Cochrane Library

Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess (Review)

Chang BA, Thamboo A, Burton MJ, Diamond C, Nunez DA

www.cochranelibrary.com

WILEY

TABLE OF CONTENTS

[Intervention Review]

Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess

Brent A Chang[1], Andrew Thamboo[1], Martin J Burton[2], Chris Diamond[1], Desmond A Nunez[1]

[1]Division of Otolaryngology Head & Neck Surgery, University of British Columbia, Vancouver, Canada. [2]UK Cochrane Centre, Oxford, UK

Contact: Brent A Chang, Division of Otolaryngology Head & Neck Surgery, University of British Columbia, 2775 Laurel St., 4th Floor Otolaryngology (ENT), Vancouver, BC, V5Z 1M9, Canada. brent.a.chang@gmail.com.

A B S T R A C T

Background

Peritonsillar abscess is a common infection presenting as a collection of pus in the peritonsillar area. The condition is characterised by a severe sore throat, difficulty in swallowing and pain on swallowing, fever and malaise, and trismus. Needle aspiration and incision and drainage are the two main treatment modalities currently used in the treatment of this condition. The effectiveness of one versus the other has not been clearly demonstrated and remains an area of debate.

Objectives

To assess the effectiveness and risks of needle aspiration versus incision and drainage for the treatment of peritonsillar abscess in older children (eight years of age or older), adolescents and adults.

Search methods

The Cochrane ENT Information Specialist searched the ENT Trials Register; Central Register of Controlled Trials (CENTRAL 2016, Issue 7); Ovid MEDLINE; Ovid Embase; CINAHL; Web of Science; ClinicalTrials.gov; ICTRP and additional sources for published and unpublished trials. The date of the search was 25 August 2016.

Selection criteria

Randomised controlled trials comparing needle aspiration with incision and drainage.

Data collection and analysis

We used the standard methodological procedures expected by Cochrane. Our primary outcomes were recurrence rate (proportion of patients needing repeat intervention) and adverse effects associated with the intervention. Secondary outcomes were time to resumption of normal diet, complications of the disease process and symptom scores. We used GRADE to assess the quality of evidence for each outcome; this is indicated in *italics*.

Main results

We included 11 studies (674 participants). The risk of bias was high or unclear in all of the included studies. All studies compared needle aspiration to incision and drainage.

All but one of the 11 studies reported on the primary outcome of **recurrence**. When we pooled data from the 10 studies the recurrence rate was higher in the needle aspiration group compared with incision and drainage: risk ratio (RR) 3.74 (95% confidence interval (CI) 1.63 to

![Cochrane Library — Trusted evidence. Informed decisions. Better health.]

Cochrane Database of Systematic Reviews

8.59; 612 participants). We detected moderate heterogeneity in this analysis (I^2 = 48%). In interpreting the pooled result it is important to note that the evidence for this outcome was of *very low quality*.

None of the other outcomes (**adverse effects** of the intervention, **time to resumption of normal diet**, **complications of the disease process** and **symptom scores**) were consistently measured across all studies.

Only three studies reported on **adverse effects/events associated with the intervention** and only one such event in a single patient was reported (post-procedure bleeding following incision and drainage: 1/28, 3.6%) (*very low-quality evidence*).

Time to resumption of normal diet was compared in two studies; neither found an obvious difference between needle aspiration and incision and drainage (*very low-quality evidence*).

Only three studies stated that they would report **complications of the disease process**. In these three studies, the only complication reported was admission to hospital for dehydration in two patients who underwent incision and drainage (2/13, 6.7%).

Symptom scores were measured in four studies; three evaluated pain using different scales and one other symptoms. The data could not be pooled in a meta-analysis. Two studies evaluating procedural pain reported this to be lower in the needle aspiration groups. One study found comparable rates of pain resolution at five days post-intervention between groups. The quality of the evidence for symptom scores was *very low*.

Authors' conclusions

Although a number of studies have sought to evaluate whether or not needle aspiration or incision and drainage is more effective in patients with peritonsillar abscess, there is no high-quality evidence to allow a firm conclusion to be drawn and the answer remains uncertain. *Very low-quality evidence* suggests that incision and drainage *may* be associated with a lower chance of recurrence than needle aspiration. There is some *very low-quality evidence* to suggest that needle aspiration is less painful.

