A prospective randomized study comparing incision and curettage with injection of triamcinolone acetonide for chronic chalazia

Reza Nabiea,*, Hadi Soleimani b, Leila Nikniazc, Shalaleh Raoufi a, Elmira Hassanpour a, Shokooh Mamaghania, Erfan Bahremania

a Nikookari Eye Center, Tabriz University of Medical Sciences, Tabriz, Iran
b Imam Reza Hospital, Tabriz University of Medical Sciences, Tabriz, Iran
c Faculty of Health and Nutrition, Tabriz University of Medical Sciences, Tabriz, Iran

Received 19 October 2018; revised 5 April 2019; accepted 13 April 2019
Available online 7 May 2019

Abstract

Purpose: To compare outcomes of intralesional triamcinolone acetonide (TA) injection and incision and curettage (I&C) in the treatment of chronic chalazion.

Methods: Patients with chronic chalazion were randomized in two groups. The patients in the TA received an intralesional injection of TA and patients in the I&C underwent I&C. The patients were followed up 3, 7, 14, 21, 28, and 45 days after the procedures. We defined success as 90% regression in the size of the lesion.

Results: There were 26 patients in the TA and 25 patients in the I&C enrolled in this study. Complete resolution was achieved in 16 patients (61.5%) in the TA group and 21 patients (84%) in the I&C (P = 0.072). Sex, initial size, and chalazion location did not influence treatment success in either group (P > 0.05). Lesion recurrence occurred in 9 patients (34.61%) in the TA group and 2 (8%) in the I&C (P = 0.04). The average times to resolution were 8.8 ± 5.6 and 5.1 ± 4.5 days in the first and second groups, respectively (P = 0.03). Drug deposition occurred in 24 (92.3%) patients in the TA group, and ecchymosis occurred in 14 (56%) patients in the I&C (P = 0.004) group. Intraocular pressure (IOP) in the TA group and visual acuity (VA) in both groups remained unchanged.

Conclusions: Both TA injection and I&C modalities are effective in the treatment of chronic chalazia. Advantages of I&C in comparison to TA include less recurrence, shorter duration of complications, and a higher success rate.

Keywords: Chalazion; Triamcinolone; Curettage

Introduction

Chalazion is a common chronic sterile lipogranulomatous mass in the eyelid that is the result of obstruction of the meibomian glands. It could involve one or both sides and any part of the superior or inferior lids in all age groups.1 Chalazia is the most frequent cause of eyelid masses in all ages and is more common in females.2 Chalazion may cause cosmetic disfiguration, local eye symptoms such as irritation and inflammation, and visual symptoms such as refractive errors and amblyopia in children, blurred vision secondary to induced astigmatism or mechanical ptosis, and rarely conjunctivitis or cellulitis.1,3,4

In the acute phase, conservative therapy includes warm compresses and antibiotic or corticosteroid ointments. Previous studies have reported a 25–50% resolution rate for these conservative methods.5–7 Two standard treatment methods for
chalazion are intralesional triamcinolone acetonide (TA) injections and incision and curettage (I&C). The complications of TA injections are local skin depigmentation and atrophy, retinal and choroidal vascular occlusion in rare cases, anterior segment ischemia, and inadvertent penetration of the globe.\textsuperscript{8–10} I&C is a minor procedure performed under local anesthesia or even general anesthesia in children, and it is considered an effective treatment for chalazion. Various results have been reported about success rates, advantages, and disadvantages of the two methods.\textsuperscript{4,10–12} Therefore, we conducted a prospective randomized study to compare the outcomes of the two chalazion treatment methods.

**Methods**

All patients with chronic chalazion that attended the Nikookari Eye Hospital from September 2015 to March 2017 were enrolled in this clinical trial (IRCT201606156033N5). The study was approved by the Ethics Committee of Tabriz University of Medical Sciences (Ref No: 9395). Informed written consent was obtained from the patients or their parents at the beginning of the study. From the literature, it was assumed that a 90% success rate could be obtained using I&C, and a 60% cure rate for the injection was considered feasible. The study was powered at 80% to detect a significant difference between the proportions of successful outcome in the groups with an \( \alpha \) level of 0.05 and \( \beta \) of 0.2. The group size needed to be 25 in each group.

