Journal of Advances in Medicine and Medical Research

34(19): 37-43, 2022; Article no.JAMMR.87770
ISSN: 2456-8899
(Past name: British Journal of Medicine and Medical Research, Past ISSN: 2231-0614, NLM ID: 101570965)

Percutaneous Release of Trigger Finger

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JAMMR/2022/v34i1931436

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/87770

Original Research Article

Received 27 March 2022
Accepted 04 June 2022
Published 11 June 2022

ABSTRACT

Background: Trigger finger (sometimes referred to as stenosing tenosynovitis) is a mechanical impingement of the hand's flexor tendon. This ailment is a frequent source of hand pain, discomfort, and impairment, since it may reduce the afflicted finger's range of motion. This research seeks to investigate the outcomes of surgical release of trigger finger by percutaneous method.
Methods: This prospective study that included 21 adult patients aged > 16 years and diagnosed by clinical assessment by percutaneous release of A1 pulley of the diseased finger with history of triggering for at least 3 months and failure of previous conservative treatments. Each case was followed up for 6 weeks after enrolment.
Results: Excellent outcomes were significantly increased in cases with one finger affection than cases with multi finger affection (P =0.025). There was no significant variance in the outcomes among patients with right and left sided hands. Patients with excellent outcome had shorter duration of symptoms than patients with good and poor outcomes (P =0.032).
Conclusions: Excellent outcomes were significantly increased in cases with office work than cases with manual work and in patients with one finger affection than patients with multi finger affection.

Keywords: Percutaneous release; Trigger finger; Annular (A1) pulley.

1. INTRODUCTION

Trigger finger (sometimes referred to as stenosing tenosynovitis) is a mechanical impingement of the hand's flexor tendon. This ailment is a frequent source of hand pain, discomfort, and impairment, since it may reduce the afflicted finger's range of motion [1].

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Trigger finger is the most prevalent form of entrapment tendinopathy, with a lifetime risk of 2% to 3% for the general population and 10% for diabetics. Affecting primarily the first annular (A1) pulley at the metacarpal head [2].

When bending or stretching the afflicted digit, trigger finger is characterised by snapping or painful catching of flexor tendons. As the condition worsens, the digit may become immobilised in flexion, requiring passive or active correction to restore complete range of motion. Over time, patient reluctance due to discomfort and resulting guarding inhibits tendon mobility and may subsequently result in contractures at the proximal interphalangeal (PIP) joint [3].

Different causes of trigger finger have been described. It may be due to repeated digital flexion and power gripping resulting in friction and irritation when the tendon passes under the A1 pulley. A size difference between the flexor tendon and the A1 pulley is also suspected to be the consequence of inflammation or thickening of the tissues [4].

There are several therapy options available. In the early stages of the condition (mild instances), nonsteroidal anti-inflammatory medications, activity moderation, splinting, and intra-sheath corticosteroid injections (CI) may offer full remission of symptoms. The effectiveness of single or repeated CI has been shown in roughly 93% of patients. If conservative therapy fails, surgical release of the A1 pulley is necessary, which may be accomplished by open surgery or percutaneous release procedures [5].

Complications after injection are uncommon but infections, tendon degeneration or rupture, subcutaneous fat necrosis or atrophy, persistent pain, hypopigmentation, flare reaction, residual snapping and flexion contracture have been reported [6].

Infection, digital nerve injury, scar tenderness, and joint contractures are complications of surgical open release. The A1 pulley is released percutaneously with a minimal complication rate and good patient satisfaction [6].

Nowadays, percutaneous A1 pulley release is the method of choice in patients not responding to conservative therapy, due to its simplicity of administration, minimal complication rates, and high patient satisfaction [6].

This surgery requires no extra preparation and may achieve the same results as an open procedure. In addition, this treatment has several benefits, including a shorter recovery period, the absence of scar discomfort, and outpatient application [7].

This research seeks to investigate the outcomes of surgical release of trigger finger by percutaneous method.

2. PATIENTS AND METHODS

This prospective study that involved 21 adult patients aged > 16 years and diagnosed by clinical assessment by percutaneous release of A1 pulley of the diseased finger with history of triggering for at least 3 months and failure of previous conservative treatments. Each case was followed up for 6 weeks after enrolment.