P L A I N   L A N G U A G E   S U M M A R Y

Needle aspiration compared to incision and drainage for the treatment of peritonsillar abscess (quinsy)

Review question

This review compared the effectiveness of the two main treatment options for peritonsillar abscess: needle aspiration and incision and drainage.

Background

Peritonsillar abscesses are infections at the back of the throat in which a collection of pus (abscess) has formed next to the tonsil. The condition is characterised by a severe sore throat, difficulty in swallowing and pain on swallowing, fever and malaise, and trismus (inability to open the mouth completely). Treatment is usually by one of two methods. The first is needle aspiration (sucking the pus out using a syringe and needle) and the second 'incision and drainage' (putting a small knife into the abscess to let the pus drain out). It remains unclear whether one type of treatment is better than the other.

Study characteristics

We included 11 studies with a total of 674 participants. The participants in the studies were aged from 8 to 79. The studies were conducted in a number of countries (six from Pakistan, two from the USA, one from Taiwan and two from South Africa). All but one of the 11 studies reported the difference in recurrence rate between needle aspiration and incision and drainage. Four studies compared symptom scores associated with the procedure and two studies compared time to resumption of normal diet. Three studies reported adverse effects/events associated with the intervention. Two studies reported complications of the disease process itself.

The evidence is current to August 2016.

Key results

Ten studies reported on the recurrence of peritonsillar abscess (our main outcome). Most of them did not clearly define 'recurrence' and they varied in the timing of its assessment, however we were able to combine (pool) the data from these studies. When we pooled the data the recurrence rate was higher in the needle aspiration group compared with incision and drainage. It is important to note that the evidence for this outcome was of *very low quality*. Some studies found that patients had more pain when they had incision and drainage.

Quality of the evidence

We identified problems or potential problems in all of the included studies. The most important of these was that the studies did not all assess recurrence in the same way, at the same time, using the same criteria. The quality of the evidence for all of the outcomes that we looked at was *very low*.

SUMMARY OF FINDINGS

Summary of findings for the main comparison.   Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess

Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess

Patient or population: patients older than 8 years with peritonsillar abscess
Setting: inpatients and outpatients
Intervention: incision and drainage
Comparison: needle aspiration

Outcomes	Anticipated absolute effects[*] (95% CI)		Relative effect	№ of participants (studies)	Quality of the evidence (GRADE)	Comments
	Risk with incision and drainage	**Risk with needle aspiration**				
Primary outcome: recurrence rate	Study population		RR 3.74, 95% CI 1.63 to 8.59	612 (10 RCTs)	⊕⊖⊖⊖ **very low** [1,2]	—
	47 per 1000	245 per 1000				
Primary outcome: adverse effects/events associated with the interventions	One study reported post-procedural bleeding in 1 patient (3.6%) in the incision and drainage group, with no adverse effects/events reported in the needle aspiration group. Two studies stated that no complications were seen in either group.		—	226 (3 RCTs)	⊕⊖⊖⊖ **very low** [2,3]	Adverse effects/events were not mentioned as a pre-specified outcome measure in any of the studies.
Secondary outcome: time to resumption of normal diet	One study found no difference in the time to resumption of normal diet (mean 3.7 days in both groups, no confidence intervals provided). Another study found that a similar percentage of patients returned to solid food within 4 days (87%: needle aspiration, 88%: incision and drainage).		—	124 (2 RCTs)	⊕⊖⊖⊖ **very low** [2,4]	—
Secondary outcome: complications of the disease process	One study described a complication of 2 patients requiring admission to hospital for dehydration in the incision and drainage group and no complications in the needle aspiration group. One study stated that no complications were seen in either group.		—	170 (2 RCTs)	⊕⊖⊖⊖ **very low** [2,5]	Complications of the disease process were not mentioned as a pre-specified outcome measure in any of the studies.

Cochrane Library

Trusted evidence.
Informed decisions.
Better health.

