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Percutaneous Release with or without Steroid Injection in The Treatment of Acquired Trigger Digits

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Abstract

Background: Trigger finger, a common condition of finger, is characterized by pain, clicking, catching, or loss of motion of the affected finger. The symptoms are attributed to inflammation and subsequent narrowing of the A1 pulley. Percutaneous release of A1 pulley has shown good success rate and has been an efficient, cost effective and safe alternative to open release for the management of trigger digits. Whether adding steroid injection concomitantly to this time-tested procedure has any advantage is not well established. This study is designed to compare the outcomes of percutaneous release with and without concomitant steroid injection in terms of pain, recurrence and complications.

Method: This prospective comparative study included 68 patients of age 18 years or older presenting with trigger thumb (Green's type II, III, and IV). They were allocated into two groups. Patients in group A underwent percutaneous release only whereas those in group B underwent percutaneous release with concomitant steroid injection. Both the groups were followed up for one month and studied in terms of patient demographics, pain, recurrence, complication and patient satisfaction.

Result: Out of the 68 patients that underwent this study, 38 (55.90%) were female and 30 (44.1%) were male with mean age of 52.87 years. At the end of final follow up, 94.12% patients in Group A and 97.06% patients in Group B had satisfactory outcome (p=0.55).

Conclusion: There is no significant difference in outcome between percutaneous release with or without concomitant steroid injection in the treatment of trigger digits.

Keywords: Annular pulley, Green's grading, Percutaneous release, Steroid injection, Trigger digit

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Introduction

The name trigger finger comes from the popping or clicking sound noticed during flexion and extension of the affected digit.[1] It was first described by Notta in 1850.[2] The lifetime risk of having trigger finger in general population is 2.60%.[3] which rises to 10% in patients with diabetes.[4] Females are affected 6 times more commonly as compared to males.

Percutaneous release is a safe and effective treatment option with high success rates of 93%-98%.[5,6] Howard and colleagues were the first to use hydrocortisone injections to treat this illness in 1953.[7] Success rates of up to 93% have been documented with injection of corticosteroid alone.[8] However there is a paucity of literature demonstrating the effectiveness of adding steroid injection to percutaneous release. This study is aimed to fill that literature gap by comparing the outcome of percutaneous release with and without concomitant steroid injection in terms of pain, recurrence and complications.

Methods

This is a hospital based prospective comparative study conducted in the department of orthopedics, Pokhara Academy of Health Sciences (PoAHS), Pokhara, over a period of twelve months from August 2022 to July 2023. Ethical clearance was obtained from the Institutional Review Committee (IRC) of PoAHS (Ref. no 108/079). Informed written consent was taken from all the patients before enrolling into the study. Inclusion criteria: Patients aged 18 years or older, any digit (including thumb), Green's type II to IV, single or multiple digit involvement, unresponsive to non-surgical treatment including one injection of local steroid. Exclusion criteria: Patients with Green's type 0 and I, presence of infection at the site of procedure, uncontrolled diabetes mellitus. A total of 68 patients were included for the study. Patients were allocated into two groups using convenient sampling. All the procedures were done by a single surgeon to ensure consistency in surgical technique.

Surgical technique

This procedure was done in OPD under strict aseptic precautions. A random blood sugar was tested in all patients prior to enrolment in the study and needful investigations were sent regarding specific illnesses of patients. The patient was arranged to sit comfortably with hand placed on examining table. Then the skin was disinfected using 5% povidone iodine solution. Patients were then asked to actively demonstrate the triggering and the digit was examined for the site of pain and nodule formation if present. The prepared area was infiltrated with 2.5ml of 2% Lignocaine. An 18 G hypodermic needle was inserted into the site of A1 pulley as explained by Ryzewicz et al[3] and checked for correct positioning by asking the patient to move the digit. A paradoxical movement of needle meant that the needle was placed into the flexor tendon. The needle was withdrawn slightly so that the needle was into A1 pulley. With the beveled edge of the needle parallel to the flexor tendon, the needle was swayed from proximal to distal staying in midline as much as possible. Once the needle started cutting the A1 pulley a grating sensation was heard and felt. The patient was asked to move digit intermittently during procedure in order to see for any persistent triggering. The procedure was declared complete once the grating sensation disappeared and there was no triggering during digit movement. For Green's type IV digits, the end point of A1 pulley release differed from that of Grade II or III because the digit started locked, so active testing was not initially possible. The endpoint here was confirmation of smooth, full passive extension of interphalangeal joint (by the surgeon) without catching, resistance, or residual locking, combined with no grating sound and free needle movement.[9]

