

Factors Associated with Increased Risk of Recurrence following Treatment of Trigger Finger with Corticosteroid Injection

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Abstract

Introduction The aim of the study was to estimate recurrence rates, time to recurrence, and predisposing factors for recurrence of trigger finger when treated with corticosteroid (CS) injection as primary treatment.

Materials and Methods In a retrospective chart review, we identified primary trigger fingers treated with CS injection as primary treatment. Affected hand and finger, recurrence, time to recurrence, duration of symptoms, secondary treatment type, and comorbidities were recorded. A total of 539 patients were included with a mean follow-up of 47.6 months

Results In total, 330/539 (61%) recurrences were registered. Mean time to recurrence was 312 days. Increased risk of recurrence was seen after treatment of the third finger (relative risk [RR]: 1.22; 95% confidence interval [CI]: 1.06–1.39). Several comorbidities were associated with increased risk of recurrence: carpal tunnel syndrome (RR: 1.27; 95% CI: 1.07–1.52), thyroid disease (RR: 1.45; 95% CI: 1.15–1.83), or shoulder diseases (RR: 1.58; 95% CI: 1.36–1.83).

Conclusion We found a recurrence rate after primary treatment of CS injection for trigger finger of 61%. Most recurrences happened within 2 years and we found treatment of third finger, carpal tunnel syndrome, shoulder, or thyroid disease to be associated with an increased risk of recurrence of symptoms.

Keywords

- trigger finger
- recurrence
- primary treatment
- cofactors

Introduction

Stenosing tenosynovitis, also known as trigger finger, is a common disorder with a lifetime prevalence around 2%¹ and even higher among patients with diabetes.² Trigger finger is caused by an obstruction of the flexor tendons in the tendon sheath, usually at the site of the A1 pulley.³ A common choice of treatment is corticosteroid (CS) injection where a glucocorticoid mixed with a local anesthetic is injected under or in close proximity to the A1 pulley to dampen the tenosynovitis.⁴ A triggering finger may be treated with an injection several times to get a sufficient effect.⁵ Previous observational

studies and retrospective chart reviews have shown a success rate between 50 and 90% for CS injection,^{6,7} success being defined as relief of symptoms or no return of symptoms.⁵ Although surgical release is considered the golden standard treatment⁸ with success rates close to 100% for various surgical procedures,⁹ many choose to get an injection as primary therapy as this treatment has a considerably less recovery time, fewer complication, and is of very low cost compared with surgical intervention.¹⁰ Besides diabetes mellitus, previous studies have proposed correlations between the onset of trigger finger and certain diseases such as carpal tunnel syndrome (CTS)^{11,12} and shoulder diseases.^{2,13}

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The purpose of this study is to estimate recurrence rates and time to recurrence of trigger fingers treated with CS injection as primary treatment. We specifically wanted to identify predisposing factors of recurrence in patients treated with CS injection as primary treatment.

Materials and Methods

Patients

A retrospective chart review was performed. Cases were identified through the Danish national register. Inclusion of patients was performed using the International Classification of Diseases (ICD)-10 diagnosis DM653, trigger finger. The cases of trigger finger were diagnosed by trained hand surgeons. The presentation of symptoms was heterogeneous and varied from pain at the A1 pulley to complete locking of the finger. We did not classify symptoms according to any classification system although some grading systems exist such as Quinell's classification.¹⁴ All patients were treated at the Department of Hand Surgery, Herlev and Gentofte University Hospital of Denmark. The data were extracted on 17th of September 2018, thereby making this the last possible day of follow-up. Due to the restricted time of inclusion, all patients were followed for a minimum of 2 years. If the referral date in the extracted data was not the one of primary treatment of the affected finger, patient records were screened to identify date of primary treatment and the case was excluded if none was found. Exclusion criteria were age under 18, death before follow-up date, previous course of treatment at which the same finger was treated with CS injection, surgical release, or any other invasive treatment.

In a 2-year period (2014 and 2015), 847 references were made to the department and given the ICD-10 diagnosis DM653. Upon examination of records, 308 were excluded as the treatment upon consultation was not primary treatment of the affected finger, the patients were given the wrong diagnosis, or the finger was not treated with injection of CS and instead had surgical release as primary treatment. Sex, age, hand, and affected finger were identified. The fingers were numbered one to five starting from the thumb. Duration of symptoms were stratified into being present in less than 6 months or equal to or more than 6 months. Employment status was defined as either working or retired if the information was obtainable. Comorbidities were identified through the journal from first visit in the outpatient clinic and through screening of previous journals. In 223 patients, thyroid or shoulder disease was registered as we found them to be possible confounding factors.

