

Interventions for acute internal hordeolum (Review)

Lindsley K, Nichols JJ, Dickersin K



**THE COCHRANE
COLLABORATION®**

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2010, Issue 9

<http://www.thecochranelibrary.com>



Interventions for acute internal hordeolum (Review)

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	2
OBJECTIVES	3
METHODS	3
RESULTS	6
DISCUSSION	6
AUTHORS' CONCLUSIONS	7
ACKNOWLEDGEMENTS	7
REFERENCES	7
CHARACTERISTICS OF STUDIES	9
DATA AND ANALYSES	12
APPENDICES	12
HISTORY	14
CONTRIBUTIONS OF AUTHORS	14
DECLARATIONS OF INTEREST	15
SOURCES OF SUPPORT	15
INDEX TERMS	15

[Intervention Review]

Interventions for acute internal hordeolum

Kristina Lindsley¹, Jason J Nichols², Kay Dickersin³

¹Center for Clinical Trials, Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, USA. ²The Ohio State University, Columbus, OH, USA. ³Center for Clinical Trials and US Cochrane Center, Johns Hopkins University, Baltimore, MD, USA

Contact address: Kristina Lindsley, Center for Clinical Trials, Johns Hopkins University Bloomberg School of Public Health, 615 North Wolfe Street, W5010, Baltimore, Maryland, 21205, USA. klindsle@jhsph.edu.

Editorial group: Cochrane Eyes and Vision Group.

Publication status and date: New, published in Issue 9, 2010.

Review content assessed as up-to-date: 20 June 2010.

Citation: Lindsley K, Nichols JJ, Dickersin K. Interventions for acute internal hordeolum. *Cochrane Database of Systematic Reviews* 2010, Issue 9. Art. No.: CD007742. DOI: 10.1002/14651858.CD007742.pub2.

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Hordeolum is a common, painful, inflammation of the eyelid margin that is usually caused by bacterial infection. The infection affects oil glands of the eyelid and can be internal or external. In many cases, the lesion drains spontaneously and resolves untreated; however, the inflammation can spread to other ocular glands or tissues and recurrences are common. If unresolved, acute internal hordeolum can become chronic or develop into a chalazion. External hordeola, also known as styes, were not included in the scope of this review.

Objectives

The objective of this review was to investigate the effectiveness and safety of non-surgical treatments for acute internal hordeolum compared to observation or placebo.

Search methods

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (which contains the Cochrane Eyes and Vision Group Trials Register) (*The Cochrane Library* 2010, Issue 6), MEDLINE (January 1950 to June 2010), EMBASE (January 1980 to June 2010), Latin American and Caribbean Literature on Health Sciences (LILACS) (January 1982 to June 2010), the *meta*Register of Controlled Trials (*mRCT*) (www.controlled-trials.com), ClinicalTrials.gov (<http://clinicaltrials.gov>) and the WHO International Clinical Trials Registry Platform (ICTRP). There were no language or date restrictions in the search for trials. The electronic databases were last searched on 21 June 2010.

Selection criteria

The selection criteria for this review included randomized or quasi-randomized clinical trials of patients diagnosed with acute internal hordeolum. Studies of patients with external hordeolum (stye), chronic hordeolum or chalazion were excluded. Non-surgical interventions of interest included the use of hot or warm compresses, lid scrubs, antibiotics, or steroids compared to observation, placebo, or other active interventions.

Data collection and analysis

Two review authors independently assessed the references identified by the electronic searches for inclusion in this review. No relevant studies were found. The reasons for exclusion were documented.

Interventions for acute internal hordeolum (Review)

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

1

Main results

There were no trials identified for inclusion in this review. The majority of the references identified from our search reported on external hordeola or chronic internal hordeola. The few references specific to acute internal hordeolum reported mostly recommendations for treatment or were reports of interventional case series, case studies, or other types of observational study designs and were published over 20 years ago.

Authors' conclusions

We did not find any evidence for or against the effectiveness of non-surgical interventions for the treatment of hordeolum. Controlled clinical trials would be useful in determining which interventions are effective for the treatment of acute internal hordeolum.

PLAIN LANGUAGE SUMMARY

Interventions for acute internal hordeolum

Hordeolum is a common, painful, inflammation of the eyelid margin that is usually caused by a bacterial infection. The infection affects the oil glands within the eyelid and can be internal or external. In many cases, the inflamed lesion drains spontaneously and resolves untreated; however, the infection can spread to other ocular glands or tissues and recurrences are common. If unresolved, acute internal hordeolum can become chronic or develop into a chalazion (cyst). External hordeola are known more commonly as styes and were not included in the scope of this review. It is common practice to use one or several interventions for the treatment of hordeolum, including warm compresses applied at home, topical medications and lid scrubs available over-the-counter, antibiotics or steroids, lid massages, and others. There were no trials identified for inclusion in this review, thus no evidence for or against the effectiveness of non-surgical interventions for the treatment of hordeolum was found. Controlled clinical trials would be useful in determining which interventions are effective for the treatment of acute internal hordeolum.

