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ARAŞTIRMA YAZISI / RESEARCH ARTICLE

PENİL KURVATÜR NEDENİYLE NESBİT OPERASYONU YAPILAN HASTALARIN MEMNUNİYET DÜZEYLERİ VE CERRAHİ SONUÇLARI

SATISFACTION LEVELS AND SURGICAL RESULTS OF PATIENTS WHO HAD NESBIT CORPOROPLASTY DUE TO PENILE CURVATURE

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ÖZET

AMAÇ: Bu çalışmada penil kurvatür nedeniyle Nesbit operasyonu yapılan hastaların cerrahiden memnuniyet düzeyi ve cerrahi sonuçların değerlendirilmesi amaçlanmıştır.

GEREÇ VE YÖNTEM: Ocak 2017 ile Mart 2023 tarihleri arasında tek merkezde penil kurvatür nedeniyle penis konveks yüzeyine Nesbit korporoplastisi yapılan hastalar çalışmaya alındı. Preoperatif dönemde hastaların Uluslararası Erektil Fonksiyon İndeksi ereksiyon fonksiyonu (IIEF-EF) skoru, penis kurvatür açısı, penis boyu ve kurvatür lokasyonu değerlendirildi. Postoperatif dönemde memnuniyet düzeyi, penis deformitesi, penis boyu ve IIEF-EF skorları her üç ayda bir değerlendirildi.

BULGULAR: Çalışmamıza 30 Peyroni hastalığı ve 10 konjenital penil kurvatür hastalığı nedeniyle penil kurvatür gelişen 40 hasta alındı. Postoperatif dönemde 11 (%27,5) hastada kurvatür nüksü izlendi. Kurvatür açısı 20 derecenin altında olan sekiz (%20) hasta vardı. Dokuz (%22,5) hastada postoperatif komplikasyon izlendi ve hastaların %97,5'inde erektil fonksiyonların korunduğu görüldü. Preoperatif IIEF-EF skoru 22,08 ± 3,46 iken postoperatif dönemde 24,02 ± 3,06'ya yükseldi ve paired sample t testine göre postoperatif erektil fonksiyonlar anlamlı olarak yüksek bulundu (p = 0,003). Ortalama penis boyu preoperatif dönemde 13,2 ± 0,57 cm iken postoperatif dönemde 11,8 ± 0,66 cm'di (p <0,001). Vizüel analog skala kullanılarak ölçülen hasta memnuniyet düzeyi 77,37 ± 19,15 olarak bulundu. En sık görülen komplikasyonlar penil hipoestezi ve sütur hissiydi.

SONUÇ: Penil kurvatür tedavisinde Nesbit prosedürü efektif ve güvenli bir tedavi seçeneğidir. En sık görülen postoperatif komplikasyonlar ise penil hipoestezi ve sütur hissiydi.

ANAHTAR KELİMELER: Korporoplasti, Nesbit, Penil kurvatür, Plikasyon, Peyroni hastalığı.

ABSTRACT

OBJECTIVE: In this study, it is aimed to evaluate the satisfaction level and surgical results of patients who were performed Nesbit operation due to penile curvature.

MATERIAL AND METHODS: Patients who were performed Nesbit corporoplasty on the penile convex surface due to penile curvature were included in a single center between January 2017 and March 2023 in the study. In the preoperative period, the patients' International Erectile Function Index erectile function (IIEF-EF) score, penile curvature angle, penile length and curvature location were evaluated. In the postoperative period, satisfaction level, penile deformity, penile length and IIEF-EF scores were evaluated every three months.

RESULTS: 40 patients who developed penile curvature due to 30 Peyronie's disease and 10 congenital penile curvature disease were included in our study. Curvature recurrence was observed in 11 (27.5%) patients in the postoperative period. There were eight (20%) patients whose curvature angle was less than 20 degrees. Postoperative complications were observed in 9 (22.5%) patients and erectile functions were preserved in 97.5% of the patients. While the preoperative IIEF-EF score was 22.08 ± 3.46, it increased to 24.02 ± 3.06 in the postoperative period, and postoperative erectile functions were found to be significantly higher according to the paired sample t test (p = 0.003). While the mean penile length was 13.2 ± 0.57 cm in the preoperative period, it was 11.8 ± 0.66 cm in the postoperative period (p <0.001). The level of patient satisfaction measured using the visual analog scale was found to be 77.37 ± 19.15. The most common complications were penile hypoesthesia and suture sensation.

CONCLUSIONS: Nesbit's procedure is an effective and safe option in the treatment of penile curvature. Penile hypoesthesia and 'sensation of suture material' are the two most frequent post-procedural complaints.