Patients were randomly assigned (double blind randomization) into the two groups: intralesional injection of 4 mg triamcinolone acetonide (Trilon, Sina Darou) (TA) and incision and curettage (I&C). We defined chronic chalazion as masses with a minimum duration of one month that were unresponsive to medical treatment. Exclusion criteria were patients with chalazia that had atypical features, multiple chalazia on one eyelid, concurrent eyelid infection, and history of previous treatment. One surgeon (R.N.) carried out all the injections and surgeries, and other colleague (H.S.) performed follow-up visits.

In the TA, intraocular pressure (IOP) was recorded, and in both groups, visual acuity (VA), chalazion size (by ruler), duration and location, occurrence and time to resolution of complications (drug deposition and ecchymosis), sex and age distributions, lesion recurrence, success rate (more than 90% lesion size regression), and time to resolution were recorded. All patients followed up for at least 45 days, and regular visits were scheduled on days 1, 3, 7, 14, 21, 28, and 45. When available, the patients followed up for a longer duration.

Lesions were categorized into two groups based on the location of the chalazia on the upper or lower eyelids. Each of these two groups was further classified into three subgroups: medial, middle, and lateral one-third. The chalazia were divided into two groups from the size standpoint: large (\( \geq 8 \) mm) and small (\(< 8 \) mm). Successful treatment was defined as at least a 90% reduction in the size of a lesion without any recurrence after the first procedure of each method. Incomplete resolution (less than 90% lesion size regression) or recurrences were considered treatment failures. Lesions with incomplete resolution or lesions that recurred after complete resolution in each group were dealt with using two methods. If the chalazion size was equal or more than 5 mm, the patient underwent the TA injection, and the smaller lesions were treated with conservative therapy.

In the TA group, after topical anesthesia with eye drops (tetracaine), an intralesional injection of 0.1 ml TA with a concentration of 40 mg/ml was done transcutaneously by using a 27-gauge needle. In the I&C group, after local anesthesia of the eyelid by injecting 1 ml of lidocaine 2% performed in an outpatient surgery room and under sterile conditions, the eyelid was everted using a chalazion clamp, and a vertical incision was made over the lesion. After careful curettage, the clamp was opened, corticosteroid and antibiotic ointments were applied, and the eye was bandaged for 24 h.

Normal distribution of data was analyzed by Kolmogorov-Smirnov test. Independent samples \( t \)-test was used to analyze data with normal distribution, and non-normal distributed data were analyzed by Mann-Whitney. Qualitative variables were analyzed using chi-squared test (by method Monte Carlo), and the two groups were compared by independent samples \( t \)-test. A \( P \)-value of \(< 0.05 \) was considered statistically significant.

Statistical analysis was performed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) Version 17 (IBM).

**Results**

Of 82 patients assessed for eligibility, 17 patients were excluded. Eight of these patients had not met inclusion criteria, 5 refused to take part in the study, and 4 were excluded because of involvement of both eyelids. The remaining 65 patients were allocated into two groups (32 in TA and 33 in I&C). Six patients in TA and 8 in I&C were missed to follow-up. Twenty-six patients in TA and 25 in I&C were analyzed.

In total, 51 patients (13 male and 38 female) with chronic chalazia were enrolled in this study (Table 1). The TA group included 26 patients (8 male and 18 female), and the I&C group included 25 patients (5 male and 20 female). There was not any statistically significant difference between sex distributions in the two groups (\( P = 0.28 \)), and there was not a

| Table 1 Pre-operation demographic data of the patients. | Group 1 (TA) | Group 2 (I&C) | \( P \)-value |
|---|---|---|---|
| Number | 26 | 25 | --- |
| Age (year) (mean \( \pm SD \)) | 25.5 \( \pm 9.1 \) | 29.6 \( \pm 16.6 \) | 0.27 |
| Gender N (percent) | | | --- |
| Male | 8 (30.7) | 5 (20) | 0.28 |
| Female | 18 (69.3) | 20 (80) | --- |
| Size (mean \( \pm SD \)) | 7.6 \( \pm 1.8 \) | 8.2 \( \pm 2.07 \) | 0.44 |
| Duration (month) (mean \( \pm SD \)) | 5.8 \( \pm 4.6 \) | 4.3 \( \pm 3.2 \) | 0.18 |

