Modified Sleeve Method Treatment of Ingrown Toenail

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BACKGROUND. Ingrown toenail is a common problem that causes inconvenience, pain, and limitation of daily function. Current conventional treatment methods are not satisfactory and have a high recurrence rate.

OBJECTIVE. To evaluate a modification of an existing, although uncommonly used, method for treating ingrown toenail.

METHODS. Patients with ingrown toenail were treated under local anesthesia by insertion of a flexible narrow plastic tube under the toenail along its lateral border. Tube fixation was performed with silk or nylon 2-0 sutures passed through the toenail. Granulomatous and inflamed tissue was removed by electrocautery or local excision.

RESULTS. Twenty-eight procedures were performed in 15 patients. In 20 procedures (71.4%), no recurrences were recorded; the other 8 procedures (28.6%), were symptomatic.

CONCLUSION. This method for the treatment of ingrown toenail was found to be simple and efficient, with a relatively low recurrence rate. Therefore we currently advocate this procedure as the treatment of choice.

Methods

Rational Basis of Therapy

The modified sleeve method is based on the gutter treatment as described by Wallace et al., and is aimed at manipulating the lateral nail in a way that pain is alleviated, the lateral nail groove is allowed to heal spontaneously, and normal function and anatomy are preserved. Insertion of an inert material serving as a gutter or sleeve is meant to relieve the tissue of ongoing trauma produced by friction against the rigid nail spur. The hypothesis postulates that provided that the tissue is protected for long enough time to heal, slow spontaneous growth of the proximal nail will continue to develop undisturbed and the clinical complaints recur. At this point, the patient can be educated toward regulating the numerous factors that may contribute to penetration of the nail, such as high heels, narrow shoes, and uneven distal trimming of the nails. At least the damage, aggravation, and further suffering can be controlled.

Suture of the sleeve to the respective nail ensures its effective and secure fixation. Electrocautery, chemosurgery, or excision of granulation tissue will immediately remove the superfluous local soft tissue reaction.

Indications

The indication for treatment in patients suffering from acute or chronic ingrown toenail is mainly persistent suffering despite attempts to alleviate the pain. This includes altering footwear, topical or systemic antibiotics, and laterodistal elevation of the nail by means of small cotton-wool pellets. If these fail, the patient is usually highly motivated to undergo any intervention in order to ease the pain.
Treatment Kit

The materials needed to perform the procedure include a hemostat, a needle holder, and 2-0 or 0 nonabsorbable suture material. The sleeve originally used in this study was snipped plastic piping from a 24 French suction catheter ore a 23-gauge butterfly catheter. Later on, in the course of the work, the drawbacks of the flexible quality of the above material encouraged their replacement with the plastic covers of acupuncture needles. This more rigid “tube” facilitates its introduction. Evidently any material with the desired qualities of a cylindrical shape and appropriate plasticity which can be slit will suffice.

Technique

Following preparation of the surgical field and application of antiseptic solution (povidone-iodine), the affected toe is anesthetized with a mixture of 3 ml of 2% lidocaine and 2 ml of 0.5% bupivacaine (Figure 1). The infiltration is administered after ethyl chloride freezing at the base of the digit as a digital block and a small amount is injected into the digit tip in the prematrix area toward the affected side. An improvised digital tourniquet is applied by means of two cut and perforated disposable latex glove fingers, which are rolled snugly toward the tarsal base. This will stop any bleeding from the site and allow a clear view during all stages of the surgery.

Not infrequently, a large reactive granuloma exists overlaying the irritated tissue in the vicinity of the prodding nail spur. This is dealt with by local destruction using electrocautery or excision with scissors, followed by immediate application of 90% phenol solution, which holds the additional advantage of enhancing long-standing anesthesia of the treated area. Manual onycholysis is performed by introducing one jaw of the hemostat underneath the nail, freeing it from the underlying nail bed. This procedure is limited to the lateral third to lateral quarter of the nail in order to allow insertion of the tube along the groove. No further manipulation of the nail is performed and no part of the nail is excised at any stage. Two 2-0 nylon or silk nonabsorbable fixation sutures are then placed along this border. The most important principle here is that the needle does not penetrate the soft tissue of the nail bed at any point in its path and it should perforate only the more medial lysed nail. Thus it can remain in position for an extended period.

