



“EVALUATION OF THE OUTCOME OF CORTICOSTEROID INJECTION IN TRIGGER THUMB OF ADULT PATIENTS”

Orthopaedics

Dr Jayeeta Kalai MS Ortho, Junior Resident, Agartala Government Medical College, Tripura, India

Dr Anupam Debnath* MS Ortho, Assistant Professor, Agartala Government Medical College, Tripura, India
*Corresponding Author

Dr Santosh Reang MS Ortho, Associate Professor, Agartala Government Medical College, Tripura, India

ABSTRACT

Introduction: Stenosing Tenosynovitis, also known as Trigger finger is a very common condition that a hand surgeon encounters. Patients usually present with clicking or locking of a digit most commonly caused by a size mismatch between the first annular pulley and the corresponding flexor tendon sheath. The disadvantage of non-operative treatment being splintage failing in moderate to severe cases, NSAIDS increasing risks of serious cardiovascular, gastrointestinal & kidney problems, so they are usually not recommended as a long-term treatment. Treatment of trigger thumb remain controversial with various modality of treatment. The purpose of this study is to determine the efficacy of corticosteroid injections in trigger thumbs, complications of corticosteroid injections and to find out the proportion of patients needing surgical interventions. **Materials and Methods:** A prospective observational study was done from December 2019 to November 2021 over 42 patients who received intralesional steroid for trigger thumb. 10mg/1ml of Inj. Triamcinolone Acetonide mixed with 0.5ml of 2% Lignocaine hydrochloride was injected by the side of the tendon and its sheath. The outcome of the study was defined using The Green's classification, Numerical Pain Rating Scale and DASH scoring system after the follow up. **Results:** Mean age of presentation was 49.7±8.5 with 34 (81.0%) patients were Female. 2 (4.8%) patients had associated Rheumatoid Arthritis. 5 (11.9%) patients were of Post Ultra Sound Therapy status. 28 (66.67%) patients were given 1 injection, 8 (19.05%) patients 2 injections and 6 (14.28%) patients 3 injections. 34 (80.95%) patients had Favourable Outcome. 1 (2.4%) patient had superficial infection and 2 (4.8%) patients had thinning of skin over injection site. Surgical Release done in 1 (2.4%) patient. 3 (7.1%) patients had Recurrence of triggering. **Conclusion:** Corticosteroid injection therapy leads to favourable outcome with excellent results for Trigger thumb with very minimal complications and no recurrence from Grade 1 & 2. So it should be considered as 1st line treatment in these two stages. Surgical release should only be considered after failure of 3 doses of corticosteroid injection. All patients of Trigger Thumb should be treated with Corticosteroid injection therapy after 6-8 weeks of failure of conservative treatment.

KEYWORDS

Trigger, Thumb, Corticosteroid, Injection.

INTRODUCTION

Stenosing Tenosynovitis, also known as Trigger finger or trigger digit (TD), is a very common condition that a hand surgeon encounters and treats^[1]. Patients usually present with clicking or locking of a digit most commonly caused by a size mismatch between the first annular pulley (A1) and the corresponding flexor tendon sheath^[2]. The French physician Alphonse Notta first described trigger fingers in 1850^[3], resulting in the term “Notta's node”^[4]. Among nondiabetic patients more than 30 years old, the lifetime prevalence of TD has been estimated to be 2.2 %, with middle-aged women most commonly affected^[5]. Patients frequently present with a painful triggering or clicking during active motion of an affected digit.^[6,7] Even though TD is called tenosynovitis, histologic evaluation shows nominal inflammatory changes inside the synovial sheath^[8]. The A1 pulley hypertrophy, produces a size discrepancy between tendon and its sheath^[9,10].

TD likely occurs more frequently in patients with diabetes mellitus, rheumatoid arthritis, carpal tunnel syndrome, Dupuytren's disease, hypothyroidism, mucopolysaccharide storage disorders, amyloidosis, and congestive heart failure^[11,12].

