Available online at www.medicinescience.org

ORIGINAL ARTICLE

Medicine Science International Medical Journal

Medicine Science 2020;9(4):950-3

Comperative outcomes of the patients undergoing percutaneous and open trigger finger release

Duran Toprak[1], Fatih Dogar[1], Burak Kuscu[1], Ali Aydİn Karadeniz[1], Okkes Bilal[1]

[1]*Kahramanmaras Sutcu Imam University, Faculty of Medicine, Department of Orthopaedic and Traumatology, Kahramanmaras, Turkey*

Received 09 July 2020; Accepted 28 Jul 2020
Available online 30.10.2020 with doi: 10.5455/medscience.2020.07.129

Abstract

The aim of this study was to compare patients who underwent open or percutaneous trigger finger release in terms of clinical outcomes, time to return to activities, and recurrence. The records of patients who underwent percutaneous and open trigger finger release between 2012 and 2018 at two different hospitals in the same city were retrospectively reviewed. The patients were divided into two groups: 33 patients who underwent percutaneous trigger finger release (Group PR) and 48 patients who underwent open release of A1 pulley (Group OR). The clinical classification of cases was done according to the Quinnell classification. The functional outcomes of the patients were evaluated according to the Quick DASH scale. The mean age of the patients was 55.95 ± 11.73 (27–82) years; 71.6% (n = 58) were female. The left side was involved in 56.8% (n = 46) patients, and 81 patients underwent percutaneous or open trigger finger release with a mean follow-up duration of 37.40 ± 16.22 (12–72) months. The time to start daily activities was shorter in Group PR than in Group OR, and the difference was statistically significant ($p < 0.001$). A comparison of the upper extremity functional scores between the two groups revealed no statistically significant difference (PR; 15.21 ± 6.17, PO; 12.99 ± 6.89, $p = 0.142$). Although the rate of complications was higher in Group OR, there was no statistically significant difference between the two groups (PR; 12.12%, PO: 20.83%, $p = 0.217$). Percutaneous trigger finger release can be preferred in adult trigger finger surgery due to increased risks regarding wound healing and infections associated with advanced age, presence of diabetes and inflammatory arthritis, and the expectation of rapid return to daily activities.

Keywords: Trigger finger, percutaneous release, open release

Introduction

Trigger finger is a common clinic condition characterized by catching, locking, and a decrease in grip strength during finger movements, resulting from incompatibility between the flexor tendons and A1 pulley [1]. Trigger finger, which is one of the most common causes of pain and disability in the hand, affects 2.6% of the people in the general population [1, 2]. It often occurs on the thumb, with a 4–6 times high incidence in females than in males [3].

Trigger finger can be seen at any age, but it is observed more often in patients aged ≥50 years and in the dominant hand [4]. The main etiological factor is chronic repetitive friction between the A1 pulley and the flexor tendon. It has been reported that some connective tissue diseases occur more often in patients with diabetes and inflammatory arthritis [5-7].

***Coresponding Author:** Duran Toprak, Kahramanmaras Sutcu Imam University, Faculty of Medicine, Department of Orthopaedic and Traumatology, Kahramanmaras, Turkey, E-mail: drdtopak@gmail.com

The Quinnell grading system is used to clinically assess the severity of trigger finger [8]. Mild cases with early disease onset can be treated by conservative methods (activity modification, splinting, nonsteroidal anti-inflammatory drugs, and local steroid injections) [1, 4, 7].

In delayed cases that do not benefit from conservative methods, open or percutaneous A1 pulley release is performed [4, 8, 9].

Various conservative and surgical methods have been described for the treatment of trigger finger, and successful outcomes have been reported. The aim of this study was to compare patients who underwent open or percutaneous trigger finger release in terms of clinical outcomes, and recurrence. As far as we can evaluate, it is the first study in the literature to compare the two different treatment options of the trigger finger in terms of time to return to daily activities.

Material and Methods

Patients who underwent percutaneous and open trigger finger release between 2012 and 2018 at two different hospitals in the same city were retrospectively reviewed after obtaining approval of the local ethics committee (Session: 2019/02, Date:06.02.2019, Decision no:10).

We included patients aged >18 years who underwent percutaneous or open trigger finger release, did not have neurological deficit, and followed up for ≥12 months. Children under 18 years of age, patients treated for recurrence, and patients with incisions or scars in the same area before treatment were excluded because they had the potential of influencing the outcomes of the treatment.

