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Comparison of the Winograd method and chemical cauterization with 10% sodium hydroxide for treating ingrown toenails

Tırnak batması tedavisinde Winograd yöntemi ve %10 sodyum hidroksit ile yapılan kimyasal koterizasyonun karşılaştırılması

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Abstract

Background and Design: This study was performed to assess the therapeutic outcomes of the surgical method, described by Winograd, and chemical cauterization with sodium hydroxide in patients with Heifetz stage 2 and 3 ingrown toenail (recurrence, complication, improvement and time to regain activity).
Materials and Methods: One-hundred patients who presented to the outpatient clinics of orthopedics, general surgery and dermatology with the complaints of pain, redness and discharge in the toenail between January 2010 and January 2012 and who failed to respond to conservative treatment and were diagnosed with Heifetz stage 2 and 3 ingrown toenail were included in the study. Fifty patients underwent chemical cauterization with sodium hydroxide, while 50 underwent Winograd surgery.
Results: The patients were followed up for a year at 2-month intervals. While no recurrence was observed in patients who received chemical cauterization, five patients who underwent Winograd surgery had recurrence (p=0.022). Three patients receiving Winograd surgery were found to have superficial wound side infection during the postoperative follow-up (p=0.08). The patients who underwent chemical cauterization with sodium hydroxide were found to have recovered and returned to normal activity in a shorter period.
Conclusion: Chemical cauterization of the germinal matrix with 10% sodium hydroxide is a convenient method with low rates of complication and recurrence compared to the Winograd surgery in the treatment of ingrown toenails.
Keywords: Ingrown toenail, Winograd method, chemical cauterization

Öz

Amaç: Bu çalışmamızın amacı Heifetz evre 2 ve 3 tırnak batması bulunan hastalarda, Winograd tarafından tanımlanan cerrahi yöntem ile sodyum hidroksit uygulanarak yapılan kimyasal koterizasyon tedavilerinin sonuçlarını (nüks, komplikasyon, iyileşme ve aktiviteye dönüş süresi) değerlendirmektir.
Gereç ve Yöntem: Çalışmaya Ocak 2010-Ocak 2012 tarihleri arasında ortopedi, genel cerrahi ve cildiye polikliniklerine ayak baş parmaklarında ağrı, kızarıklık ve akıntı şikayetleri ile başvuran, konservatif tedaviden yanıt alınamayan ve Heifetz'in evrelendirmesine göre evre 2 ve 3 tırnak batması bulunan 100 hasta alındı. Hastaların 50'sine sodyum hidroksit ile kimyasal koterizasyon yapılırken, 50'sine de Winograd cerrahi prosedürü uygulandı.
Bulgular: Hastalar 2 aylık periyodlar halinde 1 yıl takip edildi. Kimyasal koterizasyon uygulanan hastalarda nüks olmaz iken, Winograd cerrahi prosedürü uygulanan beş hastada nüks saptandı (p=0,022). Winograd cerrahi prosedürü uygulanan üç hastada postoperatif takipte yüzeyel yara yeri enfeksiyonu görüldü (p=0,08). Kimyasal koterizasyon uygulanan hastaların, daha kısa sürede iyileştikleri ve aktivasyona geri döndükleri tespit edildi.

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Sonuç: Tırnak batmasının güncel tedavisinde, germinal matriksin sodyum hidroksit ile kimyasal koterizasyonu, Winograd cerrahi prosedüre göre; uygulaması kolay, nüks oranı düşük ve komplikasyonu az olan bir yöntemdir.
Anahtar Kelimeler: Tırnak batması, Winograd yöntemi, kimyasal koterizasyon

Introduction

Ingrown toenail is a condition characerized with inflammation, granulation tissue and pain which occur as a result of sticking of the nail plaque into the lateral nailfolds leading to severe morbidity and labour loss[1]. It occurs more frequently in men compared to women[2]. The disease is generally observed in adolescence and young adulthood and its etiopathogenesis involves incorrect cutting of the nails, abnormal nail structure, excessive sweating, selection of narrow shoes, hormonal factors and genetic factors[3]. The most commonly used staging method in classification of ingrown toenails is Heifetz staging system. In this staging system, ingrown toenail is divided into three groups according to presence of pain, eryhtema, infection, drainage and granulation tissue and treatment is planned according to this staging. Common treatment options used frequently at the present time include partial nail matrisectomy (Winograd method) and chemical cauterization in association with partial matrisectomy. The agents which are used most commonly with the objective of chemical cauterization include 88% phenol and 10% sodium hydroxide (Table 1)[4,5]. In this study, we aimed to compare chemical matrisectomy applications performed by using partial matrix excision and sodium hydroxide, postoperative complications and recurrence rates.