KEYWORDS: Corporoplasty, Nesbit procedure, Penile curvature, Plication, Peyronie's disease.

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INTRODUCTION

The term penile curvature refers to dysmorphia of the erect penis in one or more planes, instead of being perpendicular. This condition may be congenital or acquired. The curvature may be ventral, dorsal, lateral, or mixed in location (1).

Acquired penile curvature can result from penile fractures or traumas, but most frequently from Peyronie's disease (PD). This benign entity is a soft tissue disease characterized by abnormal collagen accumulation in the tunica albuginea layer of the penis. This accumulation results in fibrous tissue, eventually leading to penile deformity (1,2). The reported prevalence of PD in the general population is 0.4-20.3%, and the prevalence of definitive and probable cases of PD in Turkey is approximately 5.3% (3, 4).

Congenital penile curvature (CPC) is caused by excessive development of the tunica albuginea of the corporal bodies, and is entirely independent of urethral malformation. While the curvature is ventral in the majority of cases, it can also be lateral or, less commonly, dorsal (5). This entity is rare, with a reported incidence of <1% (3). In both congenital and acquired curvatures, patients' complaints generally involve difficulty during or inability to engage in sexual relations. Although oral, intralesional, and topical alternatives are available in the treatment of PD, surgery represents the gold standard. Surgical correction of curvature is also the only option in CPC. The surgical indication arises when the curvature of the penis prevents normal sexual intercourse or for cosmetic reasons (1, 4, 6).

Various methods have been described for the surgical correction of penile curvature, which may be classified as excisional, incisional, or plication techniques (4). Overall satisfaction rates of 95.4% (87-100) have been reported in cases of excisional corporoplasty performed using Nesbit and modifications thereof, 86.8% (78-100) in cases involving incisional corporoplasty (e.g., Yachia), and 86.4% (52-100) in cases undergoing simple plication. Postoperative de novo erectile dysfunction (ED) development rates of 3% (0-13), 9.6% (0-13), and 8.1% (0-38), respectively, have been reported for these three techniques (3). Nesbit first described the removal of tunical ellipses opposite the point of maximum curvature with a non-elastic corporal segment in the treatment of CPC in 1965 (7). This technique was subsequently successfully used in the treatment of PD-associated penile curvature (4). The purpose of this study was to evaluate the surgical and functional efficiency of Nesbit corporoplasty, and to consider its effects on post-surgical sexual functions and postoperative complications.

MATERIALS AND METHODS

Study Population

Data from patients who had undergone Nesbit procedures for penile curvature at the Samsun University, Samsun Training and Research Hospital, Department of Urology, Turkey, between January 2017 and March 2023 were examined retrospectively. Indications for surgery were curvature preventing sexual intercourse and cosmetic complaints provided that curvature exceeded 30°. Patients older than 18, with stable curvature, with no ED, operated using the Nesbit technique, and with a minimum follow-up period of six months were included in the study.

1. Patients undergoing surgical techniques other than the Nesbit methods, such as Yachia's method or plication,
2. Individuals with previous histories of penile surgery,
3. Patients with moderate or severe ED,
4. Patients with PD lasting less than six months, and
5. Patients aged under 18 were excluded from the study

Patients' histories, physical examination results, age, urinary tract abnormalities, drug use, and American Society of Anesthesiologists (ASA) scores were recorded. Detailed penile examinations were performed on all patients following intracavernous 20-µg prostaglandin E1 injection. Preoperative penile lengths were determined, and curvature angles were calculated using a protractor after penile rigidity was achieved. For that purpose, a midline commencing from the proximal penile shaft was first drawn with a ruler. A straight line between the start of the curve and the glans was then drawn such as to intersect with the midline described

above. The degree of curvature was calculated by means of protractor measurements of the angle formed by the two intersecting lines. All patients were informed about the potential risks of the intervention before surgery took place, and concerning the possibility of postoperative discomfort, recurrence of the curvature, glans hypoesthesia and recurrence of ED. All patients were provided with detailed forms about their clinical details being employed for scientific research, a statutory requirement under our hospital's regulations.

Surgical Technique

The surgical procedures were carried out on the patient under general anesthesia following the administration of preoperative prophylactic antibiotics. Degloving was first performed with a peripheral incision, after which artificial erection was induced by saline injection. Buck's fascia was dissected first, followed by the tunica albuginea. Following dissection from the tunica albuginea in cases of ventral curvature, the neurovascular bundle was next carefully mobilized between the tip and the base of the penis by means of surgical loupes. The penile curve was corrected by holding the tunica albuginea with an Allis clamp, and a mean 5-10 mm transverse elliptical excision was performed from the tunica albuginea, or 1 mm ellipsoid tissue for each 10° of curvature was removed from the tunica. When required, the procedure was performed more than once until the curvature had been corrected. Subsequently, artificial erection was again induced in order to check that the curvature had been resolved. The tunical defect was closed using 2/0 polydioxanone (PDS) **(Figure 1)**.