A total of 81 patients who met the criteria were included, and their files were retrospectively reviewed. The patients were divided into two groups: 33 patients who underwent percutaneous trigger finger release (Group PR) and 48 patients who underwent open release of A1 pulley (Group OR).

Then, the data on the patient charts including age, sex, direction, dominant hand, patient complaint, etiological cause, course of treatment, follow-up period, time of return to daily activities, and complications were evaluated. The symptoms of the patients were classified according to the Quinnell grading system [8]. The functional outcomes of the patients were evaluated using the QuickDASH (disabilities of the arm shoulder and hand) scale [10].

All patients in Group OR underwent A1 pulley release under local anesthesia, and these patients received oral antibiotics and analgesics for 5 days in the postoperative period. The patients in Group PR received an injection of a mixture of betamethasone sodium phosphate 2 mg/1mL (Diprospan vial) and 1 ml of 2% xylocaine in a proximal-to-distal direction using a 21-gauge needle through a green-tip injector inserted into the flexor tendon sheath at an angle of 45º over the A1 pulley, while the metacarpophalangeal joint of the finger was in flexion. Then, the pulley was released in a longitudinal direction by serial extension and flexion movements.

Statistical Analysis

A IBM SPSS 20.0 (IBM, Armonk, NY, USA) software package was used to analyze the data obtained from patient files. Categorical variables were presented as frequency (n, %), and quantitative data were expressed mean and standard deviation. A Kolmogorov–Smirnov test was used to assess the fitness of the data for normal distribution. A chi-square (x2) test was used to compare categorical variables of the two independent groups, whereas an independent samples t-test was used to evaluate quantitative data. A p-value of <0.05 was considered statistically significant.

Results

The mean age of the patients was 55.95 ± 11.73 (27–82) years; 71.6% (n = 58) were female. The left side was involved in 56.8% (n = 46) patients, and there were 81 patients who underwent percutaneous or open trigger finger release with a mean follow-up duration of 37.40 ± 16.22 (12–72) months. The thumb was the most commonly affected finger (n = 43, 53.1%), whereas the most common etiological factor was diabetes that was found in 29.6% (n = 24) of the cases. The most common complications were recurrence (n = 7, 8.6%), delayed wound healing (n = 4), wound site infection (n = 2), and tendon rupture (n = 1). Demographic data of the cases by groups are presented in Table 1.

A comparison between the two groups did not reveal a significant difference in terms of age, sex, rate of dominant hand involvement, and Quinnell grade. The time to start daily activities was shorter in Group PR than in Group OR, and the difference was statistically significant (PR: 1.60 ± 1.45; PO: 16.31 ± 7.34; p < 0.001). A comparison between the two groups in terms of upper extremity functional scores revealed no statistically significant difference (PR: 15.21 ± 6.17; PO: 12.99 ± 6.89; p = 0.142). Although the incidence of complications was high in Group OR, there was no statistically significant difference between the two groups (PR: 12.12%, PO: 20.83%, p = 0.217). The comparison between the two groups is presented in Table 2.

Although there was a statistically significant difference between the two groups in terms of the duration of follow-up, this was not considered to have an influence on the outcomes (p = 0.048).

Table 1. Distribution of Demographic Data by Groups

		n=81 (%)
Age (mean±SD (min-max) year		55.95±11.13 (27-82)
Sex	Female	58 (%71.6)
	Male	23 (%28.4)
Side	Dominant	39 (%48.1)
	Non-Dominant	42 (%51.9)
Etiology	No	38 (%46.9)
	Diabetes Mellitus	24 (%29.6)
	İnflammatory Arthritis	9 (%11.1)
	Heavy Duty	2(%2.5)
	Hand crafted	8 (%9.9)
Affected Finger	Thumb	43 (%53.1)
	Index Finger	11 (%13.6)
	Middle Finger	16 (%19.8)
	Ring Finger	10 (%12.3)
	Little Finger	1 (%1.2)
Complaint	Trigerring	29 (%35.8)
	Pain	36 (%44.4)
	Swelling	5 (%6.2)
	Loss of Labor	11 (%13.6)
Complications	No	67 (%82.7)
	Delay in Wound Healing	4 (%4.9)
	Surgical Area Infection	2 (%2.5)
	Recurrence	7 (%8.6)
	Tendon Rupture	1 (1.2)
QDASH Scorring		13.90±6.66 (2.30-29.5)
Following Time (mounth)		37.40±16.22 (12-72)

