A study on the surgical treatment of ingrowing toenail with nail excision with chemical matricectomy versus nail excision alone

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Abstract

Objectives To compare the results of surgical treatment of ingrowing toenail with nail excision with chemical matricectomy versus nail excision alone.

Patients and methods We selected 30 patients of ingrowing toenail for the study. The patients were divided into two groups of 15 patients each. In group I patients, nail avulsion with chemical matricectomy with 88% phenol was done. In group II only nail avulsion was done.

Results In group I patients the surgical success rate was 98% and in group II, the surgical success rate was 86.6%. No patient complained about the cosmetic appearance of toenail after the operation.

Conclusions The technique is easy to perform and is associated with little morbidity and has a success rate of 98%.

Key words
Ingrowing, toenail, matricectomy, excision, phenol.

Introduction

Ingrowing toenail is a common problem affecting mainly adolescents and young adults, with a male predominance of 3:1. The disorder generally occurs in big toes. It is painful, often chronic and affects work and social activities. Most patients initially complain of pain later drainage, infection and difficulty in walking occur.

Several factors contribute to the occurrence and worsening of ingrowing toenails e.g. incorrect cutting of nails, hyperhidrosis, poor foot hygiene, excess external pressure, including poor stance and gait, ill-fitting footwear and excess trauma, excess internal pressure caused by overcurvature of the nail plate, arthritis, subungual neoplasm, skeletal abnormalities and inflammatory processes, associated systemic diseases, including diabetes; obesity, and nail changes in the elderly. Congenital misalignment is another cause, especially in infants.

There are various stages of ingrowing toenail. In stage 1, there is erythema, slight edema and pain, particularly with pressure. In stage 2, there is an increase in the severity of symptoms, the wound becomes locally infected and starts to drain. In stage 3, all of signs and symptoms are amplified and there is associated formation of granulation tissue and lateral wall hypertrophy.

There are many options for the treatment of ingrowing toenail, ranging from simple conservative approaches to relatively extensive...
surgical procedures requiring considerable surgical experience.\textsuperscript{6,7,8} Conservative approaches include soaking the foot in warm water; use of topical or oral antibiotics; silver nitrate cauterization of the granulation tissue proper nail-trimming technique; elevation of the corner of the nail with a small wisp of gauze or a plastic gutter; improvement of foot hygiene; and clipping a notch into the centre and requires patience from both doctor and patient. Because is time-consuming, demands a high level of patient cooperation third of thick nails.\textsuperscript{9,10,11,12} This form of management is time-consuming, demands a high level of patient cooperation and requires patience from both doctor and patient. Because of the intensive support necessary, it is not a cheap method of treatment. However, the treatment of stage I disease is conservative management. Stage 2 disease can be managed conservatively but recurrences are frequently seen. Stage 2 and 3 ingrowing toenails are best treated surgically.\textsuperscript{13,14,15,16} A chemo surgical technique for permanent matricectomy is ideal for the ingrowing toenail. Long-term follow-up is needed because symptoms may recur 1-2 years after the operation.

The aim of our study was to compare the treatment of ingrowing toenail with nail excision with chemical matricectomy versus nail excision alone.

**Patients and methods**

We selected 30 patients of ingrowing toenail for the study. The patients were divided into two groups of 15 patients each. In group I, nail avulsion with chemical matricectomy with 88% phenol was done. In group II only nail avulsion was performed. Prior approval of the hospital ethical committee was taken and informed consent was taken from all the patients before starting the study. The routine investigations including complete hemogram and fasting blood sugar were done in all the patients. Each patient was reviewed weekly until full wound healing was achieved and the postoperative healing period ranged from two to four weeks. The patients were followed for 18 months to see for any recurrences and complications. Patients with vascular disease were excluded. If infection was present before the operation, it was treated initially by topical and oral antibiotics and daily warm soaks with dilute povidone-iodine (Betadine\textregistered) solution. Surgical treatment was instituted as soon as the nail and skin fold became dry.

