

Efficacy of available treatments for periungual and subungual pyogenic granulomas: A systematic review



To the Editor: Pyogenic granulomas (PGs) are benign vascular proliferations arising on the skin or mucous membranes, including commonly the nail unit (NU) at periungual or subungual sites.¹ PG may resolve spontaneously, although most require treatment. Evidence suggests that surgical excision of PG is the most effective treatment; however, excisions involving the nail may lead to permanent onychodystrophy through matrix disruption.² Additionally, surgery may be impractical for multiple drug-induced lesions and not all dermatologists feel comfortable performing nail procedures.^{2,3} Current literature lacks best practice guidelines regarding the treatment of NU PG. Therefore, we conducted a systematic review summarizing the efficacies of current NU PG treatment options, while developing an index of all reported therapies.

PubMed, Embase, Scopus, and Web of Science databases were searched for articles reporting treatment of periungual or subungual PG. Of the 284 articles screened, 76 were included (Fig 1). The 2009 Oxford Levels of Evidence Criteria was referenced to determine the quality of evidence of included studies.

These manuscripts identified 341 patients with NU PG (Table I). Treatment modalities differed significantly depending on PG cause (drug-induced [$n = 166$], abnormal nail or trauma [$n = 102$]) ($P < .0001$). Stratified by treatment modality, the most frequently reported therapies included topical β -blockers (TBBs) ($n = 87$, 26.7%) and surgical interventions ($n = 31$, 9.5%). Response to treatment differed significantly depending on PG location, with PG on fingers resulting in more complete/partial resolution than PG on toes ($P = .0267$). Statistically significant comparisons of complete/partial resolution among most utilized and reported initial treatments included surgical/removal vs TBB ($P < .0001^1$), surgical/removal vs laser ($P < .0001^1$), and curettage vs TBB ($P = .0030^1$). When comparing TBB to corticosteroids as primary therapies, TBB resulted in significantly less recurrence of PG ($P = .0045$). PG response to treatment (complete [$n = 201$] vs partial [$n = 69$] vs none [$n = 47$]) differed significantly among all primary treatments

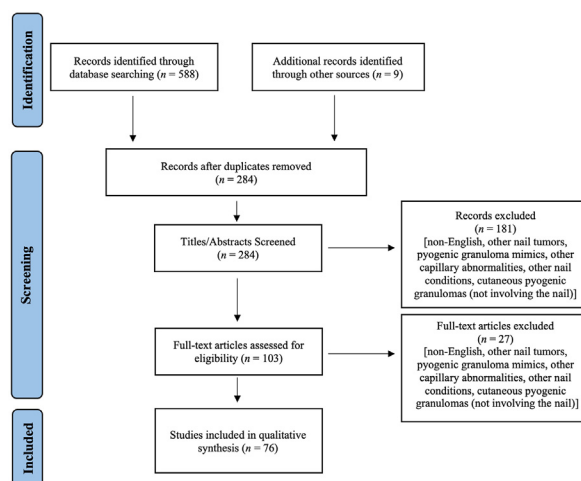


Fig 1. Flow diagram based on PRISMA 2020.

($P < .0001$). Of those requiring a second therapy, 82.1% PG completely resolved, 16.4% partially resolved, and 1.5% did not respond to treatment ($P = .0012$). Notably, resolution did not differ significantly among PG treated with TBB or lasers after one treatment ($P = .4510$). Of the PG treated with TBB, 86.7% ($n = 65$) completely/partially resolved within 1 to 4 weeks.

NU PG treatment is generally tailored to the cause, ie, drug-induced, mechanical trauma, and peripheral nerve injury.⁴ Our findings suggest that TBBs are more commonly used to treat drug-induced PG compared with PG resulting from abnormal nail or trauma. However, the latter were more likely to result in complete resolution than drug-induced PG, 82.4% and 53.6%, respectively ($P < .0001$). TBBs were the most frequently implemented intervention overall, likely due to the low risk of local and systemic side effects.⁵ Regardless of PG etiology, the majority of PG treated with TBB partially resolved by the first follow-up and completely resolved at subsequent assessment. Although treatment of PG with TBB has risen in popularity, this study highlights the benefits of several therapeutic options.

Limitations include small sample size and heterogeneity of collected data. Further investigations are needed to standardize guidelines regarding the most efficacious treatment for NU PG.

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Table I. Patient demographics and clinical characteristics, primary treatment index, and treatment response.