BACKGROUND

Description of the condition

Hordeolum is a common inflammation of the eyelid margin. It presents as a red, painful, swollen furuncle with an acute onset and is usually caused by a staphylococcal infection (Mueller 2008; Peralejo 2008; Skopin 2002). The infection can be internal, affecting the meibomian glands, or external, affecting the glands of Zeis or Moll (Wald 2004). External hordeola are known more commonly as styes. In many cases, the lesion drains spontaneously and resolves untreated; however, the infection can spread to other ocular glands or tissues and recurrences are common. If unresolved, acute internal hordeolum can become chronic or develop into a chalazion. (De Jesus 2004; Hudson 1981; Mueller 2008; Rubin 1995).

As hordeolum is one of the most common diseases of the eye, many people can be affected and there are many causative factors related to the disease. Incidence rates for hordeolum are not available because most cases are not reported. Hordeola tend to occur in younger people, but are not limited to any age, gender, or

racial group (Fuchs 1911; Lederman 1999; Roodyn 1954). Onset is spontaneous and may be related to lid hygiene, an underlying condition, or a systemic infection (Mathew 1966; Wald 2004). Studies have shown that patients with internal hordeolum tend to be nasal carriers for staphylococci as well (Copeman 1958; Roodyn 1954). Typically, the size of the swelling is a direct indicator of the severity of the infection (Lebensohn 1950). Internal hordeolum tends to be more painful and longer lasting than external hordeolum (Barza 1983; Fuchs 1911; Olson 1991; Wilkie 1956). Cases of recurrent hordeolum are usually the result of a failure to eliminate bacteria completely rather than from new infections (Roodyn 1954). Blepharitis (Fuchs 1911; Skopin 2002), acne rosacea (De Jesus 2004), trichiasis and cicatricial ectropion (Moriarty 1982) are conditions frequently associated with internal hordeolum. Since most cases of internal hordeolum resolve on their own, people with hordeolum often do not seek professional medical treatment (Olson 1991). Home therapies, including heated compresses, lid scrubs, and over-the-counter medications are often employed without consultation with a medical professional. For times when medical care is sought, a general practitioner or family physician may be consulted before seeing an ophthalmologist or

optometrist (Fraunfelder 1971; Lebensohn 1950).

Practice standards for the initial treatment of hordeola are conservative, typically limited to the application of warm compresses several times a day if any treatment is recommended at all (Barza 1983; Fuchs 1911; Librach 1979; Olson 1991; Wilkie 1956). A topical antibiotic may also be prescribed in conjunction with warm compresses (Black 1990; Diegel 1986; Lebensohn 1950; Lederman 1999; Wald 2004). If the condition is severe and resistant to topical antibiotics, systemic antibiotics or surgical incision and drainage may be implemented (Briner 1987; Moriarty 1982; Mueller 2008; Rubin 1995; Skorin 2002).

Description of the intervention

Non-surgical treatments for hordeolum include the application of warm or hot compresses, the use of lid scrubs and digital massage, the administration of antibiotics or steroids, or alternative medicine such as acupuncture and autohemotherapy. Typically, the intent of these interventions is to reduce healing time and to relieve the symptoms associated with the lesion. Thus, the timing for the interventions of interest would be during the first week after onset. Beyond one week, it is believed that internal hordeolum may resolve on its own or may require surgical incision and curettage. Secondary to the resolution of the presenting hordeolum, other aims of the interventions are to minimize the risk of the infection worsening, spreading to other areas, or becoming recurrent.

How the intervention might work

The natural history of acute internal hordeolum generally spans one to two weeks, beginning with the appearance of an abscess and concluding with the draining of the abscess. Initial treatments for hordeolum have therefore been aimed at promoting the evacuation of pus from the abscess. The application of a warm or hot compress may facilitate drainage by softening the granuloma (Diegel 1986; Fuchs 1911; Moriarty 1982; Skorin 2002). Heated compresses are typically employed for five to 10 minutes several times a day until the hordeolum is resolved.

Lid scrubs consist of mild shampoos or saline solutions and are applied while gently massaging the affected area. The theory underlying the use of lid scrubs is that they promote lid hygiene and prepare the physical environment for drainage by clearing debris from the lid margin (Driver 1996; Skorin 2002). Creating a clear channel is believed to initiate drainage, similar to the epilation of an eyelash in cases of external hordeolum (Hudson 1981). Also, ingredients used in shampoos break down bacterial membranes, which would further decrease the presence of bacteria at the infection site (McCulley 1984). Lid scrubs are commonly recommended in the treatment of other ocular bacterial infections, such as blepharitis, and may prevent the spread of the infection (Avisar

1991). In conjunction with lid scrubs, lid massage has been proposed to physically express secretions from the infected glands (Driver 1996; Scobee 1942).

Antibiotics can be administered locally at the site of the infection or given systemically. As most cases of hordeolum are caused by a staphylococcal species, antibiotics should be effective against the bacteria. The application of topical antibiotics may reduce healing time by fighting against the causative bacterial infection and reducing inflammation. Many topical medications include ingredients to relieve the symptomatic pain of internal hordeolum. Local administration of antibiotics can also be by injection. Systemic antibiotics are sometimes used when local antibiotics are not effective or when the infection is not localized.

Steroids can be applied topically as ointments or eyedrops. Since internal hordeolum has a short course, as little as one steroid treatment could be effective in reducing healing time and relieving symptoms associated with the inflammation (King 1986; Palva 1983).

