Early surgical repair or conservative treatment? Comparing patients with penile fracture concerning long-term sexual functions

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ABSTRACT

BACKGROUND: To compare the patients who underwent early surgical repair of penile fracture, which is one of the urological emergencies, and patients who recovered with conservative treatment concerning long-term sexual functions.

METHODS: The data of 42 patients who applied to our clinic with penile fracture between January 2010 and January 2020 were retrospectively analyzed. The patients were categorized into two groups as early operated and followed-up conservatively. The preoperative and postoperative findings of the patients were compared with the International Erectile Function Scale (IIEF-6) scores in the long-term follow-up.

RESULTS: The median age of the patients was 35 (20–65) years and the median follow-up period was 52 (8–120) months. The postoperative mean IIEF-6 score of the patients was 22.98±6.52. There was no significant difference between the surgical and the conservative groups concerning postoperative complications (p=0.460). In the follow-up period, the presence of palpable plaque on the rupture area was significantly higher in the conservative group (p=0.041). However, there was no significant difference between the groups concerning IIEF-6 scores (p=0.085).

CONCLUSION: Although there is no significant difference in long-term IIEF-6 scores between the two groups, the rate of palpable plaque formation is higher in patients followed-up conservatively. Therefore, early surgical repair should be considered in the foreground, especially in patients with a large rupture area.

Keywords: Conservative treatment; penile fracture; sexual functions.

INTRODUCTION

Penile fracture is one of the rare urological emergencies that arises from the rupture of the corpus cavernosa tunica albuginea layer as a result of external trauma of the erect penis. [1] Its incidence is reported as 1/175,000.[2] The most common etiological factor is reported as sexual intercourse in the USA and European countries.[3] However, forceful bending applied to the penis to provide fast detumescence of the erect penis known as “Taqaandan” in Middle Eastern and North African countries has an important place in fracture etiology. [4] Masturbation, falling on the erect penis and Clostridium histoliticum collagen injection into the penis for the treatment of Peyronie’s disease is among other etiological factors. [5] Generally, the “pop” sound of a fracture in the penis after trauma and the subsequent pain and sudden detumescence story are typical in patients.[6] Edema, ecchymosis and shape deformity in the penis, known as “eggplant deformity”, are observed in the physical examination (Fig. 1). The diagnosis can be almost certainly made by history and physical examination, but additional tests may be required to evaluate the location and size of the rupture and the presence of urethral defect.[7] Ultrasonography and MRI are helpful tests in diagnosis. In addition, retrograde urethrogram (RGU) and...
cystoscopy are recommended in the trauma guideline of the European Association of Urology (EAU) to evaluate urethral integrity. Although penile fractures were initially followed conservatively, early surgical repair has been reported to yield better results since 1971, and surgical repair has taken its place as the priority treatment option. The conservative approach is currently recommended in selected cases with small defects and limited penile deformity. One of the most important problems in patients with penile fractures is sexual problems, such as erectile dysfunction (ED), penile pain and penile plaque formation that may develop in the long term. There are several studies in which penile fracture patients with surgical repair and patients followed conservatively were evaluated separately in terms of sexual functions. However, the number of studies comparing these two approaches concerning sexual functions in the long term is very limited in the literature. Therefore, in this study, we aimed to compare the effects of these two treatment options on the long-term sexual functions of patients.

MATERIALS AND METHODS

After obtaining ethical approval from the ethics committee of our hospital, the data of 42 patients who admitted to our clinic with a penile fracture between January 2010 and January 2020 were analyzed retrospectively. Etiological factors of fracture, tunica albuginea defect size, fracture localization and accompanying urethral rupture were determined and recorded. While emergency ultrasonography was performed in all patients, MRI was performed in eight patients and RGU was performed in six patients with a suspected urethral rupture, and cystoscopy was performed in five patients. Tunica albuginea defect size was measured by penile Doppler ultrasonography. The tunical defect <1.5 cm was classified as small defect. Patients were divided two groups as a conservative follow-up group and surgical repair group, according to the treatment approach applied. Conservative treatment was considered in the foreground in patients with a defect area smaller than 1.5 cm, with no advanced hematoma and penile deformity, while early surgical treatment was applied in other patients.