Secondary outcome: symptom scores (Multiple different outcome scales used)	**Procedural pain** Study 1 Pain was less in the needle aspiration group: MD -0.8, 95% CI -1.16 to -0.44 (10-point scale) Study 2 Reported less pain in the needle aspiration group **Pain resolution** Study 3 Pain resolution was similar between groups at 5 days post-intervention **Other symptoms** Study 4 Reported comparable symptom scores between groups at presentation and 48 hours	—	Study 1 110 participants Study 2 56 participants Study 3 62 participants Study 4 52 participants	⊕⊖⊖⊖ **very low** [2,6]	—

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **MD:** mean difference; **RCT:** randomised controlled trial; **RR:** risk ratio

GRADE Working Group grades of evidence
High quality: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1]Downgraded once due to serious risk of inconsistency (unexplained heterogeneity).
[2]Downgraded twice due to very serious risk of bias (limitations in study design).
[3]Adverse event (post-procedural bleeding) was not well described.
[4]Incomplete data (no standard deviations or confidence intervals provided).
[5]Admission to hospital for rehydration is inherently subjective and depends on multiple clinical variables.
[6]Downgraded once due to imprecision and differences in data reporting.

BACKGROUND

Description of the condition

Quinsy, better known as peritonsillar abscess, is one of the most common abscesses treated by otolaryngologists. It is one of the most common ear, nose and throat (ENT) emergencies seen in acute ENT clinics and emergency departments in hospitals. Peritonsillar abscesses are a collection of pus between the fibrous capsule of the tonsil and the superior constrictor muscles of the pharynx. A peritonsillar abscess tends to be unilateral (on one side) and is believed to arise from obstructed Weber glands within the superior pole of the tonsil or from acute tonsillitis (Johnson 2005). In the United States, the incidence is estimated to be 30 people per 100,000 per year, which accounts for about 45,000 cases per year (Herzon 1995). Peritonsillar abscess affects people of all ages (Herzon 1995), and has a significant resource cost (Johnson 2005; Powell 2012).

Patients with a peritonsillar abscess present with fever, dysphagia, trismus, otalgia, a change in the voice and ipsilateral throat pain. On examination there is a swelling in the oropharynx with medialisation of the tonsil. Physical examination usually reveals uvular deviation to the contralateral side, tonsillar exudate, trismus and jugulodigastric lymphadenopathy. Patients with peritonsillar abscesses are at risk of extension of the abscess into deeper neck spaces and airway obstruction. A combination of symptoms and signs is the accepted basis for diagnosis. Further diagnostic investigations are not generally used unless the peritonsillar abscess presents with neck involvement (Powell 2012). In these circumstances the most common diagnostic test is the computed tomography (CT) scan. CT scans can accurately diagnose peritonsillar abscesses with 100% sensitivity and help to determine the extent of the disease. Ultrasound is less useful, with a diagnostic accuracy of 89% to 95% sensitivity and 79% to 100% specificity, based on level 3 evidence (Powell 2012).

Description of the intervention

Treatment commonly involves drainage of the abscess together with antibiotics, but there is no agreement on the optimal technique for initial drainage of a peritonsillar abscess (Hall 1990; Herzon 1995; Johnson 2003). Physicians generally have a choice between needle aspiration and incision and drainage, although quinsy tonsillectomy and antibiotic therapy alone are also less commonly used treatment options. Needle aspiration uses a large-bore needle inserted through the palatoglossus muscles into the abscess. Several insertions of the needle in different locations may be performed during a single treatment episode. The incision and drainage method uses a guarded scalpel to incise the palatoglossus muscle and enter the peritonsillar space/abscess. The peritonsillar space is then opened widely by dissection with blunt forceps to promote drainage of the abscess. A patient with a peritonsillar abscess is sometimes treated with a combination of these methods.

Why it is important to do this review

Patients with a quinsy often present 'out of hours' and in many healthcare settings are first assessed and managed by doctors in training. A survey in the UK showed that 60% of otolaryngologists would use needle aspiration as their primary method for draining a peritonsillar abscess. If the needle aspiration failed, 52% would then perform scalpel incision and drainage. The survey also showed geographic differences in the management of peritonsillar abscess

(Mehanna 2002). In Singapore, a retrospective review showed that most patients were treated with scalpel incision and drainage (66%) (Ong 2004).

