Section: Orthopedics

Original Research Article

A PROSPECTIVE STUDY ON CLINICAL OUTCOME OF PERCUTANEOUS TRIGGER FINGER RELEASE WITH 18 GAUGE NEEDLE

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ABSTRACT

Background: Trigger finger, or stenosing tenosynovitis, is a common hand condition characterized by pain and locking of flexor tendons during movement. While conservative treatments are often the first line of management, surgical intervention becomes necessary in refractory cases. Percutaneous release of the A1 pulley using an 18-gauge needle presents a minimally invasive alternative to open surgery. **Objective**: To evaluate the clinical outcome and efficacy of percutaneous trigger finger release using an 18-gauge needle in patients presenting with Grade II trigger finger.

Materials and Methods: This prospective cohort study included 25 patients aged 33–69 years diagnosed with Grade II trigger finger per Green's classification. All patients underwent percutaneous A1 pulley release using an 18-gauge needle under local anesthesia. Clinical outcomes were assessed using Quinnell's criteria at follow-up intervals extending to six months postoperatively.

Result: Of the 25 patients, 88% (n=22) achieved excellent outcomes and 12% (n=3) had good outcomes. No poor outcomes were reported. Minor complications included hematoma (n=2) and transient inflammation (n=2), which resolved with conservative management. The ring finger was the most commonly affected digit (72%), and right-hand involvement was predominant (68%).

Conclusion: Percutaneous trigger finger release using an 18-gauge needle is a safe, effective, and minimally invasive procedure with excellent short-term clinical outcomes and a low complication rate. It offers a viable outpatient alternative to open surgery, particularly for Grade II cases.

Key words: Trigger finger, Stenosing tenosynovitis, Percutaneous release,18-gauge needle, A1 pulley, Clinical outcome, Minimally invasive surgery, Postoperative assessment, Day-care procedure.

INTRODUCTION

Trigger finger, or stenosing tenosynovitis, is a common hand condition characterized by painful locking or catching of a digit during flexion and extension. It involves pathological changes in the tendon sheath and surrounding structures, particularly the A1 pulley.[1] The functional anatomy of the digital flexor pulley system, underscores the importance of this pulley in smooth tendon gliding and its role in trigger finger pathogenesis.[2]

The condition most frequently affects the thumb and ring finger and is more prevalent in middle-aged individuals, with an increased incidence in females and those with systemic diseases like diabetes mellitus.[3,4] Clinical management ranges from conservative treatment to various surgical interventions. Corticosteroid injections have demonstrated efficacy in many cases, though recurrence and diminished outcomes are noted in diabetic populations.[3,4,11]

Surgical release remains the definitive treatment for persistent or recurrent cases. Local corticosteroid

injection, at the site of pulley was also given as a treatment.[5] Techniques utilizing 18G needles have also shown favorable outcomes with minimal complications.[8,14]

Pediatric presentations, though less common, are effectively managed through percutaneous methods.[10] Comparisons between open and percutaneous techniques support the latter for its reduced morbidity and quicker recovery.[12]

Recent meta-analyses and systematic reviews confirm the efficacy of percutaneous A1 pulley release and guide best practice protocols.[13] The advent of endoscopic methods, a significant advance in the minimally invasive surgical management of this condition.[15]

CLASSIFICATION OF TRIGGER FINGER

Various attempts have been made to classify trigger fingers. Nonetheless, a study by Newport et al. found no link between their grading system and the results of injection therapy for trigger fingers. Several scholars have used the grading system originally proposed by Quinnell and later adapted by Green.

1. **Quinnell's Classification**

Quinnell's Classification (1980), is of the earliest formal classifications, providing a simple grading system from 0 to 4 based on finger movement and severity of triggering.

- Grade 0: Normal finger movement
- Grade 1: Uneven movement
- Grade 2: Actively correctable triggering
- Grade 3: Passively correctable triggering
- Grade 4: Fixed deformity

CLINICAL EVALUATION

- Quinnell's criteria is used for post operative evaluation

QUINNELL'S CRITERIA FOR POST-OPERATIVE SCORING

- Grade I - Normal movement, no pain
- Grade II - Normal movement, occasional pain
- Grade III - Uneven movement
- Grade IV - Intermediate locking, actively correctable
- Grade V - Locking, only passively correctable.