Why it is important to do this review

Acute internal hordeolum is a common disease experienced by a wide population. Although the course of the disease is relatively short, instances of internal hordeolum are painful and bothersome. Furthermore, improper management of the underlying cause of the infection may lead to recurrent infections or to the development of other disease. Despite the common recommendation to employ heated compresses, their efficacy in treating hordeolum has not been systematically reviewed. If heated compresses are indeed sufficient in treating hordeolum, then more rigorous interventions, such as antibiotics or steroids, may not be warranted for initial treatment. Conversely, comparing the efficacy and safety of all available interventions, to determine which may be most beneficial to the individual, is also important. A summary of the evidence should assist patients and professionals in determining preferred methods of treatment.

OBJECTIVES

The objective of this review was to investigate the effectiveness and, when possible, the safety of non-surgical treatments for acute internal hordeolum compared to observation or placebo.

METHODS

Criteria for considering studies for this review

Types of studies

This review was limited to randomized and quasi-randomized clinical trials. Examples of quasi-randomized allocation include using participants' birth dates, medical record numbers, or order of enrollment to determine treatment groups.

Types of participants

We were interested in studies of patients with a diagnosis of acute internal hordeolum. Studies of patients with only external hordeolum (stye), chronic hordeolum or chalazia were excluded.

Types of interventions

Non-surgical interventions were the primary focus of this review. We included trials which compared the use of hot or warm compresses, lid scrubs, antibiotics, or steroids to observation, placebo, or another active intervention for the treatment of acute internal hordeolum.

Types of outcome measures

Primary outcomes

The primary outcome for this review was the proportion of patients with complete resolution of hordeolum seven days after diagnosis. The seven day period for resolution was selected since most cases of hordeolum resolve on their own at between one to two weeks. We also analyzed the proportion of patients with complete resolution of hordeolum after 14 days as a secondary outcome, when these data were available.

Secondary outcomes

1. The proportion of patients requiring surgical incision and drainage after the treatment period or seven days after diagnosis.
2. The incidence of chalazion after the treatment period or seven days after diagnosis.
3. The incidence of recurrence of hordeolum after six months and after one year. A recurrent case was considered as any hordeolum that occurred after one month of the resolution of the initial hordeolum and at any location on the same eyelid, or as defined by the included study.
4. The incidence of a secondary hordeolum during or after the treatment period or seven days after diagnosis. A secondary hordeolum was defined as a hordeolum that occurred within one month of the initial hordeolum and at a different location than the initial hordeolum, or as defined by the included study.

Adverse outcomes

We planned to report all adverse effects related to the treatment of hordeolum that were reported in the primary studies. Specific adverse outcomes of interest included conjunctivitis; eye irritation; discoloration of the eyelid, conjunctiva, and lens; and corneal damage.

Economic data

We planned to report economic data.

Quality of life data

We planned to report quality of life data.

Search methods for identification of studies

Electronic searches

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (which contains the Cochrane Eyes and Vision Group Trials Register) (*The Cochrane Library* 2010, Issue 6), MEDLINE (January 1950 to June 2010), EMBASE (January 1980 to June 2010), Latin American and Caribbean Literature on Health Sciences (LILACS) (January 1982 to June 2010), the metaRegister of Controlled Trials (*mRCT*) (www.controlled-trials.com), ClinicalTrials.gov (<http://clinicaltrials.gov>) and the WHO International Clinical Trials Registry Platform (ICTRP). There were no language or date restrictions in the search for trials. The electronic databases were last searched on 21 June 2010. See: Appendices for details of search strategies for CENTRAL ([Appendix 1](#)), MEDLINE ([Appendix 2](#)), EMBASE ([Appendix 3](#)), LILACS ([Appendix 4](#)), *mRCT* ([Appendix 5](#)), ClinicalTrials.gov ([Appendix 6](#)) and the WHO International Clinical Trials Registry Platform (ICTRP) ([Appendix 7](#)).

Searching other resources

We reviewed the reference lists from potentially eligible studies to identify further studies. In addition we proposed to use the Science Citation Index to search for references that cited any included trials.

Data collection and analysis

Selection of studies

Two review authors independently assessed the titles and abstracts from the electronic literature searches and the manual search to

identify possible trials of interest according to the 'Criteria for considering studies for this review'. We designated each reference identified from the searches as (a) relevant, (b) possibly relevant, or (c) not relevant for this review. We retrieved full text copies of the articles if an abstract was classified as (a) or (b). Each article was then independently assessed by two review authors and was classified as (1) include in review, (2) awaiting classification, or (3) exclude from review. We resolved discrepancies between authors by consensus. We contacted investigators of studies classified as (2) to obtain sufficient information to include or exclude the study from the review.

Data extraction and management

As no studies were identified for inclusion in this review, no data extraction or assessment of risk of bias was performed. If, in the future, relevant studies become available, we will undertake the following methods for updating this review. Two review authors will independently extract data using the data extraction forms created by the Cochrane Eyes and Vision Group. For each included study, we will extract data on study characteristics, interventions, outcomes, cost, quality of life, and other relevant information. One review author will enter the data into Review Manager Version 5.0 and a second review author will verify the data entry. Discrepancies between review authors will be resolved by the third review author.