Following urethral catheterization, mild-to-moderate pressure penile bandage was applied to the patients in the conservative follow-up group (Fig. 2), oral 3rd generation cephalosporin was administered and the penile bandage was removed on the 7th day. Later, the patients were called for control once a week for a month. In three patients with de novo urethral rupture, a urethral catheter was placed during cystoscopy and the catheter was removed after 7th day. Then, the patients were called for control at 3rd, 6th, and 12th months and were evaluated for possible urethral stricture and penile plaque development. Penile plaque formation was determined by physical examination and the patients with a suspected penile plaque were investigated by penile Doppler ultrasonography. Surgery was performed with circumferential penile degloving technique in patients with an early surgical repair. After a 16–18 F urethral catheter was placed in the bladder, a suspension suture was placed on the glans penis and the penis was degloved all around, then, the tunical defect area was detected. Hematoma and necrotic tissue were excised carefully and the defect area was seen clearly. Then, absorbable 2/3-zero Vicryl suture was used for the repair of the rupture area using the brying knot technique. On the postoperative 1st day, the patients were discharged by starting oral 3rd generation cephalosporin after the urethral catheters were removed. Patients in the surgery group were given daily outpatient dressing for one week and were called for control at the 1st...
3rd, 6th and 12th months after the 1st week. A ban of sexual intercourse for at least six weeks was recommended for all patients in both groups. International Erectile Function Scale (IIEF-6) scores were determined by telephone calling and questioning the patients. Six questions were asked by patients and score points between 1–30 points are obtained from the IIEF-6 scoring system, which has been validated in Turkish.[13] According to this scoring system, 10 points or less severe ED, 11–16 points moderate ED, 17–21 points mild-moderate ED, 22–25 points mild ED and 26–30 points are considered normal. The results of the patients were evaluated and the groups were compared.

Statistical Analysis
All statistical analyses were performed using the SPSS 24.0 (IBM Corp., Chicago) software for Windows. In the univariate analysis, the Chi-Square Test was used for nominal data, while the Mann-Whitney U test was used for nonparametric variables. A p-value of <0.05 was considered statistically significant.

RESULTS
The patients’ median age was 35 (20–65) years, and the median follow-up time was 52 (8–120) months. It was observed that 22 (52.4%) of the patients were in the surgical repair group, and 20 (47.6%) were in the conservative follow-up group. While sexual intercourse was the etiological factor causing fractures in 30 (71.4%) of the patients, trauma caused by falling on the erect penis in six (14.3%) patients, rigid masturbation maneuver in four (9.5%) patients and a history of taqaandan in two (4.8%) patients. The mean IIEF-6 score was 22.98±6.52 in the long-term follow-up. The total characteristic data and follow-up results of the patients are shown in Table 1. The patients’ median age was 29.5 (20–65) years in the conservative follow-up group, while it was 39.5 (21–57) years in the surgical repair group, but there was no significant difference between the groups (p=0.221). There was no significant difference between conservative and surgical groups concerning etiological factors of fracture and fracture location (p=0.998 and p=0.984, respectively). De novo urethral rupture was detected in three (15%) patients in the conservative follow-up group, whereas no urethral rupture was detected in the surgical repair group (p=0.099). The mean size of TA defects in the conservative follow-up group was 9.55±3.34 mm, while it was 11.23±5.87 mm in the surgical repair group, but there was no significant difference between the groups (p=0.621). Penile plaque development was observed in six (30.0%) patients in the conservative follow-up group, while it was detected in only one (4.5%) patient in the surgical repair group, and penile plaque development was significantly higher in the conservative follow-up group (p=0.041). Concerning IIEF-6 scores, it was observed that the surgical repair group was slightly more advantageous than the conservative follow-up group, but there was no statistically significant difference between the groups (24.91±4.83 vs 20.85±7.54, p=0.085). Comparative data of the groups are shown in Table 2.

DISCUSSION
Penile fracture, which is one of the rare, urgent urological cases, was first described by Malis and Zur in 1924 and present in the modern medical literature.[14] External trauma to the erect penis is mostly caused by the backward bending of the erect penis in the position where the woman is on top during sexual intercourse.[15] In our study, it was determined that while sexual intercourse took the first place in 30 (71.4%) patients in fracture etiology, the “Taqaandan” maneuver was culturally present, especially in the Eastern and Southeastern regions of our country and two (4.8%) patients applied with a penile fracture formed for this reason. External trauma caused by falling onto the erect penis was detected in six (14.6%) patients, while four (9.5%) patients had a history of hard masturbating manipulation, and our findings are consistent with the literature data.

