Dermatology Practical & Conceptual

Efficacy of Intralesional Platelet-Rich Plasma in Treatment of Fingernail Onychomycosis: A Randomized Controlled Trial

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ABSTRACT

Introduction: Emerging evidence suggests that platelet-rich plasma (PRP) has an antifungal role.

Objectives: To investigate the efficacy of intralesional PRP in the treatment of fingernail onychomycosis.

Patients and Methods: Patients with fingernail onychomycosis were randomized to receive oral terbinafine 250 mg daily for three months, six sessions of intralesional PRP, or both (PRP + terbinafine). Primary outcome of the study was change in onychomycosis severity index (OSI) at the end of follow-up. Two blinded investigators (investigators A and B) assessed the outcomes. The assessment was carried out per affected nail rather than per affected patient.

Results: Twenty, 18, and 23 patients were included in the terbinafine, PRP, and terbinafine + PRP groups, respectively, with 40, 51, and 50 nails treated in each respective group. OSI was comparable among study groups according to investigator A (terbinafine: 4 [IQRs: 4, 9], PRP: 6 [IQRs: 2, 12], PRP + terbinafine: 5 [IQRs: 3, 8]; p>0.9) and investigator B (terbinafine: 4 [IQRs: 3, 10], PRP: 6 [IQRs: 4, 10], PRP + terbinafine: 6 [IQRs: 3, 12]; *P*>0.9). Similarly, mycological cure (terbinafine: 20%, PRP: 35%, PRP + terbinafine: 34%; *P*=0.23), clinical cure (terbinafine: 23%, PRP: 27%, PRP + terbinafine: 32%; *P*=0.61), and complete cure (terbinafine: 20%, PRP: 27%, PRP + terbinafine: 28%; *P*=0.64) were comparable.

Conclusions: Six sessions of intralesional PRP were effective in treating fingernail onychomycosis, making it a potential viable alternative for patients who may not respond well to oral antifungal medications or who experience adverse effects from these drugs.

Introduction

Onychomycosis is the most common nail disorder worldwide. Its prevalence is estimated to be 5.5%, being responsible for up to 50% of all nail diseases [1]. The causative organisms in onychomycoses are dermatophytes, non-dermatophyte molds (NDMs), and yeasts. Mixed infection has been increasingly detected in recent studies[2]. Treatment of onychomycosis can be challenging as most therapeutic options are lengthy, expensive, and potentially unsuccessful. The relapse rate of onychomycosis ranges from 10% to 53% [3]. Systemic side effects of oral antifungals are another disadvantage. These include gastrointestinal upset (7–17.7%), dermatological rashes (4–9.5%), headache (7.2–12.9%), asymptomatic elevation of liver enzymes (3.3%), and significant drug-drug interaction [4].

Platelet-rich plasma (PRP) is the portion of plasma with higher platelet concentration after centrifugation[5]. Studies have outlined a fundamental role of platelets in antimicrobial host defense mechanisms. Platelet-rich plasma exhibits chemotactic responses to inflammatory mediators, expresses immunological receptors for antibodies and complement proteins, and maintains the capacity to generate oxygen metabolites with antimicrobial properties[6, 7]. Microbicidal proteins released during platelet activation exhibit significant efficacy against diverse pathogens, including gram-negative and gram-positive bacteria, as well as fungi in both laboratory and living systems[8, 9]. PRP possesses a high concentration of neutrophils. These cells release myeloperoxidase, which has antibacterial and antimicrobial properties[10]. Recently, PRP was successfully used in the treatment of multiple recalcitrant plane and plantar warts[11, 12]. Additionally, PRP was found effective in inhibiting periodontal pathogens such as *P. gingivalis* and *A. actinomycetemcomitans* [14].

To date, only a few studies have explored the antifungal role of PRP. It has been used to inhibit growth of periodontal *C. Albicans* [13], promote healing of *C. Albicans*-infected burn wounds [14], and inhibit progress of lymphocutaneous sporotrichosis infection in experimental animals [15].

Objectives

In this study, we aimed to investigate the efficacy of intralesional PRP in the treatment of fingernail onychomycosis as compared to oral terbinafine. Results of this research may help clarify the potential antifungal role of PRP.

Patients and Methods

Ethical Considerations

This clinical trial was approved by the Research Ethics Committee, Faculty of Medicine (IRB number: SohMed-21-11-21), and prospectively registered at clinicaltrials.gov (registration number: NCT05128916). A written informed consent was obtained from all participants. The ethical guidance of this study is compatible with the Declaration of Helsinki[16].

Study Design and Inclusion Criteria

This single-blind randomized controlled clinical trial (RCT) was conducted at a dermatology outpatient clinic. Eligible participants were adult patients aged 18 years or more with fingernail onychomycosis confirmed by dermoscopy, direct potassium hydroxide (KOH) microscopic examination, and positive culture. Pregnant and lactating females, patients who had received topical or systemic antifungal therapy in the previous three months prior to enrollment, patients with impaired liver or renal functions, patients with anemia (hemoglobin level <10mg/dl), thrombocytopenia (platelet count <100,000 /μL), coagulopathies, patients on anticoagulant therapy such as aspirin, and patients with iron deficiency were excluded from the study.

