

Original Research Article

Comparison between conservative and surgical management of ingrown toenail in Bangladeshi patients

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ABSTRACT

Background: Ingrown toenail (onychocryptosis) is a common and painful condition that affects daily activities and quality of life. Treatment options include conservative and surgical interventions, with varying efficacy and patient outcomes. This study aimed to compare the effectiveness of conservative versus surgical management of ingrown toenails in Bangladeshi patients.

Methods: This prospective observational study was conducted at the Nail Unit, Aurora Skin and Aesthetic Center, Dhaka, over six months (10 January to 09 July 2024). A total of 100 patients with clinically diagnosed ingrown toenail were enrolled and equally divided into two groups: 50 patients received conservative treatment (topical antibiotics, proper nail trimming, and footwear advice) and 50 underwent surgical intervention (partial nail avulsion with/without matrixectomy). Outcomes measured included healing rate, healing time, pain reduction (VAS), recurrence, infection, patient satisfaction, and work/school absenteeism. Data were analyzed using statistical package for the social sciences (SPSS) version 25.

Results: The groups were comparable in terms of age, sex, affected toe, and disease severity. Surgical treatment showed significantly better outcomes: complete healing in 94% versus 78% ($p=0.02$), shorter mean healing time (10.1 ± 2.7 versus 13.5 ± 3.2 days; $p<0.001$), greater pain reduction (VAS: 5.1 versus 4.2; $p=0.001$), and lower recurrence (4% versus 18%; $p=0.03$). Patient satisfaction was higher in the surgical group (92% versus 68%; $p=0.003$), with fewer missed workdays and repeat visits.

Conclusion: Surgical management of ingrown toenails provides superior outcomes in terms of healing, pain relief, and recurrence compared to conservative treatment, and should be considered for definitive management.

Keywords: Ingrown toenail, Onychocryptosis, Surgical management, Conservative treatment, Recurrence, Patient satisfaction

INTRODUCTION

Ingrown toenail, or onychocryptosis, is a common and painful nail condition characterized by the penetration of the nail edge into the surrounding periungual soft tissue, leading to inflammation, pain, and in some cases, secondary infection.¹ This condition most commonly affects the great toenail and occurs across all age groups but is particularly prevalent among adolescents and young adults.² Factors contributing to ingrown toenails include

improper nail trimming, tight footwear, trauma, hyperhidrosis, obesity, and hereditary predisposition.³ If left untreated, it can significantly impair quality of life, interfere with mobility, and in severe cases, lead to chronic infection or cellulitis.

Treatment modalities for ingrown toenails can be broadly divided into conservative and surgical approaches. Conservative management is typically considered for early-stage disease and includes interventions such as

warm soaks, topical or systemic antibiotics, proper nail care education, and the placement of cotton or dental floss beneath the ingrown nail edge.⁴ These methods are minimally invasive and often preferred as the first line of management. However, they may have a higher rate of recurrence and require strict compliance from the patient.⁵

Surgical management is more commonly employed in moderate to severe or recurrent cases and may involve partial or complete nail avulsion with or without chemical or surgical matrixectomy to prevent regrowth.⁶ Surgical techniques provide faster symptom relief and are associated with lower recurrence rates, though they may involve a longer recovery time, higher initial discomfort, and minor risks such as post-operative infection or nail deformity.⁷

There remains ongoing debate among clinicians regarding the optimal treatment strategy, especially in low-resource settings where access to surgical care or patient follow-up may be limited.⁸ Moreover, patient preference, pain tolerance, recurrence risk, and treatment costs are important factors influencing the choice of treatment.⁹

In Bangladesh, ingrown toenails are frequently encountered in dermatology and general practice settings, yet local data comparing the outcomes of conservative versus surgical management are limited.¹⁰ Understanding the effectiveness, complications, recurrence, and patient satisfaction with each approach can help guide clinical decision-making and optimize patient care.¹¹

This study aimed to compare the clinical outcomes of conservative and surgical treatment of ingrown toenails among Bangladeshi patients, focusing on healing time, pain reduction, recurrence rate, complications, and overall patient satisfaction. The findings may offer practical insights into evidence-based management strategies suited to our local context.