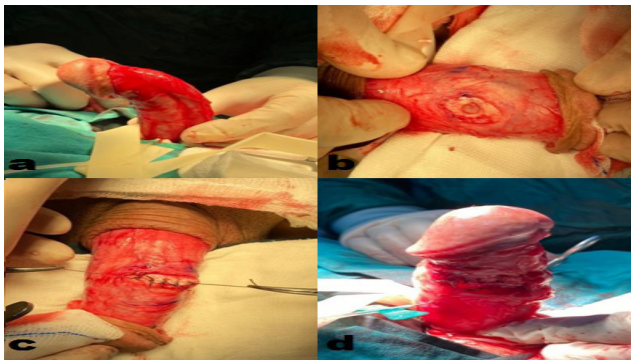

Figure 1: The different stages of the Nesbit procedure: **(a)** Induction of artificial erection; **(b)** Removal of appropriate elliptical tissue from the tunica albuginea; **(c)** Suturing of the defect area; **(d)** Checking the penis with an artificial erection

The surgical incision was then closed, and an elastic band was stretched and placed firmly around the penis in a vertical manner in order to achieve sufficient hemostatic pressure. All procedures were carried out by the same surgeon (M.U.).

Postoperative Evaluation

The urethral catheter was removed on postoperative day one and the patient was discharged on the postoperative first day. The elastic bandage was removed 24 h after the operation. Patients were instructed to avoid engaging in sexual intercourse for six weeks. International Index of Erectile Function erectile function (IIEF-EF) values, penile deformities, penile lengths and surgery area were evaluated and recorded initially, one month after surgery, and once every three months thereafter. All patients were asked to complete questions 1, 2, 3, 4, 5 and 15 of the IIEF-EF. These six items on the IIEF-EF include detailed questions concerning erection frequency and firmness, penetrative ability, maintenance frequency and ability and erectile confidence. Participants were requested to report engaging in sexual activity at least once during the four weeks before answering those questions. Each item was based on a five-point Likert scale (8). The responses to all six items were totaled to yield a total EF score, ranging from six to 30. Scores lower than 26 indicated the presence of ED (22-25 mild ED and 17-21 mild to moderate ED) (9). Patient satisfaction with surgery was also measured numerically using a visual analogue scale from 0 (*very dissatisfied*) to 100 (*very satisfied*) **(Figure 2)**.

Figure 2: The visual analogue scale assessing patient satisfaction with the operation on a scale of 0 – 100.

Regret status was determined by investigating the patient's willingness to undergo the procedure again and to recommend it to others. Data from patients' final control visits were included in the study.

Ethical Committee

Approval for the study was granted by the Samsun University medical ethical committee (no. SÜKAEK/2023/5/10, dated 15.03.2023).

Statistical Analysis

The data were analyzed using Statistical Package for Social Sciences (IBM Corp., Armonk, NY, USA) version 25 software. Nominal data were expressed as frequencies and percentages and continuous data as mean ± standard deviation. The Kolmogorov Smirnov and Shapiro-Wilk tests were employed to determine the normality of distribution of continuous variables. Pre- and postoperative differences were evaluated using the paired samples t test. A p values <0.05 were regarded as statistically significant.

RESULTS

Forty patients with a mean age of 40.6 ± 27.57 years were included in the study. Ten patients (25%) with a mean age of 19.9 ± 1.91 years were operated for CPC and 30 (75%) with a mean age of 47.5 ± 14.74 years for PD.