To prevent the injury to digital nerve, especially in thumb, some extra precautions were taken. Firstly, precise surface anatomic landmark was located to stay strictly in midline and avoid radial digital nerve which is closer radially and proximally. Secondly, the thumb was hyperextended so that the flexor tendon became subcutaneous. Thirdly, release was done by "Lift-Cut" technique from distal to proximal as described by Ragoowansi et al.[10]

For the percutaneous release group, the procedure ended at this point. For percutaneous release with concomitant steroid injection group, the needle was left in situ and 40mg of Inj. Methylprednisolone was infiltrated into the tendon sheath.

A small commercially available dressing was applied after completion of procedure in both the groups which was asked to be removed on the very next day. Patients were encouraged to move digit actively and return to their normal activity on the second day of the procedure. Oral non steroid anti-inflammatory drug (NSAID) was prescribed for three days following the procedure in each of the groups.

The patients were asked to follow up at 1 week and 4 weeks after procedure. At each follow up, Visual Analogue Scale (VAS) pain score, triggering (+/-) and complications (bowstringing, nodule formation, digital nerve injury, infection) were recorded. Based on mechanical symptoms and pain, the outcome was evaluated as Excellent, Good, Fair and Poor (Table 1). Statistical Package for the Social Sciences (SPSS) was used for statistical analysis. For descriptive statistics, frequency, percentage, proportion, mean, median, and standard deviation were calculated. For inferential statistics, Chi square test was applied. Graphical and tabular presentation of the results was done as necessary. P-value of <0.05 was taken as statistically significant at confidence interval of 95%.

Table 1. Grading of Functional Outcomes

	Pain	Stage
Satisfactory		
Excellent	None (VAS = 0)	0
Good	Minor or intermittent (VAS ≤ 2)	0
Unsatisfactory		
Fair	Patient chose to live with pain (VAS > 2)	>/= 1
Poor	Pain requiring open release (VAS > 2)	>/= 1

Results

A total of 68 patients were included in this study over a period of one year. None of the patients were lost to follow up. The summary of demographic details has been shown in Table 2.

The satisfactory outcome increased from 73.53% at the end of 1 week to 94.12% at the end of 4 weeks for patients in group A. Likewise, it increased from 91.18% to 97.06% for the patients in Group B. However, the difference in outcome of the two groups was not statistically significant (p=0.55) at either follow up.

As thumb was the most commonly involved digit, outcome analysis of this particular digit was carried out separately. 96.30% patients in Group A and 94.74% patients in Group B had satisfactory outcome. However, we did not find any significant difference in the outcome of the two groups (p= 0.79 at final follow up).

There was decrease in mean VAS in both the groups on subsequent follow ups. However, the difference in pain outcome between the two groups was not significant (p=0.17).

The final outcome has in summarized in Table 3.

One patient in each group had incomplete release (incidence = 2.94%). They underwent second percutaneous release procedure and were symptom free on longer follow up. Furthermore, one patient in Group A developed paresthesia of thumb (incidence = 1.47%). The patient could not be followed up beyond the study period.