The toe was firstly cleaned with povidone-iodine solution. Anesthesia was obtained with a standard digital block employing 2% xylocaine without epinephrine. The toe was exsanguinated by rubber operating glove tourniquet (the cut end of a rubber finger being rolled back towards the big toe base). A dry field is important for the optimum cauterizing effect of phenolization. A 2-3 mm lateral nail segment was cut free along the length of the lateral fold and removed with a straight hemostat, taking care to ensure nail removal lower than the basal lateral matrix. Hypertrophied granulation tissue was curetted. The phenol was applied with partially stripped cotton applicators, saturated with 88% liquefied phenol (distilled water was used as solvent), by vigorously massaging it into the matrix area. Care was taken to prevent spillage of phenol onto the surrounding skin. The cotton applicator was changed twice during a total application time of 3 min. After completion of this procedure, the area was lavaged with 70% isopropyl alcohol to neutralize the residual phenol. The tourniquet was removed and the wound was dressed with an antibiotic ointment, followed by longitudinal and circumferential gauze wrapping. The dressing was then secured with adhesive tape. After the operation, analgesic was given for pain control. The patient was allowed to walk immediately after the operation and directed to elevate the affected foot whenever possible. Most patients
returned to normal ambulation and activity as early as one day after the operation. It was not necessary to admit the patient to the hospital. The dressing was removed after 48 hours in the clinic. Following this, antiseptic soaks with dilute povidone-iodine solution for 15 min once a day, followed by the application of an antibiotic ointment were started and continued usually for a period of approximately 2-4 weeks, until the drainage ceased. Patients were reviewed in the clinic weekly until full wound healing was achieved.

All the patients were followed for a period of 18 months, to assess the long-term efficacy of the treatment. Recurrence was defined as evidence of ingrowth of the nail edge or spicule formation.

Results

In our study the mean age of the patient was 28 yrs. Males outnumbered females and male: female ratio was 2:1. A total of 42 nail ablations were done in 30 patients. The healing period ranged from 2-4 weeks. In group I, recurrence was seen in one patient, where as in group II patients, recurrences were seen in 3 patients (Table 1). These patients were treated again using phenol matricectomy. In group I patients the surgical success rate was 93.7% and in group II, the surgical success rate was 80.0%. No patient complained about the cosmetic appearance of toenail after the operation. Regarding the postoperative complications, postoperative necrosis was seen in 6.6% patients, in both the groups, nail spicules were seen in 13.3% patients in group I and 6.6% patients in group II. Superficial chemical burns were seen only in one patient in phenol ablation group (group I).

Discussion

Segmental matrix cauterization with liquefied phenol has been shown to be highly successful in permanently destroying the lateral matrix.\textsuperscript{17,18} Phenol (C6H5OH) is a colorless crystal derived from coal tar. Liquefied phenol (carbolic acid) has antibacterial, anesthetic and in its concentrated form, escharotic properties. For matricectomy, liquefied phenol is used at a saturated concentration of 88%. The acid mediates its injury via denaturation of the matrix as well as any other soft tissue proteins with which it comes into contact.\textsuperscript{19}

We believe that the results of the studies with long-term follow-up periods are more important for evaluating the success of this procedure as recurrence may occur even 1 or 2 years later. Surgical techniques are an important factor in the success of this method. To avoid recurrence after phenol cauterization sufficient width of nail must be removed (a full quarter). Care must be taken not to leave nail spicules in the sulcus or under the eponychium. Phenol must be applied using sterile cotton-tipped applicators by vigorously massaging it in to the matrix area for a sufficient time (application for $\leq$ 3 min results in high recurrence rates)\textsuperscript{20,21} and absolute hemostasis must be obtained as blood partly neutralizes the cauterizing effect of phenol. Newer methods of segmental nail bed ablation, including electrodessication, sodium hydroxide treatment, negative galvanic current therapy and carbon dioxide laser treatment need further evaluation. In all the patients, the procedure was done on the hallux. The healing period ranged from 2-4 weeks.

\begin{table}
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\small
\begin{tabular}{|l|c|c|}
\hline
& \textbf{Group I} & \textbf{Group II} \\
\hline
\textbf{Success rate} & 14 (93.3\%) & 12 (80.0\%) \\
\textbf{Recurrence} & 1 (6.6\%) & 3 (20\%) \\
\textbf{Complications} & & \\
Postoperative necrosis & 1 (6.6\%) & 1 (6.6\%) \\
Nail spicules & 2 (13.3\%) & 1 (6.6\%) \\
Superficial chemical burns & 1 (6.6\%) & - \\
\hline
\end{tabular}
\caption{Recurrence rate and postoperative complications.}
\end{table}
Conclusions

The technique is easy to perform and is associated with little morbidity and has a success rate of 98%. Today, phenol cauterization is the treatment of choice for most podiatrists and physicians. We conclude that phenol cauterization is an excellent surgical method for the treatment of ingrowing toenail because of its simplicity, low morbidity and high success rate. We conclude that phenol cauterization for the treatment of ingrowing toenail is excellent because of its simplicity, low morbidity and high success rate. It can easily be done as an outpatient procedure. Phenol cauterization is the treatment of choice in our institution. Long term follow up is needed because symptoms may recur 1-2 years after the operation.

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