TA: Intralesional triamcinolone acetonide.
I&C: Incision and curettage.
SD: Standard deviation.
correlation between sex and success rate in either the first 
\( (P = 0.23) \) or second \( (P = 0.57) \) group. Patients were between 
14 and 64 years of age with a mean age of 25.5 ± 9.1 in the TA 
group and 29.6 ± 16.6 in the I&C group. The difference be- 
tween age distributions in the two groups was not significant 
\( (P = 0.27) \). Success rates were 61.5\% (16 patients) and 84\% 
(21 patients) in Groups 1 and 2, respectively, which was not 
statistically significant \( (P = 0.072) \). Three patients, including 
one patient (3.85\%) in the TA group and 2 patients (8\%) in the 
I&C group had incomplete resolutions \( (P > 0.05) \). Recurrence 
was observed in 11 patients, including 9 patients (34.61\%) in 
the TA group and two patients (8\%) in the I&C group, and the 
difference was significant \( (P = 0.04) \) (Table 2).

Amongst 10 failed treatments in the TA group, the size of 
the lesions was less than 4 mm in 2 patients and equal to or 
more than 5 mm in 8 patients. In small lesions (≤5 mm), 
conservative treatment was used, and in larger lesions 
(≥5 mm), TA injections were performed. All 10 patients 
responded to treatment. In the I&C group, in all failed treat- 
ments (4 patients), the size of the lesions was ≤4 mm, and 
these were cured by conservative treatment.

The initial sizes of chalazia were between 5 and 16 mm, 
with a mean of 7.9 mm. The mean initial size of chalazia for 
the first and second groups was 7.6 ± 1.8 mm and 
8.2 ± 2.07 mm, respectively (\( t = 0.7, P = 0.44 \)). In the first 
group, there were 13 large (≥8 mm) and 13 small (<8 mm) 
lesions, and I&C was comprised of 17 large and 8 small le- 
sions. However, there was not any statistically significant 
difference between the chalazion size and treatment success 
rates in the first \( (P = 0.23) \) and second groups \( (P = 0.57) \).

The mean duration of chalazia was 5.8 ± 4.6 and 4.3 ± 3.2 
months in Groups 1 and 2, respectively \( (P = 0.18) \).

Lesions were assorted into 6 groups based on the location 
of chalazia on the eyelid. Chalazia location distribution in the 
two groups did not have significant differences \( (P = 0.64) \).

Chalazia location had no significant effect on the success rate 
\( (P = 0.25 \) and \( P = 0.2 \) in TA and I&C, respectively). The 
mean patient follow-up duration in the TA group was 
3.73 ± 1.3 months and 2.8 ± 0.6 months in the I&C group. It 
was significantly higher in the TA \( (P = 0.003) \).

VA without any changes was 10/10 in all patients before 
and after the two procedures.

IOP was measured before the injection and in follow-up 
visits. The mean IOP before injection of TA and on the 45th 
day were 13.69 ± 1.93 mmHg and 13.15 ± 1.80 mmHg, 
respectively \( (P < 1) \).

The average time to resolution was 8.8 ± 5.6 days for the 
TA group and 5.1 ± 4.5 days for the I&C group, which was 
statistically significant \( (P = 0.03) \).

The only complications of this study were drug deposition 
in the TA group and ecchymosis in the I&C group. Deposition 
was observed in 24 patients (92.3\%) in the TA group, and 
ecchymosis happened in 14 patients (56\%) in the I&C group. 
The complication rate in the TA group was statistically sig- 
nificant \( (P = 0.004) \). The mean duration of the deposits in the 
TA group was 17.6 ± 13.8 days, and the mean duration of 
cechymosis in the I&C group was 4.9 ± 3.1 days \( (P < 0.001, 
t = 3.36) \).