Exclusion criteria were recent trauma, rheumatoid disease, children, presence of local infection and uncontrolled diabetes mellitus.

2.1 Percutaneous Release of Trigger Finger

The palm and affected finger were prepared with an antiseptic solution. The release was done under local anesthesia by infiltrating the skin and flexor tendon sheath with 3-5 cm of lidocaine solution. Throughout the process, the finger to be freed was held tightly with the metacarpophalangeal joint hyperextended. A 22-gauge needle was inserted percutaneously and perpendicularly through the A1 pulley into the flexor tendon. The needle was then withdrawn from the tendon and the bevel of the needle aligned longitudinally with the longitudinal axis of the tendon. The length of the A1 pulley was incised using the bevel of the needle by a sweeping motion back and forward to incise the A1 pulley proximally and distally. As the pulley was cut, the absence of a grating feeling indicates and confirms the completion of the release. After percutaneous release, the needle was withdrawn, and the patient was instructed to actively flex and extend the finger several times to ensure complete release of the triggering. If a patient demonstrates continued triggering, the needle was reinserted, and extra release is administered.

Post-operative assessment: Clinical assessment of pain, range of movement and patient satisfaction immediately after the procedure [8] follow-ups were after 3 days, one week, 2 weeks and six weeks, the results were assessed

according to another method developed by Tanaka et al. [9] at the end of the follow up period of six weeks and the method of evaluation depends on the patient's symptoms elicited on examination [minor symptoms whose score 1 point (swelling and tenderness), minor symptoms whose score 2 points as they interfere with finger's movement (pain on movement and limitation of motion) and major symptoms (snapping).

2.2 Statistical Analysis

Statistical analysis was done by SPSS v25 (IBM Inc., Chicago, IL, USA). Shapiro-Wilks normality test and histograms were used to test the distribution of quantitative variables to select accordingly the type of statistical testing: parametric or nonparametric. Quantitative variables were presented as mean and standard deviation (SD) and were compared by paired Student's t- test for the same group. Qualitative variables were presented as frequency and percentage (%) and were compared using F test. A two tailed P value < 0.05 was considered significant.

3. RESULTS

There was a significant difference in the age of patients between patients with excellent, good, and poor outcomes (P =0.04). Patients with excellent outcome were younger than patients with good and poor outcomes Table 1.

There was no significant variance in the outcomes among male and female cases. There was no significant variance in poor outcomes among cases with manual work and cases with office work. Excellent outcomes were significantly increased in cases with office work than cases with manual work (P =0.012) and good outcomes were significantly increased in cases with manual work (P =0.035) Table 2.

There was no significant difference in good and poor outcomes between patients with one finger affection and patients with multi finger affection. Excellent outcomes were significantly increased in cases with one finger affection than cases with multi finger affection (P =0.025). There was no significant variance in the outcomes among patients with right and left sided hands Table 3.

Cases with excellent outcome had shorter duration of symptoms than patients with good and poor outcomes (P =0.032). There was no significant variance in the outcomes among patients with grade II and grade III of triggering Table 4.

Table 1. Classification of outcomes at the end of follow up according to Tanaka score in the study participants and relationship between patients' age and end results (n = 21)

		Study participants (n =21)	P-value
Outcomes at the end of follow up according to Tanaka score	Excellent	16 (76.2%)	---
	Good	4 (19%)	
	Poor	1 (4.8%)	
Age	Excellent	58.44 ± 16.46	0.04*
	Good	80.75 ± 3.4	
	Poor	85 ± 0	

*Data are presented as mean ± SD or frequency, *: statistically significant P value*

Table 2. Relationship between patients' gender, occupation and end results (n = 21)

		Male (n =7)	Female (n =14)	P-value
Gender	Excellent	5 (71.43%)	11 (78.57%)	1
	Good	1 (14.29%)	3 (21.43%)	1
	Poor	1 (14.29%)	0 (0%)	0.333
		Manual work (n =10)	**Office work (n =11)**	
Occupation	Excellent	5 (50%)	11 (100%)	0.012*
	Good	4 (40%)	0 (0%)	0.035*
	Poor	1 (10%)	0 (0%)	0.476

