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ORIGINAL ARTICLE

Neutralized Chemical Matricectomy with the Winograd Method in the Management of Ingrowing Toenail

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ABSTRACT

Background: Ingrowing toenail is a common condition provoking pain, inflammation and functional limitation. Many surgical methods have evolved over the years for its treatment. The most important aspect of treatment of this problem is to prevent recurrence. The purpose of this paper was to study the effectiveness of combining the standard Winograd technique with neutralized chemical matricectomy to reduce the chances of recurrence and expedite postoperative recovery.

Materials and methods: Between 2006 and 2013, 33 patients (18 males, 15 females); with mean age 37.39 years (range 16 to 65 years) with 38 ingrowing toenails were treated with the standard Winograd technique combined with phenol matricectomy. The patients were evaluated in subsequent follow-ups for postoperative relapse, pain score (VAS) and time return to daily activities and ability to wear footwear and overall satisfaction. The mean follow-up period was 3.57 years (range 2 to 7 years).

Results: A total of 94.73% patients were satisfied with the overall outcome. The average return to normal shoe-wear was 1.54 weeks and the average return to normal activity was 1.18 weeks. Recurrence was seen in two patients (5.26%), 5 and 6 months after surgery. Four patients had delayed healing. None of the patients had any deep infection or neurovascular complications.

Conclusion: The Winograd technique when combined with neutralized phenol matricectomy is associated with a very low recurrence and infection rate. It allows early postoperative recovery and good cosmetic results with a high level of patient satisfaction.

Keywords: Ingrown toenail, Nails, Winograd technique.

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INTRODUCTION

Ingrown toenail or onychocryptosis is one of the most common problems encountered by young adults presenting to the physician for foot problems.[1,2] It generally occurs in the great toes; rarely fingernails are involved after trauma.[3] Of the various causes of an ingrown toenail that have been proposed the two main causes are tight shoes and an incorrect nail trimming technique. Patients with an ingrown toenail are often in their second or third decade of life. Initially, most patients complain of pain; later, drainage and infection develop, and the patient may complain of cosmetic problems, loss of labor, difficulty wearing shoes, and consequently extreme restrictions in daily activities.

Conservative and surgical methods both are established modalities of treatment depending on the severity of the disease at the time of presentation. Various surgical procedures have been descried for the management, like total nail plate removal, partial nail plate removal, partial nail plate with matrix removal, nail plate and germinal matrix removal, nail fold reduction or the terminal symes procedure.[4] These described procedures have their own share of merits and demerits in terms of the requirement of technical expertise, cosmoses, recurrence rates, delayed wound healing, patient acceptability and satisfaction and restriction of daily activities.

Recurrence rates may vary depending on the treatment modality used. Besides, there is no consensus for the treatment of ingrown toenails. Surgeons generally choose the technique they are used to. The goal of the treatment is to minimize the rate of recurrence and for the patient to return to daily activities as soon as possible without pain in ingrown toenail.

The purpose of this study was to describe a novel technique, which clubs the advantages of using partial removal of the offending nail plate[5] and neutralized chemical matricectomy cauterization,[6] to note the efficacy of this procedure and record postoperative relapse, pain score (VAS) and time return to daily activities and ability to wear footwear after the procedure.

MATERIALS AND METHODS

A total of 53 cases with ingrown toenails treated between January 2006 and December 2013 were evaluated retrospectively. Ingrown toenails were classified according to the system of Heifetz. Out of the 53 patients, 20 were of stage 1, 15 of stage 2, 18 of stage 3. Inclusion criteria were patients with severe ingrown toenails stage 2 and 3; patients who were unresponsive to conservative

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treatment. Patients with diabetes mellitus, traumatic nail deformity, renal failure and patients with stage 1 ingrown toenails were excluded from this study. Medical records were reviewed and patient's data was recorded for the type of footwear used, side, site, involved border of the toe, time return to activities, pain as per the visual analog score (VAS). The median age of presentation was 37.39 years (range 16-65). Three patients had infection in their toenail; they received oral antibiotic treatment with cefuroxime sodium 500 mg for 3 days preoperatively. After the resolution of the infection, these patients underwent a surgical procedure. All patients were subjected to the Winograd procedure supplemented with phenol cauterization. Liquefied phenol 80% was used for chemical matricectomy. Ethyl alcohol (spirit) was then used as a neutralizing agent to remove the excess phenol.