METHODS

This prospective observational study was conducted in the Nail Unit of Aurora Skin and Aesthetic Center, located in ENA Shakur Tower, West Panthapath, Dhaka. The study duration was six months, from 10 January 2024 to 09 July 2024, encompassing a total of 180 days. A total of 100 patients clinically diagnosed with ingrown toenail were enrolled and divided equally into two groups: 50 patients received conservative treatment and 50 underwent surgical intervention. Patients were selected through purposive sampling after obtaining informed written consent. The diagnosis was based on clinical examination and staging of ingrown toenail, typically involving the great toe, with symptoms ranging from pain and swelling to infection.

Inclusion criteria

Inclusion criteria included patients aged 12 years and above presenting with stage I, II, or III ingrown toenails,

willingness to receive either conservative or surgical treatment, and ability to attend regular follow-up.

Exclusion criteria

Exclusion criteria included patients with uncontrolled diabetes mellitus, peripheral vascular disease, immunocompromised conditions, pregnancy, recent treatment (within the last 6 months) for ingrown toenail, or incomplete follow-up.

Conservative treatment consisted of warm saline soaks, topical or oral antibiotics as needed, cotton nail-fold packing, and proper nail trimming instructions. Surgical management included partial nail avulsion with or without matrixectomy using phenol under local anesthesia. Post-treatment care was standardized in both groups, including dressing, pain management, and follow-up instructions.

Patients were followed up for pain relief, healing time, infection, recurrence, and overall satisfaction. Pain was assessed using a 10-point visual analogue scale (VAS). Healing was defined as complete resolution of symptoms and return to normal activities. Recurrence was defined as the return of symptoms within the follow-up period.

Data were collected using a structured checklist and entered into statistical package for the social sciences (SPSS) version 25 for analysis. Continuous variables were presented as mean $\pm$ standard deviation, and categorical variables as frequencies and percentages. Statistical comparisons between groups were performed using independent t-tests or Chi-square tests as appropriate. A p value <0.05 was considered statistically significant.

RESULTS

Table 1 presents the baseline demographic and clinical characteristics of patients in both the conservative (n=50) and surgical (n=50) treatment groups. The mean age of patients was comparable between the two groups (28.4 ± 9.2 years versus 27.6 ± 10.1 years; $p=0.62$). Males comprised the majority in both groups, with no statistically significant difference in gender distribution ($p=0.68$). The great toe was the most commonly affected digit in both groups, observed in 90% of the conservative group and 94% of the surgical group ($p=0.50$). The right foot was more frequently involved in both groups, and the difference in laterality was not significant ($p=0.85$).

A higher proportion of patients in both groups presented with stage II or higher ingrown toenails, accounting for 70% in the conservative group and 76% in the surgical group ($p=0.49$).

Table 2 summarizes and compares the treatment outcomes between the conservative and surgical management groups. A significantly higher proportion of patients in the surgical group achieved complete healing (94%) compared to the conservative group (78%), with a $p=0.02$. The mean

healing time was significantly shorter in the surgical group (10.1 ± 2.7 days) than in the conservative group (13.5 ± 3.2 days), ($p < 0.001$). Pain reduction, as measured by the visual analogue scale (VAS), was also greater in the surgical group (mean score 5.1 ± 1.1) compared to the conservative group (4.2 ± 1.3), with a statistically significant difference ($p = 0.001$). Recurrence of ingrown toenail was observed in 18% of conservatively treated patients versus only 4% in the surgical group, indicating a significantly lower recurrence rate with surgical intervention ($p = 0.03$). The infection rate was slightly lower in the surgical group (6%) compared to the conservative group (12%), although this difference was not statistically significant ($p = 0.29$).

Table 1: Baseline demographic and clinical characteristics.

Characteristics	Conservative group (n=50)	Surgical group (n=50)	P value
Mean age (years)	28.4 ± 9.2	27.6 ± 10.1	0.62
Male (%)	30 (60)	32 (64)	0.68
Female (%)	20 (40)	18 (36)	
Affected toe (great toe)	45 (90)	47 (94)	0.5
Laterality (right)	28 (56)	29 (58)	0.85
Stage II or higher (%)	35 (70)	38 (76)	0.49

Table 2: Treatment outcomes.