Sample Size Calculation

Sample size calculation was conducted using G power software (version 3.1.9.6, Heinrich Heine University, Düsseldorf, Germany)[17]. With an effect size of 0.5 between the three study groups, 95% confidence interval (CI), and 90% power, the total sample size was determined to be at least 54 participants. We planned to recruit at least 70 patients to account for an expected dropout rate of 30%.

Study Groups, Randomization, and Blinding

Patients with fingernail onychomycosis were randomly assigned to one of three groups: patients who received intralesional injections of PRP (PRP group), intralesional PRP plus oral terbinafine 250 mg daily (PRP + terbinafine group), and oral terbinafine 250 mg daily (terbinafine group).

Patients were randomized to receive PRP, terbinafine, or both, with a 1:1:1 allocation ratio per a computer-generated list using permuted block size 15 (https://www.sealedenvelope.com). The results of allocation were in sealed opaque envelopes labelled with unique random codes. Due to the nature of interventions (oral versus intralesional), both the patient and treating investigator were not blinded, but the assessment of outcome was carried out by two dermatologists (MIA and YAA), who were blinded to the treatment type.

Pre-Intervention Patient Evaluation

- Medical history: A detailed medical history was taken.
- Physical examination: The number of affected fingers was recorded. The affected nails were examined for type of onychomycosis, extent of nail affection, and nail changes (thickened nail, discoloration, disfiguration/deformity, pain, and onycholysis). Also, the periungual tissue was examined for paronychia.
- Onychomycosis Severity Index (OSI): OSI was assessed for each affected nail. It is a quantitative score used to define the severity of onychomycosis. OSI score was obtained by multiplying a score for the area of involvement (range, 0–5) by a score for the disease proximity to the matrix (range, 1–5). Ten points were added for the presence of a longitudinal streak or a patch (dermatophytoma) or greater than two mm of subungual hyperkeratosis. Mild onychomycosis corresponds to a score of 1–5, moderate onychomycosis corresponds to a score of 6–15, and severe onychomycosis corresponds to a score of 16–35[18].
- Dermoscopic evaluation: Affected nails were examined using contact, polarized, non-immersion dermoscopy (DermLite DL4, FotoFinder Systems GmbH, Germany) for characteristic signs of onychomycosis, e.g., fringing at the proximal border of onycholysis, longitudinal striae of yellow-orange-brown discoloration, and subungual hyperkeratosis in ruin-like appearance[19].
- Direct microscopic KOH examination: For each patient, nail scrapings were collected from one or more affected nails and deposited onto a clean glass slide. Three drops of a mixture of 10% KOH and 40% dimethyl sulfoxide (DMSO) were added to the nail pieces. Positive specimens were those with round-to-oval budding cells and septate or aseptate hyphae[20].
- Culture: To identify the organism, culture was performed. Nail specimens were inoculated in Sabouraud dextrose agar with 5% chloramphenicol alone and with cycloheximide (Microxpress, Verna, India, LOT: SDA-2105).

Intervention and Procedures

- Intralesional injection of PRP: This was done in the PRP and PRP + terbinafine groups. Two milliliters of blood for each nail were drawn from each patient and evacuated after detachment of the syringe needle into Prothrombin time tubes containing 3.2% sodium citrate. Blood was centrifuged (80-1 centrifuge, Wincom ®, Hunan, China) at 300 G-force (~ 1500 RPM) for 10 minutes. The supernatant (upper third) was removed, and the middle third (PRP) was aspirated and used for intralesional injection of affected nails.

  Proximal nerve block of the affected finger was done by two ml of mepivacaine HCL 3% (Mepecaine®, Alexandria Co. for pharmaceuticals, Egypt). Then six PRP injections (0.1 ml each) were done at the proximal nail fold (one injection), hyponychium (one injection), and two lateral nail folds (two injections for each fold) every two weeks for a total of six sessions (total duration=12 weeks; three months).
- Oral terbinafine: Patients in the PRP + terbinafine and the terbinafine groups received 250 mg oral terbinafine tablets (Trerbi® 250 mg tab, Mash Premiere, Egypt) taken daily immediately after a fatty meal for a total of three months.

Follow-Up

Each patient was evaluated every month during the period of treatment (three months) and the period of follow-up (another three months).

- Assessment of treatment efficacy: OSI was the primary assessment tool. Clinical cure (>90% clearance of the previously affected part of the nail plate), mycological cure (negative KOH examination and negative culture), and complete cure (clinical plus mycological cures) of treated nails were also assessed at the end of treatment and at the end of follow-up [21].
- Assessment of treatment safety: We adopted patient-reported adverse outcomes (PRAO) to assess the safety of interventions. We used a numerical rating scale (NRS) from 0 to 10 to assess pain severity in patients who received PRP, given the reliability and sensitivity of this scale[22].
- Study outcomes: Improvement in OSI score at the end of and follow-up for each affected nail was considered the primary outcome of the study. Secondary outcomes included improvement in paronychia, dermoscopic findings, mycological, clinical, and complete cure rates of treated nails as well as PRAO.