OUTCOMES

- Grade I - EXCELLENT
- Grade II - GOOD
- Grade III–V - POOR.

Aim & Objectives:

"A Prospective study on clinical outcome of percutaneous trigger fingr release using 18G Needle"

Objectives

- To study the clinical outcome of percutaneous trigger finger release with an 18G needle.
- To treat the trigger finger with a procedure that is painless, effective, convenient, and safe.

MATERIALS AND METHODS

A Prospective cohort study was done in patients with trigger finger due to pathology in A1 Pulley. Sample size of 25 cases were taken up for our study.

Inclusion Criteria

- Patients age from 20 to 60 years.
- Green's classification Grade I, II.
- Recurrent trigger finger- despite receiving local steroid injections for at least two episodes.

Exclusion Criteria

- Patients aged below 20yrs and above 60yrs.
- Green's classification Grade III, IV.
- Patient not fit for percutaneous release/ not giving consent for surgery.
- Bony deformities.

PRE OPERATIVE ASSESSMENT

Patients received a thorough pre-operative assessment. This evaluation encompassed several essential parameters, including Total count (TC), Differential count (DC), Hemoglobin (Hb), Erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), Urea, Creatinine, Blood glucose levels, and Rheumatoid factor (RA).

ANAESTHESIA

Local anaesthesia with 2% Lignocaine

PROCEDURE

Patients positioned in supine with their hand on an arm table. After ensuring sterile aseptic conditions, the surgical area is painted and draped. By placing the palm facing upward and resting the hand on a rolled towel, the metacarpophalangeal joints are hyperextended, resulting in dorsal displacement of the neurovascular structures.

The A1 pulley or the first annular pulley was palpated over the metacarpal head of the finger. A 24-gauge needle was used to inject 2–3 mL of 2% lidocaine solution into the skin and flexor tendon sheath (Fig.2.1). A 20 gauge needle was then inserted through the annular pulley percutaneously, and its position within the flexor tendon was verified by asking the patient to flex the finger slightly.

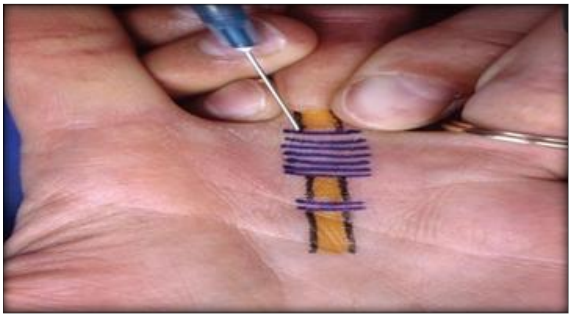


Figure 1

The needle was carefully withdrawn and rotated to ensure that its bevel was aligned with the tendon's longitudinal axis. A sweeping technique was used to cut the A1 pulley proximal and distal to the target area. The absence of grating sensation confirmed

complete transection of the annular pulley, and unrestricted movement of the tendon over the metacarpophalangeal joint was confirmed. The needle was removed and the patient was asked to flex and extend the finger repeatedly (Fig. 2.2).

Figure 2

A bandage was placed on the wound and the patient was instructed to use their hand for activities as tolerated. The patients were informed that they may experience mild-to-moderate discomfort for a few days. It is advised to apply ice and take anti-inflammatory medications during the first 48–72 h after the procedure.

POST OPERATIVE PROTOCOL

Follow up on postoperative day 3, day 7, 3 weeks, 6 weeks, 12 weeks, 6 months.

Routine analgesics.

Note for any Complications

- Transient inflammation
- Hematoma
- Infection
- Residual pain and tenderness
- Bowstringing

RESULTS

AGE DISTRIBUTION

1. Age range: 33-69 years
2. Mean age: 52.76 years
3. Age group distribution:

- 56% (14 patients) were between 51-70 years
- The remaining 44% (11 patients) were between 33-50 years

1. Higher incidence in the older population: The majority of cases (56%) occur in the 51-70 age group, indicating a higher prevalence among older adults.
2. Mean age: The mean age of 52.76 years suggests that trigger finger tends to affect middle-aged to older individuals more frequently.
3. Age-related risk: The data implies that the risk of developing trigger finger increases with age, with a notable shift occurring around the age of 50.
4. Lower incidence in younger adults: Fewer cases are observed in the 33-50 age group compared to the older group.