Abbreviation: QDASH; Quick Disabilities of Arm, Shoulder & Hand

Table 2. Comparative Outcomes of The Groups

		Group PR (n=33)	Group OR (n=48)	p Value
Age (mean±SD (min-max) year		57.81±11.32	54.66±10.93	0.213
Sex	Female	24	34	0.853
	Male	9	14	
Side	Dominant	18	21	0.339
	Non-Dominant	15	27	
Quinnell Classification	Class 2	2	2	0.405
	Class 3	10	22	
	Class 4	21	23	
	Class 5	0	1	
Time to Return to Daily Activities (day)		1.60±1.45	C	**0.000**
QDASH Scorring (Mean ± SD)		15.21±6.17	12.99±6.89	0.142
Complications	Delay in Wound Healing	0	4	0.217
	Surgical Area Enfection	0	2	
	Recurrence	4	3	
	Tendon Rupture	0	1	
Mean Follow-up Time (month)		33.12±14.64	40.35±16.73	

Abbreviation: QDASH; Quick Disabilities of Arm, Shoulder & Hand

Discussion and Conclusions

Trigger finger occurs in individuals aged >50 years, often in those with diabetes and autoimmune disorders (such as rheumatoid arthritis) [4-7, 11]. Aging, diabetes, and inflammatory arthritis are known to affect wound healing adversely by reducing cell proliferation, revascularization, growth factors, and collagen deposition and remodeling in the wound site [12-14].

In this study, there was no delay in wound healing and no wound site infection in Group PR. PR of the trigger finger is superior to open release in terms of their effects on wound healing. Thus, percutaneous trigger finger release should be preferred in the treatment of elderly patients with diabetes and inflammatory arthritis who are at risk of a delay in wound healing. Although the complication rate was lower in Group PR than in Group OR, the difference was not statistically significant. This finding is caused by the small sample size. Percutaneous release is superior to open release in terms of complications. A success rate of 45% was reported in trigger finger surgery after a single corticosteroid injection, whereas another study reported successful outcomes in 39% of the patients who did not respond to the first two injections. The patients are advised to undergo surgery following two unsuccessful steroid injections. Most surgeons prefer percutaneous or open release techniques [15-17].

In trigger finger surgery, open release of A1 pulley is a reliable method yielding a success rate of 92%–100% [18-21]. The efforts toward reducing the size of incision during open release surgery resulted in the introduction of percutaneous release technique, which was described for the first time in 1958 [22]. Although it is reported to be safe in most studies, the reported success rate is 91%–100% [23-25]. In our study, the success and recurrence rate of both treatment methods are consistent with those in the literature. Short follow-up periods may be the cause of high success rates reported in some studies. The studies on patients with and without diabetes suggest that percutaneous release with concurrent corticosteroid injection is more reliable and successful than steroid injections alone [26, 27]. However, in the first one-month period, it has been reported that pain complaints were less common only in the steroid group. A comparison between patients undergoing open and percutaneous release revealed no difference between the two groups in terms of treatment success and complications and that both treatments can be performed successfully [4, 23, 28]. In Group PR, the mean duration of pain and the mean time to recovery of motor functions were shown to be shorter, showing faster healing, in Group PR than in Group OR [23].

In our study, the success of treatment, QDASH scores, and complication rates were similar between the two groups, but the time of return to daily activities was shorter in the percutaneous release group. Percutaneous release technique must be preferred in patients who expect to return to daily activities in the early period. The involvement of two different surgeons in the treatment of patients and the retrospective study design are important limitations of the study. There is a need for randomized and prospective studies on a larger series of patients. In conclusion, percutaneous trigger finger release can be preferred in adult trigger finger surgery due to increased risks regarding wound healing and infections associated with advanced age, presence of diabetes and inflammatory arthritis, and the expectation of rapid return to daily activities.

Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content, including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Human and Animal Rights Statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Acknowledgements
The authors thank Enago – https://www.enago.com.tr/ceviri/ for their assistance in manuscript translation and editing.

Conflict of interests
The authors declare that they have no competing interests.

Financial Disclosure
There are no financial supports.

