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Original Article

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Penile Fracture: Importance of Time in Management

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Abstract

Background: *Most Penile fracture is classically recognized as a urological emergency. Immediate surgical repair is the current standard of care with lower risks of complications. Although immediate surgery is advocated, timing of penile fracture repair can either be early (less than 24 hours from injury to presentation/surgery) or delayed (greater than or equal to 24 hours).*

Objective: *To determine whether early surgical intervention has less postoperative complications than late intervention in patients presenting with penile fracture.*

Methodology: *This 15-month prospective analytical study conducted in the Department of Urology, Dhaka Medical College Hospital. Patients diagnosed with penile fracture undergoing surgery was the study population. A total of 24 patients were purposively selected as per inclusion and exclusion criteria. Their clinical history, physical examination, investigation reports & per-operative findings on surgical exploration were recorded. The patients were allocated into two groups according to the time of surgical intervention. Group A included the patients who were treated within 24 hours of incident and Group B included the patients who were treated with more than or equal to 24 hours of incident. The patients were followed up after 4 weeks, after 2 & 3 months.*

Result: *There was no significant difference regarding mechanism of injury, side, site & length of injury, associated urethral injury & repairing difficulties. Wound infection & duration of hospital stay were more in delayed intervention group & that were statistically significant (p= 0.0244 & p=0.0163 respectively). During follow-up, delayed intervention group had statistically significant erectile dysfunction (p=0.0455 & p=0.048 respectively) after 2 & 3 months. Lastly, there was no significant difference regarding skin necrosis, hematoma, pyrexia in early post-operative period & palpable nodule, painful erection, chordee during follow up after 4 weeks, after 2 & 3 months.*

Conclusion: *There was statistical difference between timing of penile fracture repair (early vs. delayed) regarding wound infection, duration of hospital stay & ED, which recommends early repair with less complications.*

Keywords: Delay, fracture, penis, time, urethra.

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Introduction

Penile fracture is defined as "rupture of the tunica albuginea of the corpora cavernosa caused by trauma to the erect penis"[1,2]. A normal penis is protected by its natural genital mobility. However, an erect penis is prone to injury when intracavernous pressure increases abruptly[3]. There may be an associated injury to the corpus spongiosum or urethra. The extravasation of blood, urine or both may extend to the scrotum, the perineum and the inguinal region, if Buck's fascia is torn[4]. A history and clinical examination are the most important tools to diagnose penile fracture. The presentation of penile fracture may vary depending on the delay to seek medical attention and on the presence of associated injuries[5]. Conservative treatment (non-operative) was practiced to manage the fracture of the penis until the 1970s. It included "the urethral catheterization, compression bandages, and consistent cooling, combined with anti-inflammatory, anti-erectile, antibiotic and analgesic therapy"[6]. However, this conservative treatment showed the occurrence of acute and chronic complications, such as infections, abscesses, penile deformity, fistula, pulsatile diverticulum, persistent hematoma, and decreased turgidity in patients with penile fracture[7]. Moreover, around 50% of patients who underwent conservative management can experience complications such as palpable nodule, penile curvature, and erectile dysfunction (ED)[8]. The management, however, has changed over the past few decades from a conservative approach to a more aggressive surgical approach[9]. The surgical repair showed to be beneficial than conservative management of penile fracture due to exquisite long-term results in good clinical settings[10]. Although immediate surgery is advocated, timing of penile fracture repair can either be early (less than 24 hours from injury to presentation/surgery) or delayed (greater than or equal to 24 hours). Delayed repair of penile fracture may occur due to delayed presentation after initial injury, surgeon preference, or in patients who initially select conservative management[11]. A delay may allow for medical optimization of the patient prior to surgery, reduced tissue edema, and the demarcation of healthy and necrotic tissue. Further, preoperative imaging with ultrasound or magnetic resonance imaging (MRI) may allow for a reduction in negative explorations and more precise planning of the repair[12]. Some authors suggested that intentional delaying of the repair for 7-12 days facilitates easy identification and repair of the torn corpus cavernosum[13]. Delay in presentation has been associated with worse postoperative outcome in previously published articles; however, there has been no conclusive evidence to support this[5].