Table 1: A?

AGE IN YEARS	FREQUENCY	PERCENTAGE
31-40	2	8
41-50	9	36
51-60	6	24
61-70	8	32

Among the 25 patients, 10 were male and 15 were female, indicating a female predominance of approximately 60%. This suggests a higher prevalence within the female population.

SIDE DISTRIBUTION

1. Right hand predominance:

- 68% of cases (17 out of 25) affected the right hand
- This indicates a right-sided predominance in trigger finger occurrence

2. Left hand incidence:

- 32% of cases (8 out of 25) affected the left hand

3. Ratio:

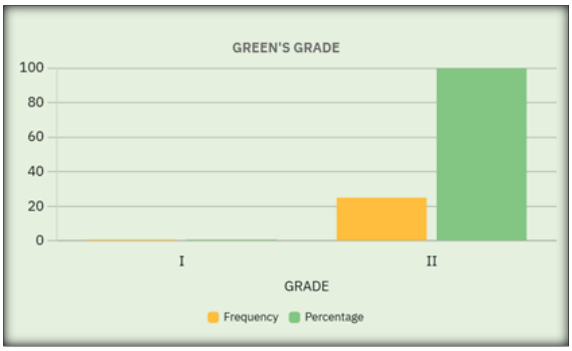
- The ratio of right to left hand incidence is approximately 2.125:1

Table 2: Gender distribution of patients)

SIDE	FREQUENCY	PERCENTAGE
RIGHT	17	68
LEFT	8	32

GRADING DISTRIBUTION

All the 25 patients included in the study exhibited Grade II severity of trigger finger according to Green's classification.



DIGIT DISTRIBUTION

Among the 25 patients, 18 exhibited involvement of the ring finger, 6 had involvement of the middle finger, and 1 had involvement of the index finger. This data indicates that ring finger involvement is more preval Bent than involvement of other fingers.

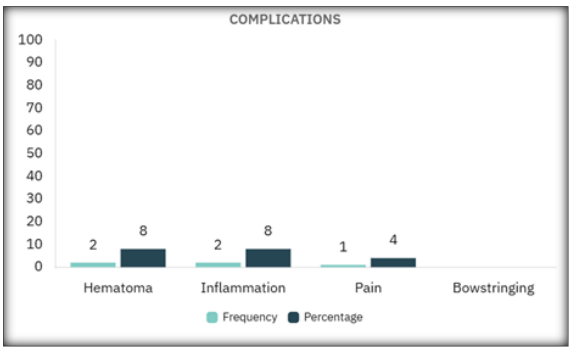
Table 3

FINGER	FREQUENCY	PERCENTAGE
INDEX	1	4
MIDDLE	6	24
RING	18	72
THUMB	0	0

COMPLICATIONS

Three complications were observed. The first, hematoma, occurred in two patients and manifested immediately post-procedure. Compressive dressings were applied, and analgesics were administered, resulting in a reduction in visibility after one week.

Two patients experienced an inflammatory reaction, and one patient reported pain at the needle insertion site. For these conditions, analgesics and antibiotics were provided, leading to the resolution of the inflammatory reaction within a ten-day period. These three patients continued to experience occasional pain during normal finger movements, even at the final follow-up.



POST OPERATIVE OUTCOME ASSESSMENT

QUINNELL'S score was used to evaluate postoperative results.

22 patients (88%) achieved an excellent outcome, while 3 patients (12%) had a good outcome following trigger finger release.

Table 4

QUINNELL'S SCORE	NO. OF PATIENTS
GRADE I (EXCELLENT)	22
GRADE II (GOOD)	3
GRADE II-IV(POOR)	0

CASE ILLUSTRATIONS:
CASES 1
PRE OP

IMMEDIATE POST OP

12 WEEKS POST OP

In this study, a total of 30 patients with trigger finger classified as Green's grade II presented to the outpatient department of our hospital and were considered for a specific procedure. Of these, 5 patients declined surgical intervention and were thus excluded from the study.

