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Surgical Outcome of Penile Fracture Management in a Tertiary Level Hospital in Bangladesh

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Abstract **Original Research Article**

Background: Fracture of the penis is a urological emergency which occurs as a result of abrupt trauma to an erect penis. Immediate surgical repair is the standard of care and is superior to non- operative management due to excellent long term outcomes. ***Objective:*** The aim of this study was to investigate surgical and functional outcomes in patients who underwent penile fracture repair. ***Methods:*** A cross sectional descriptive study was conducted during the period of July 2017-June 2018 to find out the pattern of surgical management of fracture penis among the patients admitted in the urology department of Dhaka Medical College Hospital. A total 50 patients of fracture patients were selected purposively. Outcome of surgical management was investigated by using semi structured and International Index of erectile function questionnaire. ***Results:*** The study reveals that the mean age of the patients were 34.26±9.96 (range: 18–65), predominantly married (70%). The mean follow-up period was 12 weeks. Patients 'history and clinical examination were highly sensitive and accurate in predicting a tunical tear. 15 patients (30%) received surgical treatment within six hours from the hospital admission, while 31 patientsand 4 others seek surgical intervention within 6-24 hours and more than 24 hours respectively.It was revealed that the presenting symptoms were pain (72%), penile swelling (100%), eggplant deformity (100%), and hematuria (22%) with associated urethral injury in 22% of patients. Post- operative complications found were infection (14%), penile nodule (26%), chordee (14%), painful erection (16%) and erectile dysfunction (34%). There is a significant relationship between having painful erection and erectile function of the patients at the time of interview [X^2=23.44, df=4, p=0.000], The relationship between the time elapsed from hospital admission to surgery and erectile function at the time of interview was not significant [X^2=10.39, df=8, p=0.239]. The relationship between age group and erectile function at the time of interview was significant [X^2=27.08, df=16, p=0.041]. ***Conclusion:*** History and clinical examination are sufficient to diagnose fracture penis and early surgical repair does not make any difference regarding surgical outcome and conservation of sexual functions. Younger age group is doing better concerning preservation of erectile function. The necessity of carnal knowledge is no less important to maintain healthy lifestyle.

Keywords: Fracture of penis, abrupt trauma, surgical repair, standard of care.

INTRODUCTION

Penile fracture is an emergency presentation to urology departments with an incidence of 1 in 175,000 [1]. The first documented report of this fracture is credited to an Arab physician, Abul Kasem, in Cordoba over 1000 years ago. True incidence is probably higher than reported as many patients do not seek medical attention due to embarrassment [2]. It was reported that adjacent urethral injury is seen in 10%-33% of penile fractures, and when present, gross haematuria or urethrorrhagia with voiding difficulty are additional clinical findings [1, 2]. It is defined as the traumatic

