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# Subcutaneous extralesional triamcinolone acetonide injection versus conservative management in the treatment of chalazion

## 皮下注射曲安奈德與保守治療方式治療胞生痰核

**Objective.** To compare the efficacy of subcutaneous extralesional triamcinolone acetonide injection versus conservative treatment for chalazion.

**Design.** Randomised controlled trial.

**Setting.** Eye clinics of two regional hospitals in Hong Kong.

**Patients.** Patients over 18 years old presenting with primary chalazion were randomised into two groups. In group 1, 12 patients were treated with lid hygiene, warm compresses, and chloramphenicol 1% ointment 4 times a day. In group 2, 16 patients were treated with 0.3 mL triamcinolone acetonide (10 mg/mL) injection to the subcutaneous tissue extralesionally via the percutaneous route. Exclusion criteria were: acutely infected chalazion with preseptal cellulitis, recurrent chalazion, small chalazion ( $\leq 2$  mm), and prior treatment to chalazion.

**Main outcome measures.** Size of chalazion, recurrence of chalazion, intraocular pressure, and complications from treatment, including skin pigmentary change or atrophy and pyogenic granuloma.

**Results.** There was a clinically and statistically significant difference between the success rates in group 1 (58.3%) and group 2 (93.8%). In group 1, the mean prior duration of chalazion before treatment was significantly shorter in success cases than in failed cases. One patient with multiple chalazia in group 2 developed hypopigmentary skin changes at one treatment site.

**Conclusion.** Subcutaneous extralesional triamcinolone acetonide injection was more effective than conservative treatment for chalazion.

**目的：**比較皮下注射曲安奈德與保守治療方式，治療胞生痰核的效果。

**設計：**隨機對照試驗。

**安排：**香港兩間地區醫院的眼科診所。

**患者：**18歲以上出現原發性胞生痰核的病人被隨機分為兩組。第一組的12名病人以清潔眼瞼、暖敷布和每日四次塗含有1%氯黴素的藥膏治療胞生痰核。第二組的16名病人則以經皮方式，在患處及以外的皮下組織注射0.3毫升曲安奈德（每毫升含量10毫克）。如病人有出現眼瞼板前蜂窩組織炎的急性感染胞生痰核、復發性胞生痰核、胞生痰核過小（等於或少於2毫米）和以前已接受過胞生痰核治療的病人，則被剔除為研究對象。

**主要結果測量：**胞生痰核體積、復發性況、眼內壓、治療引起併發症如皮膚色素改變、皮膚萎縮、出現化膿性肉芽腫等。

**結果：**兩組病人臨床和統計上的治愈率有明顯分別（第一組58.3%；第二組93.8%）。第一組病人中，成功治療的病人其胞生痰核生存的時間，平均短於治療失敗的病人。一名長有多粒胞生痰核的第二組別病人，其中一個治療位置出現皮下色素轉變。

**結論：**皮下注射曲安奈德方法比保守治療方式更有效治療胞生痰核。

### Introduction

Hordeolum internum (without cellulitis) is an acute purulent inflammation of the meibomian glands in the tarsal plate of the eyelids, which presents clinically as a deep, tender, warm erythematous lesion. Histologically, polymorphonuclear leukocytes, oedema, and vascular congestion are centred around meibomian

#### Key words:

Chalazion;  
Injections, subcutaneous;  
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#### 關鍵詞：

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glands. Chalazion is a hard, painless nodule of an eyelid caused by chronic inflammation of meibomian glands. Histologically, a zonal lipogranulomatous inflammation is centred around spaces previously filled with lipid, but dissolved during tissue processing. Polymorphonuclear leukocytes, plasma cells, lymphocytes, and multinucleated giant cells can be found in the lesion.<sup>1</sup> Conservative management using lid hygiene, warm compresses, and topical antibiotics has been reported to have a success rate of up to 80%,<sup>2-4</sup> compared with 93% after intralesional corticosteroid injection.<sup>2,5-9</sup> Intralesional steroid injection can be painful, whereas subcutaneous injection of triamcinolone acetonide suspension into the looser extralesional tissue may cause less pain. Leinfelder<sup>10</sup> reported using subconjunctival injection of methylprednisolone acetate to treat acute chalazion. Ho and Lai<sup>11</sup> reported complete subsidence in 89.6% of lesions after subcutaneous injection.

This randomised controlled study aimed at comparing the efficacy and safety of treating chalazion by subcutaneous extralesional triamcinolone acetonide injection via the percutaneous route versus conservative management (involving warm compresses, lid hygiene, and chloramphenicol eye ointment).

## Methods

Patients older than 18 years with a primary chalazion or multiple chalazia, who attended eye clinics of the United Christian Hospital and Tseung Kwan O Hospital between July 2003 and February 2005 inclusive were recruited into this intention-to-treat study. Approval from the Ethics Committees of both hospitals was obtained and all patients were asked to provide written informed consent.