Methodology

All suspected penile fracture patients attending at Department of Urology, DMCH between January 2021 to March 2022 fulfilling the inclusion and exclusion criteria were enrolled initially for this prospective analytical study. Patient with history of penile fracture with active intervention outside Dhaka Medical College Hospital were excluded. Approval from local ethical committee was taken for the study. Patients were counseled about the treatment, and informed written consent was taken. After case selection, obtaining informed consent from the patient participating in this study, they were assured about the privacy of the information. During the recruitment period, the objectives of the study were explained to the potential participants. The patients were allocated into two groups according to the time of surgical intervention. Group A included 12 patients who were presented and treated within 24 hours of incident and Group B included other 12 patients who were treated more than or equal to 24 hours of incident. A per-urethral catheter was introduced in each patient after spinal anesthesia. All the patients were undergone surgical exploration performed in supine position. First, the fracture site was identified through a degloving sub-coronal penile incision. The site of tunical defect was identified, the tear site, size in corpora cavernosa and the associated urethral injury were assessed. In case of tear, the corpora cavernosa was repaired with absorbable vicryl 3-0 suture material. At the same time, with concomitant urethral injury, the defect was closed with absorbable vicryl 5-0 suture material. Intraoperative artificial erection was routinely induced after repair with normal saline to assess the erection and any leakage. Per urethral Foley catheter was kept in situ for one day except in the case of urethral lesion, where the catheter was kept for 21 days. Patients was advised to abstain from any sexual activity for at least three weeks after the surgery. All patients were discharged on the 3rd to 7th postoperative day. Post-operative follow-up in the early period included wound infection, necrosis, discharge, hematoma. Late postoperative follow up was scheduled after four weeks, two months and three months for delayed complications like palpable nodule, pain on erection, chordee. There was a

questionnaire to assess erectile functions in the post-operative period using IIEF-5. Appropriate data collected by using a preformed data collection sheet were analysed statistically by standard procedure to arrive at definitive conclusion. Data were processed manually and analysed with the help of Windows based Microsoft program SPSS (statistical package for social science) Version 22.0. Quantitative data were expressed as mean and standard deviation and comparison were done by unpaired "t" test. Qualitative data were expressed as frequency and percentage, comparison was carried by Z-test. P value of <0.05 was considered to indicate statistical significance.

Result

The average age at presentation among patients presenting with penile fracture were 32 ± 6.8 years for early intervention group & 35 ± 7.74 years (mean ± standard deviation) for late intervention group. The most common cause for fracture noted was sexual intercourse in 79.17% patients (19/24) followed by accident in the erect penis in 12.5% cases (3/24), and two patients reported fracture during masturbation. Time from injury to intervention in early intervention group was 17.83 ± 4.80 hours (mean ± SD) and in delayed intervention group was 53.83 ± 15.1hours (mean ± SD).

The intraoperative findings such as side, location, length & associated urethral injury have been documented in Table I. Figure 1 shows a patient with penile fracture with tear in the tunica albuginea. Figure 2 shows at the beginning of Buck's fascia repair. Figure 3 shows one patient had urethral injury which was diagnosed intraoperatively.

Postoperatively, the incidence of wound infection was 29.17% (7/24). The incidence of hematoma and postoperative pyrexia was 8.33% (2/24) and 16.67% (4/24), respectively. Skin necrosis was only found in 3 patients of delayed intervention group. The average hospital stay was 4 ± 1.28 days & 5.33 ± 1.23 days early & late intervention group, respectively. Thirty-three percent (8/24) cases had prolonged hospital admission (³6 days). Post-operative findings are summarized in Table II.

There was no statistically significant difference between early & late intervention group regarding palpable nodule, painful erection & chordee. But during follow up after 2 months & 3 months, statically significant erectile disfunction was present in late intervention group. Post-operative outcomes have been noted in Table III.