rupture of the tunica albuginea of the corpora cavernosum. Common culprits are vigorous intercourse when the penis strikes the perineum or masturbation. Other causes include rolling over in bed on to the erect penis, forced flexion to achieve de- tumescence and external blunt trauma [3]. A widely held view is that the Woman on top 'position poses the greatest risk to penile fracture although no systematic review has corroborated this. Analyzing the literature would seem to suggest a geographical variation in the etiology of penile fracture [4]. In some Middle Eastern countries, many reported cases are due to patients -kneading and snapping 'the erect penis to achieve rapid detumescence in unsuitable situations [5, 6]. The most prevalent example of this practice is one Iranian study where 269 of 352 (76%) patients suffered a penile fracture in the process. [6] (Jack *et al.*, 2004) stated that the strain of buckling the engorged corpora can generate pressures in excess of 1,500mm Hg, thus exceeding the limit of the thinned tunica [5]. In an erect penis, the tunica is exceptionally thin making it more vulnerable. The flaccid penis lacks a fulcrum for snapping and contains a relatively thick tunica albuginea conferring a protective role, while cavernosal lacerations to the flaccid penis are possible via other means, purists will argue that such injuries should not be called fractures [7]. By pain, detumescence, and a substantial subcutaneous hematoma leading to an eggplant deformity. When the tunica ruptures, rapidly followed, the classic patient gives a history of hearing a cracking noise during sexual activity [3]. Historically, penile fracture was managed conservatively, but owing to a relatively high morbidity of up to 30% ED, plaques, painful erections, curvature and infected hematomas, contemporary management has shown a trend towards following urgent surgical exploration and repair of the tunical defect [8]. Importantly, while numerous studies have reported their management of penile fractures, their cohorts are small making it challenging to generalize regarding the optimal treatment approach. The rare nature of penile fracture does not lend itself to a prospective trial. To image and locate the site of the tunical tear before surgery, some investigators have recommended the use of ultrasound, carver nosography and magnetic resonance imaging (MRI) [9, 10]. However, the positive predictive values in these studies have been shown to be similar to that of history and clinical examination [11]. Other authors propose that the use of imaging techniques in the evaluation of blunt penile trauma remains controversial [2]. However, many authors agree that the diagnosis of penile fracture can rely on patient history and clinical findings alone [12, 13]. Notably, the patient describes a cracking sound followed by pain and immediate detumescence, while local swelling rapidly appears, secondary to an enlarging hematoma [14, 15]. Although examination is always sufficient to confirm the diagnosis of penile fracture, imaging is very useful to identify the exact location of the tunical tear and possible associated urethral involvement [16-19]. The gold-standard management of penile fracture is immediate surgical exploration and repair of the tunical tear and of the associated urethral injury, if present [14, 16, 20]. The scientific literature is still lacking structured clinical reports aiming to investigate the postoperative functional outcomes of patients in whom the exact location of the tunical tear has been identified with ultrasonography, and who have undergone tunical repair through a minimally invasive approach with skin incision directly above the tunical tear. The aim of the present study is to report surgical and functional outcomes using validated questionnaires in patients who have undergone immediate penile fracture repair.

OBJECTIVES

General Objectives

The general objective of the study was to evaluate the effect of surgical repair in penile fracture management.

Specific Objectives

- To identify erectile function after surgical repair of penile fracture.
- To assess complications of penile fracture (penile nodule, curvature, painful erection).
- To find the hospital stay after penile fracture repair.

METHOD & MATERIALS

This was an observational descriptive study, conducted in the Department of Urology Dhaka Medical College Hospital, Dhaka. Bangladesh from July, 2017 to June, 2018. A total 50 patients were included in this study. Patients who were admitted for management of fracture penis were required as study population. A purposive sampling method was followed for sample selection.

Selection Criteria

Exclusion Criteria

Patients having penile injury due to trauma other than sexual act.

Study Procedure

Detailed history was evaluated, including mechanism and time of trauma. Clinical examination was performed, including evaluation of penile swelling, deformity, site of tear, presence of deviation, blood at urethral meatus, and macroscopic hematuria. Diagnosis of penile fracture was confirmed by clinical assessment. Decision of surgical exploration was recommended after proper counseling and performed after written informed consent was obtained from patients. Surgery was done using a de-gloving circumferential incision. Penile and urethral injuries were identified. Defect closure of the corpus cavernosum was performed using absorbable Prolene suture with inverted knots. In the presence of concomitant rupture of the corpus spongiosum or urethral damage, the defect will be closed with vicryl 4-0 suture. A per urethral catheter

was indwelled preoperatively and kept for 3 days. In case of urethral injury, the catheter was kept for 14 days. Patients were recommended to abstain from sexual activity for 6 weeks following surgery or conservative treatment when surgery was refused. Patients were reviewed as out- patients 6 weeks postoperatively. Patients with concomitant urethral lesions were examined 6 weeks after the repair for early follow up. Long-term follow- up was performed in all patients by validated questionnaires for assessment of erectile function (International Index of Erectile Function (IIEF-6) three months later. The study also evaluated the subjective impairment of sexual life due to penile fracture and complications like pain and deviation. The survey involved recognized scoring systems to objectively assess sexual function and erectile potency post-fracture of the penis. The International Index of Erectile Function (IIEF- 6) is an abbreviated questionnaire focusing on erectile function for the diagnosis of the presence and severity of erectile dysfunction (ED) (6 questions, maximum score 30).