Materials and Methods

A hundred patients who had stage 2 and 3 ingrown toenail according to Heifetz staging system and did not respond to conservative treatment among the patients who presented to our orthopaedics, general surgery and dermatology outpatient clinics between January 2010 and January 2012 were retrospectively screeened and included in the study. The main complaints of the patients included pain, erythema and discharge in toenails. The patients with stage 1 Heifetz ingrown toenail were excluded from the study, since they would receive medical treatment. Fourty one patients were evaluated to have stage 2 and 59 patients were evaluated to have stage 3 ingrown toenail according to Heifetz staging system. The patients who were thought to have infection clinically during examination were treated with systemic and topical antibiotic before operation. Oral amoxycillin at a dose of 1 g was given 2 times a day for 1 week and fucidic acid was given three times a day as topical treatment. Operation was planned for the patients who were reevaluated at the end of one week and concluded to have no infection. Consultation was performed with dermatology and surgical procedure was not performed in the patients who were thought to have fungal infection clinically. Chemical cauterization with sodium hydroxide and partial matrisectomy were performed in 50 of the patient and surgical partial matrisectomy was performed in the other 50 patients.

Table 1.Treatment options
Conservative treatment
Excision of the whole nail plate
Partial excision of the nail plate and excision of the matrix
Excision of the nail plate and germinal matrix
Partial excision of the nail fold and excision ot the nail matrix
Excision or reduction of the nail fold
Cemical cauterization
Nail wire

Surgical method

Prophylactic cefazolin sodium at a dose of 1 g was administered after surgery in all patients. Digital block anesthesia was performed with lidocain which did not include epinephrin and digital touniquet was applied. Winograd procedure was applied in 50 patients who were included in the study. A longitidunal cut 5-8 mm above the lunula was made towards the distal part of the eponychium as to reach the lower end of the nail plate without harming the nail plate on the side of the ingrown nail. A clamp was inserted below the nail and the ingrown nail part was removed from the external folds. The proximal part of the nail was reached from the point which was marked previously and the nail was excised (Figure 1). The germinal matrix and sterile matrix were excised with the help of a lancet. The cortex of the proximal phalanx was removed with its periost with the help of a curette to be sure

Figure 1. Picture during Winograd procedure

that the germinal matrix was removed completely. In cases in which hypertrophic granulation tissue was present, hypertrophic tissues were excised with the help of a lancet. The areas excised were washed with normal saline and the external fold of the nail was adducted to the nail plate using 2-0 prolene sutures (Figure 2). Noncompressive dressing was applied.

In the remaining 50 patients, chemical matrisectomy was performed for a period of one minute using 10% sodium hydroxide solution with the assistance of a sterile cotton-tipped swab (Figure 3). When chemical matrisectomy was completed with sodium hydroxide, neutralization procedure was performed using 10% acetic acid. In all patients, elevation and anti-inflammatory treatment was initiated in the post-operative period. The patients were followed up by cleaning the operation area using normal saline solution and applying dressing with gauze bandage impregnated with 10% poviodine solution every other day for one week and every three days for the second week. The patients were recommended not to wear narrow shoes during the treatment period. The sutures were removed on about the 15th day and the patients returened back to their daily activities. The patients were followed up for one year every 2 months. At the end of the first year, the patients were evaluated in terms of recurrence, complications, recovery period and time to return to activity.

Figure 2. Picture during Winograd procedure

Figure 3. Application of 10% sodium hydroxide using cotton-tipped sterile applicator

In statistical analysis of the data, mean and standard deviation values were used as descriptive statistics for numerical variables. The categorical variables were expressed as numbers and percentages. The relationship between the categorical variables was examined using the chi-square test. The statistical significance level was set at a p value of 0.05 and a p value of <0.05 was considered statistically significiant. Statistical analyses were performed using SPSS 15.0 program.

Results

In this study, 31 (62%) of the patients in whom Winograd method was applied were female and 19 (38%) were male; 26 (52%) of the patients in whom chemical cauterization was applied were female and 24 (48%) were male (p=0.22). A statistically significant difference was not found between the patients who were considered Heifets stage 2 and Heifetz stage 3 in both groups (p=0.73, p=0.83, respectively). The mean age was 29.88±11.21 years in the group in which Winograd method was applied and 28.04±11.6 years in the group in which chemical cauterization was applied (p=0.42). In the follow-up, presence of erythema, pain and discharge was considered recurrence. Recurrence did not occur in the follow-up in the group in which partial matrisectomy was performed using chemical cauterization, whereas erythema and pain was found in five of the patients in whom partial matrisectomy was applied and this was considered recurrence. This difference between the two groups in terms of recurrence was found to be significant (p=0.022). The mean time period for development of recurrence was found to be 3.5 months (Table 2). In this study, neurovascular complication, osteomyelitis, necrosis, deep wound site infection did not occur during and after surgical procedure in any patient. Superficial wound site infection developed in only three of the patients in whom Winograd procedure was performed. The difference between the groups was not statistically significant (p=0.08) (Table 2). When we evaluated the time periods

Table 2. Clinical outcomes of the patients included in the study

	Partial matrisectomy (n=50)	Chemical cauterization (n=50)	p value
Recovery time (days)	21.9±4.8	17.6±3.4	<0.001
Time to regain activity (days)	8.26±1.4	7.36±1.4	0.001
Complication	3 (6%)	0 (0%)	0.08
Recurrence	5 (10%)	0 (0%)	0.022

to return to daily acitivities and recovery times, we observed that the mean time to return to daily acitivity was found to be 7.36±1.04 days and the recovery time was found to be 17.64±3.4 days in the patients in whom chemical cauterization was performed. In the patients in whom Winograd procedure was performed, the mean time to return to daily acitivity was found to be 8.26±1.45 days and the recovery time was found to be 21.9±4.83 days. A statistically significant difference was present between the two groups in terms of recovery time and activation times (p<0.001, p=0.001, respectively) (Table 2).

