

The Frequency of Recurrence of Ingrown Toenail After Wedge Excision of Nail, Nail Bed and Partial Matricectomy

Mehtab Ahmed, Mirza Shehab Afzal Beg.

ABSTRACT

Introduction: Ingrowing toenail is a common problem causing lot of discomfort and morbidity. Though a variety of methods have been adopted but their treatment is often frustrating for the patient as it may be associated with considerable and long-lasting morbidity.

Objective: To determine the frequency of recurrence of ingrown toe nail (IGTN) after wedge excision of nail plate, nail bed and partial matricectomy.

Study design: Descriptive case series

Study setting: Department of plastic surgery Liaquat National Hospital Karachi

Duration of study: six months from 12th Jan 2019 to 12th June 2019.

Subject & Method: We reviewed case series of 99 patients with IGTN after wedge excision of nail plate, nail bed and partial matricectomy who were examined on follow ups (at 1 month and 2 month) for the presence of signs (redness, Seropurulent discharge, pain and swelling) on clinical examination to check the recurrence (presence of any of them was labeled as recurrence).

Results: 99 patients with ingrown toe nail (IGTN) were included. 34 (34.3%) were female and 65 (65.7%) were male with mean age of 42.36 ± 8.86 years. 30 patients (30.3%) had grade-II, while 69 (69.7%) had grade-III (Heifetz grading). Recurrence of IGTN after wedge excision of nail plate, nail bed and partial matricectomy was seen in 8 patients (8.1%).

Conclusion: In conclusion surgical correction of IGTN with wedge excision of nail plate, nail bed and partial matricectomy had good results with the recurrence rate of 8%.

Key Words: ingrown toe nail, wedge excision of nail plate, partial matricectomy.

Introduction

In growing toe nail (IGTN) also known as onychocryptosis is painful foot condition in which toe nail penetrates into surrounding soft tissue leading to subsequent inflammation and infection¹. In United Kingdom, the estimated prevalence of

ingrown toe nail is 10,000 new cases/year². Of all the patients, presenting with foot problems, 20% have in growing toe nail, It is reported to be common among young, immune compromised and peripheral vascular disease patients^{3,4}. The reported risk factors for IGTN are bad trimming of nail, tight shoes, poor hygiene of foot and pointed nail shape⁵⁻⁸. Diabetes, obesity, thyroid, cardiac and renal disorders increase the likelihood of ingrowing toe nail by predisposing to lower extremity edema^{9,10}.

*Liaquat National Hospital, Karachi Pakistan.
Corresponding author: Mirza Shehab Beg.
shehabbeg@hotmail.com*

IGTN are categorized as mild, moderate and severe (The Heifetz grading). Mild (grade 1) cases are characterized by nail-fold swelling, erythema, edema and pain with pressure. Moderate (grade 2) cases are associated with increased swelling, seropurulent drainage, infection and ulceration of the nail fold. The most severe (grade 3) cases of IGTN exhibit chronic inflammation and granulation as well as marked nail fold hypertrophy¹¹. Indications for the treatment of an ingrown toenail include significant pain or infection, onychogryposis (a deformed and curved nail) and chronic recurrent paronychia (inflammation of the nail fold). A wide range of options from conservative to surgery exist for treatment of In growing toenail. The treatment option should be individualized considering risks, benefits and patient's preference^{3,13,14}. Conservative treatment is provided with wisps of cotton placed under the ingrown lateral nail edge using a nail elevator or a small curette can also be attempted, with the patient repeating this process if the cotton falls out¹⁵. Another conservative treatment approach is to use a gutter splint (e.g., a sterilized vinyl intravenous drip infusion tube slit from top to bottom with one end cut diagonally for smooth insertion) that can be affixed to the ingrown nail edge with either adhesive tape or a formable acrylic resin such as cyanoacrylate¹⁶. Many surgical techniques exist for Ingrowing toenail including, complete nail plate avulsion, wedge resection with or without matricectomy. Different research articles combine these surgical techniques with chemical matricectomy with either phenol or other chemical agents and produced different outcome and recurrence rates^{17,18}. Despite large number of treatment options available, search for ideal procedure still continues. Historically, a recurrence rate

of 13-50% has been reported after surgical treatment, although more recent papers have reported recurrence rates of less than 5%, particularly with the use of wedge resection of the nail and phenol ablation¹⁹. Reijnen and Goris²⁰ suggested following criteria for satisfactory treatment: Procedure should be simple and cheap, there should be little post treatment discomfort, return to normal activities should be quick, the percentage of complications should be low, recurrence should be minimal and resulting toe should be cosmetically acceptable. Medical treatment with warm water soaks antibiotics and proper patient education for nail trimming and nail care is indicated for grade 1 disease²¹. Surgical treatment is indicated for grade 2 and 3. The surgical treatments for ingrowing toenails include procedures on the nail plate, the nail bed (germinal matrix), and the surrounding soft tissue. Surgical techniques well described for IGTN include complete excision of nail plate and nail bed described by zadik in 1950²², and wedge excision of affected nail described by Winograd in 1929²². Soft tissue surrounding the nail can be addressed by triangular, crescent, elliptical and semi elliptical excisions²³.

