercourse for 6 weeks and not to masturbate. The patients were followed up for 3 months postoperatively. The anamneses of the patients who came for control in the 3 month were taken, and they underwent physical examinations and were asked to fill out the IIEF to check the quality of the erections. It was questioned whether there was a deviation preventing coitus. In addition, it was checked whether there were deformation and fibrous plaque at the repair site.

Statistical Analysis

In this study, the data were presented as mean±standard deviation, median and interquartile range. Version 11 of the STATA statistical program (Stata Corp LP, College Station, TX) was used to evaluate the data. The Shapiro-Wilk test was used to evaluate whether the data were normally distributed. A paired t-test was used to compare the preoperative and postoperative IIEF-EF scores with normal distribution. $p<0.05$ was considered statistically significant.

Results

The mean age of the patients who were admitted to the emergency service with the complaints of penile pain, ecchymosis, swelling, and urethral complaints was 41.25±11.78 (20-65) years, and the mean body mass index was 26.36±3.17 (21.48-35.15) kg/m^2 (Table 1). It was found that the penile fracture occurred in 18 (40%) patients during sexual intercourse, in 16 (35.5%) while sleeping, in 5 (11.1%) with a sudden penile maneuver, in 3 (6.7%) during masturbation, and in 3 (6.7%) patients due to trauma (Table 2).

In addition to penile hematoma, ecchymosis, and swelling in physical examinations, butterfly-shaped hematoma reaching the pubis and perineum, which indicates the laceration of Buck's fascia, was observed in 3 patients, and blood in external meatus was observed in 1 patient. In 40 patients, there was deviation due to hematoma size. Mean preoperative IIEF-EF scores of the patients were found as 26.12±3.21 (19-30).

After the initial evaluation, penile fracture repair was performed with spinal anesthesia in 26 of the patients and with general anesthesia in the rest of them. The size of the defect in the tunica albuginea was measured as 1.82±0.58 cm during the operation. Of the defects, 33 were in the right corpus cavernosum, 11 in the left corpus cavernosum and 1 in the patient with urethral trauma (Table 1). Primary closure was separately performed in the urethral defect with 5/0 polyglactin suture over the Foley catheter. No

Table 1. Clinical data of the patients

Age (years)	41.25±11.78 (20-65)
BMI (kg/m^2)	26.36±3.17 (21.48-35.15)
Localization	
Right corpus cavernosum	33
Left corpus cavernosum	11
Bilateral corpus cavernosum	1
Defect length (cm)	1.82±0.58 (1-2)
Preoperative IIEF-EF	26.12±3.21 (19-30)
Postoperative IIEF-EF	23.37±3.87 (10-27)
Duration of operation (minutes)	38.32±19.74 (20-90)
Average hospitalization (days)	1.28±0.61 (1-3)

BMI: body mass index; IIEF: international index of erectile function; EF: erectile function

Table 2. Etiology of penile fracture

Etiology	Number of Patients	Percentage
During sexual intercourse	18	40
During sleep	16	35.5
Sudden penile maneuvers	5	11.1
During masturbation	3	6.7
Trauma	3	6.7

drains were placed in any of the patients. No complications were observed in any of the patients during the operation and in the early postoperative period. The mean duration of operation was 38.32±19.74, and the median was found to be 30-35 (20-90) minutes. The patients were discharged after an average of 1.28±0.61 (1-3) days of hospitalization.

The patients were called for control in the 3rd postoperative month, and their erectile functions were evaluated with IIEF-EF. In the anamnesis that the patients explained in control examinations, 2 patients had painful erection and 2 patients had deviation, although not preventing sexual intercourse. In 1 patient, the suture was palpated in the area where the tear was repaired. The mean IIEF-EF score of the patients was found to be 23.37±3.87 (10-27), which was statistically significantly lower than the preoperative score (p=0.011). The patient with urethral trauma did not have any complaints related to urination in the control, and when the urine flow was measured, the average flow rate was measured as 21 mL/sec.

Discussion

Penile fracture is an uncommon urological emergency presented with typical anamnesis and physical examination findings that are mostly due to blunt trauma of the erect penis. The actual incidence in the literature is reported as 1/175,000 (4). Cases are mostly reported from the Mediterranean and Far East countries. The tunica albuginea with an average thickness of 2 mm in a flaccid penis gets as thin as 0.25-0.5 mm during erection (18). The elasticity of this thin tunica albuginea decreases as well as its resistance to any trauma (18). The tunica albuginea, which can have a tensile strength up to 1500 mm Hg intracavarnosal pressure, exceeds this limit with the abnormal bending of the penis, and transverse laceration occurs (19). In penile fractures, a tunical tear is usually unilateral in the distal third part of the penis, has a transverse course, and does not exceed half the diameter of the corpus cavernosum (20).

Penile fractures most often occur at a rate of 33%-60% as a result of trauma caused by position change during sexual intercourse (9, 21). In addition, manipulations during masturbation, sudden movements during sleep, and falling from the bed can cause penile fracture during a nocturnal erection (3). In studies reported from the Middle East, penile fractures were reported in 64%-78% of cases as a result of bending the penis manually in order to provide detumescence (16, 22-24). However, due to the fact that patients do not give their true anamnesis because of their embarrassment, the known etiologic reasons may not be reflecting the truth. We found that penile fractures occurred in 40% of our patients during sexual intercourse, in 35.5% during sleep, in 11.1% due to sudden penile maneuvers, in 6.7% during masturbation, and in 6.7% during trauma.