Assessment of risk of bias in included studies

Two review authors will independently assess the risk of bias of included studies based on the methods provided in Chapter 8 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008). Sources of potential bias affecting the quality of a study are divided into six domains that include (1) adequate sequence generation; (2) allocation concealment; (3) masking (blinding) of participants, personnel and outcome assessors; (4) adequate handling of incomplete outcome data; (5) free of selective outcome reporting; and (6) free of other sources of bias. Each domain grouping for every study included in the review will be assessed for bias and judged as (A) yes, low risk of bias; (B) unclear or not reported; or (C) no, high risk of bias. Discrepancies between review authors will be resolved by a third review author. For studies classified as unclear or not reported, we will contact the authors of the study for further information in an attempt to reclassify the quality of the study.

Measures of treatment effect

The measures of treatment effect will depend on the types of data presented in the included studies and be identified by the definitions given in Chapter 9 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Deeks 2009).

Dichotomous data

The primary outcome of interest, the proportion of patients with complete resolution of hordeolum at seven days after diagnosis, will be analyzed as a dichotomous variable: resolved versus not resolved. Data on the proportion of patients requiring surgical incision and drainage after treatment, the proportion of patients developing a chalazion after treatment, the proportion of recurrent hordeola, and the number of secondary hordeola will also be analyzed as dichotomous data. We will report dichotomous data as a summarized risk ratio with 95% confidence interval.

Continuous data

We will report continuous data as a weighted mean difference with its standard deviation. We anticipate that available economic and quality of life data will be analyzed as continuous data.

Ordinal data

We will summarize ordinal data qualitatively.

Counts and rate data

We will summarize counts and rate data in rate ratios when the event is rare and as continuous outcome data when the event is more common. We will analyze adverse events data as counts and rates.

Unit of analysis issues

The unit of analysis for this review will be an eyelid of an individual participant.

Dealing with missing data

We will contact authors of included studies in an attempt to obtain missing data. If data cannot be retrieved, we will impute data from the reported data in the study. We will report loss to follow-up when available.

Assessment of heterogeneity

We will test for statistical heterogeneity using the I^2 statistic and examine clinical heterogeneity using forest plots.

Assessment of reporting biases

We will use funnel plots to assess the possibility of reporting biases if a sufficient number of studies are available.

Data synthesis

If limited heterogeneity is suggested (defined here as $I^2 < 50\%$), we will perform meta-analyses using the random-effects model unless there are three or fewer trials, in which case we will use the fixed-effect model. If heterogeneity is detected, we will combine trial results by relevant, less heterogeneous subgroups if sufficient data are available, otherwise we will describe the results individually.

Subgroup analysis and investigation of heterogeneity

We will investigate heterogeneity by conducting subgroup analyses provided sufficient information is available. Subgroups of interest include sex, age, use of contact lenses, including soft lenses versus hard lenses, and the frequency of hordeolum occurrences, co-infections and other co-morbidities at baseline.

Sensitivity analysis

We will investigate the impact of studies with a high likelihood of bias, or missing data, as well as the impact of unpublished studies using sensitivity analyses.

RESULTS

Description of studies

See: [Characteristics of excluded studies](#).

Results of the search

There were 517 total references identified by the electronic searches as of 21 June 2010. After screening the titles and abstracts, 19 references were classified as being potentially relevant. Of the 19 references, which reported 18 unique studies, all were excluded.

Excluded studies

There were 18 excluded studies in this review. The reasons for exclusion are described in the table [Characteristics of excluded studies](#).

Of the 18 excluded studies two were randomized controlled trials that included patients with acute internal hordeolum. The first included pediatric patients with lid inflammation and was conducted to evaluate the safety of loteprednol etabonate 0.5% and tobramycin 0.3% ophthalmic suspension (Zylet®) in the pediatric population (NCT00420628 2007). As safety was the primary focus of the trial, the study population comprised patients with varying ocular inflammatory conditions and data were not collected by study investigators for specific conditions. The results

of the trial were not available during the course of this review. The second study compared the effectiveness of a combined antibiotic ophthalmic solution with placebo in patients with internal and external hordeolum following surgical incision and curettage (Hirunwiwatkul 2005). All patients were newly diagnosed and untreated prior to undergoing incision and curettage. There were 14 patients randomized to each group and results for patients with internal and external hordeolum were not reported separately. The study authors concluded that there was no evidence of differences in pain score, mass size, or duration of cure between groups.

Risk of bias in included studies

There were no included studies in this review, thus no risk of bias assessment was done.

Effects of interventions

There were no included studies in this review, thus no effects of interventions were reported.

DISCUSSION

Summary of main results

There were no trials identified for inclusion in this review.

Overall completeness and applicability of evidence

The majority of the references identified from the search for this review were related to external hordeola (styes) or chalazion. By and large the few references specific to acute internal hordeolum either reported recommendations for treatment without cited evidence or were reports of interventional case series, case studies, or other types of observational study designs. The only clinical trials found that included patients with acute internal hordeolum were not applicable for the review since they included multiple conditions and did not stratify by specific diagnoses or included patients who underwent surgical treatment as a criterion for study enrollment. Furthermore, the bulk of the literature was published over 20 years ago.