Statistical Analysis

Data were recorded using the Microsoft 365 Excel program (Microsoft Co, Massachusetts, USA). Data were analyzed using the Posit Cloud R program (Posit PBC, Boston, USA)[23]. Continuous variables are presented as median and interquartile ranges (IQRs) and were compared using the Kruskal-Wallis rank sum test, being not normally distributed. Categorical variables are presented as frequencies and percentages and were compared using the Pearson's chi-square or Fisher's exact test. Univariate and multivariate generalized linear regression analyses were carried out to investigate potential predictors of the primary outcome. A p-value of <0.05 was considered statistically significant.

Results

Study Population

One hundred and thirteen patients were screened for inclusion in the study. Following a detailed counselling session, 75 patients agreed to participate and were randomized to either the terbinafine, PRP, or PRP + terbinafine group, with 25 patients allocated to each group. Five patients in each of the PRP and terbinafine groups and one patient in the terbinafine + PRP group were lost to follow-up due to treatment-unrelated reasons. Two patients in the PRP group and one patient in the terbinafine + PRP group discontinued their sessions due to injection-related pain. A total of 20, 18, and 23 patients completed all treatment and follow-up visits in terbinafine, PRP, and PRP + terbinafine groups, respectively, and were included in the final analysis (Figure 1).

Baseline Characteristics of Treated Patients

Most patients were females (90%) and housewives (61%), with a median age of 35 years (IQRs: 29, 42). The median duration of onychomycosis was two years (IQR: 1, 3 years); 74% of patients had received previous treatment, without improvement. The median number of treated nails per patient was two fingers (IQR: 1, 3 fingers). Other patient characteristics were shown in (Table 1).

Clinical Characteristics of Affected Nails

Terbinafine, PRP, and PRP + terbinafine groups included 40, 51, and 50 affected nails, respectively. All groups were comparable regarding the clinical type of onychomycosis and distribution of affected nails. Lateral onychomycosis (LO) was the commonest clinical type detected (39%). According to OSI, 48% of treated nails had moderate onychomycosis, 32% had severe onychomycosis, and 21% had mild onychomycosis (Table S1).