The participants' mean ASA score was 1.47 ± 0.5, and their mean length of hospital stay was 2.27 ± 0.5 days. These values were 1 and 1.63 ± 0.49 day, respectively, for the CPC patients and 2.2 ± 0.42 and 2.3 ± 0.53 day for the PD patients. Sixteen patients (40%) had curvature in the dorsal area, 16 (40%) in the ventral region, and eight (20%) in the dorsolateral area. The curvature was in the ventral region in all the CPC patients. The patients' mean preoperative curvature degree was 61.62 ± 12.62. The values in the CPC and PD patients were 55.5 ± 13 and 63.66 ± 12.02 degrees, respectively. Twenty (50%) patients were operated due to difficulty in coitus, 13 (32.5%) for cosmetic reasons, and seven (17.5%) for both reasons. The mean surgical time was 80.25 ± 19.47 min. Mean operative times were 73 ± 14.56 min in the CPC patients and 82.66 ± 20.49 min in the PD patients. Hematoma was observed in three patients (7.5%) in the early postoperative period, but no other early complications occurred. Suturing sensation was observed in two patients (7.5%) in the postoperative long term period, hypoesthesia in two (5%), and ED in one (2.5%). The mean follow-up time was 17.62 ± 4.27 months. Curvature relapse was observed in 11 (27.5%) patients. The degree of curvature was <20° in eight patients, while residual curvature was observed in three. No intervention was performed on the eight patients with curvatures < 20°, who received conservative follow-up. When these patients with curvatures < 20° were included, our success rate was 92.5%. The patient characteristics and outcomes are presented in **Table 1**.

Table 1: Demographics, disease, procedure characteristics, and outcomes after surgery

Clinical variables	Values
Total number	40
Mean age ± SD (year)	40.6 ± 27.57
Diabetes mellitus (N, %)	7 (17.5%)
Location of curvature (N, %)	
Dorsal	16 (40%)
Dorsolateral	8 (20%)
Ventral	16 (40%)
Preoperative curvature degrees	61.62 ± 12.62
Complaint (N, %)	
Cosmetic	13 (32.5%)
Difficult coitus	20 (50%)
Cosmetic + difficult coitus	7 (17.5%)
Surgical time (mean ± SD) (min)	80.25 ± 19.47
Follow-up (mean ± SD) (month)	17.62 ± 4.27
Curvature after surgery (N, %)	
Fully corrected	29 (72.5%)
Improved (<20° curvature)	8 (20%)
Residual curvature	3 (7.5%)
Complications (N, %)	
Hemotoma	3 (7.5%)
Suturing sensation	3 (7.5%)
Hypoesthesia	2 (5%)
Erectile dysfunction	1 (2.5%)
Hospital stay (day)	2.27 ± 0.5
Satisfaction with surgery	77.37 ± 19.15
Willingness to the repeat surgery (N, %)	
Yes	33 (82.5%)
No	7 (17.5%)
Willingness to recommend the surgery (N, %)	
Yes	33 (82.5%)
No	7 (17.5%)

Mean preoperative penile length was 13.2 ± 0.57 cm, compared to 11.8 ± 0.66 cm after surgery. The difference was statistically significant (p = 0.004). The mean degree of penile shortening was 1.41 ± 0.42 cm. The mean preoperative IIEF-EF value in this study, 22.8 ± 3.46, was significantly lower than the 24.02 ± 3.06 value observed at the final check-ups (p <0.001). Complete preservation of erectile function was achieved in the CPC group. One patient from the PD group exhibited severe ED with an IIEF-EF score of 9 (compared to 17 before surgery) **Table 2**.

Table 2: Preoperative and postoperative assessment of IIEF-EF scores and penile length

Variables	Before surgery	After surgery	p*
IIEF-EF	22.8 ± 3.46	24.02 ± 3.06	0.004
Penile length (cm)	13.2 ± 0.57	11.8 ± 0.66	<0.001

Abbrevation: IIEF-EF, International Index of Erectile Function erectile function.
* Paired sample t-test

Patients' mean satisfaction with surgery determined using the visual analogue scale was 77.37 ± 19.15. Analysis indicated that 82.5% would be willing to undergo the operation again, while 17.5% would be reluctant to repeat it or recommend it to others.

DISCUSSION

Reconstructive surgery in cases of penile curvature entails contracting the convex side of the penis (Nesbit corporoplasty or placation procedures) while extending the concave side (incision and grafting). A tunical shortening procedure can represent an appropriate surgical approach in case of men with good erectile function (no ED or responding to pharmacotherapy in the presence of ED), adequate penile length, with mild curvature, and with no complex deformities, such as an hourglass or hinge type narrowing abnormality. A number of different techniques have been described in the literature, which can be broadly classified as excisional, incisional, and plication (3). The general success rate of the Nesbit procedure in the literature is 88.5% (86-100) (3). Full recovery was achieved in 29 (72.5%) patients in the present study and improvement (<20° curvature) in eight (20%). Our general success rate was 92.5%, and our general success rate was compatible with those of previous studies. However, the total number of patients in the present research was low, in the region of 40, and this represents a limitation of this study.