Nonoperative management includes rest, ice therapy, nonsteroidal anti-inflammatory medications, splinting and corticosteroid injections. Some investigators have indicated that splinting may be a reasonable approach only for mild triggering^[5]. The disadvantage of non-operative treatment being splintage failing in moderate to severe cases, NSAIDS increasing risks of serious cardiovascular, gastrointestinal & kidney problems, so they are usually not recommended as a long-term treatment, some cases with cortisone injection therapy may experience a return of symptoms within 6 months.^[13] The injection of long-acting corticosteroid into the flexor tendon sheath is a major treatment option for TD. Advantages include ease of administration, low complication rate, low morbidity, office setting applicability, and low cost^[14]. The exact mode of action of corticosteroids is not yet exactly understood. It is believed that the anti-inflammatory effect might reduce the swelling of the A1 pulley, despite a lack of evidence of inflammatory responses in histologic studies. Surgical treatment includes percutaneous or open A1 pulley release. Surgical release is considered an effective and definitive treatment option, but in comparison with steroid injection, it is associated with

longer recovery time, higher costs^[15], and rates of complications (e.g., nerve injury, flexor tendon bowstringing, tendon scarring) ranging from 11 to 43 %^[16,17]. Treatment of trigger thumb remain controversial with various modality of treatment.

The purpose of this study is to determine the efficacy of corticosteroid injections, in trigger thumbs, complications of corticosteroid injections and to find out the proportion of patients needing surgical interventions with recurrent cases of trigger thumbs. Considering the valuable outcome of trigger thumb when managed by steroid injections and lack of such kind of study in Tripura, this study is undertaken.

MATERIALS & METHODS

A prospective observational study was done from December 2019 to November 2021 (2 years) after getting approval from Institutional Ethical Committee [Ref. No. 4(6-11)-AGMC/Medical Education Unit/Ethics com./2018] over 42 patients (>18 years old) who received intralesional steroid for trigger thumb at Agartala Government Medical College and GB Pant Hospital. Patients presented with post-traumatic trigger thumb, Diabetes Mellitus and other metabolic disorders leading to triggering of the thumb were excluded from the study. Sampling method was census sampling. After history taking and local examination all routine blood investigations (Fasting and Post prandial blood sugar levels, RA Factor, Thyroid Profile, C-reactive protein, Anti-CCP) and X-rays of hand done. 10mg/1ml of Inj. Triamcinolone Acetonide^[18] (steroid) mixed with 0.5ml of 2% Lignocaine hydrochloride. Total volume 1.5ml was injected using a 2cc Syringe 23G needle by the side of the tendon and its sheath at the level of neck of the 1st metacarpal bone, distal to the A1 pulley. 1st follow up was after 20 days of 1st injection, then if required 2nd injection was given and the 2nd follow up was after 20 days of 2nd injection, then if required 3rd injection was given and 3rd follow up was after 20 days of 3rd injection and if even then the outcome is not favourable the patient was advised for surgical intervention. Average follow up was 3 months. The outcome of the study was defined as favourable using The Green's classification^[19] (to grade the severity), Numerical Pain Rating Scale (NRS)^[20] and DASH (Disabilities of Arm, Shoulder and Hand Score) scoring system^[21] after the follow up. Data entry and analysis was performed in computer using SPSS-21 for windows. Data was presented with the help of texts, tables, charts. Significance of

association between outcome variables was done and P-values less than 0.05 was considered statistically significant.