Data Processing & Analysis

Data were analyzed statistically by standard procedure to arrive at definitive conclusion in respect of the hypothesis. All the collected data were compiled. Percentages were calculated to find out proportion of the findings. Further Statistical analyses of the results was obtained by using Microsoft Xcel, windows 2010 and SPSS Version 20. The results were presented in tables, figures and diagrams. Quantitative data was expressed as mean and standard deviation. Qualitative data was expressed as frequency and percentage, compared by chi-square (X^2) test. A probability value (p) of less than 0.05 was considered to indicate statistical significance. The summarized findings were then presented in the form of tables.

Ethical Clearance

Ethical clearance was taken from the Ethical Review Committee of the consent hospital.

RESULTS

Table I: Distribution of patients according to their age. (N=50)

Age (In years)	n	%
18-28 yrs.	14	28.0
28-38yrs	24	48.0
38-48yrs	6	12.0
48-58yrs	5	10.0
58-68yrs	1	2.0
Mean ± SD	34.26 ± 9.96	

Table 1 showed the highest representation 28-38 year's age group of patient 48%, followed by 18-28 year' s age group 28%. The lowest representation was only 2% of 58-68 year's age group. The total mean age was 34.26± 9.96 years.

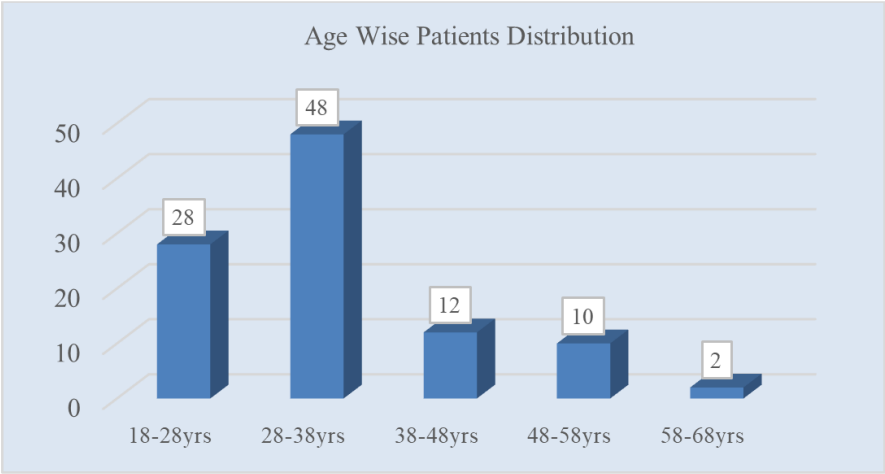


Figure 1: Bar chart showed Patients age group wise Distribution (N=50)

Table II: Distribution of patients according to their marital status (N=50)

Marital Status	n	%
Married	35	70.0
Unmarried	15	30.0

Table II showed the patient's marital status where predominant respondent was married (70%) and 30% was unmarried.

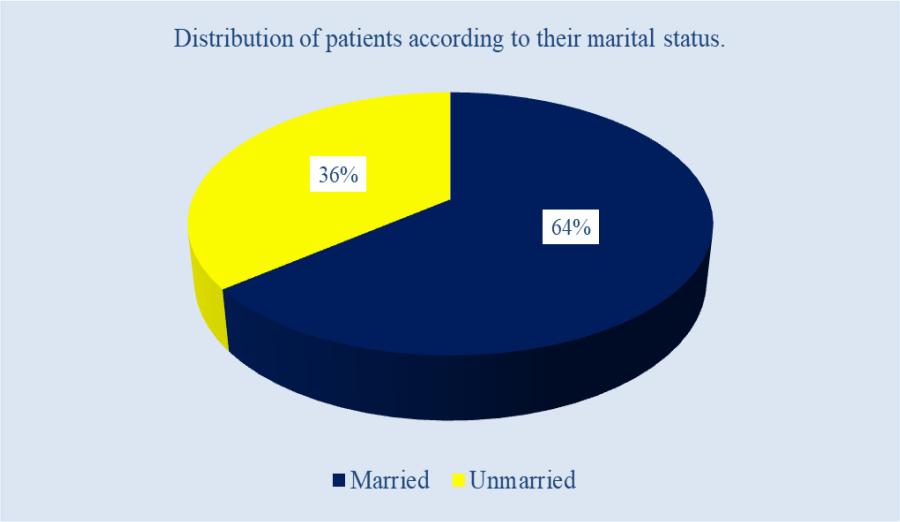


Figure 2: Pie chart showed the marital status of patients (N=50)

Table III: Distribution of patients according to time of hospital admission and accomplishing surgery (N=50)

Time elapsed from admission to surgery	n	%
Within 6 hours	15	30.0
6-24 hours	31	62.0
More than 24 hours	4	8.0
Mean ± SD	14.32 ± 7.88	

Table III showed the time elapsed from admission to surgery highest 8% was 24 hrs. plus and minimum within 6 hrs. 30%. The mean time number was 14.32 ± 7.88.