**Discussion**

In our study, it was shown that both intraleisonal TA in- 
jection and I&C were effective treatment modalities for 
chronic chalazia with success rates of 61.5\% and 84\%, 
respectively, which were not statistically significant. However, 
the success rate of I&C was clinically higher than that of TA 
injection. Previous studies reported 50–95\% success rates for steroid injections.\( ^{3,6} \) Ben Simon and colleagues' studies showed 
intraleisonal TA injection was as effective as I&C in primary 
chalazia.\( ^{4,11} \) Goawalla and Lee suggested that a single TA 
injection followed by eyelid massage is almost as effective as 
I&C in treatment of chalazia with similar patient satisfac- 
tion and less pain and patient inconvenience.\( ^{10} \) Other studies re- 
ported higher rates of resolution after one to three steroid in- 
jections regardless of the duration and consistency of the 
lesion.\( ^{6,10,11} \) The results of a study by Dhaliwal and Bhatia 
showed that I&C is a good therapeutic choice for all chalazia 
and that it could be replaced by TA injection when I&C is 
refused and in difficult lesions, such as lesions near the 
canalicular system and lid margin.\( ^{12} \) Moreover, it can be useful 
in children, particularly those with mental disability.\( ^{13} \)

Khrana et al. reported that intraleisonal steroid injection in 
small, multiple, and marginal chalazia is equally effective as 
I&C while large lesions had better responses to I&C.\( ^{14} \) Dha- 
ilwal and Bhatia showed a correlation between histologic 
analysis of the lesion and treatment outcome after intraleisonal 
TA injection or I&C. Based on this study, older patients, large 
lesions, and lesions of longer duration that were more likely to 
be the suppurating granulomas histologic type responded 
better to I&C. In their study, mixed-cell granulomas had equal 
responses to the both therapeutic methods.\( ^{12} \)

Unlike previous studies, in our study there was not any 
correlation between the mean size and duration of chalazia 
with success rates in both groups.\( ^{3,12} \) Our results showed that 
the recurrence rate in the TA group (34.61\%) was significantly 
higher than the I&C group (8\%). In addition, recovery time 
was longer in the TA group. In previous studies, recurrence 
ocurred in 4.5−17\% of cases after intraleisonal injection of 
5 mg/ml triamcinolone. In another study, recurrence of 3\% 
was reported after successful I&C.\( ^{4,11−15} \)

| Table 2 | Post-operation data of the patients. |
|-----------------|-----------------|-----------------|
|                | Group 1 (TA)    | Group 2 (I&C)   | \( P \)-value |
| Time to resolution (days) (mean ± SD) | 8.8 ± 5.6 | 5.1 ± 4.5 | 0.03 |
| Incomplete resolution N (percent) | 1 (3.85\%) | 2 (8\%) | >0.05 |
| Recurrence N (percent) | 11 (34.61\%) | 2 (8\%) | 0.04 |
| Overall success N (percent) | 16 (61.5\%) | 21 (84\%) | 0.07 |
| Follow-up (month) (mean ± SD) | 3.73 ± 1.3 | 2.8 ± 0.8 | 0.003 |

| TA: Intralesional triamcinolone acetonide. |
| I&C: Incision and curettage. |
| SD: Standard deviation. |
Topical and subconjunctival corticosteroids may cause increased IOP or skin depigmentation. To reduce risk of this complication, researchers used various concentrations of TA. Indeed, even with a lower concentration of injected TA (5 mg/ml), the effectiveness of this method has been reported. Kim et al. used various concentrations of TA injections and found no significant difference in success rates. We encountered no IOP rise or skin depigmentation after TA injection. With increasing concentration of TA, the risk of drug deposition may have increased. Goawalla used 0.2 ml with a concentration of 10 mg/ml and did not report any adverse effects such as skin depigmentation or depositions. Factors like race and the color of skin may influence deposition. We encountered a higher rate of deposition (92%). We speculated that despite careful intraleisional injection of TA, sometimes a small amount of TA may be leaked out of the lesion. In addition, TA deposition in the TA group took a longer time to resolve than ecchymosis in the second group; therefore, to get a faster response, I&C is a better option.

