Investigating the Outcome of Surgery in Patients with Penile Fracture

Hamid Mazdak, Hanieh Salehi, Zahra tolou ghamari, Reza Kazemi*

Purpose: The aim of study was to investigate the outcome of surgery in patients with penile fracture in Al-Zahra hospital.

Materials and Methods: This cross sectional study was conducted on 187 patients with penile fracture underwent surgery in Al-Zahra hospital during 2016- 2020. Data such as penile fracture causes, erectile dysfunction, time of surgery after penile fracture, degree of penile curvature and etc were extracted from medical records.

Results: The most common reason of penile fracture in these patients was manipulation and trauma with frequency 70 (37.4%) and 69 patients (36.9%), respectively. Lower urinary tract symptom, urinary tract injury, penile curvature, penile nodule and erectile dysfunction were observed in 1 (0.54 %), 2(1.06 %), 76 (40.64%), 75 (40.1%), 43 (23%) patients, respectively. Mild and moderate erectile dysfunction was seen in 38 (88.3%) and 5 (11.62%) patients, respectively. There was a significant relationship between erectile dysfunction with the degree of penile curvature, surgical time and size of defect ($P < .01$). Furthermore, significant relation was observed between penile nodules and suture type ($P = .000$).

Conclusion: According to findings, erectile dysfunction was observed in 23 % of patients; however most of these patients had mild erectile dysfunction. Moreover, erectile dysfunction was influenced by penile curvature, surgical time and size of defect. Therefore, early surgery and special attention to patients with severe penile curvature are proposed for prevention of erectile dysfunction in these patients.

Keywords: erectile dysfunction; penile curvature; penile fracture; penile nodule

INTRODUCTION

Penile fracture is defined as disruption of tunica albuginea of corpus cavernosum[1]. This rare injury may occur due to anal intercourse, vigorous vaginal, forceful manipulation, gunshot wounds, masturbation, or any other mechanical trauma[2,3]. Other reasons of penile fracture include rolling in bed on the erect penis[4] and using collagenase clostridium histolyticum in treatment of Peyronie's disease[5]. The most common reason of this injury in Europe and United States is trauma during sexual intercourse[1,6]. Approximately 8 % of the cases of penile fracture in Iran were attributed to sexual intercourse and remaining cases were related to self-manipulation and other factors[7,8]. The events following this injury includes popping and cracking sound accompanied with sudden pain, quick detumescence, deviation of the penis to the opposite side of the injury and swelling and ecchymosis[9]. Recognized physical findings including edema, penile deformity, ecchymosis and patient history often indicate the diagnosis, and additional imaging procedures are often not necessary[9]. Various imaging modalities such as ultrasound[10], MRI[11] and cavernosography[1] have shown different levels of utility in cases of equivocal diagnosis. Treatment contains the use of anti-inflammatory drugs and cold compresses[1]. But these forms of treatments are not acceptable, due to high rate of complications[3]. Today, prompt surgical repair is accepted as choice therapy in these patients[12-14]. Surgical management includes hematoma evacuation, penile exploration, local defect in the tunica albugine, and urethra with subsequent repair of those injuries. Prompt repair of penile fracture prevents urinary incontinence, penile dyspareunia, or pain during intercourse [3]. However, postoperative common complications include penile nodules, lower urinary tract symptom and urinary tract injury and erectile dysfunction. But other studies reported that penile fracture repair has no effect on sexual function. They also reported that lower complication rate in these patients is due to immediate surgical correction of the penile[15].

Prevalence of penile fracture in recent years is increasing and few studies have been conducted regarding the outcome of surgery in patients with penile fractures in our country. Moreover, no study is conducted regarding the role of postoperative surgical time and degree of penile curvature on erectile dysfunction in our region, therefore, the aim of current study was to investigate the outcome of surgery in patients with penile fracture in educational hospital of Isfahan.

Department of Urology, Isfahan University of Medical Sciences, Isfahan, Iran.
*Correspondence: Department of Urology, Isfahan University of Medical Sciences, Isfahan, Iran.
Rezakazemi201978@gmail.com
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Table 1. Frequency and mean quantitative parameters of patients with penile fracture in terms of penile fracture