Patient demographics and clinical characteristics	<i>n</i>	%
Sex (n = 341)		
Male	129	37.9
Female	132	38.7
Not reported	81	23.8
Patient (n = 341)		
Adult (≥ 18 y)	252	73.9
Pediatric (<18 y)	22	6.5
Not reported	74	21.7
PG digit location (n = 282*)		
Hand RI	20	7.1
Hand RII	14	5.0
Hand RIII	22	7.8
Hand RIV	20	7.1
Hand RV	3	1.1
Hand LI	18	6.4
Hand LII	10	3.5
Hand LIII	18	6.4
Hand LIV	12	4.3
Hand LV	2	0.7
Feet RI	50	17.7
Feet RII	6	2.1
Feet RIII	9	3.2
Feet RIV	6	2.1
Feet RV	4	1.4
Feet LI	46	16.3
Feet LII	9	3.2
Feet LIII	5	1.8
Feet LIV	5	1.8
Feet LV	3	1.1
PG nail unit location (n = 341)		
Periungual	265	77.7
Subungual	29	8.5
Digit	21	6.2
Nail	13	3.8
Subungual + periungual	6	1.8
Not reported	7	2.1
PG periungual location (n = 265)		
Lateral nailfold	122	46.0
Proximal nailfold	53	20.0
Lateral + proximal nailfold	4	1.5
Distal nailfold	1	0.4
Not reported	86	32.5
Cause of PG (n = 341)		
Antineoplastic	146	42.8
Ingrown nail	29	85.0
Immobilization	20	5.9
Trauma	19	5.6
Retinoid	15	4.4
Antiretroviral	14	4.1
Friction	13	3.8
Retronychchia	7	2.1
Foreign body	6	1.8
Other	6	1.8
Onychotillomania	2	0.6
Anti-inflammatory	1	0.3

Continued

Table I. Cont'd

Patient demographics and clinical characteristics	n	%
Not reported	63	18.5
Diagnosis of PG (n = 341)		
Histologically	61	17.9
Clinically [†]	96	28.2
Not reported	184	54.0
Size of PG (n = 341)		
Small (≤ 4 mm)	23	6.7
Moderate (>4 mm to 10 mm)	45	13.2
Large (>10 mm)	18	5.3
Not reported	255	74.8
Treatment vs spontaneous resolution of PG (n = 341)		
Treatment	327	95.9
Spontaneous resolution	14	4.1
Resolution post-first treatment (n = 327)		
Complete resolution	201	61.5
Partial resolution	69	21.1
No response	47	14.4
Not reported	10	3.1
Resolution post-second treatment (n = 86)		
Complete resolution	55	64.0
Partial resolution	11	12.8
No response	1	1.2
Not reported	19	22.1
Time to complete/partial resolution, overall (n = 270)		
<1 wk	1	0.4
1 wk to 1 mo	142	52.6
>1-2 mo	22	8.1
>2 mo	4	1.5
Not reported	101	37.4
Time to complete/partial resolution, treated with TBB (n = 75)		
<1 wk	1	1.3
1 wk to 1 mo	65	86.7
>1-2 mo	8	10.7
>2 mo	0	0.0
Not reported	1	1.3
If resolution post-first treatment, did PG recur (n = 270)		
Yes	24	8.9
No	141	52.2
Not reported	105	38.9
Index of primary reported treatment modalities (n = 327)		
Topical β -blocker [‡]	87	26.7
Surgical intervention [§]	31	9.5
Antibiotic + corticosteroid	25	7.6
Surgical intervention + cautery	25	7.6
Laser	24	7.3
Phenolization	19	5.8
Phenolization + cautery + antiseptic	18	5.5
Surgical intervention + curettage	9	2.8
Curettage	8	2.4
Curettage + corticosteroid + antibiotic	7	2.1

Continued

Table I. Cont'd

Patient demographics and clinical characteristics	n	%
Corticosteroid	6	1.8
Discontinued medication + corticosteroid	6	1.8
Antibiotic	5	1.5
Table salt	5	1.5
Discontinued medication	4	1.2
Cauterization + antibiotic	4	1.2
Cauterization	4	1.2
Phototherapy	4	1.2
Topical β -blocker + corticosteroid	4	1.2
Discontinued medication + corticosteroid + antibiotic	3	0.9
Surgical intervention + corticosteroid + antibiotic	3	0.9
Cauterization + corticosteroid + antibiotic	3	0.9
Placebo	3	0.9
Discontinued medication + antibiotic	2	0.6
Curettage + antibiotic	2	0.6
Cryotherapy	2	0.6
Surgical intervention + antibiotic	2	0.6
Surgical intervention + curettage + antibiotic + corticosteroid	2	0.6
Surgical intervention + phenolization	1	0.3
Cryotherapy + antibiotic	1	0.3
Topical α -blocker	1	0.3
Antibiotic + antifungal + medication dose decrease	1	0.3
Medication dose decrease + corticosteroid + antibiotic + shave biopsy	1	0.3
Curettage + topical β -blocker	1	0.3
Medication dose decrease + antibiotic + corticosteroid	1	0.3
Curettage+ cautery	1	0.3
Antibiotic + antifungal	1	0.3
Boric acid	1	0.3