A total of 539 fingers were included in this study. Average follow-up time was 47.6 months (range: 22.1–78.1).

Endpoints

The primary outcome was recurrence defined as a secondary contact to the department with symptoms of trigger finger after the primary treatment. Time to recurrence after primary treatment was recorded and was defined as number of days between primary treatment and the revisit to the outpatient clinic. Date of primary treatment was defined as

the date at which the treating surgeon considered the treatment completed and denoted it in the journal. Surgeons were allowed to administrate multiple injections during the course of primary treatment. If more than one injection was administered during the primary treatment, the date of the last injection in the treatment course was used as date of primary treatment.

Procedure

A blinded palmar injection was administered at the level of A1 pulley. The treatment was performed in an outpatient clinic. The patient was in a sitting position, and the area of application was disinfected twice before the procedure. A mixture of 1 mL triamcinolone acetonide 40 mg/mL and 1 mL xylocaine 10 mg/mL was used. To ensure the mixture was not applied intratendinously, the finger was passively flexed and extended before injection, and only applied upon little to no resistance.

Statistics

Based on similar studies,^{5–7} we chose a sample size similar to or exceeding their numbers of analyzed cases. Risk and relative risks were calculated and analyzed using Fischer's exact test and Student's *t*-test. Statistical analyses were done using Microsoft Excel and SPSS version 25.

Results

A total of 539 patients were treated with CS injection as primary treatment. The total number of recurrences was 330 fingers at the end of the study resulting in a recurrence rate of 61%.

Mean time to first recurrence was 10.3 months (range: 0–50.9). Two-thirds (220/330) of the recurring fingers had recurred within 1 year of follow-up, and within 2 years, 319 of 330 recurrences were registered (►Fig. 1).

There were more women than men treated, and the mean age was 60.9 years (►Table 1). Right hand was affected the

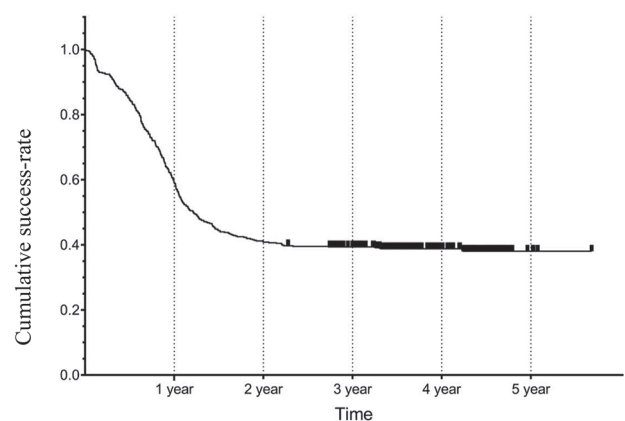


Fig. 1 Cumulative success-rate of primary CS-injection, success being defined as not getting recurrence of symptoms. About 61% (330/539) had recurrence of symptoms of trigger finger after primary CS-injection. Within 2 years, 97% (319/330) of the registered recurrences were recorded. Censored cases are marked with a tick. CS, corticosteroid.

Table 1 Demographic table of the included population

Variables	
Included patients, <i>n</i>	539
Mean follow-up, mo (range)	
Primary treatment	47.6 (22.1–78.1)
Secondary treatment	39.3 (2.9–70.6)
Sex, <i>n</i> (%)	
Male	191 (35)
Female	348 (65)
Age	
Mean, range	60.91 (18–92)
Side, <i>n</i> (%)	
Right	294 (55)
Left	245 (45)
Finger, <i>n</i> (%)	
1	173 (32.1)
2	26 (4.8)
3	148 (27.5)
4	147 (27.3)
5	45 (8.3)
Duration of symptoms, <i>n</i> (%)	
<6 mo	330 (61.2)
≥6 mo	83 (15.4)
N/A ^a	126 (23.4)
Number of injections at primary treatment, <i>n</i> (%)	
1	466 (86.5)
2	68 (12.6)
3	5 (0.9)
Work status, <i>n</i> (%)	
Employed	277 (51.4)
Retired	206 (38.2)
N/A ^a	56 (10.4)

Abbreviation: N/A, not applicable.

^aData were not available.

most (294; 54.5%) and the most affected finger was the thumb (173; 32.1%) followed by the third finger (148; 27.5%) (► **Table 1**). Age did not vary between genders. The most predominant comorbidity was diabetes followed by cardiovascular diseases and untreated CTS (► **Table 2**).