Parameters	Frequency (percent)
Reason of Penile fracture	
Trauma*	69 (36.9)
Intercourse	48 48 (25.7)
Manipulation	70 70 (37.4)
Total	187 (100)
Marital status	
Single	84 (44.9)
Married	103 (55.1)
Total	187 (100)
Fracture side	
Right	72 (38.5)
Left	90 (48.1)
Ventricle	21 (11.2)
Dorsal	4 (2.1)
Total	187 (100)
The sound of a fracture	
Yes	145 (77.5)
No	42 (22.5)
Total	187 (100)
Location of injury	
Proximal	56 (29.9)
Medial	99 (52.9)
Distal	29 (15.5)
Proximal and Distal	3 (1.6)
Total	187 (100)
Sexual impotence (Erectile Dysfunction)	
No	144 (77)
Yes	43 (23)
Total	187 (100)
Erectile Dysfunction	
Mild	38 (88.3)
Moderate	5 (11.62)
Total	43 (100)
Penile nodule	
No	112 (59.9)
Yes	75 (40.1)
Total	187 (100)
The size of defect (cm)	
≤ 2	161 (86.09)
>2≤4	22 (11.77)
> 4	4 (2.14)
Total	4 (2.14)
Urinary tract injury	
No	185 (98.94)
Yes	2 (1.06)
total	187 (100)
Suture type	
Monocryl	86 (46)
Vicryl	101 (54)
Total	187 (100)
Surgical cleft	
Circumcision	167 (90.4)
Longitudinal	18 (9.6)
Total	187 (100)
Lower urinary tract symptom	
No	186 (99.46)
Yes	1 (0.54)
Total	187 (100)
Penile curvature	
Yes	76 (40.64)
No	111 (49.3)
Time of the first intercourse after surgery (day)	
Less than 30 days	17 (9.09)
After 30 days 170 (90.9)	
Age, year; mean ± SD (range)	32.91 ± 12.69 (16-75)
Time of surgery after Penile fracture hours; mean ± SD (range)	9.96 ± 11.32 (3-72)
Duration of hospitalization; day; mean ± SD (range)	1.09 ± 0.33 (1-3)

*Manipulation: Fracture by the person by manipulation during erection
Intercourse: Fractures when the penis enters the vagina
Trauma: Anything other than the above two

Table 2. Relation between erectile dysfunction with parameters

Parameters mean ± SD (range)	Erectile dysfunction *P*-value Correlation coefficient
Degree of penile curvature	
Group 1: 3.78 ± 6.59 35-0))	.000
Group 2: 21.6±15.8 45-0))	0.41
Postoperative surgical time	
Group 1: 8.06±7.54 (48-3)	.004
Group 2: 16.30±17.89 (48-4)	0.25
Size of defect	
Group 1: 1.37±0.59 (0.5-5)	.008
Group 2: 2.33± 1.3 (0.7—7)	0.30

Group 1: without erectile dysfunction; group 2: erectile dysfunction

MATERIALS AND METHODS

Study population

This cross sectional study was conducted on 187 patients with penile fracture who underwent surgery in Al-Zahra hospital, Isfahan, Iran during 2016- 2020. Before collecting samples, this study was approved by Isfahan University of Medical Sciences (number: IR.MUI.MED.REC.1399.058).

Inclusion and exclusion criteria

All patients with penile fractures were included in the study. Moreover, exclusion criteria were penile curvature, urinary symptoms and sexual impotence. In addition, patients with incomplete information were excluded from study.

Procedure

All patients with penile fracture underwent surgery in Alzahra hospital, Isfahan, Iran. All patients were followed up 3 months after surgery. Data such as age, size of defect, penile fracture causes (manipulation, intercourse, trauma), marital status, side of fracture, sound of fracture, location of injury, erectile dysfunction, sexual impotence, penile nodules, urinary tract injury, suture type and lower urinary tract symptom were extracted from medical records and entered to questionnaire. In addition, other data including time of surgery after penile fracture, duration of hospitalization, time of the first intercourse after surgery and degree of penile curvature were entered to questionnaire. Extent of penile deviation was measured through images which are taken of the penis in the state of erection.
In addition, erectile function was assessed by international index of erectile function (IIEF), based on ED questionnaire.

Statistical analysis

Data were entered to SPSS, version 19. Qualitative variables were shown as frequency and quantitative parameters as mean± SD. Relation between erectile dysfunction with parameters was assessed by Chi-square test. Then, for determination of coefficient correlation, we used Lambda coefficient correlation. P<0.05 was assumed significant.

RESULTS

Frequency and mean quantitative parameters of patients with penile fracture in terms of characteristics such as penile fracture causes, marital status and etc is shown in **Table 1**.
As shown in Table 1, erectile Dysfunction and penile

curvature was seen in 23 % and 40.64 % of patients, respectively. Relation between erectile dysfunction with degree of penile curvature, postoperative surgical time, size of defect and surgical cleft is shown in **Table 2**.
Relation between erectile dysfunction with parameters was assessed by chi square. Lambda coefficient correlation was used for determining coefficient correlation. $P < 0.05$ was assumed significant.
As shown in Table 2, there was significant relation between erectile dysfunction with degree of penile curvature, postoperative surgical time, and size of defect ($P < .01$). Furthermore, significant relation was observed between penile nodules and suture type ($P = .000$, coefficient correlation=0.68).