Ethical approval
This study was approved by K.S.Ü Faculty of Medicine Clinical Research Ethics Committee. (Session: 2019/02, date: 06.02.2019, decision no: 10)

References

1. Akhtar S, Bradley MJ, Quinton DN, et al. Management and referral for trigger finger/thumb. BMJ. 2005;331:30-3.
2. Strom L. Trigger finger in diabetes. J Med Soc New Jersey.1977;74:951-4.
3. Sheikh E, Peters JD, Sayde W, et al. A prospective randomized trial comparing the effectiveness of one versus two (staged) corticosteroid injections for the treatment of stenosing tenosynovitis. Hand. 2014;9:340-5.
4. Sato ES, Gomes Dos Santos JB, Belloti JC, et al. Treatment of trigger finger: randomized clinical trial comparing the methods of corticosteroid injection, percutaneous release and open surgery. Rheumatology (Oxford). 2012;51:93-9.
5. Hueston JT, Wilson WF. The aetiology of trigger finger: explained on the basis of intratendinous architecture. Hand. 1972;4:257-60.
6. Koh S, Nakamura S, Hattori T, et al. Trigger digits in diabetes: their incidence and characteristics. J Hand Surg Eur Vol. 2010;35:302-5.
7. Frontera WR, Silver JK, Rizzo TD. Essentials of physical medicine and rehabilitation: musculoskeletal disorders, pain, and rehabilitation. Saunders/ Elsevier;2008.
8. Quinnell RC. Conservative management of trigger finger. Practitioner. 1980;224:187-90.
9. Turowski GA, Zdankiewicz PD, Thomson JG. The results of surgical treatment of trigger finger. J Hand Surg Am. 1997;22:145-9.
10. Hudak PL, Amadio PC, Bombardier C. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder and hand) [corrected]. The Upper Extremity Collaborative Group (UECG). Am J Ind Med. 1996;6:602-8. Erratum in: Am J Ind Med. 1996;30:372.
11. Langer D, Maeir A, Michailevich M, et al. Evaluating hand function in clients with trigger finger. Occup Ther Int. 2017;2017:9539206.
12. Quirinia A, Viidik A. The influence of age on the healing of normal and ischemic incisional skin wounds. Mech Ageing and Dev. 1991;58:221-32.
13. Young A, McNaught CE. The physiology of wound healing. Surgery Oxford. 2011;29:475-9.
14. Rasik AM, Shukla A. Antioxidant status in delayed healing type of wounds. Int J Exp Pathol. 2000;81:257-63.
15. Wojahn RD, Foeger NC, Gelberman RH, et al. Long-term outcomes following a single corticosteroid injection for trigger finger. J Bone Joint Surg Am. 2014;96:1849-54.
16. Dardas AZ, VandenBerg J, Shen T, et al. Long-term effectiveness of repeat corticosteroid injections for trigger finger. J Hand Surg Am. 2017; 42:227-35.
17. Singla R, Gupta Y, Kalra S. Musculoskeletal effects of diabetes mellitus. JPMA J Pak Med Assoc. 2015;65:1024-7.
18. Fiorini HJ, Tamaoki MJ, Lenza M, et al. Surgery for trigger finger. Cochrane Database Syst Rev. 2018;2:009860.
19. Turowski GA, Zdankiewicz PD, Thomson JG. The results of surgical treatment of trigger finger. J Hand Surg Am. 1997;22:145-9.
20. Bruijnzeel H, Neuhaus V, Fostvedt S, et al. Adverse events of open A1 pulley release for idiopathic trigger finger. J Hand Surg Am. 2012;37:1650-6.
21. Lange-Riess D, Schuh R, Hönle W, et al. Long-term results of surgical release of trigger finger and trigger thumb in adults. Arch Orthop Trauma Surg. 2009;129:1617-9.
22. Lorthioir J. Surgical treatment of trigger-finger by a subcutaneous method. J Bone Joint Surg Am. 1958;40:793-5.
23. Gilberts EC, Beekman WH, Stevens HJ, et al. Prospective randomized trial of open versus percutaneous surgery for trigger digits. J Hand Surg Am. 2001;26:497-500.
24. Ragoowansi R, Acornley A, Khoo CT. Percutaneous trigger finger release: the"lift-cut" technique. Br J Plast Surg. 2005;58:817-21.
25. Ha KI, Park MJ, Ha CW. Percutaneous release of trigger digits. J Bone Joint Surg Br. 2001;83:75-7.
26. Abe Y. Clinical results of a percutaneous technique for trigger digit release using a 25-gauge hypodermic needle with corticosteroid infiltration. J Plast Reconstr Aesthet Surg. 2016;69:270-7.
27. Saremi H, Hakhamaneshi E, Rabiei MAS. Percutaneous release of trigger fingers: comparing multiple digits with single digit involvement. Arch Bone Jt Surg. 2016;4:224-7.
28. Wang J, Zhao JG, Liang CC. Percutaneous release, open surgery, or corticosteroid injection, which is the best treatment method for trigger digits? Clin Orthop Relat Res. 2013;471:1879-86.