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Original Article

Surgery Section

Aetiology, Evaluation and Management of Penile Fracture: Experience at a Teaching Hospital in Central India

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ABSTRACT

Introduction: Penile fracture is rupture of corpora cavernosa which occurs when the rigid penis is forcibly bent against resistance, leading to the disruption of tunica albuginea. There is classical history and physical examination before reaching upon this diagnosis.

Aim: To study the aetiology, clinical presentation and share the experience in evaluation and treatment of penile fracture.

Materials and Methods: The retrospective study was carried out on 26 patients, admitted in surgical facility in SS Medical College and associated SGM Hospital, Rewa, Madhya Pradesh, India from January 2014 to December 2018. Patient details like, age, marital status, aetiology, clinical presentation, time interval from injury to presentation, investigation done, treatment given and intraoperative findings were assessed from the hospital records.

Results: The main cause of penile fractures was sexual intercourse (65.38%) followed by manual manipulation (26.92%). Ultrasonography (USG) was used for confirmation of diagnosis with sensitivity and specificity of 87.5% and 100%, respectively. Surgical exploration and repair of injury was done in all patients. The unilateral corporal injuries were the most common finding (76.92%). Urethral injuries were found in 11.53%.

Conclusion: Most of the time diagnosis of penile fracture can be made reliably by history and physical examination. USG can be useful adjunct in confirmation of diagnosis and planning of incision. Early surgical intervention is standard of care, because it is associated with a good outcome, regardless of the timing of presentation.

Keywords: Surgical management, Ultrasonography, Urethral injuries

INTRODUCTION

Penile fracture is an uncommon injury, incidence is 1 in 175,000 [1] and defined as the rupture of corpora cavernosa which occurs when the rigid penis is forcibly bent against resistance leading to the disruption of tunica albuginea [2]. Penile fracture has been reported with sexual intercourse, masturbation, rolling over the bed or falling on to erect penis [2]. Classically, there is history of snap sound, pain, detumescence and on physical examination, haematoma of penis with"eggplant deformity" and "rolling sign" in experienced hands. Synchronous urethral injury could be present in 1% to 38% of cases which should be suspected in presence of voiding symptoms, bleeding per urethra and haematuria [3,4]. Preoperative retrograde urethrography or urethroscopy during surgical exploration should be considered, if there is suspicion of urethral injury. There are no clear consensus regarding use of imaging modalities in the diagnosis of penile fracture [4]. USG, cavernosography and Magnetic Resonance Imaging (MRI) are used as diagnostic tools in literature [4,5].

Immediate surgical intervention is the mainstay in the management of penile fracture, which is also favoured by most of the studies because it is associated with adequate functional and cosmetic results, with minimal complication [2,4,6-9].

This retrospective study was done with the aim to analyse the aetiology, clinical presentation and role of ultrasonography in diagnosis and treatment planning in patients of penile fracture. Penile fracture is under-reported entity especially in India, with this study, author want to share the experience in evaluation and treatment of the same at a teaching hospital of Central India region.

MATERIALS AND METHODS

This retrospective study was done at SS Medical College Rewa and associated SGM Hospital, Rewa, Madhya Pradesh, India from January 2014 to December 2018. Institutional approval was taken for the study. In total, 26 patients admitted in the surgical facility with penile fracture were included in the study. Patient details: age, marital status, aetiology, clinical presentation, time interval from injury to presentation, investigation done, treatment given and intraoperative findings were assessed from the hospital records.

Long term follow-up data were incomplete in hospital records, so all patients were called for evaluation in month of November 2019 with help of available postal address and telephone number. Voiding symptoms and erectile function were evaluated. The International Index of Erectile Function (IIEF 5) was used for grading of Erectile Dysfunction (ED). Clinical examination was done for presence of nodule and chordee.

STATISTICAL ANALYSIS

The statistical analysis of the data was done by using the Excel program (Microsoft Inc., Redmond, WA, USA).