Direct comparisons of individual first treatments

Treatment	Complete response	Partial response	P value
Topical β -blocker (n = 75)	34 (45.3%)	41 (54.7%)	<.0001 [†]
Surgical/removal (n = 29)	29 (100.0%)	0 (0.0%)	
Topical β -blocker (n = 75)	34 (45.3%)	41 (54.7%)	.4510 [†]
Laser (n = 24)	13 (54.2%)	11 (45.8%)	
Surgical/removal (n = 29)	29 (100.0%)	0 (0.0%)	<.0001 [†]
Laser (n = 24)	13 (54.2%)	11 (45.8%)	
Topical β -blocker (n = 75)	34 (45.3%)	41 (54.7%)	.0030 [†]
Curettage (n = 8)	8 (100.0%)	0 (0.0%)	

First treatment (n = 317^{*})

Treatment	Complete response (n = 201)	Partial response (n = 69)	No response (n = 47)	P value
Topical β -blocker	34 (16.9%)	41 (59.4%)	12 (25.5%)	<.0001 [†]
Surgical/removal	29 (14.4%)	0 (0.0%)	0 (0.0%)	
Other	16 (8.0%)	3 (4.3%)	14 (29.8%)	
Laser	13 (6.5%)	11 (15.9%)	0 (0.0%)	
Curettage	8 (4.0%)	0 (0.0%)	0 (0.0%)	
Corticosteroid	5 (2.5%)	0 (0.0%)	1 (2.1%)	
Medication discontinued	2 (1.0%)	1 (1.4%)	0 (0.0%)	
Antibiotic	1 (0.5%)	1 (1.4%)	1 (2.1%)	
Combination therapy	93 (46.5%)	12 (17.4%)	19 (40.4%)	

Continued

Table I. Cont'd

Second treatment (n = 67**)				
Treatment	Complete response (n = 55)	Partial response (n = 11)	No response (n = 1)	P value
Topical β -blocker	21 (38.2%)	1 (9.1%)	0 (0.0%)	.0012 [†]
Laser	10 (18.2%)	1 (9.1%)	0 (0.0%)	
Other	9 (16.3%)	0 (0.0%)	1 (100.0%)	
Medication discontinued	8 (14.5%)	1 (9.1%)	0 (0.0%)	
Surgical/removal	4 (7.3%)	1 (9.1%)	0 (0.0%)	
Corticosteroid	1 (1.8%)	1 (9.1%)	0 (0.0%)	
Curettage	1 (1.8%)	1 (9.1%)	0 (0.0%)	
Combination therapy	1 (1.8%)	5 (45.5%)	0 (0.0%)	

Cause of PG vs treatment response (n = 268)				
Cause of PG	Complete response	Partial response	No response	P value
Drug-induced (n = 166)	89 (53.6%)	48 (28.9%)	29 (17.5%)	<.0001 [†]
Abnormal nail or trauma (n = 102)	84 (82.4%)	7 (6.9%)	11 (10.8%)	

PG, Pyogenic granuloma; TBB, topical β -blockers.

*n varies from total because of patients with multiple PG reported and others with location not reported.

[†]Clinical diagnosis signifies that PG was diagnosed based on the typical characteristic morphology of PG, history of ulceration, bleeding, and/or crusting with no biopsy performed.

[‡]Topical β -blockers: 0.5% timolol maleate ophthalmic solution, topical 1% propranolol cream, 1 mg/g timolol maleate gel, 0.25% betaxolol ophthalmic solution.

[§]Surgical intervention: excision, biopsy, "gutter method," nail avulsion, nail debridement, matricectomy, incision and drainage.

^{||}Laser: pulsed-dye laser (PDL) and Nd-YAG with differing numbers of impulses, energy densities, wavelengths, pulse durations, and treatment intervals.

[¶] χ^2 P value,

[#]n is not equivalent to total number of patients who received a first treatment (n = 327) because the outcome of 10 patients was not reported.

^{***}n is not equivalent to total number of patients who received a second treatment (n = 86) because the outcome of 19 patients was not reported.

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Conflict of interest

None disclosed.

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