

Comparison of Outcome of Ingrowing Toenail Surgery---Simple Nail Removal V/S Wedge Resection

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ABSTRACT

Objective: To compare outcome of ingrowing toenail surgery---simple nail removal v/s wedge resection.

Study Design: Quasi-experimental study.

Place and Duration of Study: Combined Military Hospital, Rawalpindi, Pakistan, from Mar 2022 to Feb 2023.

Methodology: A total of 100 patients were enrolled and randomly divided into two equal groups. Group A cases were treated with simple nail removal whereas Group B was allotted Wedge resection. Both of these techniques were compared for operative time, recurrence of ingrowing toenail and post operative infection.

Results: The mean age of the patients in Group A was 37.86 ± 9.33 years and in Group B, it was 41.08 ± 7.59 years (p -value=0.061), while gender distribution showed that males numbered 29(58%) in Group A and 31(62%) in Group B whereas, females comprised 21(42%) in Group A and 19(38%) in Group B, (p -value=0.68). Mean operative time in Group A was 10.68 ± 2.23 minutes and in Group B it was 10.30 ± 2.67 minutes while recurrence was recorded as 2(4%) in Group A and 3(6%) in Group B. We found post operative infection in 1(2%) patient in both groups with p -value>0.999.

Conclusion: We found no significant difference in both techniques regarding recurrence, post operative infection, and operative time. However, simple nail removal is well tolerated, and does not present any technical challenges; hence, it ought to be regarded as an alternative to other techniques of treatment.

Keywords: Ingrowing Toenail, Simple Nail Removal, Wedge Resection, Outcome.

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INTRODUCTION

Nail ingrowing is a typical condition among young adults' great toes: in most cases, fingernails are unaffected.¹ Onychocryptosis is the most frequent type, where pain, swelling, and granulomas may result from inflammation of periungual tissues. The most frequent cause of ingrown toenails is thought to be improper nail clipping, which creates a nail spike that traumatizes the surrounding soft tissue,²⁻³ but ingrown toenails may also be caused by wearing shoes that are too small, having poor foot care, having hyperhidrosis, experiencing trauma, or taking epidermal growth factor receptor inhibitors (cetuximab).⁴ Nail deformities and other anatomical abnormalities are also potential risk factors as some research has linked ingrown toenails to characteristics such as pincer-nail deformity, large nail plates, congenital malalignment of the toenails, and thickness of the nail plate,^{3,5} while recent research has demonstrated that ingrown toenails might be caused by anomalies in the bones of the ankle, foot, or toe

which raise the internal pressure.^{1,6} However, subsequent studies have shown no structural differences.⁷ The prevalence of this disease has been estimated to be between 2.5%-5%⁶ and becoming more common in recent years due to growing number of physical activities with the lateral edge of the toe being affected twice as often as the medial side,^{6,8} and the nail becoming distorted due to pressure and necrosis.⁹ Reactive ground pressures from exercise, obesity, or wearing shoes that are too tight facilitate this breach.²

Ingrown toenails may be treated surgically in a variety of ways, yet there is no agreement on the best approach with low recurrence rate and excellent functional and cosmetic results. Research shows that basic nail avulsions have an elevated risk of recurrence, however, the success rate varies. Therefore, we conducted this study to find more appropriate way to manage ingrown nails with least chances of recurrence.

METHODOLOGY

This quasi-experimental study was conducted at Combined Military Hospital (CMH), Rawalpindi,

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Pakistan, from 1st March 2022 to 28th February 2023, after obtaining approval from Ethics Review Board via letter number EC: 367. Sample size of 100 patients was calculated by keeping 95% confidence level, 6% margin of error and percentage of recurrence as 10.34% after surgical removal. Patients were enrolled by using non-probability, consecutive sampling technique.

Inclusion Criteria: Patients of either gender, ranging in age from 18 - 60 years, presenting in Outpatient Department (OPD) and diagnosed with ingrowing nails were included.

Exclusion Criteria: Pregnant females, patient with known allergy to anesthetic drug, having localized abscess at site of injection, previously diagnosed with diabetes mellitus or having recurrent ingrown nail, were excluded from the study.