RESULTS

The mean age was 31.53± 9.41 years (17-52 years). Seventeen patients (65.38%) were married and 9 (34.61%) were single at the time of presentation. The time interval from injury to presentation was 26.34±18.16 hours (7-72 hours). The mean hospital stay was 5.15± 2.5 days (2-12 days).

The injury was caused by sexual intercourse in 17 (65.38%), manipulation during masturbation in 7 cases (26.92%), direct blow on erect penis in 1 (3.84%) and rolling over or falling from bed with erect penis in 1 (3.84%).

Most of the patients presented with the typical clinical picture of a characteristic sound at the time of injury, pain, detumescence and significant haematoma. Haematoma was present in 25 cases (96.15%) [Table/Fig-1]. Rolling sign which is characteristic of fracture penis was positive in 19 cases (73.07%).

USG was done in all cases for confirmation of diagnosis. Defect in the tunica albuginea was seen in 21/24 patients of true penile fracture [Table/Fig-2]. Urinalysis was done in all cases. Three patients

presented with bleeding per urethra. Retrograde urethrography was performed in all three cases.

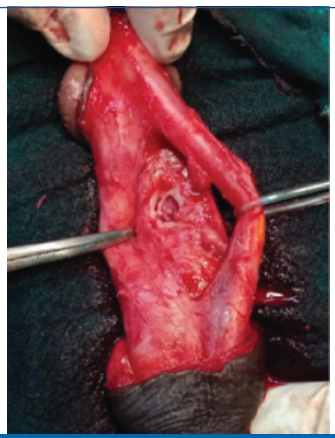
Symptoms and signs	Number	Percentage
Haematoma	25	96.15
Pain	23	88.46
Penile deviation	23	88.46
Detumescence	21	80.76
Cracking sound	17	65.38
Urethral bleeding	3	11.53

[Table/Fig-1]: Symptoms and signs in patients of penile fractures (n=26).

Total Number of Cases	26
Fracture confirmed after surgery	24
USG showing fracture	21
False penile fracture	2
Sensitivity	87.5%
Specificity	100%
Positive Predictive Value	100%

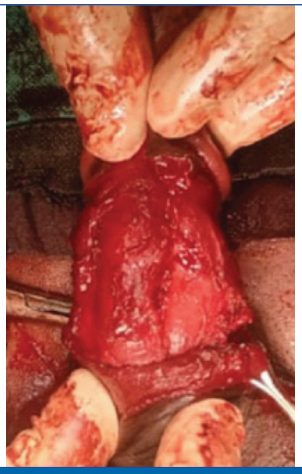
[Table/Fig-2]: Role of USG in cases of penile fracture.

In all 26 patients, surgical repair was performed under spinal anaesthesia. Per urethral catheterization (14F-16F) was done in all patients except in suspected urethral injuries. Distal circumcoronal incision was used in 22 cases and degloving of penis was done for the inspection of all the three corporeal bodies and urethra. Median raphe incision at penoscrotal junction was used in four cases on the basis of USG finding, suggestive of injury at proximal corpora. The procedure included: evacuation of the haematoma, identification of the site and number of defect [Table/Fig-2]. Closure of the tunical defect with interrupted 2-0 or 3-0 absorbable sutures (polyglactin) was done. In case of urethral injuries, absorbable (polyglactin) suture (4-0) was used for repair of urethra [Table/Fig-3-5].



[Table/Fig-3]: Image showing tunica albuginea tear.

[Table/Fig-4]: Tunica albuginea tear along with urethral injury.



[Table/Fig-5]: Image after repair of tunica albuginea and urethral tear.

Penile fracture was found in 24 cases. Injury involved unilateral corpora cavernosum in 20 cases (76.92%), bilateral corpora cavernosa in 4 cases (15.38%). Synchronous urethral injury was found in three cases and in two cases, exploration revealed intact tunica with bleeding from the torn superficial vein that was ligated (false penile fracture) [Table/Fig-6]. Circumcision, was done in all 22 cases in which circumcoronal incision was used.