*Data are presented as frequency, *: statistically significant P value*

Table 3. Relationship between number of finger affection, patients' hand side and end results (n = 21)

		One finger (n =14)	Multi finger (n =7)	P-value
Number of finger affection	Excellent	13 (92.9%)	3 (42.9%)	0.025*
	Good	1 (7.1%)	3 (42.9%)	0.087
	Poor	0 (0%)	1 (14.3%)	0.333
		Right hand (n =17)	**Left hand (n =4)**	
Patients' hand side	Excellent	0 (0%)	1 (25%)	0.191
	Good	6 (35.3%)	2 (50%)	0.617
	Poor	11 (64.7%)	1 (25%)	0.272

*Data are presented as frequency, *: statistically significant P value*

Table 4. Relationship between patients' duration of symptoms, patients' grade of case and end results (n = 21)

		Duration of symptoms (months) n =21		P-value
Patients' duration of symptoms	Excellent	5.44 ± 1.41		0.032*
	Good	7.25 ± 0.5		
	Poor	8 ± 0		
		Grade II (n =10)	**Grade III(n =11)**	
Patients' grade of case	Excellent	1 (10%)	0 (0%)	0.476
	Good	3 (30%)	1 (9.1%)	0.311
	Poor	6 (60%)	10 (90.9%)	0.149

*Data are presented as mean ± SD or frequency, *: statistically significant P value*

Regarding the complications at the end of follow up in the study participants, swelling occurred in 3 (14.3%) cases, pain in 2 (9.5%) cases, and numbness in 1 (4.8%) case. Table 5.

Table 5. Complications of the group at the end of follow up

	n (%)
Pain	2 (9.5%)
Triggering	0 (0%)
Stiffness	0 (0%)
Digital nerve injury	0 (0%)
Scar	0 (0%)
Swelling	3 (%14.3)
Numbness	1 (4.8%)
Recurrence	0 (0%)

Data are presented frequency

4. DISCUSSION

In this research, the ages of the participants varied from 29 to 82, with a mean of 62.52 17.03 and a male to female ratio of 1: 2 (there were 7 (33.3%) males and 14 (66.7%) females).

Another study by Abdoli et al. [10] which included 83 patients with trigger finger study in a clinical trial to examine the effectiveness of two outpatient methods of percutaneous trigger finger release and CI, they also reported an average age of 52.54 ± 11.45 ranged from 28 to 85 with a male to female ratio of 1: 3.6.

The higher average age and the predominance of women in the current study goes with the population average as it is reported that incidence of trigger finger is most common in the sixth decade of life with two to six times more in females than males [11, 12].

In the present study, 10 (47.6%) of study participants had a manual job while 11 (52.4%) work in an office. Despite findings associating trigger finger to jobs involving substantial physical work [13], many others question this relation and report that there is no association between trigger finger and the workplace.

Trezies et al. [14] who investigated the occupation of 178 patients with idiopathic trigger finger, found that the distribution of their vocations did not vary considerably from that of the local general population, and the great majority of trigger fingers are caused by factors other than occupation.

In the present study, the duration of symptoms ranged from 4 to 8 months with an average duration of 5.75 ± 1.64 with a right to left hand ratio of 0.75.

In contrast to Lin et al. [5] who studied 126 patients who underwent percutaneous release to compare short and long outcomes between open surgical release and percutaneous trigger finger. Their duration of symptoms ranged from 4 to 24 months with an average of 8.8 with right to left hand ratio of 1.47.

As regards the frequent related symptoms, Marij et al. [15] conducted a prospective observational study to evaluate the outpatient percutaneous release of trigger finger in 52 patients. They found that the most frequent symptom was pain which occurred in 25 (48.14%) patients followed by stiffness which occurred in 15 (28.8%) patients.

In the presented patients grade III affection (52.4%) was more noticed than grade II (47.6%).

This is in accordance with a study by Yang et al. [16] who included 65 patients with trigger fingers to compare outcomes of treatment by percutaneous release therapy regimen alone or percutaneous trigger finger release combined with finger splint. There were 24 (36.9%) patient grade II and 41 (63.1%) patient grade III.

In the current study four (19%) of the cases had diabetes mellitus and this matched with Rozental et al. [17] who studied the prognostic factors of trigger finger in 124 patients and their study included 26 (21%) patients with DM and 98 (79%) without.