In the TA group, 8 of the patients who failed to resolve after first injection of TA, responded completely to the second injection. Our study design was to compare the response after one injection. If we compared the success after the second injection, the result would have been completely different.

Our study had some limitations. The main one was small numbers of patients. We used a ruler to measure the size of the lesion. Although we did it carefully and reliably, it may be preferable to estimate the size by digital photography. Furthermore, our follow-up time was short. In a longer time, some cases of depigmentation might have occurred.

In conclusion, both TA injection and I&C modalities are effective in chronic chalazia treatment. Advantages of I&C in comparison to TA include less recurrence, shorter duration of complications, and higher success rates with less time to resolution.

References
1. Bagheri A, Hasani HR, Karimian F. Effects of chalazion on refractive error and corneal topography. *Bina J Ophthalmol*. 2007;12(4):504–510.
2. Bagheri A, Tavakoli M, Saloor H, et al. Epidemiology of eyelid skin masses over a 10-year period at Labbafinejad Medical Center. *Bina J Ophthalmol*. 2013;18(3):257–264.
3. Unal N. Chalazion treatment. *Orbit*. 2008;27(6):397–398.
4. Ben Simon GJ, Rosen N, Rosner M, Spierrer A. Intraleisional triamcinolone acetonide injection versus incision and curettage for primary chalazia: a prospective, randomized study. *Am J Ophthalmol*. 2011;151(4):714–718.
5. Yagi A, Palamar M, Egrilmez S, Sabbazov C, Ozbek SS. Anterior segment ischemia and retinochoroidal vascular occlusion after intraleisional steroid injection. *Ophthal Plast Reconstr Surg*. 2008;24(1):55–57.
6. Aycinena AR, Achiron A, Paul M, Burgansky-Eliash Z. Incision and curettage versus steroid injection for the treatment of chalazia: a meta-analysis. *Ophthalmic Plast Reconstr Surg*. 2016;32(3):220–224.
7. Wong MY, Yau GS, Lee JW, Yuen CY. Intraleisional triamcinolone acetonide injection for the treatment of primary chalazions. *Int Ophthalmol*. 2014;34(5):1049–1053.
8. Hoşal BM, Zilelioğlu G. Ocular complication of intraleisional corticosteroid injection of a chalazion. *Eur J Ophthalmol*. 2003;13(9-10):798–799.
9. Park J, Chang M. Eyelid fat atrophy and depigmentation after an intraleisional injection of triamcinolone acetonide to treat chalazion. *J Craniofac Surg*. 2017;28(3):198–199.
10. Goawalla A, Lee V. A prospective randomized treatment study comparing three treatment options for chalazia: triamcinolone acetonide injections, incision and curettage and treatment with hot compresses. *Clin Exp Ophthalmol*. 2007;35(8):706–712.
11. Ben Simon GJ, Huang L, Nakra T, Schworm RA, McCann JD, Goldberg RA. Intraleisional triamcinolone acetonide injection for primary and recurrent chalazia: is it really effective? *Ophthalmology*. 2005;112(5):913–917.
12. Dhiwlai U, Bhata A. A Rationale for therapeutic decision-making in chalazia. *Orbit*. 2005;24(4):227–230.
13. Mustafa TA, Oriafage IH. Three methods of treatment of chalazia in children. *Saudi Med J*. 2001;22(11):968–972.
14. Khurana AK, Ahluwalia BK, Rajan C. Chalazion Therapy. Intraleisional steroids versus incision and curettage. *Acta Ophthalmol*. 1988;66(3):352–354.
15. Kim E, Yu S, Jeong B, Lee K, Mun H. The Effects of intraleisional steroid injection for chalazion according to the concentrations of triamcinolone acetonide. *J Korean Ophthalmol Soc*. 2013;54(3):396–400.
16. Lee YJ, Park CY, Woo KI. Ocular hypertensive response to topical dexamethasone ointment in children. *Kor J Ophthalmol*. 2006;20(3):166–170.