The rationale of my study is to determine the frequency of recurrence of ingrown toenail in our population after surgical procedure in which wedge excision of nail plate and nail bed along with partial matricectomy of germinal layer is done to see the recurrence of IGTN after this procedure and establish whether this technique is adequate as satisfactory treatment option. With low recurrence as compared to other techniques this procedure will considered as ideal treatment option for patients presenting with ingrown toenail.

Material and Methods

A descriptive case series study was conducted at Department of plastic surgery, Liaquat National Hospital Karachi in between jan 2019 to june 2019. Total 99 patients are included in study. Inclusion criteria were patients of either gender with unilateral ingrown toenail of any duration, patients with Heifetz grade 2, 3 and in between 18 to 60 years of age. Patients with recurrent IGTN and those on blood thinners were excluded. Patient sampling was done by non-probability consecutive sampling. Data was collected after informed consent from the patients meeting the inclusion criteria on Performa designed for this study by principal investigator. Written and informed consent was be taken for procedure. Patient's demographic information including name, age, sex and occupation was collected. Data regarding duration of disease, history of trauma, risk factors (already described), and side of IGTN was documented. All surgeries were performed as day care by same surgeon. Infected cases were treated with preoperative antibiotics for 5 days. Standard surgical procedure of wedge excision of nail, nail bed and partial matricectomy was performed (modified zadik's procedure). All surgeries were performed under local anesthesia by ring block technique. Rubber glove tourniquet was used for hemostasis during surgery. Standard dressing was applied to all patients. All patients were called at 1 and 2 months to check for recurrence. Final outcome was assessed at 2 months. Postoperative assessment for recurrence was done on clinical Examination. The statistical analysis was done using SPSS windows package version 17. Descriptive statistics were calculated for qualitative and quantitative variables. Frequency distribution and percentages were calculated for

qualitative variables i.e. Heifetz grade, gender, occupation and risk factors (including bad trimming of nail, tight shoes, poor hygiene of foot, pointed nail shape, family history of igtn, BMI>30, thyroid disease, cardiac disease and renal disease), side involved, H/O trauma to nail and recurrence, educational status. Mean and standard deviation was calculated for quantitative variables like age, duration of disease .chi square test was applied. The effect modifiers like age, duration of symptoms, factors, occupation, stage, site involved, family H/O IGTN, educational status and history of any trauma to nail were addressed through stratification. Post stratification was done through chi square test. P-value less than or equal to 0.05 was taken as significant.

Results

A total 99 patients with ingrown toe nail (IGTN) after wedge excision of nail plate, nail bed and partial matricectomy were included in our study. The mean age was 42.36 ± 8.86 years. 34 (34.3%) were female and 65 (65.7%) were male. Mean duration of disease was found to be 5.37 ± 3.37 weeks. (Fig 1). 23 patients (23.2%) were laborer, 40 (40.4%) were office workers and 36(36.4%) were professionals. As for as education status is concerned, 21 patients were illiterate, 45 patients (49.5%) were metric passed and 29 (29.3%) were graduate. 9 patients (9.1%) had history of trauma. In 63 patients (63.6%) IGTN was medial, while in 36 patients (36.4%) it was lateral. In case of Heifetz grading on clinical examination, 30 patients (30.3%) had grade-II, while 69 (69.7%) had grade-III Heifetz grading. The distribution of Heifetz grading on clinical examination is presented in fig-2. Three patients (3.0%) had family history of IGTN. Bad trimming of nail

with pointed ends of nail was seen in 57 patients (57.6%), 37 (37.4%) had history of wearing tight shoes, poor hygiene of foot (whether washes feet with soap regularly to maintain hygiene) was seen in 12 (12.1%), pointed nail shape was seen in 6 (6.1%), Obesity with BMI >30 was seen in 27 (27.3%), three patients (3%) had history of Thyroid disease (positive if taking any treatment), 7 (7.1%) had cardiac disease (positive if taking any treatment), four (4%) had renal disorders (positive if taking any treatment). The distribution of risk factors on history is presented in fig-3.