Consequently, 25 patients underwent the procedure, comprising 10 males and 15 females, indicating a higher prevalence of trigger finger among female patients. The age of the patients ranged from 33 to 69 years, with a mean age of 52.76 years. Notably, 56%,[14] of the patients were aged between 50 and 70 years, suggesting a higher incidence in the older population compared to the younger cohort.

In terms of laterality, 17 patients exhibited right-sided involvement, while 8 patients had left-sided involvement, indicating a predominance of right-sided cases in this study. Most cases were of primary etiology. Among the 25 patients, 18 exhibited involvement of the ring finger, 6 had involvement of the middle finger, and 1 had involvement of the index finger indicating that ring finger is more commonly involved. Postoperative rehabilitation was initiated according to the established protocol and all patients were followed for a period of 6 months, with assessments conducted at day 3, day 7, 3 weeks, 6 weeks, 3 months, 6 months intervals to evaluate clinical outcomes.

QUINNELL'S Grading score, based on clinical assessment of triggering severity post-procedure, classified outcomes as "Grade I (Excellent), Grade II (Good), and Grades III-V (Poor)". According to this grading, 22 patients achieved an excellent outcome, 3 patients had a good outcome, and none experienced a poor outcome. The study reported a total of three complications: two patients experienced inflammation and one patient reported pain at the procedure site, both of which were resolved with analgesics and antibiotics within a week. However, these three patients reported occasional pain at the release site during follow-up. Additionally, two patients developed hematomas post-surgery, which were managed with compression dressing and analgesics, resolving within 5- 7 days.

DISCUSSION

Trigger finger is a prevalent and debilitating condition affecting the hand, with an incidence rate of 2.2 % in the general population over 30 yrs of age and 10 % among individuals with Diabetes mellitus. It is more frequently observed in middle-aged healthy women, occurring at a rate two to six times higher than in men. The incidence of trigger finger increases with age, peaking in the fifth or sixth decade of life. The condition commonly affects the thumb, followed by the ring, middle, little, and index fingers in cases of multi digit involvement.

When conservative treatments and steroid injections fail, surgical intervention becomes necessary. The open surgical procedure involves sectioning of the A1 pulley through a transverse or longitudinal incision, a technique that has been employed for an extended period. However, the surgical procedures can lead to complications such as impaired wound healing, infection, bleeding and neurovascular injury. Even in healthy patients, surgery requires significant recovery time, wound care, rehabilitation, and incurs costs.

Lange-Riess, et al. reported only nine complications in their series of 305 open surgery cases for trigger finger, including two superficial wound infections, one case of delayed wound healing, and six instances of temporary digital sensory loss, with no

permanent complications observed after a 14 year follow up period.

Percutaneous release of A1 pulley in trigger finger offers an alternative to open surgery. It can be performed on an outpatient basis, with minimal post procedural care, allowing patients to resume the normal activities the following day.

Eastwood, et al. described the percutaneous release technique as a cost-effective, convenient procedure with a low complication rate, gaining popularity over open surgery. They suggested that percutaneous release aims to reduce complications associated with open release surgery such as infections, painful scar formation, weakness, bowstringing of the flexor tendons due to pulley damage, digital neurovascular damage, and joint stiffness.

Ha KI et al. observed no complications in their 185 percutaneous release procedures. In a retrospective study, Wang HC compared 32 cases of open surgical release with 40 cases of percutaneous release, concluding that there were no statistically significant clinical differences between the two methods. The findings suggested that percutaneous release serves as a satisfactory alternative to open release.

In 1958, Lorthioir introduced the concept of percutaneous trigger finger release, suggesting it as an alternative to the traditional open release method. Supporters of this approach claim it allows for a safe separation without incisions, leading to less post-operative discomfort and quicker recovery. Additionally, it is thought to be cost-effective, as it can be swiftly performed using local anesthesia.