Age influenced the risk of getting a recurrence, as age below the mean was associated with having higher risk of recurrence (relative risk [RR]: 1.23; 95% confidence interval [CI]: 1.07–1.40). Also, patients who were in work had higher risk of recurrence compared with those who were retired (RR: 1.1; 95% CI: 1.03–1.35). If the symptoms had persisted in more than 6 months, the risk of recurrence after primary CS injection was higher compared with those with shorter duration of symptoms (RR: 0.77; 95% CI: 0.68–0.88).

Table 2 Overview of Comorbidities in the included population

Comorbidities	% (n/N)
Diabetes	14.3 (77/539)
Arthritis	3.9 (21/539)
Dupuytren	5.2 (28/539)
Thyroid disease	4.5 (10/223)
Shoulder disease	9.0 (20/223)
Carpal tunnel syndrome	8.5 (46/539)
Carpal tunnel syndrome treated ^a	5.8 (31/539)
Trauma	6.7 (36/539)
Cardiovascular diseases	8.7 (47/539)

^aPreviously had carpal tunnel release surgery on affected hand.

Three different comorbidities were found to be associated with increased risk of having recurrence when treated with CS injection: Untreated CTS (RR: 1.27; 95% CI: 1.07–1.52), shoulder disease (RR: 1.45; 95% CI: 1.15–1.83) and thyroid diseases (RR: 1.58; 95% CI: 1.36–1.84) were more prevalent among the recurring cases of trigger finger. Adjusting for age did not alter any associations (► **Table 3**).

After receiving one injection as primary treatment, patients may be reinjected at the following consultation in the outpatient clinic if the symptoms were only partially relieved. We found that being treated with two or more injections during the primary course of treatment increased the risk of recurrence (RR: 1.36; 95% CI: 1.18–1.57).

Upon recurrence, secondary treatment was CS injection in 206 cases and surgical release in 102 cases. Mean follow-up for recurred cases treated with CS injection was 39.3 months (range: 2.9–70.6). Significantly more cases of trigger finger recurred again upon secondary treatment if they were treated with CS injection compared with open surgery (Fischer's exact test, $p < 0.001$). Of the 206 cases which received a secondary injection, 105 trigger fingers recurred again and had to be treated a third time. Among the 102 cases of trigger finger which were surgically released upon recurrence of symptoms, only eight recurred and needed a third course of treatment. A total of 22 recurring trigger fingers did not receive any further treatment. After secondary treatment with CS injection, an accumulated 310 patients (58%) did not have recurrence at the end of follow-up.

Discussion

After a mean follow-up of 47.6 months, we report that 61% of trigger fingers treated with CS injection represented for further treatment. Within the first 24 months of follow-up symptoms of trigger finger had recurred in 59% of the analyzed cases.

Our findings are in good concordance with previous studies, though some studies have found higher rates of success.^{15,16} Newport et al¹⁷ found that 49% of the patients had resolution or improvement of symptoms after a single injection and Wojahn et al¹⁸ found 45% of patients to

Table 3 Recurrence rates among patients treated with corticosteroid-injection as primary treatment

Variable	Recurrence (%)	RR	95% CI
Sex			
Male	58.6	1	
Female	62.6	1.06	0.93–1.23
Age			
Above mean	55.7	1	
Below mean	68.2	1.23	1.07–1.40 ^a
Side			
Right	63.9	1	
Left	58.0	0.91	0.93–1.04
Finger			
1	55.5	0.87	0.74–1.01
2	53.8	0.87	0.61–1.26
3	70.3	1.22	1.06–1.39 ^a
4	61.2	1	0.86–1.16
5	57.8	0.94	0.72–1.22
Duration of symptoms			
<6 months	54.8	0.77	0.68–0.88 ^a
≥6 months	80.7	1.40	1.23–1.60 ^a
Work status			
Employed	66.1	1.18	1.03–1.35 ^a
Retired	60.2	0.97	0.85–1.12
Comorbidities ^b			
Diabetes	59.7	0.97	0.80–1.18
Arthritis	66.7	1.09	0.8–1.49
Dupuytren	71.4	1.18	0.92–1.50
Thyroid disease	90.0	1.45	1.15–1.83 ^a
Shoulder disease	95	1.58	1.36–1.84 ^a
Carpal tunnel syndrome	76.1	1.27	1.07–1.52 ^a
CTS treated ^c	48.4	0.78	0.54–1.13
Trauma	58.3	0.95	0.72–1.26
Cardiovascular diseases	53.2	0.86	0.65–1.13

Abbreviations: CTS, carpal tunnel syndrome; RR, relative risk.