Penile fractures are commonly seen in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the fractures were in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the fractures were in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the fractures were in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the fractures were in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the fractures were in the region close to the suspensory penile ligament and more rarely in the mid-penile and distal penile regions.[16] Similar to the literature in our study, the most common localization of the
fracture was observed in 27 (64.3%) patients in the ventrolateral of the proximal penis. Many surgical techniques aiming to reach the fracture area easily and reduce the risk of neurovascular damage have been defined. Circumferential penile degloving, a direct longitudinal incision in the damaged area, inguino-scrotal approach, midline raphe incision and suprapubic approach techniques are the main surgical methods.[17] In our study, the penile degloving technique with a circumferential incision was applied in all patients in the surgical repair group. This technique allows all hematoma accumulated in the dartos layer to be evacuated and all necrotic tissues caused by hematoma to be removed. In addition, De-novo urethral damage repair can be performed easily in necessary cases. On the other hand, although the selection of the suture material used in the repair of the fracture area varies in various studies, it has been reported that the use of both non-absorbable and absorbable sutures provides similar results.[16,17]

Table 2. Comparison of the groups

|                          | Conservative (n=20) | Operation (n=22) | p-value |
|--------------------------|--------------------|------------------|---------|
| Age, median (range), years | 29.5 (20–65)       | 39.5 (21–57)     | 0.221   |
| TA defect size, mean±SD, mm | 9.55±3.34         | 11.23±5.87       | 0.621   |
| IIEF-6 score, (0–30), mean±SD | 20.85±7.54        | 24.91±4.83       | 0.085   |
| Etiolog, n (%)          |                    |                  | 0.998   |
| Sexual intercourse      | 14 (70.0)          | 16 (72.7)        |         |
| Trauma                  | 3 (15.0)           | 3 (13.6)         |         |
| Masturbation            | 2 (10.0)           | 2 (9.1)          |         |
| Taqandan                | 1 (5.0)            | 1 (4.5)          |         |
| Fracture location, n (%)|                    |                  | 0.984   |
| Distal penile           | 2 (10.0)           | 2 (9.1)          |         |
| Mid- penile             | 5 (25.0)           | 6 (27.3)         |         |
| Proximal penile         | 13 (65.0)          | 14 (63.6)        |         |
| De-novo urethral rupture, n (%) | 3 (15.0)         | 0 (0)            | 0.099   |
| Penile plaque, n (%)    | 6 (30.0)           | 1 (4.5)          | 0.041   |
| Complication, n (%)     |                    |                  | 0.460   |
| Skin infection          | 2 (10.0)           | 1 (4.5)          |         |
| Skin necrosis           | 2 (10.0)           | 0 (0)            |         |
| Urine retention         | 0 (0)              | 2 (9.0)          |         |
| Urethral stricture      | 1 (5.0)            | 1 (4.5)          |         |

In many studies, early surgical repair of penile fracture has been shown to be very successful in preserving sexual functions in the postoperative period. Zargooshi reported the results of 352 patients who were operated on for penile fracture.[18] In this study, 214 (98.6%) of 217 patients who had sexual partners in the postoperative period were reported to be potent and the mean IIEF-6 score of the patients was 29.8±1.1. Additionally, in this study, it was report-
ed that an insignificant palpable nodule was detected in the proximal penis in 330 (93.7%) patients. In another similar study, Sharma et al.[19] reported the results of 20 patients, 14 of whom were sexually active, who underwent surgical repair. In this study, it was reported that the mean Sexual Health Inventory for Men (SHIM) score was 21.36±1.33 and the mean Erection Hardness Score (EHS) was 3.21±0.43, and as a result, sexual functions were well preserved. On the other hand, in this study, it was reported that four of 20 patients had penile nodules and two of them developed insignificant penile curvature. In another recent study, Kati et al.[20] compared the preoperative and postoperative IIEF-5 scores of 56 patients who underwent penile fracture repair and aimed to show the effect of surgical repair on erectile functions. According to this study, the preoperative mean IIEF-5 score of the patients was 22±0.6, while the mean IIEF-5 score at the postoperative 6th month was 20±1.1, and it was reported that erectile functions were well preserved after surgery. In another similar study, Nason et al.[17] reported the results of 17 patients in whom they performed penile fracture repair. According to this study, in the postoperative period, 14 patients had an IIEF-5 score of >22 and their erectile functions were well preserved. Other one patient’s IIEF-5 score was 17–21 (mild ED), and one patient’s IIEF-5 score was 12–16 (mild-moderate ED). However, it was reported that none of the patients had severe ED that could not provide vaginal penetration.
Similar to the literature data, in our study, the mean IIEF-6 score was 24.91±4.83 in patients with an early surgical repair and it was observed that erectile functions were preserved quite well. In the postoperative period, the palpable nodule was detected in only one (4.5%) patient in the early surgery group, and this result supports the idea that early surgical repair significantly reduces the rate of palpable nodule formation and secondary penile curvature. On the other hand, “inverted stitch” suture burying technique with 2/3 zero absorbable Vicryl suture was used in all patients we underwent surgical repair. The suture burying technique we used and the absorbability of the suture might contribute to the reduction of palpable plaque development in the long term. Although early surgical repair is currently the gold standard of penile fracture treatment, conservative follow-up is still an alternative treatment option, especially in selected patients with small TA defects and no advanced penile deformity and penile hematoma.\cite{11,12} The advantages of conservative follow-up include no need for anesthesia, minimal invasiveness, low cost and easy application. Martinez et al.\cite{21} in their article discussing conservative and surgical treatment in penile fracture they stated that early surgical repair provides better results and that it is more advantageous in returning to sexual activity with lower morbidity and shorter hospitalization time. In another recent study, Ouellette et al.\cite{22} reported the results of 32 patients in which they compared conservative follow-up and surgical repair in penile fracture treatment.