All patients underwent surgery only after providing informed consent. Twenty-five patients were operated on under local anesthesia using an 18-gauge needle for the percutaneous release of the A1 pulley.

Post-operative rehabilitation was conducted according to protocol. Patients were followed up for six months to assess pain, infections, and the severity of triggering recurrence using Quinnell's criteria. Quinnell's criteria was employed to evaluate the clinical outcome of percutaneous trigger finger release.

ADVANTAGES

1) Can be done in a day care setting.
2) It involves minimal invasion.
3) There is little to no harm to digital nerves and blood vessels.
4) Stitches are not required.
5) It is more cost-effective.
6) The procedure yields positive outcomes in short-term recovery

CONCLUSION

The percutaneous release of trigger finger using an 18-gauge needle appears to be an effective, safe, and minimally invasive treatment option for trigger finger. The procedure demonstrates excellent outcomes in the majority of patients, with a low complication rate. It offers several advantages over open surgery, including reduced surgical time, lower cost, and potentially faster recovery.

The technique can be done as an outpatient procedure under local anesthesia. The significant improvement in hand function, as evidenced by Quinnell's outcome score, suggests that this procedure can effectively alleviate the symptoms and functional limitations associated with trigger finger.

REFERENCES

1. Notta A. Recherches sur une affection particuliere des gaines tendineuses de la main. Arch Gen Med.185
2. Lin GT, Amadio PC, An KN, et al. Functional anatomy of the human digital flexor pulley system. J Hand Surg [Am] 1989; 14:949–56..
3. Anderson B1, Kaye S. A prospective study of the response to local injection. Arch Intern Med. 1991 Jan;151(1):153-6.
4. Griggs SM1, Weiss AP, Lane LB, Schwenker C, Akelman E, Sachar K. Treatment of trigger finger in patients with diabetes mellitus. J Hand Surg Am. 1995 Sep;20(5):787-9.
5. Patel MR, Moradia VJ. Percutaneous release of trigger digit with and without cortisone injection. J Hand Surg Am 1997; 22(1):150–155.
6. Ragoowansi R, Acornley A, Khoo CT. Percutaneous trigger finger release: The 'lift-cut' technique. Br J Plast Surg. 2005; 58:817–21.
7. Jou IM, Chern TC. Sonographically assisted percutaneous release of the a1 pulley: a new surgical technique for treating trigger digit.J Hand Surg [Br] 2006;31(2):191–199.
8. Dahabra IA, Sawaqed IS. Percutaneous trigger finger release with 18gauge needle.Saudi Med J. 2007 Jul;28(7):1065-7.
9. De la Parra-Márquez ML1, Tamez-Cavazos R, Zertuche-Cedillo L, Martínez- Pérez JJ, Velasco-Rodríguez V, Cisneros-Pérez V. Risk factors associated with trigger finger. Case-control study. Cir Cir. 2008 Jul-Aug;76(4):323-7.
10. Amrani A, Dandane MA, Alami ZF. Percutaneous release of trigger thumb in children: 63 cases. Chir Main 2011; 30:102-4.
11. Dala-Ali BM, Nakhdjevani A, Lloyd MA, Schreuder FB. The efficacy of steroid injection in the treatment of trigger finger. Clin Orthop Surg 2012;4(4):263–268.
12. Guler F, Kose O, Ercan EC, Turan A, Canbora K .Open versus percutaneous release for the treatment of trigger thumb. Orthopedics.2013 Oct;36(10):e1290-4.
13. Zhao JG, Kan SL, Zhao L, et al. Percutaneous first annular pulley release for trigger digits: a systematic review and meta-analysis of current evidence. J Hand Surg Am 2014;39(11):2192–2202.
14. Grinčuk A, Baužys K, Porvaneckas N, Uvarovas V, Rauba G, Ryliškis S. Identification of the location of the A1 pulley combining palpation technique with palm landmarks and percutaneous release of A1 pulley with a 19-gauge needle: A cadaveric study.J Orthop Surg (Hong Kong). 2017 Sep-Dec; 25(3):2309499017731631.
15. Single. -Incision Endoscopic Trigger Finger Release Cooper Tye et al. Tech Hand Up Extrem Surg. 2023.