On follow ups (at 1 month and 2 month), presence of signs on clinical examination was redness (erythema) in two patients (2%), Seropurulent discharge in one (1%), pain was present in four (4%) and swelling was seen in one patient (1%). The distribution of follow ups (at 1 month and 2 month) is presented in Table-1
 Recurrence was seen in 8 patients (8.1%).
 Table-1.

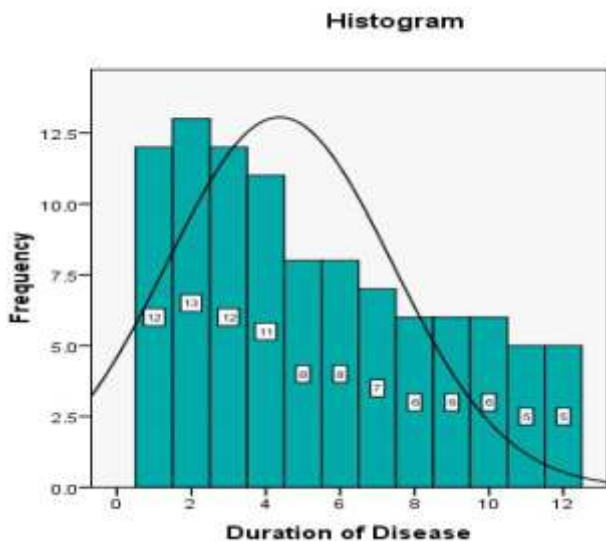


Figure 1: Graphical distribution of duration of disease in weeks.

The stratification according to age, gender, occupation, education status, history of trauma, duration of disease, site of IGTN, Heifetz grading on clinical examination, family history of IGTN, factors on history was done to observe the effect of these modifiers on follow ups (at 1 month and 2 month) and recurrence of IGTN.

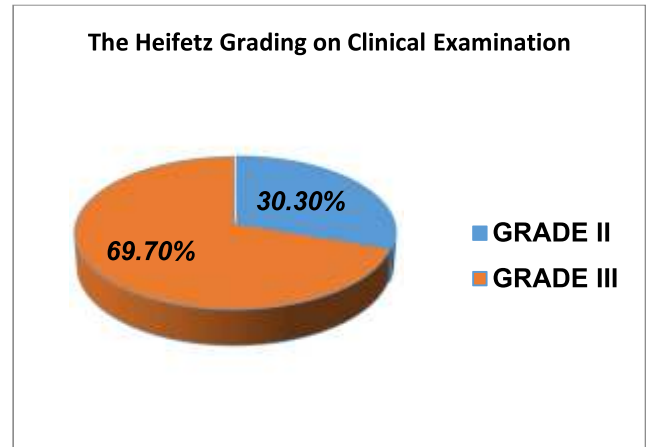


Figure 2: Frequency Distribution of The Heifetz Grading on Clinical Examination

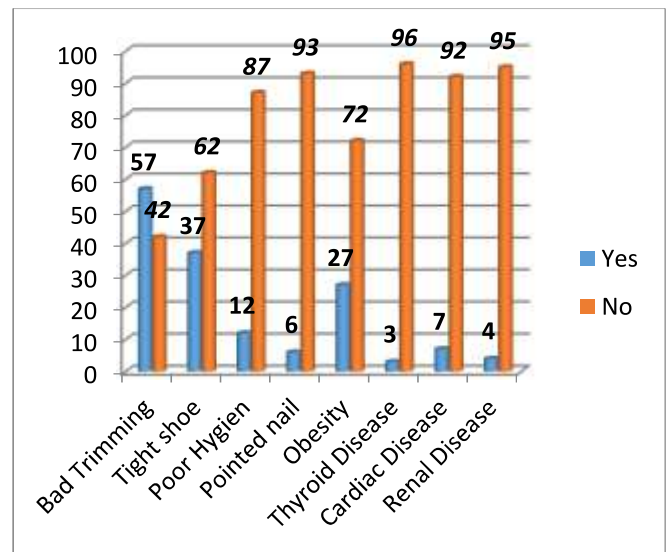


Figure 3: Frequency Distribution of Factors on History (n=99)

Table 01: Follow UPS (at 1 Month And 2 Month) According To Age (n=99)