DISCUSSION

Management of penile fracture with emergency surgical repair is the most effective approach in these patients. However, postoperative complications including erectile dysfunction, penile nodules, penile curvature and painful erection or intercourse are common in penile fracture patients[16]. The most reason of penile fracture in this study was manipulation. Ibrahim et al., reported the most common cause of penile fracture in Egypt was sexual intercourse[17]. Jack et al., reported that only 19 % of causes of penile fracture in Japan is sexual intercourse and other causes of penile fracture are rolling over in bed onto an erect penis and masturbation[18]. Shafi et al., conducted a study on patients of Babol province and reported that masturbation is a main reason of penile fracture in this area[3]. Kochakarn et al., reported that the most common cause of penile fracture was sexual intercourse (83%) and masturbation (16. 6%)[14]. Reise et al., in a study in Brazil reported that the most dangerous condition for penile fracture was sexual intercourse in status of woman on top[16]. Other studies reported that the cause of half of cases of penile fracture in Middle East is manual bending of erected penis for achieving detumescence. They believed that this is due to lack of sexual education or cultural belief in this area as evidenced by the extensive practice. Shafi et al., conducted a study on patients of Babol province and reported that masturbation is a main reason of penile fracture in this area[3]. Therefore, it seems that the cause of penile fracture is mainly related to geographic area and cultural circumstances[3].
Postoperative erectile dysfunction was also seen in 23 % of patients of our study. In this regard, 38 patients had mild erectile dysfunction and 5 had moderate erectile dysfunction. In addition, we observed a significant relation between postoperative erectile dysfunction and surgical time. Nason et al., assessed the outcome of sexual function following penile fracture in 21 patients and observed 1 patient with symptoms of mild erectile dysfunction (ED) and 1 patient with mild to moderate ED (19-24). In addition, 14 patients did not demonstrate evidence of erectile dysfunction. They also reported that sexual satisfaction in long term was promising. Swanson et al., assessed penile fracture in 29 patients in northwestern Memorial hospital and reported 9 patients (31 %) with mild erectile dysfunction. The incidence of erectile dysfunction in this study was higher than our study. El-salami et al., assessed erectile dysfunction in 180 patients with penile fracture after 106 months follow-up and observed 3.8 % patients with mild erectile dysfunction and 2.2 % with moderate erectile dysfunction (25). It seems that the difference between our study and El-salami's study may be due to the difference in age range of patients[26] and surgical time. Muentener et al., in a study evaluated patients with penile fracture who underwent surgery and observed good outcome in 92% of patients. Immediate surgery leads to excellent findings and is superior to non-operative treatment in patients with penile fracture[2]. Other research and guidelines are strongly proposed prompt surgical therapy of penile fracture due to early return of sexual activity and less morbidity[27].
In addition, degree of penile curvature affected sexual impotence in our study. Burri et al., also reported that men with stronger curvature had more overall sexual dissatisfaction, which was consistent with our study[28]. Urai et al., reported no significant relation between penile curvature severity and comorbidities in men with Peyronie's disease[29]. Therefore, more studies are needed regarding the role of penile curvature and sexual impotence. Furthermore, size of defect was another parameter that affected erectile dysfunction in our study. Few studies have been performed considering erectile dysfunction and size of defect, but Levine et al., reported that size of defect did not affect erectile dysfunction [30]. Kati et al., reported that the size of defect in patients with penile fracture was in the range 0.3-3.6 cm; however, they did not assess relation of erectile dysfunction and defect size[31]. It seems that more studies should be conducted in this regard.
In our study, postoperative penile nodules were observed in 40.1 % of patients. Atyeh et al., conducted a study on patients with penile fracture and observed that penile nodules as the most common postoperative complications were seen in 41.7 % of patients[32]. These findings were almost like to our study. Kominsky et al., reported that penile nodules were observed in 13.7 % of patients[1]. According to the findings of our study, one of the influential factors on penile nodules was suture type. In this regard, vicryl led to more nodules than monocryl. Regan et al., also compared monocryl (poliglecaprone-25) and vicryl (polyglactin-910) in patients with penile fracture and observed superiority of monocryl than vicryl, regarding penile nodules[33]. This finding was consistent with our study. Niessen et al., compared poligecaprone-25 and polyglactin-910 and found that poligecaprone-25 led to less hypertrophic scars[34]. Therefore, it is proposed to pay more attention to the type of suture in the surgery of patients with penile fractures.

CONCLUSIONS

According to these findings, erectile dysfunction was observed in 23 % of patients; however, most of the patients had mild erectile dysfunction. Moreover, erectile dysfunction was also influenced by penile curvature, surgical time and size of the defect. Therefore, early surgery and special attention to patients with severe penile curvature are proposed for prevention of erectile dysfunction in these patients.

CONFLICT of INTEREST

There is no conflict of interest.

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