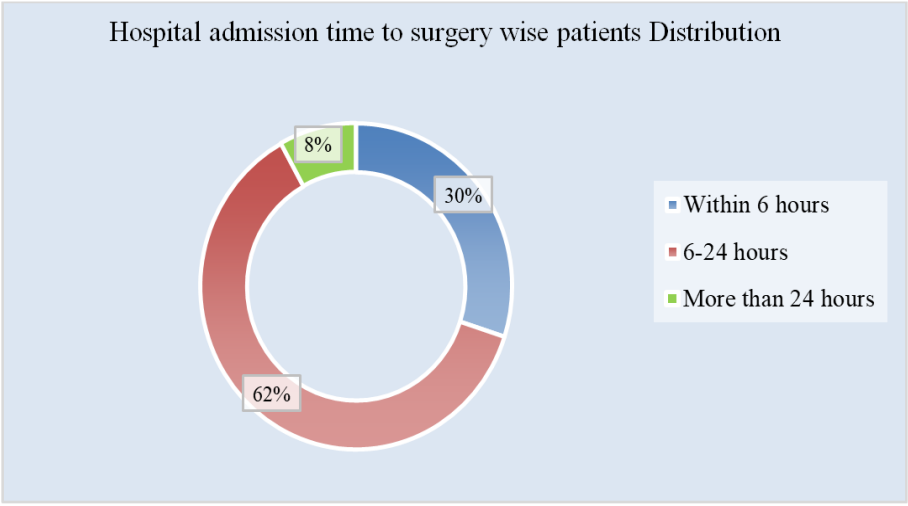


Figure 3: Pie chart showed hospital admission hrs. accomplishing surgery of patients (N=50)

Table IV: Distribution of patients according to their hospital stay postoperatively (N=50)

Days of hospital stays	n	%
1-3 days	35	70.0
4-6 days	13	26.0
More than 6 days	2	4.0

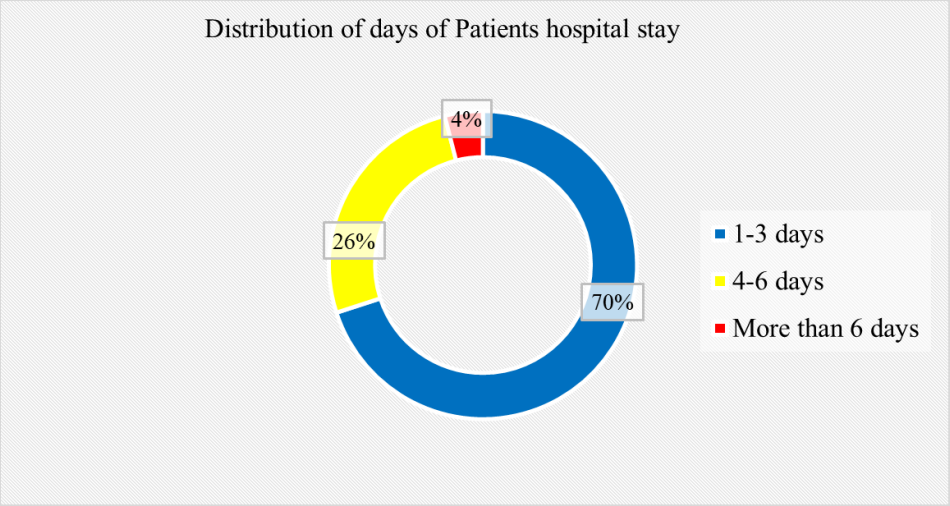


Figure 4: Pie chart showed of days of Patients Hospital stay (N=50)

Table IV showed the hospital stay days of patients. According to the analysis, maximum was 70% was 1-3 days and minimum was 4%, more than 6 months.