Potential biases in the review process

The primary source of bias for this review pertained to selection bias, specifically the identification and inclusion of relevant studies. Prior to beginning the review process, we expected that few

trials had been published on hordeolum, that various authors used different terminologies when referring to different classifications of hordeola (that is hordeolum, stye, chalazia, etc.), and that relevant studies may be from older publications. We therefore designed a broad search strategy for the electronic databases in order to increase identification of potentially relevant studies. We also manually searched the reference lists of potentially relevant studies to identify older studies that may not be included in electronic databases.

To minimize bias during the process of selecting studies for this review, two review authors screened the references from the electronic search and independently classified them for inclusion or exclusion. We included potentially relevant references that mentioned any type of hordeolum or external eye inflammation for assessment at the full text level. Inclusion and exclusion were determined by using the definition of the disease given in the full text article. Furthermore, one review author screening the studies had a clinical background (JN) and one had a methodological background (KL).

Agreements and disagreements with other studies or reviews

While it is the most recommended therapy for hordeola, the application of warm compresses has not been shown to be effective in accelerating the healing time or reducing the symptoms associated with hordeolum in a controlled trial. Moreover, there is no evidence that warm compresses alone would eliminate the infection. It is also unclear whether medical treatments or lid hygiene are effective in treating acute internal hordeolum.

AUTHORS' CONCLUSIONS

Implications for practice

Common interventions for the treatment of acute internal hordeolum include warm compresses applied at home, topical medications and lid scrubs available over-the-counter, antibiotics or steroids, lid massages, and others. At this time there is insufficient evidence regarding the effectiveness of these non-surgical interventions for treating acute internal hordeolum. Clinical practice decisions should be based on physician judgment and available treatment options should be discussed with patients.

Implications for research

Generally, RCTs are considered the gold standard for comparing the efficacy of interventions. However, because of the relative mildness and short duration of the disease, study participants may be limited to more severe cases that are not representative of the general population; recruitment of patients at onset may be challenging. Even with these considerations, controlled clinical trials would be useful in determining which interventions are effective for the treatment of acute internal hordeolum.

ACKNOWLEDGEMENTS

We thank Iris Gordon and the Cochrane Eyes and Vision Group editorial team for devising and implementing the electronic search strategy for the review and for assisting with the preparation of the protocol. We also thank Barbara Hawkins, Karen Blackhall, Daniel Ezra and John Bladen for their comments; and Takeshi Iwase and Sueko Matsumura for their assistance with evaluating Japanese-language articles.

REFERENCES

References to studies excluded from this review

Bahgat 1986 *{published data only}*

Bahgat MM. Comparative study of local injection therapy of chalazia. *Orbit* 1986;**5**(3):219–22.

Copeman 1958 *{published data only}*

Copeman PW. Treatment of recurrent styes. *Lancet* 1958;**2**(7049):728–9.

Garrett 1988 *{published data only}*

Garrett GW, Gillespie ME, Mannix BC. Adrenocorticosteroid injection vs. conservative therapy in the treatment of chalazia. *Annals of Ophthalmology* 1988;**20**(5):196–8.

Hatano 1969 *{published data only}*

Hatano H, Saito T, Takahashi N. Ophthalmological application of minocycline. *Japanese Journal of Antibiotics*

1969;**22**(6):522–5.

Hatano 1974 *{published data only}*

Hatano H, Tokuda H, Kayaba C. Evaluation of amikacin (BB-K8) in ophthalmological field. *Japanese Journal of Antibiotics* 1974;**27**(4):451–5.

Hirunwiwatkul 2005 *{published data only}*

Hirunwiwatkul P, Wachiraserechai K. Effectiveness of combined antibiotic ophthalmic solution in the treatment of hordeolum after incision and curettage: a randomized, placebo-controlled trial: a pilot study. *Journal of the Medical Association of Thailand (Chotmaibet thangphaet)* 2005;**88**(5):647–50.

Jacobs 1984 *{published data only}*

Jacobs PM, Thaller VT, Wong D. Intralésional corticosteroid therapy of chalazia: a comparison with incision and