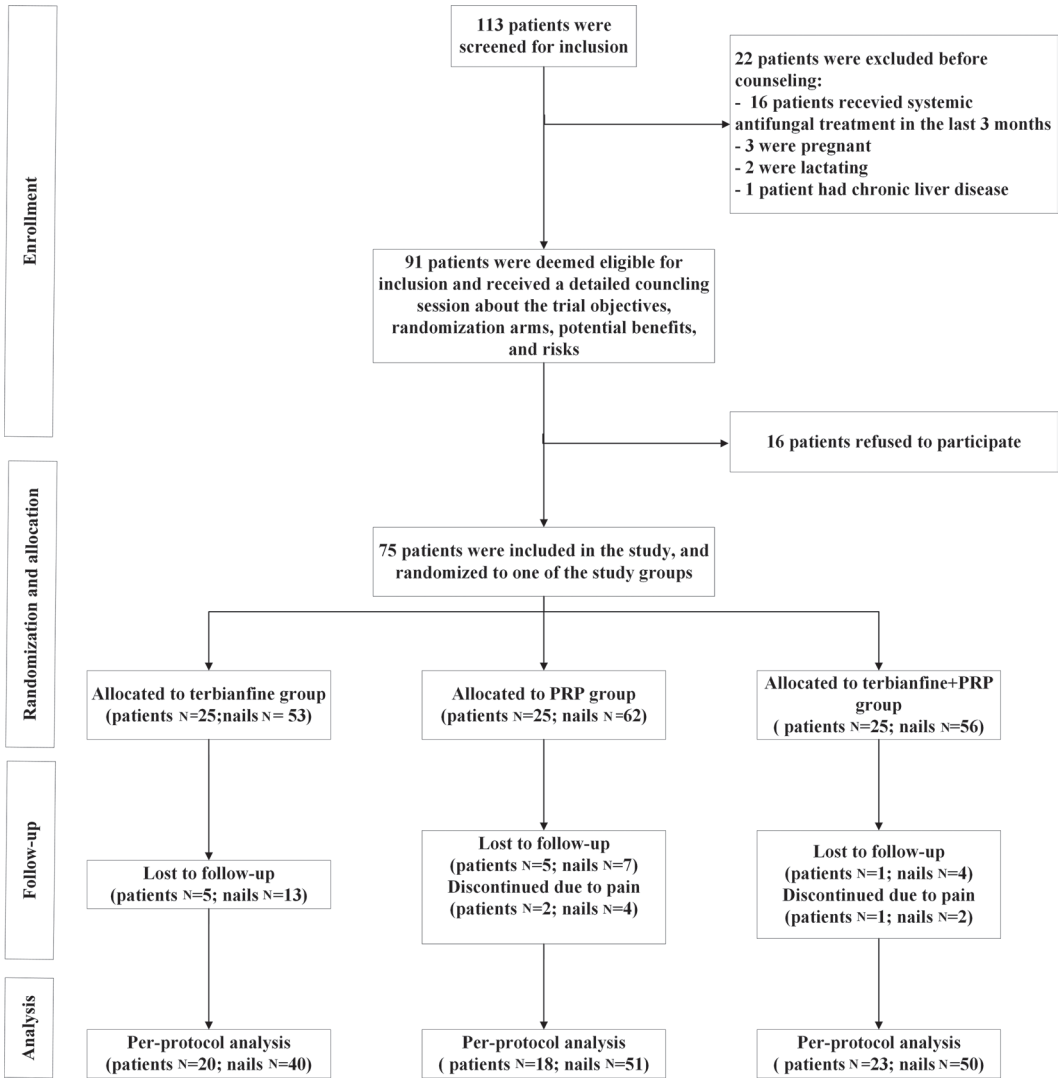

Figure 1. Flowchart of the study design according to Consolidated Standards of Reporting Trials (CONSORT) guidelines.

Table 1. Baseline characteristics of the study groups.

Characteristic	Terbinafine, N=20[1]	PRP, N = 18[1]	PRP+Terbinafine, N=23[1]	Overall, N=61[1]	p-value[2]
Age (years)	36 (29, 48)	36 (31, 38)	35 (28, 43)	35 (29, 42)	0.9
Sex					0.7
Female	17 (85%)	17 (94%)	21 (91%)	55 (90%)	
Male	3 (15%)	1 (5.6%)	2 (8.7%)	6 (9.8%)	
Occupation					>0.9
Housewife	12 (60%)	11 (61%)	14 (61%)	37 (61%)	
Nurse	2 (10%)	4 (22%)	1 (4.3%)	7 (11%)	
Student	2 (10%)	2 (11%)	3 (13%)	7 (11%)	
Cook	1 (5.0%)	0 (0%)	1 (4.3%)	2 (3.3%)	
Farmer	1 (5.0%)	0 (0%)	1 (4.3%)	2 (3.3%)	
Unemployed	1 (5.0%)	1 (5.6%)	0 (0%)	2 (3.3%)	
Doctor	0 (0%)	0 (0%)	1 (4.3%)	1 (1.6%)	
Employee	1 (5.0%)	0 (0%)	0 (0%)	1 (1.6%)	
Teacher	0 (0%)	0 (0%)	1 (4.3%)	1 (1.6%)	
Worker	0 (0%)	0 (0%)	1 (4.3%)	1 (1.6%)	
Residence					0.3
Rural	14 (70%)	12 (67%)	19 (83%)	45 (74%)	
Suburban	0 (0%)	2 (11%)	0 (0%)	2 (3.3%)	
Urban	6 (30%)	4 (22%)	4 (17%)	14 (23%)	
Duration (years)	1.75 (0.88, 2.00)	2.00 (1.00, 2.75)	2.00 (1.00, 3.50)	2.00 (1.00, 3.00)	0.2
Previous treatment	13 (65%)	16 (89%)	16 (70%)	45 (74%)	0.2
Family history	2 (10%)	2 (11%)	1 (4.3%)	5 (8.2%)	0.7
Laterality					0.2
Bilateral	8 (40%)	12 (67%)	11 (48%)	31 (51%)	
Unilateral	12 (60%)	6 (33%)	12 (52%)	30 (49%)	
No. of treated fingers/ patient	2 (1, 3)	2 (2, 5)	2 (1, 3)	2 (1, 3)	0.2

[1] Median (IQR); n (%)
[2] Kruskal-Wallis rank sum test; Fisher's exact test; Pearson's chi-square test
* PRP: platelet-rich plasma

Improvement in OSI

The two blinded investigators achieved strong agreement in OSI assessment (r>0.8). OSI was significantly higher in the PRP group at baseline than the other two groups according to both investigator A (*P*=0.004) and investigator B (*P*=0.015). However, OSI was comparable among all groups at the end of 3-month treatment according to investigator A (*P*=0.088) and investigator B (*P*=0.2). OSI was also comparable among the different groups at the end of 3-month follow-up period according to investigator A (*P*>0.9) and investigator B (*P*>0.9) (Table 2; Figures S1-S4).

Improvement in Paronychia

There was a strong agreement between both blinded investigators in paronychia assessment (weighted kappa correlation >0.8); 75% and 77% of the treated nails had paronychia before treatment according to investigators A and B, respectively (Table S2, Figures S3, S4, S6).