Table V: Distribution of patients according to infection in postoperative period (N=50)

Infection	n	%
No infection	43	86.0
Presence of infection	7	14.0

Table V showed the patients postoperative infection. It was found that only 7(14%) patients had infection. On the other hand, the majority of the 43(86%) patients didn't face infection.

Table VI: Distribution of patients according to having postoperative penile nodule (N=50)

Penile nodule	n	%
Present	13	26.0
Absent	37	74.0

Table VI showed the presence of the penile nodule of patients at post-operative stage. It was revealed that in 13(26%) patients had found penile nodule while majority of the patient 37(74%) did not complain about penile nodule the end of three months.

Table VII: Distribution of patients according to penile curvature (N=50)

Penile curvature	n	%
Present	7	14.0
Absent	43	86.0

Table VII showed the patients penile curvature at post-operative. It was stated that only 7(14%) patients mentioned that they have developed curvature in the phallus post-operatively, while majority patients did not complain about penile curvature.

Table VIII: Distribution of patients according to painful erection (N=50)

Painful erection	n	%
Present	8	16.0
Absent	42	84.0

Table VIII showed regarding erection of patients in the post-operative period at the end of three months, most of the patients 42(84%) mentioned that they did not encounter any painful erection during coitus. On the other hand, only 6(16%) patients shared no painful erection during copulation.

Table IX: Distribution of patients according to their erectile function (N=50)

Erectile function	n	%
Normal function (IIEF-6>22)	33	66.0
Mild erectile dysfunction (IIEF-6=12-16)	10	20.0
Mild to moderate erectile dysfunction(IIEF-6=12-16)	4	8.0
Moderate erectile dysfunction (IIEF-6=8-11)	1	2.0
Severe erectile dysfunction(IIEF-6=5-7)	2	4.0

Table IX showed the, according to the International Index of Erectile Function (IIEF). Current study revealed 33(66%) patients reported attempts at sexual inter-course as being satisfactory most or all of the time. These patients demonstrated no evidence of erectile dysfunction, while 10(20%) patients reported symptoms of mild ED, 4(8%) patients reported mild to moderate ED, 1(2%) patient experienced moderate ED and 2(4%) patients mentioned severe ED. The erectile function ranging from 5 to 30 with the mean value was 22.52 ± 5.73.

Table X: Distribution of patients according to painful erection and erectile dysfunction (N=50)

Painful erection	Erectile dysfunction					
	Normal	Mild	Mild to moderate	Moderate	Severe	Total
Present	1	2	2	1	2	8
Absent	32	8	2	0	0	42

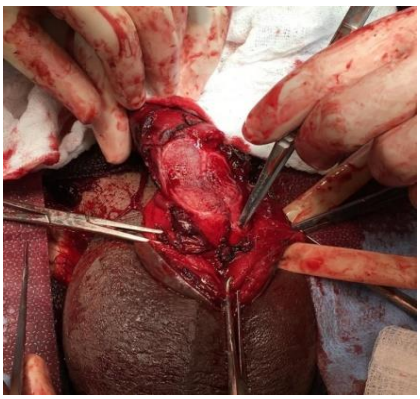
Table X showed the, this is a cross tabulation between having post-operative painful erection and erectile function. It was revealed that 8 patients have complained about painful erection and among them one had normal erectile function. Among the others two had mild, two had mild to moderate, one had moderate and two had severe erectile dysfunction. On the other hand, 42 patients did not complain of painful erection and among them 32 patients had normal erectile function. Among the others eight had mild and two had mild to moderate erectile dysfunction (Table X).