Informed consent and demographic data of patients was acquired. We randomly divided 100 patients into two equal groups, these being Group A (n=50) and Group B (n=50). Pre-operative investigations were recorded. All patients had normal arterial pulses and laboratory test for blood glucose performed prior to surgery. In Group A, simple method of surgical treatment was done, which involves removing a thin slice of soft tissue from the fold of the paronychium, located where the toenail corner enters the soft tissue. After preliminary excision or curettage of the granulation tissue in the nail groove, a transposition flap of the nail wall was produced. Anesthesia was administered either by a normal digital block or with a local injection. Before the start of surgery, we applied enough pressure with a tourniquet to stop the flow of blood. We found that using a straight nail margin elevator provided the best results for cleanly separating and elevating the nail margin from the gutter. A wound on the side of the toe that was either flattened or in the shape of a crater may be left behind after the lateral granulation tissue was excised. Before the procedure was finished, we assured that adequate hemostasis had been achieved. One bite suture using nylon 3-0 was performed in order to correct the nail margin on the toe, and this suture was removed after three weeks. Antibiotic ointment was applied to the affected region and patients were discharged from the hospital while wearing a one-time-use surgical slipper. In Group B, the foot was cleaned with chlorhexidine, wrapped in sterile gauze and 5 mL of Xylocaine diluted to 2% was injected into the first web space and the medial side of

the first metatarsophalangeal joint along with a single dose of injection ceftriaxone. A sterile glove tourniquet was used and excised wedge included the section of the nail that extended up to the germinal matrix as well as the hypertrophied soft tissue that extended up to the level of the bone while the remaining portion of the soft tissue was sutured to the nail. After the application of a sterile dressing, compression bandaging was applied. The patient was given oral analgesics and released the same day with instructions to elevate their foot for the next 24 hours, with the first dressing change performed 48 hours later. Around the two-week mark, the stitches were taken out. Patients were checked once every month for six months and outcomes were noted. All the data was recorded in a data collection tool and then entered and analyzed on SPSS version 25. Both groups were compared for mean operative time by applying independent samples t-test and for recurrence and post-operative infection by applying chi-square test, where $p\text{-value} \leq 0.05$ was regarded as significant.

RESULTS

In our study, mean age of the patients in Group A was 37.86 ± 9.33 years and in Group B 41.08 ± 7.59 years, in Group A, 29(58%) patients were male and 31(62%) patients in Group B were male, whereas, females numbered 21(42%) in Group A and 19(38%) in Group B. Mean operative time in Group A was 10.68 ± 2.23 minutes and in Group B, it was 10.30 ± 2.67 minutes. Recurrence was recorded as 2(4%) in Group A and 3(6%) in Group B while post-operative infection was found in 1(2%) patient in both groups, as shown in Table-I.

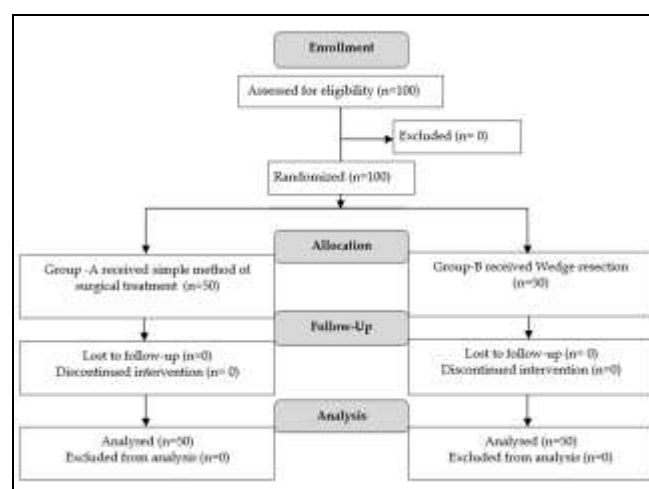


Figure: Patient Flow Diagram (n=100)

Table: Demographic Data of Participants and Outcome of Surgery in Both Groups (n=100)