Discussion

Ingrown toenail is a very common condition in the community and leads to severe morbidity in patients. This condition causes a marked labour loss and limitation in social life. Since it is a common condition in the community and leads to labour loss, the treatment methods to be applied should be simple and cost-efficient, provide rapid returning to work and have a low recurrence rate[6-8].

As a result of these conditions, many treatment options have come to the forefront and applied. The general approach includes conservative treatment in patients with stage 1 disease, while there is no consensus about treatment options in patients with stage 2-3 disease[9]. The most commonly used methods in treatment of stage 2-3 ingrown toenail include complete or partial matrisectomy, chemical cauterization, electrocauterization and laser and cryotherapy applications[6,7]. The procedure which was described by Winograd is an easy and rapidly applicable method and it is the most commonly used surgical method, because its recurrence rate is low, does not require too many surgical devices and the complication rates are low in the postoperative period[10]. In contrast to these advantages, some disadvantages including deep wound infection, osteomyelitis, neurovascular complications and extensor tendon injury may be observed, albeit rarely[11]. There are other lateral matrix wedge excision techniques described by other surgeons (Anger; Watson-Cheyne and Burghard; O' Donoughe) in addition to Winograd surgical procedure. In both techniques, the main objective is removal of the germinal matrix. The main problem in lateral matrix wedge resection is the fact that the most important tissues which should be resected include the top point of the wedge resection and the matrix tissue in the narrowest part of resection. Nail spiny processes recur as a result of inadequate removal of the germinal matrix from this top point. Anger thought that insufficient resection of the matrix could be prevented by keeping the top point of the wedge wide in lateral wedge techniques[10]. Recurrence rates have been reduced with addition of chemical cauterization to surgical procedure, because recurrence is observed with a higher rate in cases where the germinal matrix has not been eliminated[7,12]. Chemical cauterization with phenol or sodium hydroxide in association with partial nail excision is a widely used and successful method[5,12-14]. Recurrence and postoperative pain rates are low in chemical cauterization with phenol. However, the fact that tissue damage can not be predicted, because coagulation necrosis caused by phenol during neutralization procedure is only diluted with alcohol, observation of longer drainage compared to sodium hydroxide application and need for a long period for recovery drive chemical matrisectomy with sodium hydroxide forward[5,12,15-18]. The fact that a significant difference was found between Winograd procedure and chemical cauterization with sodium hydroxide in terms of recurrence rates in our study was compatible with the information that chamical cauterization should be performed to provide full injury in the germinal matrix. In our study, significant findings were obtained in terms of complete recovery, drainage and tissue injury in the group in which sodium hydroxide was applied for one minute compared to the other group; returning to daily activities in the postoperative period occured in a shorter time. In the study conducted by Güler et al.[19] in which partial matrix excision was applied with Winograd technique in 19 239 patients, recurrence was found in 3.7% of the patients, the mean recurrence time was found to be 5.6 months and the time to return to daily activities was found to be 6.7 days. In the study conducted by Koçyiğit et al.[20] in which 20 66 patients with ingrown toenail were divided into 3 groups and chemical cauterization with 10% NaOH was performed for 30 seconds, 1 minute and 2 minutes, recurrence was found with a rate of 29.1% in the first group, with a rate of 7.3 in the second group and with a rate of 5.6% in the third group and the mean recurrence time was reported to be 6.4 months. In the study conducted by Ozdemir et al.[21] in which 156 chemical cauterizations were performed using 10% NaOH, recurrence was not found in any patient. Although recurrence was found with a low rate in the group in which chemical cauterization was performed in our study in accordance with the literature, the recurrence rate was found to be higher and the mean recurrence time and the time to regain the ability to perform daily acitivities were found to be longer in the group in which Winograd procedure was performed.

Conclusion

Cauterization of the germinal matrix with sodium hydroxide is a feasible method which has low recurrence and complication rates.

Ethics

Ethics Committee Approval: Approval was obtained from Turgut Özal University, Faculty of Medicine, Clinical Research Ethics Committee for this study, Informed Consent: Informed consent was obtained from all patients included in our study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Ahmet Onur Akpolat, Ozan Namdaroğlu, Nebahat Demet Akpolat, Concept: Nebahat Demet Akpolat, Design: Nebahat Demet Akpolat, Data Collection or Processing: Nebahat Demet Akpolat, Ayşe Akkuş, Analysis or Interpretation: Nebahat Demet Akpolat, Literature Search: Ayşe Akkuş, Nebahat Demet Akpolat, Writing: Nebahat Demet Akpolat, Ahmet Onur Akpolat.

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