Table XI: Distribution of patients according to the time elapsed from hospital admission to surgery and erectile function (N=50)

Admission to Surgery	Erectile dysfunction					
	Normal	Mild	Mild to moderate	Moderate	Severe	Total
Within 6 hours	12	2	1	0	0	15
6-24 hours	20	5	3	1	2	31
>24 hours	1	3	0	0	0	4

Table XII: Distribution of patients according to their age group and erectile function

Age group years	Erectile dysfunction					
	Normal	Mild	Mild to moderate	Moderate	Severe	Total
18-28 yrs.	12	2	0	0	0	14
28-38 yrs.	16	5	2	0	1	24
38-48 yrs.	2	2	0	1	1	6
48-58 yrs.	3	1	1	0	0	5
58-68 yrs.	0	0	1	0	0	1
Total	**33**	**10**	**4**	**1**	**2**	**50**



Photograph 1: Penile fracture with bilateralcorporal tears and complete urethral disruption Kushan *et al.*, 2017 [21]

Photograph 2: Tear in the tunica albuginea with clot overlying it Rajendra *et al.*, 2017 [22]

Photograph 3: Tear repaired Rajendra *et al.*, 2017 [22]

DISCUSSION

The rupture of the tunica albuginea of the corpora cavernosa defines as penile fracture that occurs with the organ in an erectile position. Diagnosis is made by history and clinical examination, and the classic triad of an audible cracking sound, followed by immediate detumescence and pain, is usually present. Although imaging may be required for better evaluation, usually it is unnecessary. In the present study it was observed that patients were aged from 18- 65 years with the highest number (48%) in 28-38 year's age group, majority of respondents (70%) were married. Zargooshi *et al.*, in 2000 reported on the long term outcome of surgical repair in 170 patients with a mean age of 27 years. [6] Current study revealed that the time elapsed from hospital admission after the incident to surgery was ranged from four hours to thirty-five hours with a mean time of 14.32 hours and majority (62%) of the subjects were in the group of 6-24 hours. Whereas Rajendra *et al.*, reported in their study in 2017 that the mean time interval between injury and presentation was 22 hours and between presentation and repair was 10 hours [22]. In our study penile fracture was diagnosed by gathering proper history of the incident and appropriate clinical assessment in all patients and surgical repair was chosen as the standard treatment of penile fractures. Others study also mentioned that it is widely accepted that the diagnosis of penile fracture is mainly based on the clinical history, with the patients describing a sudden cracking sound, pain and immediate detumescence [14, 18]. Many other investigators considered that caver nosography, ultrasound, and MRI all have a role in diagnosis for patients presenting with equivocal symptoms [23, 24].