There is no consensus regarding the best drainage procedure and each method has risks and benefits. Needle aspiration may potentially be less painful, cheaper and technically easier to perform; it can also double as a diagnostic method. Incision and drainage that includes blunt dissection theoretically promotes more effective drainage of the abscess by dissecting through the tissue barriers (septations) that divide the abscess cavity into micro-cavities or loculations. The resulting wide pathway to the oral cavity allows air to enter the depths of the abscess cavity, increasing the oxygen tension that in turn reduces the survival of anaerobic bacteria exposed to air. However, it is a more invasive method and it has been suggested that it may carry a risk of aspiration of purulent material or incisional injury to underlying structures (Khayr 2005; Spires 1987). The method of drainage used may be associated with varying degrees of abscess recurrence, pain and haemorrhage. A review performed by Johnson et al concluded that needle aspiration was the best initial treatment, followed by incision and drainage if needle aspiration failed (Johnson 2003). Since then, additional studies on this subject have been undertaken, making it important to re-evaluate the available evidence. If there is an optimal drainage procedure for peritonsillar abscesses, then it should be adopted widely.

OBJECTIVES

To assess the effectiveness and risks of needle aspiration versus incision and drainage for the treatment of peritonsillar abscess in older children (eight years of age or older), adolescents and adults.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs).

Types of participants

Adult or child patients (of eight years of age or older) with a clinical diagnosis of peritonsillar abscess.

Types of interventions

Needle aspiration versus incision and drainage.

We defined needle aspiration as either a single insertion or multiple insertions of a needle with aspiration during the same clinical procedure. We defined needle aspirations undertaken on subsequent days or during a separate attendance at a healthcare facility on the same day as repeat interventions.

We defined incision and drainage as incision of the pharyngeal mucosa with or without any additional wound exploration to promote drainage. We considered 'confirmatory' needle aspiration immediately prior to this procedure as part of the incision and drainage intervention.

We considered antibiotic therapy as part of the intervention (needle aspiration or incision and drainage), as long as it was available to both treatment groups.

Types of outcome measures

Primary outcomes

We analysed the following outcomes in the review, but we did not use them as a basis for including or excluding studies.

- Recurrence rate (proportion of patients needing repeat intervention)
- Adverse effects/events associated with the interventions

Secondary outcomes

- Time to resumption of normal diet
- Complications of the disease process
- Symptom scores

Search methods for identification of studies

The Cochrane ENT Information Specialist conducted systematic searches for randomised controlled trials and controlled clinical trials. There were no language, publication year or publication status restrictions. The date of the search was 25 August 2016.

Electronic searches

The Information Specialist searched:

- Cochrane ENT Trials Register (searched 25 August 2016);
- Cochrane Central Register of Controlled Trials (CENTRAL 2016, Issue 7);
- Ovid MEDLINE (1946 to 25 August 2016):
  - Ovid MEDLINE (In-Process & Other Non-Indexed Citations);
  - PubMed (as a top up to searches in Ovid MEDLINE);
- Ovid Embase (1974 to 2016 week 34);
- EBSCO CINAHL (1982 to 25 August 2016);
- LILACS, lilacs.bvsalud.org (searched 25 August 2016);
- KoreaMed (searched via Google Scholar 25 August 2016);
- IndMed, www.indmed.nic.in (searched 25 August 2016);
- PakMediNet, www.pakmedinet.com (searched 25 August 2016);
- Web of Knowledge, Web of Science (1945 to 25 August 2016);
- CNKI, www.cnki.com.cn (searched via Google Scholar 25 August 2016);
- ClinicalTrials.gov (searched via the Cochrane Register of Studies 25 August 2016);
- World Health Organization (WHO) International Clinical Trials Registry Platform (ICTRP), www.who.int/ictrp (searched 25 August 2016);
- ISRCTN, www.isrctn.com (searched 25 August 2016);
- Google Scholar, scholar.google.co.uk (searched 25 August 2016);
- Google, www.google.com (searched 25 August 2016).