Note: Age below mean age, having trigger finger on the third finger, duration of symptoms ≥6 months and employment to be associated with higher risk of recurrence. We also found increased risk for patients having carpal tunnel syndrome, shoulder, or thyroid diseases

^aSignificantly different risks.

^bThyroid and shoulder diseases only registered in 223 patients.

^cPreviously had carpal tunnel release surgery on affected hand.

demonstrate long-term treatment success after a single injection. Schubert et al⁷ found a lower recurrence rate after primary CS injection (0.34), but average time to recurrence was similar to our findings (320 days). Other studies have shown similar rates of recurrence after CS injection with 1

year of follow-up.¹⁹ Different study designs, methods of sampling and definitions of primary treatment and recurrence may cause the small variability in recurrence rates when comparing our results to those stated above.

Regarding secondary treatment with CS injection, we found similar results to those of Schubert et al⁷ who found a recurrence rate of 49% after secondary CS injection. An accumulated 58% (310/539) of our population did not represent after secondary treatment of CS injection. Dardas et al⁵ found a lower success rate after second injection (39% compared with our 49%) but had a slightly higher primary success rate and reported a success rate of a second injection varied from 23 to 68% in other studies.⁵ Along with our results, this may consider the proclamation that CS injection, as primary and secondary treatment followed by surgery as third line, may be the most efficient and cost efficient strategy of therapy for trigger finger among non-diabetics,²⁰ as we are able to successfully treat almost 60% before advancing to the more expensive surgical release of A1 pulley.

We found several factors to be associated with increased risk of recurrence such as treatment in the third finger. Dala-Ali et al³ found CS injection to be more effective when administered in the thumb compared with the other four fingers, but the effect on third finger was similar to the second, fourth, and fifth between 50 and 57% success rate. For treatment on the third finger, we found a success rate of only 29.7%, and our results combined with those of Dala-Ali et al indicate that the fingers two to five may have higher risk of recurrence upon primary steroid injection compared with the thumb, and a different course of treatment, such as primary surgery, could be considered.

Upon CS injection, increased recurrence risk was associated with three comorbidities, one being CTS. Zhang et al¹¹ and Kumar et al²¹ have previously suggested that CTS and trigger finger predispose one another, but there are no reported suggestions to CTS being a predictor of recurrence of trigger finger.

We found records of associations between trigger finger and shoulder and thyroid diseases to be sparse. One study found the prevalence of trigger finger among patients with various thyroid diseases to be similar to that of the background population, but increased among patients with subclinical hypothyroidism.²² In a case-control study by Titchener et al,¹³ the diagnosis of trigger finger was associated with rotator cuff disease, but we believe that more studies are needed to further elucidate the associations between onset and recurrence of trigger finger and the two groups of diseases.

Age also seemed to influence the risk of representation and may be due to lack of interest, concurrent diseases, or possibilities to revisit outpatient clinics upon recurrence.

Concerning the significantly higher recurrence rates of CS injection compared with surgical release of A1 pulley upon secondary treatment, Hansen et al¹⁹ found a similar difference in recurrence between injection and surgically treated fingers of 50% after 12 months (49 and 99% success rate, respectively). Also, in a meta-analysis of including

10 randomized controlled studies, Ma et al⁸ found injection to be inferior to surgery in regards of success rate and recurrence rate with relative risks of 0.55 and 21.15, respectively. Some studies did though find lower rates of relapse, but this may be due to shorter time of follow-up and ways of reporting. Relapse rates was higher when comparing those treated with CS injection to those who had either surgical or percutaneous release of the A1 pulley (RR: 19.53, $p < 0.000$).

The results presented in this study may be biased due to lack of identification. Each case of trigger finger is analyzed separately, and we did not record the number of trigger fingers one patient presented. Therefore, patients with multiple trigger fingers may affect the results as they would have more visits to the outpatient clinic and maybe present mild symptoms of recurrence earlier than others. Patients also have the opportunity to receive treatment elsewhere, meaning, they will not be included in our study if the trigger finger recurs. However, if patients had primary treatment at this clinic, they usually receive secondary treatment here as well if needed.

Conclusion

Among cases of trigger finger being treated with CS injection as primary treatment, we found younger age, duration of symptoms greater than 6 months, and occurrence in the third finger to be associated with higher rates of recurrence. Mean time to recurrence was 312 days, and among concurrent diseases, we found that CTS, thyroid, and shoulder diseases were associated with increased risk of recurrence after a CS injection.

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None.

Conflict of interest

None declared.

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