Figure 1a: Clinical case 1



Figure 1b: Injection technique 1



Figure 2a: Clinical Case 2



Figure 2b: Injection technique 2



Figure 3: Surgical Release

RESULTS

In our study mean age of presentation was 49.7 ± 8.5 with majority of patients 20 (47.6%) were in 51-60 years of age group. 34 (81.0%) patients were Female and 8 (19.0%) patients were Male. 5 (11.9%) patients had Bilateral side affected, 3 (7.1%) patients had Left side and 34 (81.0%) patients had Right side affected (majority). 7 (16.7%) patients had associated Trigger fingers along with Trigger thumb. 2 (4.8%) patients had associated Rheumatoid Arthritis. 5 (11.9%) patients were of Post Ultra Sound Therapy status. 7 (16.7%) patients

had Mild Pain, 24 (57.1%) patients had Moderate Pain and 11 (26.2%) patients had Severe Pain during 1st visit. 34 (81.0%) patients had Painful ROM during 1st visit. 19 (45.2%) patients had Restricted Extension of thumb during their 1st visit. 1 (2.4%) patient had Green's Grade 1, 22 (52.4%) patients had Green's Grade 2, 17 (40.5%) patients had Green's Grade 3 and 2 (4.8%) patients had Green's Grade 4 during their 1st visit. 28 (66.67%) patients were given 1 injection, 8 (19.05%) patients were given 2 injections and 6 (14.28%) patients were given 3 injections in the total study period. 34 (80.95%) patients had Favourable Outcome and 8 (19.05%) patients had Unfavourable Outcome. 2 complications were seen, 1 (2.4%) patient had superficial infection and 2 (4.8%) patients had thinning of skin over injection site. 1 (2.4%) patient had Surgical Release. 3 (7.1%) patients had Recurrence of triggering. Mean DASH Score (mean $\pm$ s.d.) of patients was 28.6821 ± 13.0535 during 1st visit. Mean FU1 DASH (mean $\pm$ s.d.) of patients was 16.9948 ± 11.7377 , mean FU2 DASH (mean $\pm$ s.d.) of patients was 10.3069 ± 10.5896 , mean FU3 DASH (mean $\pm$ s.d.) of patients was 4.5340 ± 8.4751 .

Table I: Association between Affected Side and Outcome

OUTCOME			
Affected Side	Favourable	Unfavourable	TOTAL
Bilateral	5	0	5
Row %	100.0	0.0	100.0
Col %	14.7	0.0	11.9
Left	3	0	3
Row %	100.0	0.0	100.0
Col %	8.8	0.0	7.1
Right	26	8	34
Row %	76.5	23.5	100.0
Col %	76.5	100.0	81.0
TOTAL	34	8	42
Row %	81.0	19.0	100.0
Col %	100.0	100.0	100.0

Chi-square value: 2.3253; p-value: 0.3127

Table II: Difference of mean DASH Score: Trigger Grading

	Number	Mean	SD	Minimum	Maximum	Median	p-value
DASH Score	Grade 1	1	6.6700	0.0000	6.6700	6.6700	<0.0001
	Grade 2	22	20.4005	9.6822	5.0000	31.6700	
	Grade 3	17	38.5782	6.4325	26.6700	52.5000	
	Grade 4	2	46.6700	7.0711	41.6700	51.6700	

Table III: Association between Complications: Outcome

OUTCOME			
Complications	Favorable	Unfavorable	TOTAL
Nil	34	5	39
Row %	87.2	12.8	100.0
Col %	100.0	62.5	92.9
Superficial Infections	0	1	1
Row %	0.0	100.0	100.0
Col %	0.0	12.5	2.4
Thinning of skin over injection site	0	2	2
Row %	0.0	100.0	100.0
Col %	0.0	25.0	4.8
TOTAL	34	8	42
Row %	81.0	19.0	100.0
Col %	100.0	100.0	100.0

Chi-square value: 13.7308; p-value: 0.0010

Table IV: Association between Trigger Grading & Recurrence of Triggering

RECURRENCE OF TRIGGERING			
Trigger Grading (Green's)	No	Yes	TOTAL
Grade 1	1	0	1
Row %	100.0	0.0	100.0
Col %	2.6	0.0	2.4