At this point, both sutures are displaced medially, passing under the distal free edge of the nail such as not to impinge on sleeve alignment. The rigid tube is slit lengthwise and pushed proximally toward the matrix (Figure 2). Then the proximal suture is replaced to its original position and tied, followed by ligation of the distal suture (Figure 3). The free end of the sleeve is trimmed along the horizontal line of the distal nail so as not to press against any forefoot. The tourniquet is released and the area dressed with mupirocin or chloramphenicol ointment covered by petrolatum gauze and tubue gauze. Analgesics are prescribed for the first several hours after surgery and the dressings changed daily until follow-up within 1 week.

Patients are instructed not to have the sleeve removed by anyone and to leave it in position for the next 6–8 weeks.

Methodology

Consecutive patients arriving at our primary clinic or self-referred for dermatology consultations with the presentation of an ingrown toenail were indiscriminately recruited for the study group. Informed consent was obtained from each patient and the study protocol was approved by the Human Research Review Committee. Provided the above-mentioned conservative measures had been attempted and failed, the patient was accepted for surgical intervention. The patients were also informed about the existence of more invasive surgical techniques and their drawbacks, while the principal problem with the sleeve method is the possibility of recurrence. Defined inclusion criteria were recent toenail symptoms of pain, swelling, discharge, or obvious granulation; no evidence of abnormal thickening of the nail; and previous treatment attempts by manipulation (ie, nail avulsions were equally included in the study group). All procedures were performed on an outpatient basis.

Each patient was interviewed for personal details and specific complaints. The operating physician and practice nurse performed the follow-up. Continual surveillance was maintained by means of telephone calls or patient visits until data collection was completed. The patient was considered cured when self-inspection of the nail showed no subjective evidence of ingrowing of the toenail; there was no discharge from the toe tissue; and there was no pain or discomfort from the toe.
Results

Twenty-five patients were included in this series. Between April 1999 and August 2000, 28 ingrown toenails were treated. Twenty-eight procedures fulfilled the inclusion criteria. The median age of the subjects was 16 years (range 12–47 years). Thirteen subjects were males and 9 were females. None of the subjects suffered from diabetes mellitus or foot ischemia.

The site of the ingrown toenail was the large first tarsal in all cases. There were no cases of premature release of sleeves. Sleeves either fell off spontaneously after 6–8 weeks or were removed after substantial procession of nail growth beyond the edge of the digit.

One pilot case was performed without suture fixation of the sleeve, which fell out prematurely. Following recurrence, she was then entered into the study and recalled for sleeve fixation, which was retained for 2 months. She was later placed in the cured category. The results of this series are summarized in Table 1. Follow-up was continued for an average of 11.6 months.

Complications

In three cases, antibiotics were administrated after the procedure because of purulent discharge oozing from the sleeve area. An important finding was a discoloration of the subungual surface undergoing onycholysis. The resultant greenish hue is to be expected and not indicative of any inflammatory process. The infections rapidly resolved after systemic administration of either cloxacillin or fusidic acid.

Pain was intense the first few hours after the anesthesia wore off, usually ascribed to hyfrecation burn (when performed) or subungual surface manipulation. We found excision and chemocautery of the local granulation tissue to be far less painful than fulguration, despite the minor bleeding that may be seen following tourniquet removal. Within 24–48 hours, normal standing and walking were resumed. There were no specific complaints related to the sleeve, although other health professionals observing the site after the intervention were surprised to find sutures remaining for such a long period of time. If not well prepared and warned, the patient may easily be persuaded to have them removed any time after 14 days from placement upon detection by our colleagues.