Table 2. Demographic details

Features	Group A	Group B	p value
Number of patients (percentage)	34 (50)	34 (50)	
Number of digits (percentage)	34(50)	34(50)	
Age (years)			
Average	53.12	52.62	0.85
Range	28-79	32-73	
Standard deviation	11.33	9.79	
Sex ratio (F:M)	1	1.62:1	0.33
Laterality (R:L)	2.09:1	1.27:1	0.32
Hand dominance (R:L)	10.33:1	7.5:1	O.69
Digit involved			
Thumb	27	19	0.23
Index	2	4	
Middle	2	5	
Ring	3	6	
VAS at presentation			
Average	3.29	3.62	0.35
Range	1-6	1-6	
Standard deviation	1.17	1.36	
Grading of trigger			
Grade II	19	24	0.28
Grade III	13	7	
Grade IV	2	3	

Discussion

Our study tried to address the additive value of steroids in percutaneous release of trigger digits. Jegal et al in their study found that pain improvement was better in patients undergoing percutaneous release as compared to the ones undergoing percutaneous release with simultaneous steroid injection.[11] However, in terms of Quinnel grading, the difference in outcome was not significant. A systematic review by Wen J et al on concurrent percutaneous A1 pulley release and corticosteroid injection reported high overall satisfaction (96.20%) but mixed comparative results across included studies.[12] In the study done by Patel et al, 96% patients treated with combined steroid injection and percutaneous release had satisfactory outcome while 89% patients treated with percutaneous release only had satisfactory outcome (p=0.04).[13] In the study performed by Liu et al, they recorded that 97.50% patients treated with combined steroid injection and 99.10% treated with percutaneous release

Table 3. Final Outcome

Outcome		Group A	Group B	Total	Chi square test p-value
Satisfactory	Excellent	29 (85.29%)	33 (97.06%)	62 (91.18%)	0.10
	Good	3 (8.82%)	0	3 (4.41%)	
Unsatisfactory	Fair	2 (5.89%)	0	2 (2.94%)	
	Poor	0	1 (2.94%)	1 (1.47%)	
Total		34 (100%)	34 (100%)	68 (100%)	

only had a successful outcome.[6] Though the percutaneous release only group fared slightly better in terms of final outcome, the difference was not statistically significant (p= 0.19). The lack of added benefit from corticosteroid injection in combination with percutaneous release may be explained by the biomechanical etiology of trigger finger. The primary pathoanatomy, involving inflammation and narrowing of the A1 pulley, is directly addressed by the mechanical release of the pulley during percutaneous intervention, as described by Ryzewicz M et al.[3] This is particularly relevant for Green's types II–IV, where mechanical symptoms predominate, potentially rendering the anti-inflammatory effects of corticosteroids redundant. This finding is consistent with a thumb-specific analysis within our study, which showed no significant difference in outcomes (96.30% vs. 94.74%, p = 0.79), despite the thumb being the most commonly affected digit, as noted by Baumgarten KM et al.[14] The demographic profile of our study population (mean age 52.87 years, 55.90% female) mirrors the epidemiology of trigger finger, which is more prevalent in women, as reported by Makkouk et al.[1]

The short 4-week follow-up period represents a key limitation, as it may not capture delayed recurrences or long-term outcomes. The exclusion of patients with uncontrolled diabetes may have limited our ability to fully assess outcomes in this high-risk subgroup of trigger thumb. Diabetes mellitus is a recognized risk factor for the development and persistence of stenosing tenosynovitis, and patients with poor glycemic control are more likely to present with more severe symptoms, reduced tendon gliding, and a higher likelihood of recurrence or incomplete resolution after treatment. By excluding these patients, the study may not fully capture the spectrum of disease severity and treatment response seen in clinical practice, thereby limiting the applicability of the findings to diabetic populations, particularly those with uncontrolled disease.[7,8] Another limitation is the relatively small sample size (n=68), which may reduce the statistical power to detect subtle differences between groups.

These results reinforce the role of percutaneous release as a standalone intervention, offering a safe and cost-effective option for managing trigger finger. Future studies with larger cohorts, extended follow-up periods, and inclusion of milder trigger finger grades or diabetic patients could further elucidate the role of corticosteroids in specific subgroups.

Conclusion

We conclude that there is no significant difference in outcome between percutaneous release with concomitant steroid injection and percutaneous release only in the treatment of trigger digits.

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