Outcome variables	Conservative group (n=50)	Surgical group (n=50)	P value
Complete healing (%)	39 (78)	47 (94)	0.02*
Mean healing time (days)	13.5 ± 3.2	10.1 ± 2.7	<0.001 *
Pain reduction (VAS)	4.2 ± 1.3	5.1 ± 1.1	0.001*
Recurrence (%)	9 (18)	2 (4)	0.03*
Infection rate (%)	6 (12)	3 (6)	0.29

*P value statistically significant

Table 3 highlights differences in patient satisfaction and follow-up outcomes between the conservative and surgical treatment groups. A significantly higher proportion of patients in the surgical group reported high satisfaction with treatment (92%) compared to the conservative group (68%), with a $p = 0.003$. The average number of missed work or school days was significantly fewer in the surgical group (3.2 ± 1.7 days) than in the conservative group (4.6 ± 2.1 days), indicating faster functional recovery ($p = 0.001$). Repeat visits due to unresolved or recurring symptoms were more common in the conservative group (24%) than in the surgical group (10%), with the difference being statistically significant ($p = 0.04$). Follow-up completion rates were high in both groups (96% in

conservative versus 100% in surgical), and the difference was not statistically significant ($p = 0.15$).

Table 3: Patient satisfaction and follow-up.

Variable	Conservative group (n=50)	Surgical group (n=50)	P value
Patient satisfaction (high) (%)	34 (68)	46 (92)	0.003*
Missed work/school days (mean)	4.6 ± 2.1	3.2 ± 1.7	0.001*
Required repeat visit (%)	12 (24)	5 (10)	0.04*
Follow-up completed (%)	48 (96)	50 (100)	0.15

*P value statistically significant

DISCUSSION

In this prospective study conducted in a dermatology center in Dhaka, surgical management of ingrown toenail demonstrated superior outcomes compared to conservative treatment in terms of healing rate, pain reduction, recurrence prevention, and patient satisfaction. These results are consistent with several previous studies emphasizing the efficacy of surgical intervention—particularly partial nail avulsion with phenol matrixectomy—in managing moderate to severe cases of onychocryptosis.

Our findings showed a 94% complete healing rate in the surgical group versus 78% in the conservative group, with significantly shorter healing time. This supports the results reported by Exley et al who found that phenol-based surgical techniques offer more rapid symptom resolution and improved functional recovery compared to conservative methods.¹² Similarly, Ergün et al demonstrated that surgical correction using minimally invasive nail fixators or the Winograd technique provides faster healing and lower complication rates.¹³

Pain reduction was also significantly greater in the surgical group in our study. This parallels findings from Guler et al, who compared nail braces to the Winograd technique and reported that surgical patients had more rapid relief from pain and inflammation.¹⁴

Although conservative techniques like braces or taping can be effective in early-stage cases, they often require prolonged adherence and show variable pain control, as noted by Watabe et al.¹⁵

Recurrence was a key differentiator in our study—18% in the conservative group versus only 4% in the surgical group ($p = 0.03$). Exley et al in their meta-analysis reported similar findings, indicating that phenol matrixectomy significantly reduces recurrence risk (risk ratio ~ 0.13) when compared to avulsion alone.¹ These findings are

further supported by Uygur et al who demonstrated superior long-term outcomes with modified suturing techniques after surgical correction.¹⁶ Although infection rates did not differ significantly between groups in our study, they were lower in the surgical cohort (6% versus 12%). Similar infection profiles have been reported by DeBrule et al and Dressler et al where controlled chemical cauterization following nail avulsion was associated with minimal infection risks.^{17,18}

Patient satisfaction was another important outcome where surgical management clearly excelled. In our study, 92% of surgical patients reported high satisfaction compared to 68% in the conservative group. Peyvandi et al found similar satisfaction levels in patients undergoing surgical correction using the sleeve and Winograd methods.¹⁹ Additionally, Mitchell et al emphasized the importance of long-term satisfaction, especially in pediatric populations, where cosmetic and functional outcomes influence acceptance.²⁰

We also found that the surgical group missed fewer work or school days and required fewer repeat visits, supporting the cost-effectiveness and time-efficiency of surgical intervention. Gera et al reported that nail avulsion in adolescents led to a significantly faster return to regular activities compared to nonoperative management.²¹ Our findings align well with these results and highlight the functional benefit of definitive surgical treatment.

Limitations

This study has some limitations. Being a single-center observational study from a single city with a relatively short follow-up (6 months), long-term recurrence and satisfaction data could not be assessed.

CONCLUSION

In conclusion, our results reinforce that partial nail avulsion combined with phenol matrixectomy is an effective, reliable, and patient-preferred method for managing ingrown toenails, especially in moderate to severe cases. Conservative management may still be considered in early stages or when surgical options are not feasible, though it carries higher recurrence, slower recovery, and lower satisfaction. Tailoring treatment to disease severity and patient preference, supported by local capacity and follow-up feasibility, remains the cornerstone of effective ingrown toenail management.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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