Table I: *Distribution of the patients according to intraoperative findings*

		Number of patients	Percentage
Side of Injury	Rt	10	41.67%
	Lt	12	50%
	Bilateral	02	8.33%
Location of injury	Proximal	19	79.17%
	Distal	05	20.83%
Length of tear	0.5 – <1 cm	13	54.17%
	1-2 cm	11	45.83%
Associated urethral injury		03	12.5%

Table III: *Distribution of the patients according to post-operative findings*

Post Operative Parameter	Early Intervention Group	Delayed Intervention Group	P value
	Number of patients		
Wound infection	01	06	0.0244
Skin necrosis	0	03	
Hamatoma	01	01	
Pyrexia	01	03	0.2713
	Mean ± SD		
Duration of hospital stay	4 ± 1.28	5.33 ± 1.23	0.0163

Table III : *Distribution of the patients according to post-operative follow-up:*

	Number of patients	Number of patients	P Value	
Palpable nodule	After 4 weeks	06	08	0.406
After 2 months	04	07	0.219	
After 3 months	02	06	0.084	
Painful erection	After 4 weeks	03	04	0.653
After 2 months	03	03		
After 3 months	01	0		
Chordee	After 4 weeks	0	0	
After 2 months	0	1		
After 3 months	1	2	0.535	
	Mean ± SD	**Mean ± SD**		
Erectile Function	After 4 weeks	18.83 ± 4.39	15.50 ± 5.60	0.1192
After 2 months	19.67 ± 1.28	15.17 ± 1.69	0.0455	
After 3 months	20.58 ± 1.28	16.08 ± 1.73	0.048	

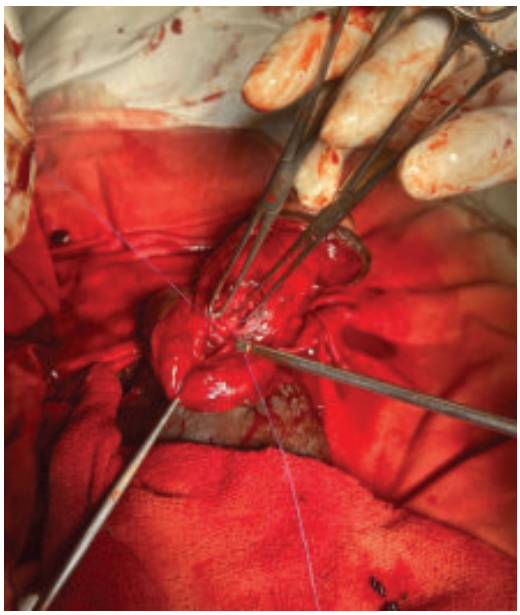

Fig 1: *Tear in Tunica Albuginea*

Fig 2: *Beginning of repair of Buck's fascia*

Fig 3: *Associated urethral injury*

Discussion

Penile fracture has been most associated with vigorous sexual activity in the Western literature stated by Kamath et al.[14]. It is widely accepted that the diagnosis of penile fracture is mainly based on the clinical history and physical examination[15]. Imaging can take time and delay surgical exploration in the emergency setting. In this paper, we didn't use any USG or imaging investigation other than clinical confirmation by history and examination of the affected penis.

Most contemporary series of penile fracture recommend urgent surgical intervention because of its

excellent outcome in addition to decreased hospital stay. But El-Assmy et al. recommended, delayed surgical repair for penile fracture[6]. Their argument is that in the acute stage of trauma, there is extensive penile edema and hematoma, which make accurate localization of the tear difficult, so a degloving incision may be necessary for adequate exploration of both corpora. Such extensive dissection could injure more blood vessels and nerves, traumatize more tissue, take longer to perform, and lead to a higher incidence of wound infection and skin necrosis. Furthermore, because the majority of patients with penile fracture have small, proximal, unilateral tears, it seems unnecessary to deglove the entire penis to expose and repair this injury.