Improvement in Dermoscopic Characteristics

Chromonychia was the most prevalent finding, seen in 88%, 92%, and 90% of nails at baseline in the terbinafine, PRP, and PRP + terbinafine groups, respectively (Figure 2A, 2C). No significant change was noted after treatment or at follow-up in any group. Subungual hyperkeratosis was a common finding, present in 63%, 41%, and 48% of nails at baseline in the terbinafine, PRP, and PRP + terbinafine groups, respectively (*P*=0.12; Figure 2A, 2C). After treatment, the prevalence of subungual hyperkeratosis decreased significantly in PRP (*P*=0.022). All changes of the dermoscopic features are shown in Table S3.

Table 2. Onychomycosis Severity Index (OSI) per affected nail among different study groups (two-investigator assessment).

	Investigator	Terbinafine, N=40[1]	PRP, N=51[1]	PRP Terbinafine, =50[1]	p-value[2] (groups)	p-value before vs. after treatment[3]	p-value before vs. follow-up[3]	p-value after treatment vs. follow-up[3]	Agre Ement[4]
OSI[5]						T<0.001 PRP<0.001 T+PRP<0.001	T<0.001 PRP<0.001 T+PRP<0.001	T=0.88 PRP =0.016 T+PRP=0.03	
Baseline	A	8 (4, 17)	15 (8, 24)	9 (4, 15)	0.004				0.95
	B	8 (6, 19)	16 (8, 26)	9 (4, 15)	0.015				
After treatment	A	5 (4, 13)	8 (4, 16)	6 (3, 12)	0.088				0.96
	B	6 (4, 13)	8 (4, 16)	7 (3, 12)	0.2				
At follow-up	A	4 (4, 9)	6 (2, 12)	5 (3, 8)	>0.9				0.92
	B	4 (3, 10)	6 (4, 10)	6 (3, 12)	>0.9				

[1]Median (IQR); [2]Kruskal-Wallis rank sum test; [3]Bonferroni adjusted p-value, based on investigator A assessment; [4]Pearson's correlation; [5]OSI range: Mild= 1–5, Moderate= 6–15, Severe= 17–35. Abbreviations: * PRP: platelet-rich plasma; T: terbinafine