Surgery in Both Groups (n=100)			
Variable	Group A (n=50)	Group B (n=50)	p-value (≤0.05)
Age (years)	37.86±9.33	41.08±7.59	0.061
Gender			
Male	29(58%)	31(62%)	0.68
Female	21(42%)	19(38%)	
Operative time (mins)	10.68±2.23	10.30±2.67	0.44
Recurrence			
Yes	2(4%)	3(6%)	0.64
No	48(96%)	47(94%)	
Post operative Infection			
Yes	1(2%)	1(2%)	1.0
No	49(98%)	49(98%)	

DISCUSSION

An ingrown toenail is a disorder that affects toes quite often and is responsible for a large amount of morbidity. The most prevalent causes are not well understood, however, nail trimming or wearing shoes that are too tight considered as the commonest cause. In its earlier stages, the condition may be treated conservatively with warm soaks, antibiotics, and analgesics; nevertheless, in its later stages, surgical intervention may be required. In order to deal with this issue, a wide variety of surgical procedures have been reported. With simple nail avulsions, the probability of recurrence is the highest of any damage type at 70%. Studies have indicated that chemical and laser matricectomy had lower recurrence rates than mechanical matricectomy.^{10,11} Indications for therapy include disease stage, previous treatment methods in case of recurrence, and other considerations such as allergy to local anesthetics, pregnancy, and bleeding problems with mild to moderate lesions (stages 1 and 2) are often treated with conservative treatments, but severe lesions leading to impairment need surgical approaches (stage 3).⁸⁻¹³ It was pointed out by Muhammad et al., that ingrowing toe nails may be avoided by clipping the nails carefully, paying specific attention to the corners, avoiding wearing shoes that are too tight, and keeping the foot dry and clean.¹⁴ The same observations were made by Kuru *et al.*, as well.¹⁵ Research shows that basic nail avulsions have an elevated risk of recurrence. In a recent clinical experiment, Khan,¹⁶ excised 29 toes in a total of 23 individuals. Of the 29 toes that were operated on, there were 3(10.34%) recurrences, and 2(6.89%) individuals had secondary infections. Their total series had a satisfaction percentage of 69.56% across the board. These findings correspond to our results as we recorded 6% of the cases with recurrence, however,

post operative infection rate was lower than the above study i.e., 2% only. Mousav and others,¹⁷ tested a simple surgical procedure for ingrown toenails and found that it had favorable outcomes. They found that recurrence occurred in just 1.08% (2 of 185 toenails), and only one toe needed further surgical treatment for the condition. Although the total failure rate of the procedure is just 1.7%, and the success rate of surgical therapy is above 98%, the recurrence rate is far lower than what was reported in our research. Thus, cosmetically, wedge resection is a better choice as the nail plate remains intact.¹⁸ Wedge excision has similar frequency of relapses as complete nail removal, but was more effective than foldoplasty.^{19,20} We found no study comparing both of these techniques, however, according to the findings of our research, the primary benefits of the simple method include the fact that the surgical procedure can be performed with ease throughout all stages, producing very good cosmetic results; the recurrence rate is quite low and having no significant difference when compared with wedge technique; postoperative pain and limitations on daily functioning are minimal; and indicated are the exceptional aesthetic effects that may be achieved with this treatment, in addition to the high rate of success in curing the condition, the relatively short length of postoperative discomfort and morbidity, and the low risk of postoperative infection. For operations that are more definite, a simple surgical procedure for ingrown toenails that involves resecting a slice of soft tissue along the fold of the paronychium has been shown to produce with encouraging outcomes.

LIMITATIONS OF STUDY

The follow-up duration was not investigated, potentially underestimating long-term recurrence, while outcome measures like pain, patient satisfaction, or functional recovery were not recorded. Recruitment from a single military hospital limit generalizability to civilian or diverse populations, and unblinded operators/patients may have influenced outcome reporting.

CONCLUSION

The simple nail removal technique is successful, well tolerated, and does not present any technical challenges; hence, it can serve as an alternative to the techniques of treatment that are now in use.

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Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

JA & SMH: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

STHG & RA: Conception, data analysis, drafting the manuscript, approval of the final version to be published.

SAZ & SAM: Data acquisition, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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