Despite that many other studies reported that DM is a risk factor of trigger finger [12, 18], there were fewer patients with diabetes in our study, this can be explained by Chammas et al. [19] who studied the relation between DM and trigger finger, they reported that the prevalence in diabetics is associated with the actual duration of the disease, not with glycaemic control so the shorter the duration of DM the lower the risk of trigger finger.

In the current study, 14 (66.7%) had one affected finger while 7 (33.3%) had multiple affected fingers. This goes with Rozental et al. [17] who reported 39 (32%) out of 124 patients with multiple finger affection, they also found in their study that the presence of multiple finger affection is associated with higher recurrence rate and treatment failure if the patient was treated with corticosteroids injection.

In terms of the complications that were recorded at the end of follow-up; swelling in the present study, pain WAS the most appeared symptom in the patients, and it appeared in 3 (14.3%) patients, followed by pain in 2 (9.5%) patients and numbness in 1 (4.8%) patient. Further, Aksoy et al. [20], retrospectively evaluated 39 patients who had percutaneous release of the trigger finger. Patients were assessed for digital nerve damage (hypoesthesia), recurrence, painful scar, and tendon rupture. Most commonly, hypoesthesia was seen in the first and fourth digits. One patient experienced tendon rupture (fourth finger) towards the end of the first year. At the conclusion of the first (n=5) and third (n=9) years, there were recurrences. The fourth finger was most often affected, followed by the third finger. Two individuals were noted to have painful scars.

In the current study, the level of overall patient satisfaction after percutaneous release of trigger finger was excellent in 16 (76.2%), good in 4 (19%), and poor 1 (4.8%) patient. This is in accordance with Marij et al. [15] who reported patient satisfaction after percutaneous release in 47 (90.4%) of patients and unsatisfaction in only 5 (9.36%) patients.

Moreover, Guler et al. [21] who compared open to percutaneous release of trigger finger in 87 patients found that the percentage of satisfaction of patients who underwent percutaneous release was 97% and it was comparable to the percentage of satisfaction of patients who underwent surgical release that was 98%. This shows that percutaneous technique offers a great deal of patient satisfaction as a method for trigger finger release.

In the current study there was statistically significant relationship between type of finger affection and patient satisfaction. Patients with single trigger finger were more satisfied than the multiple trigger finger cases.

There was statistically significant relationship between occupation and patient satisfaction. Office workers were more satisfied than manual workers. This could be due to the repeated overuse of the fingers in those patients.

There was statistically significant relationship between patients' age, and duration of symptoms and patient satisfaction. The younger the patient, the more the patient was satisfied with the outcome of the procedure, and the less the duration of symptoms the more the patient was satisfied with the outcome of the procedure.

In contrary, Becker et al. [22] who studied the factors affecting patient satisfaction with treatment for trigger fingers, they asked the patients to fill out questionnaires at enrolment and final evaluation was by phone. They studied these factors on 75 patients who was diagnosed with one or more trigger fingers.

They reported that there was no significant variation in degree of patient satisfaction and, type of finger affection whether it is one digit or more, occupation, age, and duration of symptoms.
The difference in results can be explained by the subjective way patients' satisfaction was assessed. This way may be affected by many factors related to patients or their service provider.

In the current study, there was no statistically significant relationship between gender of patients, dominant hand side, grade of the case and patient satisfaction.

This is in accordance with the results of Becker et al. [22] who reported that same results and found that the only factor affecting patient satisfaction is the relief of triggering score.

Limitations: The sample size was relatively small, follow-up duration was relatively short-term, no comparison group was included in this study, the procedure should be done on stable patients not hysterical, the procedure should be done under complete sterile conditions and the procedure should not be done for patients with fixed deformities

5. CONCLUSIONS

Excellent outcomes were significantly increased in cases with office work than cases with manual work and in patients with one finger affection than patients with multi finger affection. Patients with excellent outcome had shorter duration of symptoms than patients with good and poor outcomes.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT AND ETHICAL APPROVAL

An informed written consent was obtained from the patient or relatives of the patients. The study was done after approval from the Ethical Committee Tanta University Hospitals.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/87770