- curetage. *British Journal of Ophthalmology* 1984;**68**(11): 836–7.
- Kastl 1987** *{published data only}*
Kastl PR, Ali Z, Mather F. Placebo-controlled, double-blind evaluation of the efficacy and safety of yellow mercuric oxide in suppression of eyelid infections. *Annals of Ophthalmology* 1987;**19**(10):376–9.
- Magnuson 1967** *{published data only}*
Magnuson RH, Suie T. Gentamicin sulfate in external eye infections. *JAMA* 1967;**199**(6):427–8.
- Manabe 1981** *{published data only}*
Manabe R, Moriyama H, Suda T. A double-blind study of tobramycin eye drops on infectious diseases of anterior portion of the eye. Comparison with gentamicin eye drops. *Folia Ophthalmologica Japonica* 1981;**32**(4):1041–65.
- Mathew 1966** *{published data only}*
Mathew M. Munomycin in hordeolum externum. *Indian Practitioner* 1966;**19**(10):689–90.
- NCT00420628 2007** *{published data only}*
NCT00420628. Pediatric Zylet safety and efficacy study. ClinicalTrials.gov. <http://ClinicalTrials.gov/show/NCT00420628> (accessed 9 June 2010).
- Oishi 1973** *{published data only}*
Oishi M, Imai M, Takahashi T, Motoyama M, Tanaka M. Clinical evaluation of clindamycin-2-palmitate for ophthalmic infections of children. *Japanese Journal of Antibiotics* 1973;**26**(6):535–9.
- Panda 1987** *{published data only}*
Panda A, Angra SK. Intra lesional corticosteroid therapy of chalazia. *Indian Journal of Ophthalmology* 1987;**35**(4): 183–5.
- Sawae 1971** *{published data only}*
Sawae Y, Inoue H, Shiraishi M, Fujimura T, Takemori K. Laboratory and clinical evaluation of clindamycin. *Japanese Journal of Antibiotics* 1971;**24**(2):51–8.
- Vácha 1987** *{published data only}*
Vácha J, Bodnár M. Kenalog injection—one possibility in the treatment of chronic chalazion. *Ceskoslovenska Ofthalmologie* 1987;**43**(5):374–6.
- Watson 1984** *{published data only}*
Watson AP, Austin DJ. Treatment of chalazions with injection of a steroid suspension. *British Journal of Ophthalmology* 1984;**68**(11):833–5.
- Willcox 2008** *{published data only}*
Willcox M, Bengaly T, Lopez V, Falquet J, Lambert B, Diallo D. Traditional malian ointment for styes. *Journal of Alternative & Complementary Medicine* 2008;**14**(5):461–4.
- Additional references**
- Avisar 1991**
Avisar R, Savir H, Deutsch D, Teller J. Effect of I-Scrub on signs and symptoms of chronic blepharitis. *DICP* 1991;**25** (4):359–60.
- Barza 1983**
Barza M, Baum J. Ocular infections. *Medical Clinics of North America* 1983;**67**(1):131–52.
- Black 1990**
Black RL, Terry JE. Treatment of chalazia with intralesional triamcinolone injection. *Journal of the American Optometric Association* 1990;**61**(12):904–6.
- Briner 1987**
Briner AM. Treatment of common eyelid cysts. *Australian Family Physician* 1987;**16**(6):828–30.
- De Jesus 2004**
De Jesus JM. Treating hordeola with systemic medications: First-line therapy with oral antibiotics for the treatment of hordeola may provide a more permanent resolution. *Pacific Optometry*. Available from <http://www.opt.pacificu.edu/test/journal/Articles/deJesus%20hordeola/hordeola.html> (accessed 4 June 2008).
- Deeks 2009**
Deeks JJ, Higgins JPT, Altman DG (editors). Chapter 9: Analysing data and undertaking meta-analyses. In: Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.0.2 [updated September 2009]. The Cochrane Collaboration, 2009. Available from www.cochrane-handbook.org.
- Diegel 1986**
Diegel JT. Eyelid problems. Blepharitis, hordeola, and chalazia. *Postgraduate Medicine* 1986;**80**(2):271–2.
- Driver 1996**
Driver PJ, Lemp MA. Meibomian gland dysfunction. *Survey of Ophthalmology* 1996;**40**(5):343–67.
- Fraunfelder 1971**
Fraunfelder FT, Roy FH. How to treat common external eye problems. *American Family Physician* 1971;**3**(4):104–9.
- Fuchs 1911**
Fuchs E. Text-book of Ophthalmology. *Textbook of Ophthalmology*. JB Lippincott Company, 1911.
- Glanville 2006**
Glanville JM, Lefebvre C, Miles JN, Camosso-Stefinovic J. How to identify randomized controlled trials in MEDLINE: ten years on. *Journal of the Medical Library Association* 2006;**94**(2):130–6.
- Higgins 2008**
Higgins JPT, Altman DG (editors). Chapter 8: Assessing risk of bias in included studies. In: Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.0.1 [updated September 2008]. The Cochrane Collaboration, 2008. Available from www.cochrane-handbook.org.
- Hudson 1981**
Hudson RL. Treatment of styes and meibomian cysts. Practical procedures. *Australian Family Physician* 1981;**10** (9):714–5, 717.
- King 1986**
King RA, Ellis PP. Treatment of chalazia with corticosteroid injections. *Ophthalmic Surgery* 1986;**17**(6):351–3.

Lebensohn 1950

Lebensohn JE. Treatment of hordeola. *Postgraduate Medicine* 1950;**7**(2):133.

Lederman 1999

Lederman C, Miller M. Hordeola and chalazia. *Pediatrics in Review* 1999;**20**(8):283–4.

Librach 1979

Librach I. Layman's guide to common complaints. 8. Tonsillitis. 9. Styes and conjunctivitis. *Nursing Mirror* 1979;**149**(11):18–9.

Mathew 1966

Mathew M. Munomycin in hordeolum externum. *Indian Practitioner* 1966;**19**(10):689–90.

McCulley 1984

McCulley JP. Blepharconjunctivitis. *International Ophthalmology Clinics* 1984;**24**(2):65–77.

Moriarty 1982

Moriarty PA, Collin JR. Eyelid problems. *Practitioner* 1982;**226**(1367):901–23.