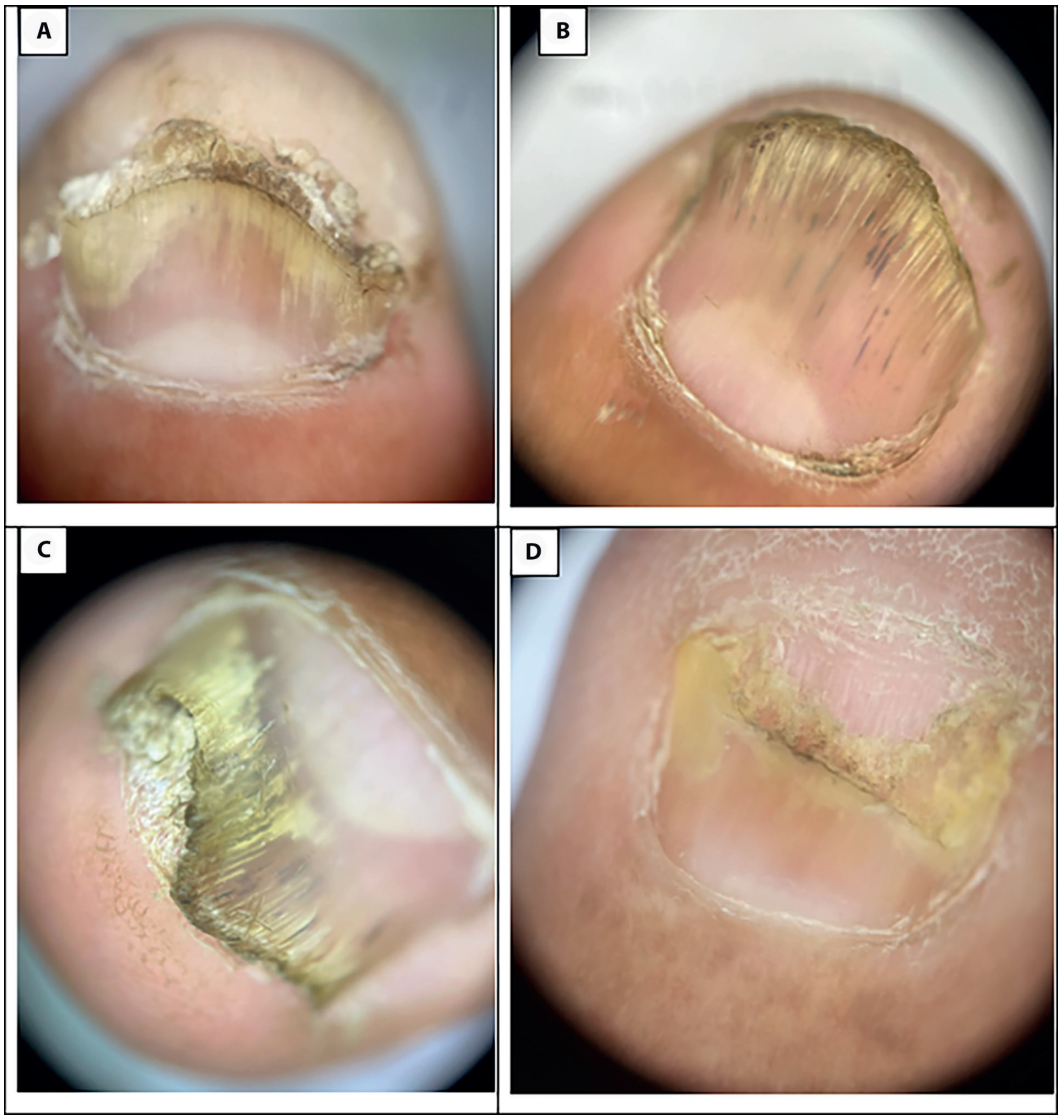

Figure 2. Dermoscopic findings of onychomycosis in our cases.

KOH and Fungal Culture Findings

KOH was comparable among all groups at different treatment and follow-up points (P>0.05). All treated nails had positive fungal culture before treatment, without any statistical difference in the results of culture among them. *C. albicans* was the most commonly detected fungus among all study groups (61.7%), followed by *A. flavus* (18.4%), *Mucormycosis* (14.2%), *T.rubrum* (3.5%), *Epidermophyton* (1.4%), and *M.canis* (0.7%). All groups showed a significant reduction in culture positivity after treatment (P<0.05) and after follow-up (P<0.05) (Table S4).

Cure Rates

Of the treated nails, 26.2% showed a mycological cure after treatment and 30.4% showed a mycological cure at follow-up. Clinical cure was achieved in 18.4% and 17.7% of treated nails after treatment and 27.6% and 26.2% of treated nails at follow-up according to investigators A and B, respectively. Complete cure was achieved in 16.3% and 14.2% of treated nails after treatment and 25.5% and 24.1% of treated nails at follow-up according to investigators A and B, respectively. (Figures 3, 4).

Patients-Reported Adverse Outcomes (PRAO)

The PRP and PRP + terbinafine groups achieved a similar pain scale of six (IQR: 6, 7; P=0.8). Both the PRP and PRP + terbinafine groups were comparable regarding the occurrence of bruises after injection (61% vs. 57%; P=0.9 (Figure S4).

Predictors of OSI Improvement

We conducted univariate and multivariate generalized linear regression analyses to investigate significant factors associated with improvement in OSI at the end of follow-up (Table

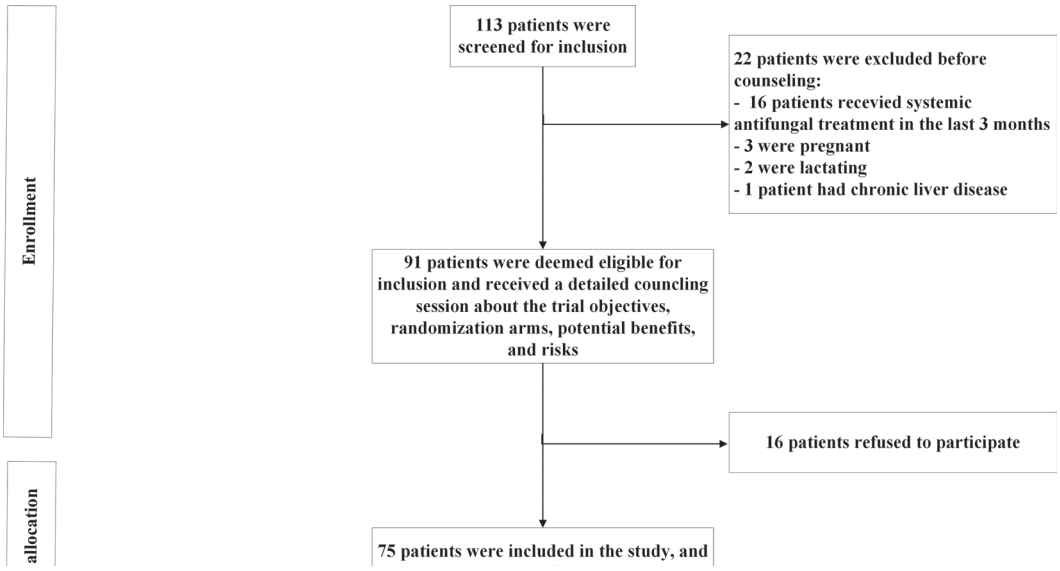

Figure 3. Mycological cure rates in different study groups after treatment and at the end of follow-up.