The surgical procedure was done under short general anesthesia under tourniquet control to provide a bloodless surgical field. The affected foot was prepared completely. Prophylactic IV antibiotic (first generation cephalosporin) was administered before elevating the tourniquet. First, the affected nail fold was elevated from the nail plate using a blunt Mc Donald elevator (Fig. 1). A vertical incision was taken along the nail border with a No. 15 blade. The incision was extended proximally into the eponychium (Fig. 2). Sharp dissection was performed to separate the nail piece from the nail body. The adjacent hypertrophic tissues offending the nail fold were cleaned. The underlying matrix with all the granulation tissue was removed (Fig. 3). The cavity was scraped clean. The tourniquet was released and thorough hemostasis was achieved. Then chemical matricectomy was performed with 80% phenol using a swab stick (Fig. 4). The contact time of phenol was strictly maintained below 3 minutes. Excess phenol was washed off using ethyl alcohol soaked gauze or swab stick (Fig. 5). The cavity was packed with paraffin soaked gauze (Fig. 6) and approximated with nonabsorbable sutures. Sterile dressings were applied. All patients received a single dose of IV antibiotic. Immobilization and extremity elevation for at least a day was recommended. Initial dressing change was done 48 hours

Fig. 1: Elevation of the nail fold from the nail plate

Fig. 2: Incision of the eponychium

Fig. 3: Removal of portion of nail plate and exposed pearly white matrix and granulation tissue

Fig. 4: Cauterization of the exposed nail bed with liquefied phenol

postoperative and then directly after a week. Sutures were removed after 7 days. Further follow-up visits were scheduled at 1 month, 3 months and then yearly basis. The patients were evaluated in subsequent follow-ups for postoperative relapse, pain score (VAS) and time return to daily activities and ability to wear footwear.

STATISTICAL ANALYSIS

All statistical analysis were performed using the SPSS software package 15.0 (SPSS Inc, Chicago, IL, USA). Data were shown as mean ± SD or median for continuous variables and percentages for categorical variables.

RESULTS

The final cohort included 33 patients with 38 involved digits with ingrowing toenails. The mean age of the patients was 37.39 years (range 16-65 years). Eighteen patients were males and 15 were females. The great toe was the most commonly involved digit. Three digits were affected on both the medial and lateral nail folds.

Fig. 5: Rinsing of nail bed with ethyl alcohol soaked gauze to neutralize the remaining phenol

Fig. 6: Insertion of paraffin soaked gauze into the dead space

Five patients presented with bilateral involvement. The mean follow-up was for 3.57 years ranging from 2 to 7 years. All patients were operated using the partial nail plate removal technique with matricectomy (Winograd) and combined with phenol cauterization.

There were two cases (6.06%) of local infection in the early postoperative period that required debridement under local anesthesia and oral antibiotics. Complete healing was observed in the next 2 weeks. As meticulous hemostasis was achieved during the procedure along with chemical cauterization, there were no cases of hematoma formation during the postoperative period. Four patients (12.12%) had delayed wound-healing postoperatively. Excellent long-term results were seen in all patients, except the two who had a local postoperative infection. Two (6.06%) digits had recurrence, 5 and 6 months after the initial surgical procedure. These patients were treated again using exactly the same technique and no failures were recorded after a follow-up period of 2 years. There was no case with postoperative spicule formation in our study.

The cosmetic results were acceptable in all patients as only partial nail plate was removed (Fig. 7). In terms of cosmesis and patient satisfaction, 94.73% were satisfied with the overall outcome. The pain score, using the visual analog were significantly lower compared to the preoperative score. The average return to normal shoewear was 1.54 weeks and the average return to normal activity was 1.18 weeks. Patient's demographics and complications are as mentioned in Tables 1 and 2.