One of the subjects about which patients most frequently complain in Nesbit surgery is penile shortening. A significant penile shortening rate of 8.7% (5-39%) has been reported with the Nesbit method (3). Penile length must be assessed during preoperative evaluation, and the patient must be given the requisite information regarding postoperative penile shortening. The European Association of Urology guideline suggests that the main objective of surgery is to achieve a "functionally straight" penis, and goes on to say that the patient must be fully aware of this in order to obtain the optimal postsurgical satisfaction outcomes (3). The mean penile shortening in the present study was 1.41 ± 0.42 cm, significantly lower compared to the preoperative period ($p < 0.001$). Consistent with the present study, Unal et al. reported the mean penile shortening of 1.54 ± 0.44 cm in their retrospective study of 40 patients with a mean curvature of 55.6°, who underwent Nespit procedure for congenital penile curvature (10).

Patients' postoperative IIEF-EF values rose in this study, a significant difference being observed between preoperative and postoperative IIEF-EF values ($p = 0.004$). Other studies with a similar design to that of the present research have also observed an increase in postoperative IIEF-EF compared to preoperative values (1, 10 - 12). The rise in patients' postoperative IIEF-EF values may be attributable to the self-confidence developing as a result of correction of the penile curvature.

However, notwithstanding its high functional and anatomical success rates, the Nesbit procedure can also result in long-term complications, including recurrence of ED and permanent or temporary penile curvature, as well as short-term complications such as hematoma and penile desensitization, although these are uncommon (13). Hematoma was observed in three patients (7.5%) in the present study, suturing sensation in three (7.5%), penile hypoesthesia in two (5%), and ED in one (2.5%). ED has been reported at a rate of 6.9% (0-17%) in the literature (3). The rate of ED in the present study was slightly lower than that in previous studies. In two studies from Turkey, Unal et al. reported an incidence of postoperative hematoma of 0%, while Simsek et al. reported an incidence of 10% in their study of 10 patients (10, 14). The incidence of penile hematoma in the present study was 7.5%, a figure consistent with Simsek et al.

Non-absorbable sutures are currently preferred in order to prevent postoperative curvature recurrence. However, non-absorbable suture use can give rise to symptoms such as suture granuloma, sutures being perceptible by touch, and pain during erection (15). The rate of curvature recurrence in cases in which absorbable sutures are employed is high (16). Curvature recurrence rates of 28% and 50% were reported in two different studies involving absorbable sutures (17, 18). Suturing sensation was observed at a rate of 7.5% in the present study, compared to 0% in Unal et al. and 10% in Simsek et al. (10, 14).

The reported incidence of penile hypoesthesia in the literature is 11.8% (2-60%) (3). Penile hypoesthesia is thought to be directly associated with neurovascular bundle dissection and is particularly seen in patients with ventral curvature (10). Although a surgical loop was employed during neurovascular bundle dissection in the present study, penile hypoesthesia was observed in two patients (5%) with ventral curvature. Neurovascular bundle dissection must therefore be performed with care in patients with ventral curvature in particular.

The mean level of satisfaction with surgery measured using the visual analogue scale in this study was 77.37 ± 19.15. Analysis revealed that 82.5% of patients would be willing to undergo the operation again, although 17.5% would be reluctant to repeat it and would be unlikely to recommend it to others. To the best of our knowledge, other studies involving the Nesbit procedure have not evaluated patients' satisfaction with surgery and satisfaction levels. However, two different studies involving tunical lengthening procedures due to PD have reported rates of unwillingness to undergo the procedure again (19, 20). In the first of these studies, Valente et al. reported that 21.4% of 28 patients with penile curvature degrees of 80.1° ± 14.9° and who underwent grafting with small intestine mucosa with plaque incision between February 2011 and December 2014 would be unwilling to undergo it again (19). In another study by those authors involving 22 patients with penile curvature degrees of 78.22° ± 10.12° who underwent grafting with temporal fascia with plaque incision, 13.6% were unwilling to repeat the procedure (20).

There are several limitations to this study, the most important of which involve its retrospective nature and relatively small number of patients. In addition, quality of life, another highly important clinical factor, could not be evaluated since this was not recorded on a regular basis in the preoperative period, and the patients' anxiety levels were not determined in either the preoperative or postoperative periods. Other significant factors including postoperative regret over having undergone surgery and partner satisfaction were also not considered. Finally, the follow-up period in this study was quite short, and there is a possibility that our complication rates may change over time. We think that further studies with longer follow-up periods and larger numbers of patients are now needed to confirm the reliability of our findings.

The Nesbit procedure is an effective and safe method for treating both congenital and acquired penile curvature. Our patients reported high levels of satisfaction with the operation. Although the incidence of complications is low on the basis of this study, suturing sensation and penile hypoesthesia are the most frequent complaints.

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