Mueller 2008

Mueller JB, McStay CM. Ocular infection and inflammation. *Emergency Medicine Clinics of North America* 2008;**26**(1):57–72.

Olson 1991

Olson MD. The common stye. *Journal of School Health* 1991;**61**(2):95–7.

Palva 1983

Palva J, Pohjanpelto PEJ. Intralesional corticosteroid injection for the treatment of chalazia. *Acta Ophthalmologica* 1983;**61**(5):933–7.

Peralejo 2008

Peralejo B, Beltrani V, Bielory L. Dermatologic and allergic conditions of the eyelid. *Immunology & Allergy Clinics of North America* 2008;**28**(1):137–68.

Roodyn 1954

Roodyn L. Staphylococcal infections in general practice. *British Medical Journal* 1954;**2**(4900):1322–5.

Rubin 1995

Rubin S, Hallagan L. Lids, lacrimals, and lashes. *Emergency Medicine Clinics of North America* 1995;**13**(3):631–48.

Scobee 1942

Scobee RG. The role of the meibomian glands in recurrent conjunctivitis. *American Journal of Ophthalmology* 1942;**25**:184–92.

Skorin 2002

Skorin L. Hordeolum and chalazion treatment: The full gamut. *Optometry Today*. Available from www.optometry.co.uk 28 June 2002 (accessed 4 June 2008): 25–7.

Wald 2004

Wald ER. Periorbital and orbital infections. *Infectious Disease Clinics of North America* 2004;**25**(9):312–20.

Wilkie 1956

Wilkie JL. Styes. *Practitioner* 1956;**176**(1053):318–21.

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Bahgat 1986	Not population of interest: controlled trial of patients with chalazia, defined as chronic lipogranulomas with duration of one month to three years before therapy. Patients were stratified by type of chalazia and assigned to injections of corticosteroids with or without antibiotics, or to control
Copeman 1958	Not population of interest: controlled trial of patients with recurrent external hordeola, defined as at least one previous stye of the eyelash follicle within the last month. Patients alternately assigned to antibiotic ointment or control applied to the anterior nares
Garrett 1988	Not population of interest: RCT of patients with chalazia, defined as chronic inflammations of the meibomian glands. Patients randomly assigned to warm compresses and lid scrubs, intralesional steroid injections, or both treatments
Hatano 1969	Not population of interest: Interventional case series of patients with ophthalmic infections. Of the 28 participants studied 10 were diagnosed with hordeolum, but internal and external cases were not specified. All patients received topical minocycline
Hatano 1974	Not population of interest: interventional case series of patients with ophthalmic infections. Of the 40 participants studied 10 were diagnosed with hordeolum, but internal and external cases were not specified. Four of these patients underwent surgery at the time of first consult and six received the antibiotic amikacin
Hirunwiwatkul 2005	Not intervention of interest: RCT of patients with internal and external hordeolum after undergoing surgical incision and curettage. Patients randomly assigned to treatment with antibiotic ophthalmic solution or placebo following surgery
Jacobs 1984	Not population of interest: RCT of patients with non-infectious chalazia present for two or more weeks. Patients randomly assigned to injection with triamcinolone or incision and curettage
Kastl 1987	Not population of interest: RCT of patients with active eyelid infections (styes and blepharitis) determined by cultures taken from the base of the eyelashes. Patients randomly assigned to treatment with yellow mercuric oxide or placebo
Magnuson 1967	Not population of interest: interventional case series of patients with various eye infections with the majority having conjunctivitis, meibomianitis, or blepharitis. Of the 131 participants studied, as many as three may have had stye. All patients received gentamicin sulfate and hot and cold compresses
Manabe 1981	Not population of interest: CCT of patients with infections of the anterior portion of the eye. Patients were assigned by order of enrollment to treatment with tobramycin ophthalmic solution or gentamicin ophthalmic solution. Of the 504 participants studied 43 were diagnosed with hordeolum, but internal and external cases were not specified. Data were not reported separately for hordeolum cases

(Continued)

Mathew 1966	Not population of interest: interventional case series of patients with external hordeola, defined as acute inflammations of the glands situated at the root of eye lashes. All patients received penicillin and streptomycin plus a polyvalent antigen (Munomycin)
NCT00420628 2007	Not population of interest: RCT of pediatric patients with lid inflammation to evaluate the safety and efficacy of Zylet® compared to vehicle. As the focus of the trial was primarily safety of Zylet® in pediatric patients, eligibility criteria were not strict and subgroup data for specific diagnoses were not collected (personal correspondence)
Oishi 1973	Not a controlled trial: interventional case series of 26 children with ophthalmic infections, 3 of whom had internal hordeolum. All patients received topical clindamycin-2-palmitate
Panda 1987	Not population of interest: controlled trial of patients with chalazia, defined as chronic inflammatory granulomas. Patients assigned to injection with one of three corticosteroids: dexamethasone, hydrocortisone, or triamcinolone
Sawae 1971	Not population of interest: interventional case series of patients with ophthalmic infections. Of the 22 participants studied one was diagnosed with hordeolum, but it was not specified as being internal or external. All patients received clindamycin
Vácha 1987	Not population of interest: observational study of patients with chalazia, defined as granulomas. Treatment with kenalog injections was compared to incision and curettage
Watson 1984	Not population of interest: controlled trial of patients with chalazia, defined as chronic granulomas. Patients alternately assigned to injection with triamcinolone acetonide or incision and curettage
Willcox 2008	Not population of interest: case report of a patient treated with malian ointment for a sty

DATA AND ANALYSES

This review has no analyses.