Table 1. Prospective Study Results: Sleeve Method

<table>
<thead>
<tr>
<th>Patients</th>
<th>25</th>
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</thead>
<tbody>
<tr>
<td>Procedures</td>
<td>28</td>
</tr>
<tr>
<td>Successes</td>
<td>20 (71.4%)</td>
</tr>
<tr>
<td>Failures*</td>
<td>8 (28.6%)</td>
</tr>
<tr>
<td>Complications: infection</td>
<td>3</td>
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</tbody>
</table>

*Typical symptoms of ingrown nail.
Recurrences

When recurrences appeared, these were usually observed after less than 3–4 months, compatible with the amount of time it takes for regeneration of the new nail and the nail spicule to encroach on the lateral ridge tissue structures. Therefore, for our purposes, we chose a 4-month follow-up as an initial cutoff point to judge success. The rationale for this decision is further reinforced by Wallace’s testimony that in his series the failures were apparent shortly after gutter removal. In all but one case the recurrence noted shortly after sleeve removal.

Individuals failing to respond to the treatment and returning for a corrective procedure were offered lateral avulsion and chemical cauter to with highly concentrated phenol solution, which was successful in all cases. This procedure, which is more often successful and less time consuming, was offered to the patients initially, but was usually not preferred because of the expected resulting aesthetic defect.

Discussion

For the past three decades, much discussion has occurred regarding the standards of care for ingrown toenails, and treatment guidelines have been recommended. Many treatments have been suggested, such as nail edge separation, partial matrix phenolization, wedge resection, and complete or partial simple toenail avulsion. These classic treatment modalities may lead to severe damage of the nail fold or to frequent relapse. In 1975 Murray and Bedi reviewed 200 patients treated for ingrown toenails in Glasgow, Scotland. They commented that despite the high recurrence rate following simple toenail avulsion (64–86%), its place in the initial management of this condition is justified. Wallace et al., in a preliminary retrospective study, compared the gutter treatment to avulsion. They later continued with a prospective randomized trial of the gutter treatment versus wedge resection. Their results of the gutter treatment showed only a 52% success rate compared to 71.4% success in our series of a similar size. Our conclusions are similar to theirs. We have currently abandoned simple nail avulsion when treating ingrown toenails, since we cannot justify the discomfort of anesthesia with a procedure that fails so often. If recurrence occurs after using the sleeve method, we immediately plan phenol cauterization of the lateral nail matrix, not the more invasive and less efficacious matrixectomy.

A more rigid plastic tube facilitates sleeve insertion and is preferable to flexible tubing. In 1998, Schulte et al. reported on nail splinting using flexible tube as a new noninvasive treatment for ingrown toenail. They used soft sticky strips for tube fixation. Their techniques and methods were never formally published for review. In a pilot observation, our experience with sticky strips was extremely unsuccessful and impractical, which led us to develop our modified method. The single case in which success directly followed longer use of the sleeve supports time as a dominant determining factor.

Gutter treatment for ingrown toenail has been reported over the last five decades, yet many physicians still prefer complete toenail avulsion as the procedure of choice. We find the modified sleeve method a minimally invasive technique, producing a fair chance of long-term remission from the ingrown toenail. Furthermore, the technique is simple and can be learned in a single lecture presentation; as attested to by our trainees. They have since reported success with this technique in their own practices.

We have not elucidated which patients undergoing invasive therapy for ingrown toenail are doomed to failure with our method. There may be some correlation between the inclination angle of the lateral edges of the nail, but no specific characteristic has yet been determined. As we gather greater experience with this technique, we may, in the future, succeed in selecting the most appropriate candidates for this procedure.

The modified sleeve method for treating ingrown toenail is a sensible, practical, and economical method to consider before alternative, potentially disfiguring methods. Therefore we currently advocate this procedure as the treatment of choice for patients unprepared to sustain long-term alteration of the nail anatomy. It seems reasonable to use more invasive techniques only for the most obstinate cases. Further larger series are needed to substantiate our impressions of this new procedure.

References