Intraoperative findings (Site of Lesion)	Number	Percentage
Unilateral corpora cavernosum	20	76.92
Bilateral corpora cavernosa	4	15.38
Synchronous urethral injury	3	11.53
False penile fracture	2	7.69

[Table/Fig-6]: Intraoperative findings (n=26).

Urethral catheter was removed after 24 hours. In case of urethral injury, Foley catheter was removed after the pericatheter contrast study to rule out any extravasation of dye at two weeks. Patients were instructed to withhold intercourse and masturbation for four weeks. All patients were discharged with estradiol 0.05 mg orally to prevent postoperative painful erections for three weeks.

Skin blackening was seen in one patient and serous discharge was noted in two patients in immediate postoperative period which were managed conservatively. Twenty-one patients had reported for follow-up in November 2019. Significant thickening at place of repair was seen in eight patients, mild chordee (<20°) was noted in two patients. Seventeen patients demonstrated no ED (IIEF-5 >22) and four patients had mild ED (IIEF-5, 17-21). All patients reported adequate erection for intercourse without voiding symptoms.

DISCUSSION

Penile fracture is rare occurrence but, it is being reported with increased frequency in the recent past [10]. Injuries to the flaccid penis are uncommon due to its protected location and relative mobility [2]. In the errect state, there is engorgement of corpora cavernosa with blood and the tunica albuginea thins out which makes it more vulnerable to trauma [11].

As long as Buck's fascia remains intact and haematoma is contained within it, patient presents with "eggplant deformity" that is swelling, discolouration and deviation of the penile shaft, it is a common finding in less severe cases. The "rolling sign" is due to presence of clot over the tunica albuginea tear. On palpation, there is firm, tender and fixed swelling and skin can rolled over it, this sign helps in determining the site of injury [3]. In case of injury to Buck's fascia, there is extension of haematoma into the subcutaneous plane of the scrotum, perineum and suprapubic region [12]. Surgical intervention is required in most of the cases because false penile fracture that is injury to superficial veins cannot be distinguished clinically or radiologically from true penile fracture with certainty [4,12].

In present study, the mean age of patients with penile fracture was 31.53 years. Sexual intercourse was most common aetiology leading to penile fracture in 65.38% in present series. There is delay of 26.3 hours between injury and presentation to the hospital. It is mainly due to social inhibition and underlying shame associated with event.

Recent series have demonstrated that the diagnosis of penile fracture is mainly based on history and physical examination [5,13,14]. Ultrasound is non-invasive, safe and cost effective modality, which determines the site and length of injury in most of the cases [2,5,15]. There is an interruption of the thin echogenic line of the tunica albuginea with associated haematoma suggestive of penile fracture. Absence of loss of the continuity does not always rule out penile fracture, because small tear occluded by a thrombus can be missed [5,12]. It also helps in planning of incision.

Immediate operative intervention was done in all patients regardless of the timing of presentation. This is in accordance with the recent European Association of Urology Guidelines [16]. Fetter and Gartmen's first described the operative repair of penile fracture in 1936 [17], several incisions have been described in literature which includes longitudinal incision over the haematoma, suprapubic incision, inguinoscrotal incision, high scrotal midline incision on the raphe and penile degloving. Sub-coronal circumferential incision to deglove the penile shaft gives excellent exposure of all the three corpora and avoids missing the injuries, if at multiple sites and associated with urethral injuries [3,18].

Urethral injury could be an associated lesion in 1% to 38% of penile fractures [3]. Patients with associated urethral injury present with blood at the external meatus, gross haematuria or urinary retention. But, absence of these signs does not exclude urethral injuries. Currently, cystoscopic placement of urethral catheter in operating room has been advocated when there is high suspicion of urethral injuries [19]. Three (11.53%) of the present study patients had concomitant urethral injury. Most of the index study findings are consistent with recent Indian and international studies [Table/Fig-7] [6-9,12-14,20-25]. [Table/Fig-8] shows comparison of different studies using USG as a diagnostic modality [2,5,8,15,21].