DISCUSSION

An ingrown toenail is a disorder that negatively affects life quality of particularly young adults.[7] In our study, we observed that an ingrown toenail is more common in males wearing shoes with a narrow toe box and that the

Fig. 7: Clinical picture of toenail on follow-up, esthetic in appearance

Table 1: Patients' demographics

Characteristics	*Value*
Patients affected	33
Ingrown nails	38
Males	18
Females	15
Age	16-65 (mean 37.39)
History of using tight footwear	21
Heifetz's staging	I-20
	II-15
	III-18
Toe affection	Lateral—20
	Medial—15
	Lateral and medial—3
Number of patients with infection on presentation	3
Follow-up	2 to 7 years (mean 3.57)

Table 2: Complications

Complications	*Number of cases*
Chemical burn	Nil
Local infection	2 (5.26%)
Delayed healing	4 (10.52%)
Recurrence	2 (5.26%)
Spicule formation	Nil
Neurovascular complication	Nil

lateral nail fold was affected more commonly.[8] Although several treatment modalities have been tried until today, it has been established that recurrence rates are lower with surgical treatment in comparison with conservative treatment. One of the most common surgical treatment methods for ingrown toenails is the partial matricectomy procedure.[7] Recently, combination treatment with phenol has reduced the rate of recurrence. There is no consensus regarding the best technique for the management of an ingrown toenail.

Van der Ham et al have compared the results of wedge excision with phenol cauterization. According to them, there is less pain and a statistically significant reduction in the number of days of sick leave after phenol cauterization. Recurrence rate after phenol was 9.6% *vs* 16% after wedge excision.[8] This corroborates the observations in our study. Pettine et al have reported 95 nail edges excised by the Winograd technique with only a 6% recurrence rate after a mean follow-up of 9.7 years.[9] Shaikh et al have reported a low recurrence rate in their study in which they used wedge resection with phenolization as the treatment modality.[10] In our study, we had a recurrence rate of 5.26% after a mean average follow-up of 3.57 years.

Our procedure combines, the merits of two different modalities. In a skeletally mature foot, the germinal matrix is 2 to 3 mm deep to the proximal nail fold. The germinal matrix sends projections into the adjacent soft tissue that make a complete nail ablation difficult and it is this germinal matrix which causes longitudinal growth of the nail plate and so leads to recurrence of an ingrown nail. Surgical excision of the germinal matrix at the edge along with chemical cauterization hence appears to be a complete way of solving the basic problem in an ingrown toenail.[11] In comparison to other partial nail plate removal surgeries, it has very low long-term recurrence rates because of the added effect of phenol cauterization used for matricectomy. Other methods, such as removal of the complete nail bed and matrix or partial nail extraction, were associated with high recurrence rates of 64 to 83%.[12]

There are some cases of uncontrolled burns reported in literature, with use of phenol like agents.[13-15] To avoid this, the total contact time of phenol in our study was always kept below 3 minutes[8] and careful application technique was practiced. CO_2 laser technique is another method for treatment.[16] In our study, we have then utilized ethyl alcohol (spirit) as a neutralizing agent, which has not been described in the past. With our method, there is not only a limited use of phenol, but also all excess phenol after cauterization is washed away with the spirit; it thus reduces the chances of postoperative wound infection and delayed healing.

Antonio Córdoba-Fernandez et al have demonstrated the use of platelet gel to achieve good hemostasis postoperatively.[17] We have had no complications of postoperative hematoma. Also, as per literature topical use of local antibiotic has had no advantage with regards to reducing the postoperative infection rate.[3] There were only two patients in our study, who had postoperative infection.

Winograd's procedure is cosmetically acceptable as only the offending part of the nail plate is removed. The cosmetic results were acceptable to all patients in our study, and it avoided the unpleasant turned up pulp deformity observed after total nail plate removal.[4]

CONCLUSION

Our study has found that combining partial nail plate removal with neutralized chemical matricectomy is an ideal procedure and effective in terms of simple to perform, low incidence of complication, cosmetically acceptable outcome, allowing early return to normal activities and shoe-wearing.

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