Exclusion criteria were: (1) acutely infected chalazion with preseptal cellulitis, (2) prior treatment to the chalazion, (3) recurrent chalazion, (4) any small chalazion ( $\leq 2$  mm), and (5) a history of steroid-induced elevated intra-ocular pressure (IOP).

Duration since onset, size, and location of the chalazia were documented. If a patient had multiple chalazia, only one lesion was randomly included into this study. The IOP was measured using an applanation tonometer. Patients were randomised into two groups, but the allocation result was not masked for the surgeon carrying out relevant measurements. Group 1 patients were treated conservatively with warm compresses using a warm towel for 10 minutes 4 times a day, cleansing of the eyelid margin with cotton tip sticks soaked with warm, boiled water 4 times a day, and topical chloramphenicol 1% ointment 4 times a day. Group 2 patients were given 0.3 mL Kenacort-A (triamcinolone acetonide) suspension (10 mg/mL) into the subcutaneous tissue within the orbicularis oculi over the chalazion via the percutaneous route, using a 1 mL tuberculin syringe with a 25-gauge needle. The same surgeon gave all triamcinolone injections.

**Table 1. Patient characteristics of groups 1 and 2**

Characteristic	Group 1, n=12	Group 2, n=16	P value
Sex (male:female)	4:8	7:9	0.71*
Mean age (SD) [years]	38 (17)	39 (17)	0.91†
Mean prior duration of chalazion (SD) [weeks]	4.6 (4.3)	8.8 (9.9)	0.20†
Mean initial size of chalazion before treatment (SD) [mm]	6.0 (3.6)	6.1 (2.1)	0.34†
Mean intra-ocular pressure before treatment (SD) [mm Hg]	12.5 (3.4)	12.7 (2.5)	0.78†
Distribution			
Right upper lid	6 (50.0%)	4 (25.0%)	-
Right lower lid	1 (8.3%)	3 (18.8%)	-
Left upper lid	2 (16.7%)	5 (31.3%)	-
Left lower lid	3 (25.0%)	4 (25.0%)	-

\* Fisher's exact test

† Mann-Whitney *U* Test

Patients were followed up 2 and 4 weeks later and the IOP was measured. The size of the chalazia, complications, and compliance to the conservative treatment were recorded. In group 2, if the size of the chalazion remained greater than half of its original size based on its estimated diameter at the 2-week follow-up, another subcutaneous triamcinolone injection 0.3 mL was repeated. If the chalazion resolved, the patient would be seen again 4 weeks later for recurrence. In either group, if the chalazion persisted 4 weeks after treatment, surgical incision and curettage was to be performed unless the patient declined and opted for further triamcinolone injection or conservative management.

The main outcome measures were: the size of each chalazion, recurrence (reappearance of a chalazion at the same site less than 4 weeks after resolution), IOP, and complications including skin pigmentary change or atrophy and pyogenic granuloma. Successful resolution of a chalazion was defined as a decrease in size to 2 mm or smaller within 4 weeks of initiating treatment. For defaulting patients, telephone enquiry was made as to resolution of the chalazion and presence of any skin changes.

Fisher's exact test was used for analysing the association between nominal data. The non-parametric Mann-Whitney *U* test was used to detect the significance of ordinal data between the two groups. The non-parametric Wilcoxon's signed rank test was used for detecting difference between paired IOP data within the same group. Linear regression was used to control for potential confounders of initial chalazion size, prior duration before treatment, and patient age.

## Results

Twelve (4 male, 8 female; mean age, 38 years; standard deviation [SD], 17 years) and 16 (7 male, 9 female; mean age, 39 years; SD, 17 years) patients were recruited into groups 1 and 2, respectively. One patient in group 2 had three chalazia: at the right upper lid, right lower lid, and

**Table 2. Characteristics of patients with resolution of chalazion**

	Group 1, n=7	Group 2, n=15	P value
Sex (male:female)	3:4	7:8	1.00*
Mean age (SD) [years]	40 (17)	39 (18)	0.73 <sup>†</sup>
Mean initial size of chalazion before treatment (SD) [mm]	5.2 (2.8)	6.5 (2.0)	0.25 <sup>†</sup>
Mean period for resolution of chalazion (SD) [weeks]	2.3 (0.8)	2.5 (0.9)	0.53 <sup>†</sup>

\* Fisher's exact test

<sup>†</sup> Mann-Whitney *U* test

left upper lid, and only the right lower lid chalazion was included for study. The mean prior duration of the chalazia before treatment in group 1 was 4.6 (SD, 4.3) weeks and in group 2 was 8.8 (SD, 9.9) weeks ( $P=0.20$ , Mann-Whitney *U* test). The mean initial size of the chalazia was 6.0 (SD, 3.6) mm in group 1 and 6.1 (SD, 2.1) mm in group 2 ( $P=0.34$ , Mann-Whitney *U* test). The demographic characteristics of the two groups are summarised in Table 1. Five patients in group 1 and three in group 2 defaulted follow-up. These patients were contacted by telephone and reported complete resolution of chalazia. The success rate in group 1 was 58% (7/12 chalazia) and in group 2 it was 94% (15/16 chalazia);  $P=0.036$ , Fisher's exact test. No second triamcinolone injection was required for the 17 successfully treated chalazia in group 2. In the remaining patient, unsuccessful treatment after the first injection was followed by two repeat injections at 2 and 7 weeks, but the chalazion persisted and required incision and curettage. No recurrence was reported in either group.