In our study we did not consider conservative treatment appropriate for the management of fracture penis and no conservative management was tried in our setting. Morey *et al.,* 2004 found that conservative treatment leads to significantly worse outcomes, including significant degrees of erectile dysfunction and penile curvature as well as a much longer mean hospital stay of 14 days vs. 3.8 for surgically managed patients [23]. There are advocates of conservative treatment with compressive bandages, administration of NSAIDs, and drugs to prevent erection, and even proteolytic enzymes, as well as longer catheterization [25]. However, there is agreement that this approach increases complications such as the formation of abscesses, penile curvatures, or persistent hematomas requiring delayed surgery. In addition, late complications such as fibrosis and angulation from increased complications, it raises the mean stay were found in 35% of cases and impotence in 62% [26]. Aside from increased complications, it raises the mean stay of the patient to about 14 days [27]. Interestingly enough, another study found that early surgical intervention (1-24 hours vs. 30 hours-7 days) may not reduce the complication rate related to this injury [13]. Karadeniz *et al.,* 1996 and Gottenger *et al.,* 2000 stated that most important factor leading to late complications was the delay between the injury and surgery [28, 29]. This study also unveiled that the hospital stay after operation was ranged from one day to seven days with a mean of 2.74 days and predominant respondents (70%) were in the spell group of 1-3 days. Borja *et al.,* 2012 stated that mean hospital stay was 3 days, with a range of 1 to 9 days [29]. Post-operative complications those are assessed in the current study are as follows infection (N=07; 14%), penile nodule (N=13; 26%), penile curvature (N=07;14%), painful erection (N=8; 16%) and erectile dysfunction (N=17; 34%). Erectile dysfunction was found to be the most common complication. May be it was related to fear and embarrassment that have gone through by the respondents. Hinev *et al.,* 2000 stated that only 16% of their series (N=25) developed penile nodules and 8% developed penile curvature after a period exceeding 1year [31] that The percentage of penile curvature is around 5%, stated by McEleny *et al.,* 2006 [32]. Therefore, on complications it seems that the follow-up period should be longer to reach a final conclusion. Painful erection was reported during the first few months only. Therefore, painful erections seem to be common complications during first months; however, these complications subside with time and rarely persist [20, 32]. Both groups treated with either immediate or delayed surgical repair, painful erection, wound infection, penile edema, and temporary loss of sensation over the penile skin disappeared with time. Eke *et al.,* 2002 reported long- term sequel after penile fracture repair include: penile deviation, painful intercourse, painful erection, erectile dysfunction, priapism, skin necrosis, arteriovenous fistula, urethra-cavernous fistula, and urethral stricture [2]. Morey *et al.,* 2015 and El-Taher *et al.,* 2004 reported that immediate surgical reconstruction results in faster recovery, decreased morbidity, lower complication rates, and lower incidence of long-term penile curvature [33, 34]. While immediate repair results in penile curvature in less than 5% of patients, conservative management of penile fracture has been associated with penile curvature in more than 10% of patients, abscess or debilitating plaques in 25% to 30%, and significantly longer hospitalization times and recovery [33]. El- Assmy *et al.,* 2011 noted no difference in serious long- term complications between those who were treated surgically following an early or delayed presentation [13]. Current study revealed erectile function ranging from 5 to 30 with the mean of 22.52 ± 5.73. 33(66%) patients reported sexual inter-course as being satisfactory most or all of the time when they attempt. These patients demonstrated no evidence of erectile dysfunction (IIEF-6 >22), while ten patients (20%) reported symptoms of mild ED (IIEF-6=17-21), four patients reported mild to moderate ED (IIEF-6=12-16), one patient experienced moderate ED and two patients mentioned severe ED at the time of interview. Zargooshi *et al.,* in 2000 reported on the long term outcome of surgical repair in 170 patients [35]. The mean time interval between injury and presentation was 22 hours and between presentation and repair was 10 hours. Mild to moderate erectile dysfunction was reported by eight patients. Rajendra *et al.,* in 2017 interviewed 15 patients of whom 13 were sexually active [22]. Attempts at sexual inter-course as being satisfactory most or all of the time 13(86.6%) patients reported. These patients demonstrated no evidence of erectile dysfunction, 1 patient reported symptoms of mild ED and 1 patient reported mild to moderate ED. Patients did not complain of any bending of penis in erect and non-erect positions. Pavan *et al.,* in 2014 touches on another important but under-reported consequence of penile fractures the fear of incurring another injury [36]. Current study revealed that there is a significant relationship between having painful erection and erectile function of the patients at the time of interview [X^2=23.44, df=4, p=0.000], means that those patients those who have painful erection complained of erectile dysfunction more frequently than those who did not have painful erection. This is specifically the case for ED, curvature and painful erections. The relationship between the time elapsed from hospital admission to surgery and erectile function at the time of interview in this study was not significant [X^2=10.39, df=8, p=0.239]. It means that preservation of erectile function did not depend on delay intervening the time of hospital admission and undergoing surgery for fracture penis. The timing of surgery may also influence long-term success those undergoing repair within 8 hours of injury had significantly better long-term results than did those having surgery delayed 36 hours after the fracture occurred stated by Asgari *et al.,* in 1996 reported [12]. In a study Kozacioglu *et al.,* 2011 reported no serious deformity or ED as a

consequence of delay in surgery within a given timeframe in 56 penile fractures, in terms of number of hours to presentation [37]. Present study established a relationship between age group and erectile function at the time of interview was significant [X^2=27.08, df=16, p=0.041]. It means that conservation of erectile function was dependable factor for different age group. It is very much true that, information concerning factors related to penile fracture is always obtained by the story that patients tell their doctors. Given the intimacy and taboos of patients 'sexual life, a large number preferred to omit details while the others might have been imprecise about the real truth.

Limitations of the Study

Sample size was small, so it might not reflect the actual result of the study. It was a single centered study. Sampling technique was purposive. Blinding was not possible. Other stent related symptoms like haematuria, infection, sexual dysfunction was not considered.

CONCLUSION AND RECOMMENDATION

This study was aimed to compare the outcomes of Tamsulosin and Solifenacin to relieve stent related symptoms. We conclude that Tamsulosin is more effective than Solifenacin in this regard. Tamsulosin can be recommended to relieve stent related symptoms. However, a large scale multicenter, double blind, placebo controlled study should be done to find out the actual scenario.

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