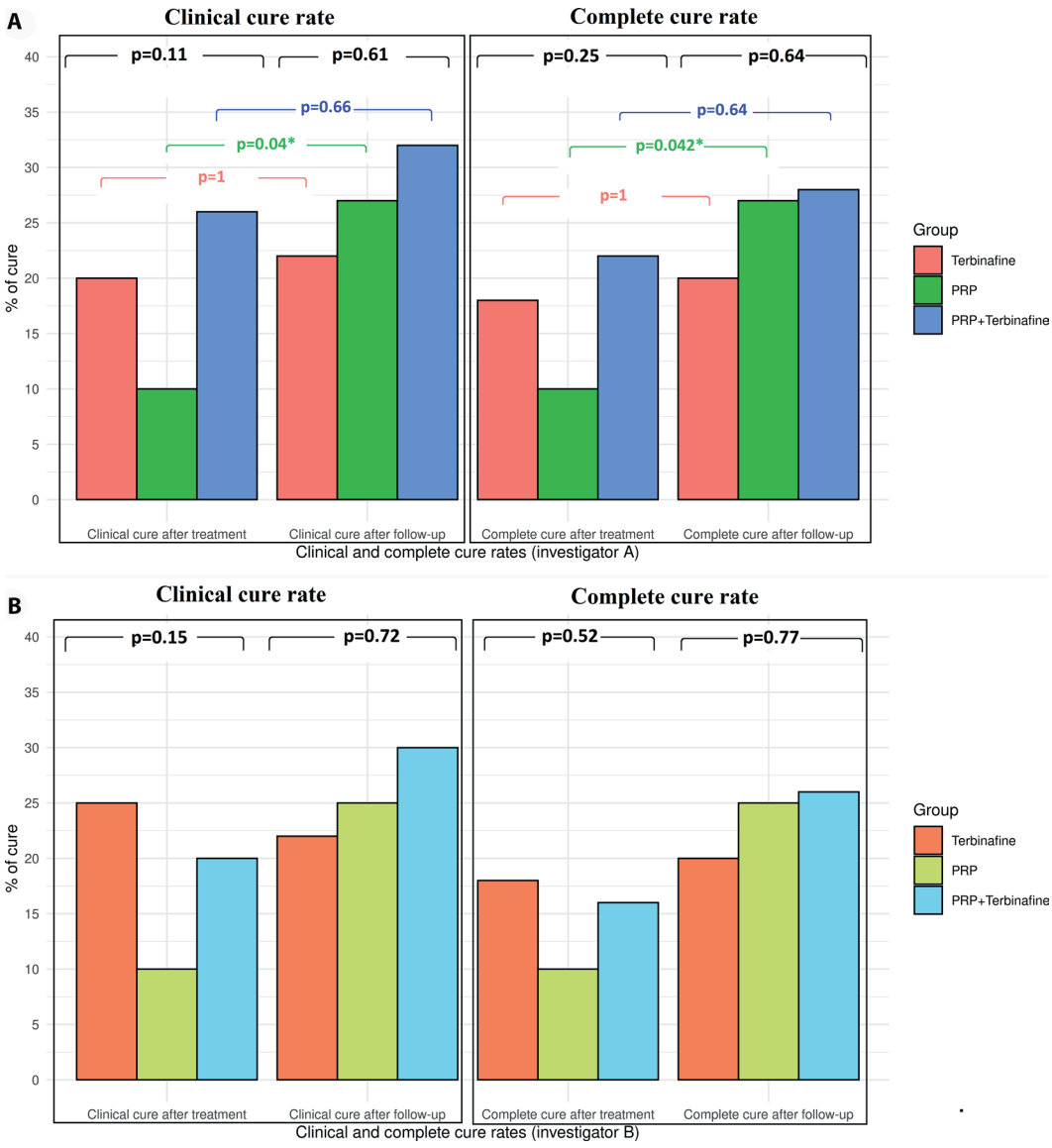

Figure 4. Clinical and complete cure rates in different study groups after treatment and at the end of follow-up. (A) investigator A assessment, and (B) investigator B assessment.

2). In the univariate model, higher patient age was associated with higher (worse) OSI at the end of follow-up in both the univariate (odds ratio [OR]=1.34; 95% CI: 1.14–1.57; *P*<0.001) and multivariate (aOR=1.31; 95% CI: 1.04–1.66; *P*=0.025) models. Total dystrophic onychomycosis (TDO) was associated with higher (worse) odds of OSI at the end of follow-up in both the univariate (OR= 20.7; 95% CI: 5.53–77.2; *P*<0.001) and multivariate (aOR=4.24; 95% CI: 1.14–15.7; *P*=0.033) models. On the other hand, intervention was not a significant predictor of improvement in OSI at the end of follow-up in either the univariate or multivariate models (Table 2).

Discussion

Treatment of onychomycosis is challenging, with a rising prevalence of mixed infections [2], suboptimal cure rates and potential side effects of systemic antifungal [4, 24], and high relapse rates [3]. There is emerging evidence of the antimicrobial properties of PRP. Platelet α-granules are released in high concentrations after platelet aggregation and may have antibacterial effects [6, 25]. In addition, PRP has two- to fourfold higher concentrations of white blood cells than does whole blood. Neutrophils release myeloperoxidase, which has a defensive action against fungi and bacteria, while lymphocytes and monocytes are immunogenic cells [10].