The Information Specialist modelled subject strategies for databases on the search strategy designed for CENTRAL. Where appropriate, they were combined with subject strategy adaptations of the highly sensitive search strategy designed by Cochrane for identifying randomised controlled trials and controlled clinical trials (as described in the *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0, Box 6.4.b. (Handbook 2011). Search strategies for major databases including CENTRAL are provided in Appendix 1.

Searching other resources

We scanned the reference lists of identified publications for additional trials and contacted trial authors where necessary. In addition, the Information Specialist searched Ovid MEDLINE, the *Cochrane Library* and Google to retrieve existing systematic reviews relevant to this systematic review, so that we could scan their reference lists for additional trials.

Data collection and analysis

Selection of studies

Two authors (BAC and AT) independently reviewed all retrieved articles and determine eligibility based on the inclusion criteria. We resolved disagreements by consensus discussion.

Data extraction and management

Two authors (BAC and AT) independently extracted data from studies using standardised data forms. Briefly, extracted data items included information on study design, study participants, study characteristics, interventions and outcomes. We extracted data so as to allow an intention-to-treat analysis. Where data were missing, we wrote to the authors of the study to request further information.

Assessment of risk of bias in included studies

BAC, AT and DAN undertook assessment of the risk of bias of the trials being considered for inclusion independently, with the following taken into consideration, as guided by the *Cochrane Handbook for Systematic Reviews of Interventions* (Handbook 2011):

- sequence generation;
- allocation concealment;
- blinding;
- incomplete outcome data;
- selective outcome reporting; and
- other sources of bias.

We used the Cochrane 'Risk of bias' tool in RevMan 5.3 (RevMan 2014), which involves describing each of these domains as reported in the trial and then assigning a judgement about the adequacy of each entry: 'low', 'high' or 'unclear' risk of bias. Each review author independently determined whether a study was sufficiently free of bias in each domain and a majority decision determined the ratings given.

Measures of treatment effect

Recurrence (primary outcome) was measured as dichotomous data. We used risk ratios (RR) with 95% confidence intervals to compare data. We planned to use the mean difference to assess continuous data. We had planned to use hazard ratios to assess time-to-event data.

Dealing with missing data

We made attempts to contact original investigators to obtain any missing data. We had planned sensitivity analysis to assess the impact of data that could not be obtained.

Assessment of heterogeneity

We assessed heterogeneity using the I^2 statistic. Roughly, we used the following thresholds as a guide to heterogeneity (RevMan 2014):

- 0% to 40%: might not be important;
- 30% to 60%: may represent moderate heterogeneity;
- 50% to 90%: may represent substantial heterogeneity;
- 75% to 100%: considerable heterogeneity.

We planned meta-analysis for outcomes in which heterogeneity was less than 50%.

Assessment of reporting biases

We had intended the use of funnel plots to assess the potential for reporting (publication) bias, if necessary. However, this was not possible.

Data synthesis

We had intended to use a fixed-effect model if there was minimal heterogeneity in the included studies (less than 30%); otherwise we used a random-effects model.

Subgroup analysis and investigation of heterogeneity

We had planned no subgroup analysis.

Sensitivity analysis

If there was any ambiguity regarding whether studies would meet the inclusion criteria or if study quality was insufficient, then we had intended the use of sensitivity analysis (repetition of the analysis with the inclusion of different data or trials due to decisions that may have been arbitrary or unclear) (Handbook 2011).

GRADE and 'Summary of findings' table

Two authors independently used the GRADE approach to rate the overall quality of evidence. The quality of evidence reflects the extent to which we are confident that an estimate of effect is correct and we applied this in the interpretation of results. There are four possible ratings: high, moderate, low and very low. A rating of high quality of evidence implies that we are confident in our estimate of effect and that further research is very unlikely to change our confidence in the estimate of effect. A rating of very low quality implies that any estimate of effect obtained is very uncertain.

The GRADE approach rates evidence from RCTs that do not have serious limitations as high quality. However, several factors can lead to the downgrading of the evidence to moderate, low or very low. The degree of downgrading is determined by the seriousness of these factors:

- study limitations (risk of bias);
- inconsistency;
- indirectness of evidence;
- imprecision; and
- publication bias.