In current series, sexual intercourse was the prime cause of trauma in both groups, similar to that reported in Western countries, followed by history of accidental trauma in erect penis and masturbation[16].

Current study defined early repair as less than 24 hours and delayed repair as greater than 24 hours. These ranges are used, as they were the most common definitions within the available literature. However, it would be ideal to further divide the time delays to less than 24 hours, 24 72 hours, 72 hours one week and greater than one week.

The tunica albuginea lacks longitudinal layer at 5 and 7 o'clock positions and thus is extremely thin and has been mentioned to be the most common site for penile fracture. There was no side predominance in present study. Tear in tunica albugenia was present for all patients with a varying number of the tear in corpora cavernosa. Ibrahiem et al. found tunical tear in the right corpus cavernosum in 90 patients (58.1%), in the left corpus in 49 (31.6%), and bilateral in 3 cases (1.9%)[2]. Ateyah et al. linked this to the fact that right-handed population is greater than left-handed ones among the patients, thus the penile manipulation is frequently to the left side, resulting obviously in tunical tears on the right side[18].

Evidence of bilateral corporal rupture should prompt investigation for a potential urethral injury, because bilateral injuries have a higher rate of urethral disruption compared with unilateral fractures[6]. In this study, urethral damage was found during surgical intervention.

In current study, total 7 (29.17%) patients developed post-operative wound infection and results were statistically significant (p=0.0244) between these groups. So early intervention will reduce wound infection during post-operative period. Postoperatively, Kamath et al. found the incidence of wound infection was 44.44% (8/18) for delayed intervention group that also supports us[14].

Ekwere et al. demonstrated that exaggerated dissection may possibly raise the tendency of skin necrosis, decreased penile sensation and hematoma[19]. Regarding present study, post-operative skin necrosis was not statistically significant (p=0.0643) between early & delayed intervention group.

In recent study, mean hospital stay was statistically significant between early & delayed intervention group (p=0.0163). As surgeons wanted appropriate follow-up for post-operative complications, maybe that's why mean hospital stay was more in present study.

During post-operative follow-up, the number of patients having palpable nodule was decreasing gradually in both groups. On long term follow-up by Ibrahiem et al., 14 patients (10%) had palpable fibrous scarring; this was considered higher[2]. This could be because they depended on physical examination rather than patients' complaint, as most of those patients had no complaint of mild penile curvature on erection. So, longer the follow-up period, less will be the number of palpable nodules.

In current study, during post-operative follow-up, after 4 weeks painful erection was not found statistically significant (p=0.653) between two groups. Athar et al. advised to use mild sedation (benzodiazepam) for the immediate intermittent painful erection[20].

Initially, there was no chordee in early intervention group after 4 weeks and 2 months follow up, but one patient developed chordee after 3 months. In a large series of penile fracture reported by Asgari et al. found that a delay of 48 hours was associated with penile curvature and painful intercourse postoperatively[21]. Larger number of patients and longer follow-up time are required for better understanding of these variation of results.

In our study, during follow-up, though after 4 weeks there was no significant differences of erectile function between both groups, delayed intervention group had statistically significant erectile dysfunction (p=0.0455 and p=0.048 respectively) after 2 and 3 months. The sexual dysfunction resulting from penile fracture is either due to penile curvature, ED (linked to an organic

or psychogenic element), or simply painful intercourse. In another study, Kamath et al. found no patient with ED following early intervention and 8 patients with ED following delayed surgical intervention which was statistically significant similar to this study[14].

Limitations of this study are smaller sample size, shorter follow-up period. Confounding factors like DM were not evaluated. The patients' erectile function status before the surgery was unknown & data regarding erectile functions was subjective.

Conclusion

This study strongly advices early and prompt surgical intervention in the management of penile fracture because of the excellent results, shorter hospitalization, less morbidity, and early return to full sexual activity that would definitely help the patient lead an almost normal life.

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Conflicts of interest

There are no conflicts of interest.

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