APPENDICES

Appendix 1. CENTRAL search strategy

- #1 MeSH descriptor Hordeolum
- #2 hordeol* or sty or stye or styes
- #3 MeSH descriptor Meibomian Glands
- #4 (meibomian) near/3 (gland* or cyst*)
- #5 (conjunctiv*) near/3 (gland* or cyst*)
- #6 (gland*) near/5 (Zeis or Moll)
- #7 #1 or #2 or #3 or #4 or #5 or #6

Appendix 2. MEDLINE search strategy

1. randomized controlled trial.pt.
2. (randomized or randomised).ab,ti.
3. placebo.ab,ti.
4. dt.fs.
5. randomly.ab,ti.
6. trial.ab,ti.
7. groups.ab,ti.
8. or/1-7
9. exp animals/
10. exp humans/
11. 9 not (9 and 10)
12. 8 not 11
13. exp hordeolum/
14. (hordeol\$ or stye or styes).tw.
15. sty.tw.
16. exp eyes/
17. 15 and 16
18. exp meibomian glands/
19. (meibomian adj3 (gland\$ or cyst\$)).tw.
20. (conjunctiv\$ adj3 (gland\$ or cyst\$)).tw.
21. (gland\$ adj5 (Zeis or Moll)).tw.
22. 13 or 14 or 17 or 18 or 19 or 20 or 21
23. 12 and 22

The search filter for trials at the beginning of the MEDLINE strategy is from the published paper by Glanville et al ([Glanville 2006](#)).

Appendix 3. EMBASE search strategy

1. exp randomized controlled trial/
2. exp randomization/
3. exp double blind procedure/
4. exp single blind procedure/
5. random\$.tw.
6. or/1-5
7. (animal or animal experiment).sh.
8. human.sh.
9. 7 and 8
10. 7 not 9
11. 6 not 10
12. exp clinical trial/
13. (clin\$ adj3 trial\$).tw.
14. ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj3 (blind\$ or mask\$)).tw.
15. exp placebo/
16. placebo\$.tw.
17. random\$.tw.
18. exp experimental design/
19. exp crossover procedure/
20. exp control group/
21. exp latin square design/
22. or/12-21
23. 22 not 10
24. 23 not 11
25. exp comparative study/
26. exp evaluation/
27. exp prospective study/
28. (control\$ or prospectiv\$ or volunteer\$).tw.
29. or/25-28
30. 29 not 10
31. 30 not (11 or 23)
32. 11 or 24 or 31
33. exp hordeolum/
34. (hordeol\$ or stye or styes).tw.
35. sty.tw.
36. exp eye/
37. 35 and 36
38. exp meibomian glands/
39. (meibomian adj3 (gland\$ or cyst\$)).tw.
40. (conjunctiv\$ adj3 (gland\$ or cyst\$)).tw.
41. (gland\$ adj5 (Zeis or Moll)).tw.
42. 33 or 34 or 37 or 38 or 39 or 40 or 41
43. 32 and 42

Appendix 4. LILACS search strategy

hordeol\$ or stye\$ or meibomian

Appendix 5. metaRegister of Controlled Trials search strategy

hordeolum or hordeola or stye or styes or meibomian

Appendix 6. ClinicalTrials.gov search strategy

hordeolum or hordeola or stye or styes or meibomian

Appendix 7. WHO International Clinical Trials Registry Platform search strategy

hordeolum or hordeola or stye or styes or meibomian

HISTORY

Protocol first published: Issue 2, 2009

Review first published: Issue 9, 2010

CONTRIBUTIONS OF AUTHORS

Conceiving the review: KD, KL

Designing the review: KL, JN

Co-ordinating the review: KL

Data collection for the review

- Designing electronic search strategies: Cochrane Eyes and Vision Group

- Undertaking electronic searches: Cochrane Eyes and Vision Group

- Screening search results: KL, JN

- Organizing retrieval of papers: KL

- Screening retrieved papers against inclusion criteria: KL, JN

- Appraising risk of bias of papers: KL, JN

- Extracting data from papers: KL, JN

- Writing to authors of papers for additional information: KL

- Providing additional data about papers: KL, JN

- Obtaining and screening data on unpublished studies: KL, JN

Data management for the review

- Entering data into RevMan: KL, JN

Analysis of data: KL, JN, KD

Interpretation of data

- Providing a methodological perspective: KL, KD
- Providing a clinical perspective: JN
- Providing a policy perspective: JN
- Providing a consumer perspective:

Writing the review: KL, JN, KD

Providing general advice on the review: KL, JN, KD

Securing funding for the review: KD

DECLARATIONS OF INTEREST

None

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Grant 1 U01 EY020522-01, National Eye Institute, National Institutes of Health, USA.

INDEX TERMS

Medical Subject Headings (MeSH)

Acute Disease; Hordeolum [pathology; *surgery]

MeSH check words

Humans