Author (Year)	No. of cases	M.C. aetiology	Mean age (Years)	Time elapsed since injury	Surgical Treat-ment	Urethral injury (%)	Mean hosp. stay
Internaional studies							
Yamacake KG et al., (2013) [12]	42	Intercourse (80.9%)	35.2 (21-61)	21.8h	35 (83.3%)	11.9	1.6d
Nason GJ et al.,, (2013) [6]	21	Intercourse (95.23%)	33.1 (19-63)	16.3h	21 (100%)	9.09	NR
Omisanjo O (2014) [13]	15	Intercourse (66.7%)	35.2 (23-56)	60h	15 (100%)	26.6	3.7
Swanson DE et al., (2014) [7]	30	Intercourse (86.66%)	33 (19-59)	25.4h	27 (90%)	16.66	NR
Özorak A et al., (2014) [14]	31	Intercourse (87.09%)	32 (23-47)	5h*	21 (67.7%)	0%	NR
De Luca F et al., (2017) [8]	76	Intercourse (92.15%)	39.5 (21-72)	NR	76 (100%)	27.63	NR
Barros R et al., (2019) [25]	58	Intercourse (79.3%)	38.5 (18-66)	25h*	58 (100%)	29.3	NR
Kati B et al., (2019) [9]	56	Intercourse (57.1%)	30.22 (18-56)	2.2h	56 (100%)	16.07	NR
Indian studies							
Bali RS et al., (2013) [20]	36	Intercourse (66.7%)	32.3 (16-67)	2h-7d	34 (94.4%)	11.11	with in 7d
Mahapatra RS et al., (2015) [21]	20	Intercourse (50%)	33.55 (19-56)	37.66h	19 (95%)	10.52	NR
Rajendra NB et al., (2017) [22]	22	Intercourse (86.3%)	29.31	48.77h	22 (100%)	4.54	NR
Kumar L et al., (2018) [23]	20	Intercourse (90%)	27.7 (20-60)	28.8h	18 (100%)	15	NR
Patil B et al., (2019) [24]	18	Intercourse (66.66%)	28.88	25.11h	18 (100%)	5.55	5.11d
Present study (2020)	26	Intercourse (65.38%)	31.53 (17-52)	26.3h	26 (100%)	11.53	5.15d

[Table/Fig-7]: Comparison with different studies [6-9,12-14,20-25].
MC: Most common; h: hours; d:days; T/t- Treatment; Hosp.: Hospital; NR-Not recorded in study; * Trauma to surgery interval

Author (Year)	Total no. of cases	USG used	USG positive	Surgically confirmed	Detection rate
Reis LO et al., (2014) [2]	42	16	16	14*	**
Mahapatra RS et al., (2015) [21]	20	19	17	19	89.47%
Shukla AK et al., (2015) [15]	15	15	15	15	100%
Zare Mehrjardi M et al., (2017) [5]	25	25	22	25	88%
De Luca F et al., (2017) [8]	78	78	76	78	97.43%
Present study (2020)	26	26	21	24	87.5%

[Table/Fig-8]: Comparison of the studies according to USG findings [2,5,8,15,21].
*2 false positive, **positive predictive value 87.5%

Most of the literature supports the surgical intervention in management of penile fracture which results in earlier recovery, lower incidence of ED and less chances of long-term penile curvature [6-9,25,26]. Surgical intervention is better than conservative management, but short delay in surgery does not adversely affect the outcome of procedure [27].

Limitation(s)

The limitations of present study are its retrospective nature and limited number of cases due to rarity of disease.

CONCLUSION(S)

Penile fracture is a rare urological emergency. There is significant delay in presentation, due to social inhibition and underlying shame associated with event. Most of the time diagnosis of penile fracture can be made reliably by history and physical examination. USG can be useful adjunct in confirmation of diagnosis and planning of incision. Early surgical intervention is standard of care, because it is associated with faster recovery and increased patient satisfaction, regardless of the timing of presentation.

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