Grade 2	22	0	22
Row %	100.0	0.0	100.0
Col %	56.4	0.0	52.4
Grade 3	15	2	17
Row %	88.2	11.8	100.0
Col %	38.5	66.7	40.5
Grade 4	1	1	2
Row %	50.0	50.0	100.0
Col %	2.6	33.3	4.8
TOTAL	39	3	42
Row %	92.9	7.1	100.0
Col %	100.0	100.0	100.0

Chi-square value: 7.8552; p-value: 0.0491

DISCUSSION

In our study, the most common age was between 51-60 (47.6%) with females most commonly affected (81%) and most commonly affected side being Right side (81%) which are comparable to other studies done by **Notta A et al.**^[9] who found TD in nondiabetic patients more than 30 years old, **Kazuki K et al.**^[21] found mean age 60 years, **Schubert C et al.**^[23] where majority of the cases were female 71.3 % at an average age of 58.3 years.

In our study, 78% patients had significant pain relief after the 1st injection. Outcome was considered as favourable and was statistically significant with p-value = < 0.0001. **Shultz K J et al.**^[24] found significant resolution of triggering with p-value = 0.0347.

28 (66.67%) patients received only a single shot, 8 (19.05%) patients received 2 injections & only 6 (14.28%) patients received 3 injections. The findings are in line with the other studies done by **Peters.Veluthamaningal C et al.**^[9] where they gave 3 injections to all patients. In our study, the favourable outcome is found in 80.95% patients. The mean final DASH score was 4.5±8.47. The results are comparable to other studies by **Dala-Ali et al.**^[19] with 79.7% success rate, **Schubert C et al.**^[23] found 66% success rate. 1 case (2.4%) was found to have superficial infection which was cured with oral antibiotics and regular dressing. 2 cases (4.8%) were found to have thinning of skin over the injection site due to fat atrophy which was cured on its own within 6 months. The association of complications with the outcome was statistically significant with p-value = 0.0010. No serious adverse events such as tendon ruptures or deep skin infections were found in our study. **Ryzewicz M et al.**^[5] found complications are rare but include bowstringing, digital nerve injury, and continued triggering which were less in our study. In our study, surgical release was advised after the failure of corticosteroid injection therapy and 1 (2.4%) patient was operated with surgical release of A1 pulley and did not have any recurrence of triggering and had complete resolution after three months. Other patients refused or were lost after giving consent for the surgical release. **Dardas A Z et al.**^[25] they stated 38% underwent surgical release. In our study, only 2.4% patients needed surgical release, which may be due to good injection technique, timely follow-up or may be even due to less sample size.

In our study, total 3 (7.1%) patients came back to OPD with recurrence of triggering, 2 of whom (66.7%) had Green's grade 3 and 1 patient (33.3%) had Green's grade 4. The association of Green's grading with the recurrence of triggering was statistically significant with p-value = 0.0491.

We found 2 (4.8%) patients were having associated Rheumatoid polyarthritis, one of whom had unfavourable outcome was advised for surgical release but refused surgery. This shows that there is an association of Trigger digits with Rheumatoid arthritis.

5 (11.9%) patients received ultrasound therapy for trigger thumb before injection; 4 patients improved but 1 patient who was also Green's grade 3 had unfavourable outcome and was counselled for surgical release but refused. This shows Steroid injection is better than Ultrasound therapy.

CONCLUSION

In Conclusion, Corticosteroid injection (mixed with 2% injection Lignocaine Hydrochloride) therapy leads to favourable outcome with excellent clinical results for Trigger thumb with very minimal complications and no recurrence from Grade 1 & 2. As there is no recurrence after corticosteroid injection therapy in Green's grade 1 &

2, it should be considered as 1st line treatment in these two stages. Surgical release should only be considered if corticosteroid injection therapy treatment fails even after 3 injection sessions. Therefore, all patients of Trigger Thumb should be treated with Corticosteroid injection therapy after 6-8 weeks of failure of initial conservative treatment irrespective of Triggering stage.

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