We included a 'Summary of findings' table, constructed according to the recommendations described in Chapter 10 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Handbook 2011). We included the following outcomes in the 'Summary of findings' table: recurrence rate, adverse effects/events associated with the intervention, time to resumption of normal diet, complications of the disease process and symptom scores.

R E S U L T S

Description of studies

Results of the search

The literature search identified 370 potential records after duplicates were removed. Of these, we deemed 17 eligible for full-text review. We identified one additional article from searching the reference lists of these publications, yielding 18 total studies that we reviewed in full.

Eleven publications fulfilled the review's inclusion criteria (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Stringer 1988; Younas 2015). We included these 11 studies in the review.

We excluded six studies (Fry 1987; Herzon 1995; Khayr 2005; Kulkarni 2013; Stringer 1986; Wolf 1994). See Excluded studies and Characteristics of excluded studies.

One study, Tyagi 2011, is awaiting classification (see Characteristics of studies awaiting classification). Currently, there are no ongoing studies identified.

See Figure 1 for a PRISMA flow diagram depicting the search and study selection process.

Figure 1.   Process for sifting search results and selecting studies for inclusion.
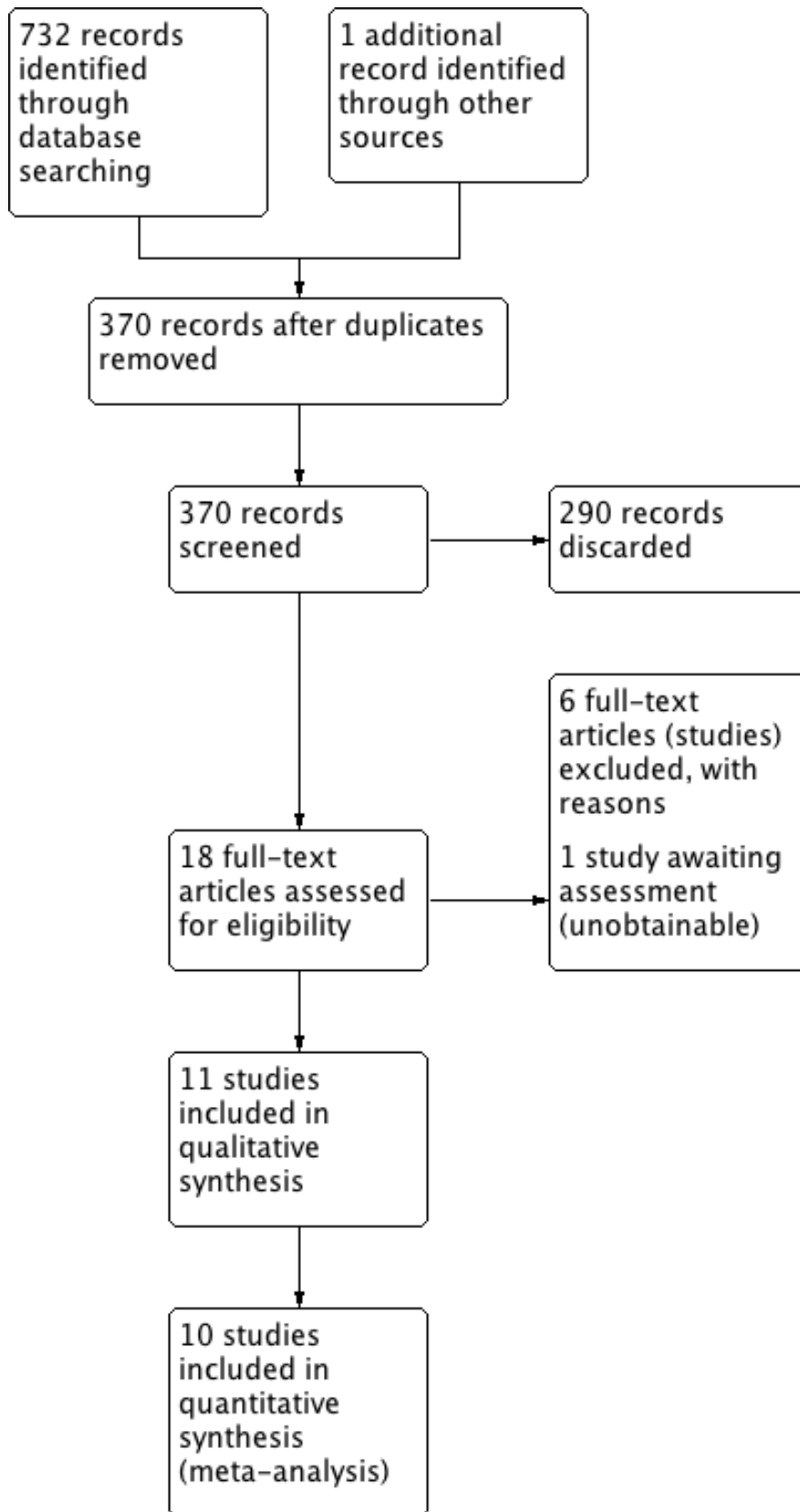
Included studies