AGE	REDNESS		SEROPURULENT DISCHARGE		PAIN		SWELLING	
	NO	YES	NO	YES	NO	YES	NO	YES
18-40 YEARS	23 (23.5%)	0	23 (23.5%)	0	22 (22.5%)	1 (1%)	23 (23.5%)	0
41-60 YEARS	74 (74.5%)	2 (2%)	75(75.5)	1 (1%)	73 (73.5%)	3 (3%)	75 (75.5%)	1 (1%)
TOTAL	97 (98%)	2 (2%)	98 (99%)	1 (1%)	95 (96%)	4(4%)	98 (99%)	1 (1%)
	99(100%)		99(100%)		99(100%)		99(100%)	
P VALUE	***1.000		***1.000		***0.379		***1.000	

Chi Square test was applied.

P-value ≤ 0.05 considered as significant.

***not Significant at 0.05 levels

Discussion

Ingrown toenails are common worldwide, and diverse treatment options exist. An ideal surgical technique is not currently available, but theoretically, such approach should be technically simple, cost effective and yield good cosmetic results with low recurrence rates. Furthermore, the procedure would be done on an outpatient basis with a quick return to normal activities and low complication rates. The approach described in this study meets all of these criteria and is the first to detail the long-term outcomes of soft-tissue nail-fold excision in the treatment of ingrown toenails.

In the early 20th century, treatment was guided by this philosophy, "the more radical the surgery, the greater the success²⁴." Recently, the value of more conservative approaches has been recognized, especially in patients with stage 1 disease²⁴⁻²⁸. Today, the most popular conservative therapies include warm water soaks, topical or oral

antibiotic therapy, proper nail trimming, and elevation of the corner of the nail with a cotton wick^{27,30}. Soaking the toe in warm water for 15 minutes can reduce inflammation²⁷. While antibiotics reduce bacterial infection²⁶, their value remains unproved in the treatment of ingrown toenails. Many treatment modalities of ingrown toenail are reported in the literature, often associated with unacceptably high recurrence rate³¹.

Multiple surgical approaches to the correction of ingrown toenails have been suggested. Initially, the preferred treatment was simple nail avulsion alone; however, this approach has fallen out of favor given the high recurrence rates (about 70%).^{32,33}. Surgery of the toenail should preserve as much uninvolved, normal tissue as possible. Simple partial nail fold excision technique for ingrown toenails consisting of a resection of a slice of soft tissue at the fold of the paronychia where the toenail corner enters

the soft tissue (without matricectomy or permanent destruction of the nail-forming tissue) has been advocated for stage 2 ingrown toenails. In one previous study simple technique was preferred because partial avulsion with matricectomy reduces the width of nail. Removal of the lateral nail without matricectomy results in recurrence of ingrown nail in 70 percent of patients^{16,32,33}. In our study Recurrence of IGTVN was seen in 8 patients (8.1%), which is similar to Mousavi et al³³ study which showed (2 of 185 toenails) recurrence. The entire nail plate should not be removed unless necessary because of the resulting large area of tender, exposed nail bed.

The major contraindication to matricectomy is digital ischemia from disorders such as diabetes or peripheral or collagen vascular disease²⁶. In children, conservative treatments with antimicrobial ointments, gutter treatment, and in selected cases systemic antibiotics are more promising than in adults. If these efforts remain unsuccessful, the only reliable surgical approach is a radical wedge resection³⁴. Currently there are various surgical treatment modalities for ingrowing nail. None of these procedures are perfect to achieve esthetic results with low cost, recurrence, and complication rates³⁵.

Excision of a slice of soft tissue at the fold of the paronychia, combined with lateral nail margin elevation, suture, and fixed nail, produces excellent cure rates in patients with stage 2 and 3 disease. These techniques minimize the trauma and removal of normal tissue. This simple technique, when performed correctly, in future repositions the lateral nail groove against the cut edge of the nail.

The current study revisits a classical pathophysiologic model for the surgical management of ingrown toenails. Where the results and experiences with wedge excision of nail plate, nail bed and partial matricectomy presented in this study are impressive, there are a few limitations. All surgeries were conducted at a single site, and no randomization was performed. Furthermore, the analysis was descriptive series. Given that the results presented in this study are a significant improvement compared with the current literature.

In summary, we present a surgical approach to the treatment of ingrown toenails that focuses on the wedge excision of nail plate, nail bed and partial matricectomy. Our findings show good results, with recurrences rate of 8%.

Conclusion

In conclusion surgical correction of IGTVN with wedge excision of nail plate, nail bed and partial matricectomy had good results with the recurrence rate of 8%.

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