An in vitro animal study showed antifungal properties of PRP against lymphocutaneous sporotrichosis [15], and in vivo studies have shown an antifungal activity of PRP against periodontal and wound *C. Albicans* infections [13, 14]. We thought to investigate the efficacy of intralesional PRR in the treatment of fingernail onychomycosis. We selected oral terbinafine as a comparator due to its reported higher efficacy in the treatment of onychomycosis in comparison with other oral antifungal agents [24]. We also combined PRP and terbinafine in a subgroup of patients. We adopted an RCT design and selected the OSI quantitative score as the primary outcome.

Findings of this trial revealed significant improvements in OSI scores across all groups, both after completing the course of treatment and at the end of follow-up. The PRP group demonstrated a 9-point reduction in OSI at follow-up, compared to 4-point improvements in both the terbinafine and combination groups. However, statistical analysis showed comparable posttreatment and post-follow-up OSI scores among the three groups. This finding was further confirmed by the multivariate analysis, suggesting that PRP could be a promising therapeutic line when the traditional systemic antifungal therapy is contraindicated or not tolerated.

A further increase in mycological cure was observed at the end of follow-up, with the PRP group achieving 35% and the PRP + terbinafine group achieving 34%, while no change was noted in the terbinafine group. This delayed improvement could be related to nail growth dynamics. Further studies are required to address this point and confirm whether PRP exerts delayed immunomodulatory antimicrobial properties.

A recent network meta-analysis reported mycological and complete cure rates of 66.3% and 45.6%, respectively, for a daily dose of terbinafine 250 mg for 12 weeks. The prevalence of *C. albicans* among 61.7% of our patients may explain the lower mycological (20%) and complete (20%) cure rates for terbinafine in this study. While studies from the northern hemisphere have reported dermatophytes as the most common cause of fingernail onychomycosis [26, 27], studies from Africa, the Middle East, and Egypt have reported a higher prevalence of yeasts compared to dermatophytes [2, 28-31]. The predominance of *C. albicans* in our study can be linked to the demographic characteristics of our cases, most of whom were housewives [32].

However, our study had several limitations. First, this study was powered to detect a moderate effect size of 0.5. A larger sample size is required to detect more subtle differences in the OSI among study groups. We performed per-nail rather than per-patient analysis. While this provided a more precise tracking of dermatological, mycological, and clinical findings, biological and patient-related factors could confound our results. Despite using block randomization, different dropout rates among the study groups resulted in an unequal number of cases of 20, 18, and 23 in the terbinafine, PRP, and PRP + terbinafine groups, respectively. Cases who failed to continue their treatment or follow-up sessions were excluded from the analysis. As we performed a per-protocol analysis, this could overestimate the treatment effect if dropout was related to side effects or lack of efficacy. Second, this study evaluated intralesional PRP in fingernail onychomycosis, and its results cannot be generalized to toenail onychomycosis, which is even more challenging to treat. While the PRP group showed the greatest decrease in OSI scores, this group had a significantly higher OSI from the start, which could bias the impression of "improvement" in that arm.

We used oral terbinafine as a comparator to intralesional PRP due to its reported superior efficacy in onychomycosis [24]. However, *C. albicans* was the most prevalent fungus in this study, affecting 50% and 74% of terbinafine and PRP + terbinafine groups, respectively. Terbinafine has inferior efficacy against *C. albicans* when compared to triazole antifungals [33]. Therefore, the results of terbinafine therapy of fingernail onychomycosis in our study should be interpreted with caution. Another limitation is the three-month follow-up period, which may have been insufficient to fully assess the long-term efficacy and potential relapse of the treatment modalities used.

This study provides valuable insights into PRP's potential as an onychomycosis treatment. The comparable efficacy of PRP to oral terbinafine found in this study, coupled with its favorable safety profile, suggests that it could be a promising therapeutic line for patients who cannot tolerate or prefer to avoid systemic antifungal medications. However, this treatment is more suitable for patients with a few affected nails, given the injection-related pain and the need for many sessions. Future trials could explore different PRP preparation protocols or administration schedules to optimize efficacy. Furthermore, combining PRP with topical antifungal agents rather than systemic medications may also be worth exploring to potentially enhance efficacy while minimizing systemic side effects.

Conclusion

Intralesional PRP was found to be effective in the treatment of fingernail onychomycosis. Unexpectedly, combining both therapies did not provide superior results. Intralesional PRP may constitute a potential second-line treatment option for fingernail onychomycosis patients who develop resistance to oral antifungals or in whom systemic antifungals are contraindicated, although topical antifungals are still a valuable option for this group of patients. Further clinical studies with a larger sample size are required to confirm the comparable efficacy of intralesional PRP and systemic antifungal agents.

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