Table 2 compares the characteristics of patients in both groups for those in whom the chalazia resolved. In group 1, the mean prior duration of the chalazion for successfully treated lesions was 2.3 (SD, 2.8) weeks and for failed lesions was 7.8 (SD, 4.3) weeks; this difference was statistically and clinically significant ( $P=0.01$ , Mann-Whitney *U* test; Table 3). In group 2, the corresponding figures were 9.1 (SD, 10.1) weeks and 4.0 (SD, 0) weeks;  $P=0.82$ .

Two patients did not comply with the conservative management regimen. One did not use warm compresses but the chalazion resolved. The other, applied warm compresses and chloramphenicol ointment only once daily. The chalazion did not resolve and was subsequently treated by incision and curettage.

The mean IOP before treatment in groups 1 and 2 were 12.5 (SD, 3.4) mm Hg and 12.7 (SD, 2.5) mm Hg, respectively ( $P=0.78$ , Mann-Whitney *U* test); the mean IOP at 2 weeks after treatment were 11.9 (SD, 1.7) mm Hg and 13.4 (SD, 3.3) mm Hg, respectively. No difference in IOP before and after treatment was found in either group (in group 1:  $P=0.67$  at 2 weeks,  $P=0.28$  at 4 weeks; in group 2:

**Table 3. Prior duration of chalazion versus success and failure of treatment**

	Mean prior duration of chalazia (SD) [weeks]		P value*
	Success cases	Failed cases	
Group 1	2.3 (2.8)	7.8 (4.3)	0.01
Group 2	9.1 (10.1)	4.0 (0)	0.82

\* Mann-Whitney *U* test

$P=0.12$  at 2 weeks,  $P=1.00$  at 4 weeks; Wilcoxon's signed rank test).

One 30-year-old woman (with three chalazia) developed hypopigmentary skin changes at one injection site. In both groups, no granuloma appeared after treatment was started. No patient perceived severe pain during triamcinolone injection.

Using linear regression to control for potential confounders; neither initial chalazion size, prior duration of the chalazion, or patient age were found to be significant ( $P=0.54$ , 0.96, and 0.79 respectively).

## Discussion

Conservative treatment including lid hygiene, warm compresses, and topical antibiotics have been used widely. However, results can be unsatisfactory as patients may not be able to apply warm compresses during work. Our study showed that subcutaneous triamcinolone injection around the chalazion was more effective than conservative treatment. Local corticosteroid injections work as a depot. This is especially useful when poor compliance to conservative management is anticipated and provides an alternative to undergoing surgical incision and curettage.

The prior duration of chalazion was reported to be unrelated to the effectiveness of intralesional triamcinolone,<sup>8</sup> which was confirmed in the present study. Nonetheless, the duration of chalazia that resolved with conservative treatment was significantly shorter than those that did not ( $P=0.014$ ). Conservative management may not be effective in treating chalazia of long duration.

Several uncommon side-effects of local corticosteroid injection have been reported: yellow deposits at the site of injection,<sup>5</sup> depigmentation of the eyelid,<sup>12</sup> microembolisation causing retinal and choroidal vascular occlusion and appearance of granuloma.<sup>4</sup> In our study, one patient (6.3% of chalazia treated with triamcinolone injection) who had three chalazia developed skin hypopigmentary change at a right lower lid injection site. It is difficult to predict who will have skin changes as they vary even in the same patient. Previous studies<sup>5,12</sup> reported skin changes in black patients. Our patient was a Chinese with fair skin

colour. Inhalational and nasal corticosteroids have been associated with increase in IOP.<sup>13</sup> In our study, no change in IOP was encountered before and after extralesional triamcinolone injection, which is consistent with prior studies.<sup>6,8</sup>

In this study, possible errors in measuring sizes of chalazia could have occurred. Oedema of soft tissues overlying a lesion could misleadingly increase its externally measured size. Besides, conservative treatment by warm compresses could also increase local tissue oedema and affect measurements. Moreover, telephone interview of defaulted patients about resolution of chalazia was not an objective method of determining success and complications from treatment. The number of enrolled patients was small, so a larger study to confirm the effectiveness of intralesional triamcinolone in treating chalazion is required.

Although intralesional corticosteroid injection is effective in treating chalazia, it can be painful. A high pressure is built up within the wall of the lesion and injection can be difficult to perform due to high resistance. Injection of triamcinolone into loosely packed subcutaneous tissue appears to cause less pain and therefore no local anaesthetic is needed. Extralesional triamcinolone injection is more effective than conservative treatment; the former is a simple and fast procedure and can be considered an alternative first-line treatment for chalazion.

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