According to this study, conservative treatment was applied to 14 (44%) patients with minimal pain, no difficulty in urination, and small ultrasound tear area, while 18 (56%) patients underwent emergency surgical repair. In this study, it was reported that no early postoperative complications developed in 18 (56%) patients who underwent emergency surgery. Additionally, in this study, it was reported that there were no major complications in any patient who underwent conservative treatment or surgical repair; however, five patients with conservative treatment required further surgical repair. In our study, it was observed that there was no difference between the conservative follow-up group and the surgical treatment group in terms of early complications. None of the patients in the conservative follow-up group required subsequent surgical repair. Similar to the literature in our study, it was observed that the mean IIEF-6 score of the patients in the surgical treatment group was slightly better than the conservative treatment group in the long-term follow-up, but there was no statistically significant difference between the groups. However, as a result of our study, it was seen that the formation of palpable plaques causing discomfort in the penis in the conservative follow-up group was significantly higher than the surgical repair group in the long-term follow-up. This result is in accordance with the literature and supports the idea that the defect area is more risky concerning plaque development in the spontaneous recovery process in patients who undergo conservative follow-up.

**Limitations**

Our study has some limitations. The most important limitation was the retrospective nature of our study. Also, the IIEF-6 data of the patients before penile fracture were not recorded. Another limitation was that the presence of penile curvature could not be detected in patients with palpable plaques.

**Conclusion**

Early surgical repair should be considered as the first choice in penile fracture treatment. Early postoperative complication rate of early surgical repair is very low. In addition, early surgical repair is very advantageous in terms of preserving the erectile functions of patients in the long term and achieving good cosmetic results. Although conservative follow-up provides erectile functions similar to early surgical repair, conservative follow-up should be considered, especially in selected patients with a small fracture area and it should be known that the risk of palpable penile plaque that may develop in the long term is high. Early surgical repair should be the primary choice, especially in the presence of extensive hematoma, with a large rupture area and severe penile deformity.

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Erken cerrahi onarım mı konservatif tedavi mi? Penil fraktürlü hastaların uzun dönem seksüel fonksiyonlar bakımından karşılaştırılması

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AMAC: Ürolojik acil olgulardan olan penil fraktürde erken dönem cerrahi onarım yapılan hastalarla konservatif tedaviyle iyileşen hastaların uzun dönemde cinsel fonksiyonlar bakımından karşılaştırılması.

GEREÇ VE YÖNTEM: Klinikimize Ocak 2010 ile Ocak 2020 tarihleri arasında penil fraktür nedeniyile başvuran toplam 42 hastanın verileri geriye dönük olarak incelendi. Hastalar erken dönemde ameliyat edilenler ve konservatif olarak takip edilenler olarak iki gruba ayrıldı. Hastaların ameliyat öncesi ve sonrası bulguları ile uzun dönem takipinde Uluslararası Erektil Fonksiyon Ölçeği (IIEF-6) skorları karşılaştırıldı.

BULGULAR: Hastaların median yaşı 35 (20–65) yıl ve median takip süreleri 52 (8–120) aydı. Hastaların ameliyat sonrası ortalama IIEF-6 skoru 22.98±6.52 bulundu. Ameliyat sonrası komplikasyon varlığı açısından cerrahi yapılan grupla konservatif izlenen grup arasında anlamlı fark bulunmadı (p=0.460). Uzun dönem takipinde rüptür alanında palpe edilen plak varlığı konservatif tedavi grubunda anlamlı olarak yüksek bulundu (p=0.041). Ancak IIEF-6 skorları bakımından gruplar arasında anlamlı fark olmadığı görüldü (p=0.085).

TARTIŞMA: Penil fraktür hastalarında erken cerrahi onarım yapılanlarla, konservatif izlem yapılanlar arasında uzun dönemde IIEF-6 skorları bakımından anlamlı fark yoktur. Ancak konservatif takip edilen hastalarda penise plak oluşum oranı daha yüksektdir. Bu nedenle özellikle rüptür alanı büyük hastalarda acil cerrahi onarım ön plana düşünebilir.

Anahtar sözcükler: Konservatif tedavi; penil fraktür; seksüel fonksiyonlar.

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