The age range for penile fracture ranges between 12 and 82 years in the studies presented in the literature. The age range in our patient group was found as 20-65 years in compliance with the literature. Its typical presentation is sudden detumescence, severe pain, ecchymosis, and swelling with fracture sound, and penis deviated in the opposite direction of the fracture. McEleny et al. (25) described this as an aubergine deformity or symptom. The hematoma is usually limited to the penis because there is no rupture in the Buck's fascia during fracture. However, when the Buck's fascia is torn, hematoma that can spread toward the symphysis pubis and perineum forms a typical "butterfly" appearance. In our series, there was hematoma spreading toward the pubis and perineum in 3 patients. If it is suspected that only anamnesis and physical examination are not sufficient, ultrasound, color Doppler ultrasonography, magnetic resonance imaging, or cavernosography can also be used. Due to the anaphylactic reaction risk due to the radiopaque material used and the fibrosis caused by the extravasation of opaque material, the use of cavernosography should be reconsidered (4). In addition, the closure of the corporal defect with a clot may also cause cavernosography to give false-negative results (7). In atypical cases or in the cases where the rupture in tunica albuginea is suspected, ultrasonography or magnetic resonance imaging may be used. The presence of hematoma, the tunical integrity, and continuity of Buck's fascia can be examined with ultrasonography. We did not need any imaging modalities during the diagnosis of the patients treated in our clinic. The patients were diagnosed with anamnesis and physical examination findings. Urethral injury also accompanies 10% to 33% of the cases (7, 8). While the rates of urethral injury reported from the Western countries are 20%, the rates reported from the Mediterranean, Middle East, and Asian countries are as low as 3% (22). The cases with urethral injuries are those that have been exposed to a very high-energy trauma (3). In these patients, urinary extravasation is seen in the retrograde urethrography used for imaging performed due to the complaint of urethrorrhage or failure to urinate. In our series, urethral injury was found only in 1 patient (2.2%). Extravasation was found in the retrograde urethrography performed because urethrorrhage was seen in our patient.

The treatment of penile fractures is an emergency surgical repair although it continues to be controversial. The hematoma is evacuated, hemorrhage is taken under control, and the defect in the tunica albuginea is repaired surgically. In conservative treatment, erection suppression treatments are applied using a pressure dressing with elastic bandage, the Folay catheter placement, cold compress, and antibiotic, fibrinolytic, and antiinflammatory drugs. Undesired results such as penile deviation, painful penile erections, and arteriovenous fistula formation may occur at a rate of 10% in conservative treatment (7, 26). In a study comparing conservative treatment with surgical treatment, while success was achieved in 92% of the patients in whom surgical treatment was applied, this rate was found as 59% in the conservative treatment group (13). Patients treated with early surgical procedures have lower morbidity, better functional outcomes, and shorter hospitalizations (27, 28). Apart from that, complications such as penile curvature, fibrotic plaque formation, and pain during erection are less common, and the erectile function is preserved. Although the IIEF-EF scores of our patients after surgery were significantly lower than the preoperative scores, the average score of 23.37±3.87 indicated that the erectile function was maintained. However, the penile fracture may have late complications such as penile curvature, painful erection, pain during sexual intercourse, erectile dysfunction, urethrocavernosal and cutaneous fistula, and urethral stricture in patients with urethral injury (8).

Different incisions can be used in the repair of tunica albuginea defects that occur in penile fractures. In cases where the defect is located exactly, penile degloving with direct, dorsal longitudinal, penoscrotal, lateral, or subcoronal circumcision incisions is an al-

ternative. Both the corpus cavernosa and corpus spongiosum can be explored with subcoronal circumcision incision, and because the suturation is performed through the circumcision line, it does not cause any unfavorable situation in terms of cosmetics after the operation (27). A disadvantage of the subcoronal circumcision incision is the difficulty in approaching the proximal part when there is excessive hematoma and edema (29). In the cases with massive penile edema, inguinal scrotal incision is recommended (30). We preferred this method of incision because we thought that it provided a better exploration in all our cases.

Conclusion

Penile fracture is an uncommon urological urgency that can be easily diagnosed through anamnesis and physical examination. Additional imaging modalities may be needed in suspected cases and in cases such as urethrorrhagia, suggesting urethral trauma. Surgical exploration and primary repair that are applied in the early period of the treatment give very successful results.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Informed consent was obtained from the patients who participated in this case.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - M.K., E.E.; Design - M.G.Ç., U.Y.; Supervision - B.M., V.S.; Resource - M.K., M.G.Ç.; Materials - M.K., U.Y.; Data Collection and/or Processing - M.G.Ç., E.E., B.M.; Analysis and/or Interpretation - M.K.; Literature Search - M.G.Ç., M.K., U.Y.; Writing - M.K., E.E.; Critical Reviews - V.S., B.M.

Conflict of Interest: The authors have no conflict of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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Cite this article as: Kadıhasanoğlu M, Çulha MG, Yücetaş U, Erkan E, Mansuroğlu B, Saçak V. Diagnosis and Treatment of Penile Fracture: Analysis of Clinical Characteristics of 45 Cases. İstanbul Med J 2018; 19: 14-7.