See Characteristics of included studies.

Design

All of the included studies were randomised controlled trials; however, three of the studies were quasi-randomised (Khan 2012; Maharaj 1991; Spires 1987). Maharaj 1991 and Khan 2012 allocated patients on an alternate basis. Spires 1987 only randomised a portion of the patients. None of the trials were obviously blinded in terms of the study personnel collecting follow-up data. Intention-to-treat analysis was not specifically carried out.

Sample sizes

The numbers of participants in the included studies were as follows: 62 (Spires 1987), 52 (Stringer 1988), 60 (Maharaj 1991), 75 (only 50 patients were in groups compared in this review) (Nwe 2000), 50 (Rafi 2007), 62 (Khan 2011), 56 (Khan 2012), 50 (Sheikh 2012), 110 (Chi 2014), 62 (Younas 2015) and 60 (Khokhar 2015). Other than Khokhar 2015, no mention was made of sample size calculations in any of the studies to ensure that they were adequately powered.

Setting

Nwe 2000 did not specify the setting of the study, although it was published in South Africa. Otherwise, all included studies took place in a hospital setting. Khan 2011, Khan 2012, Khokhar 2015, Rafi 2007, Sheikh 2012 and Younas 2015 all took place in Pakistan and were undertaken with participants in an inpatient hospital setting. Chi 2014 took place in Taiwan and also had participants admitted to hospital in an inpatient setting. The remaining studies treated patients in an outpatient hospital setting: Maharaj 1991 (South Africa), Spires 1987 (USA) and Stringer 1988 (USA).

Participants

Spires 1987 included patients aged 12 to 53, Stringer 1988 included patients aged 13 to 60, Nwe 2000 included patients aged 15 to 43, Khan 2011 included patients aged 15 to 35, Khan 2012 included patients aged 16 to 50 and Chi 2014 included patients aged 12 to 79. Rafi 2007 included patients aged 22 to 43 and Sheikh 2012 included patients aged 18 to 51. Khokhar 2015 included patients aged 17 to 53. Younas 2015 included patients aged 8 to 57. Maharaj 1991 included patients ranging from "under 14" to "over 40", and did not state how many were male or female. Nwe 2000 had a population that was 67% female; all the other studies had more male than female participants.

Interventions

All 11 studies compared needle aspiration with incision and drainage (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015 Maharaj

1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Stringer 1988, Younas 2015). One study also compared a third group treated only with intravenous antibiotics (Nwe 2000).

Outcomes

Primary outcomes

All studies except one (Younas 2015) reported on recurrence rate (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Stringer 1988). However, the definition of recurrence was not well described. This is summarised in Table 1. Less than half of the studies provided a specific definition for recurrence. There was also wide variability in the method and timing of assessment for recurrence.

Only three studies made reference to plans to identify and report any adverse events/effects associated with the intervention (Chi 2014; Khan 2012; Khokhar 2015).

Secondary outcomes

Time to resumption of normal diet was reported by two studies (Spires 1987; Younas 2015). Complications of the disease process were mentioned in two studies, with Maharaj 1991 reporting two complications (dehydration requiring hospitalisation) and Chi 2014 reporting no complications. Symptom scores were reported by four studies (Chi 2014; Khan 2012; Stringer 1988; Younas 2015), each using different scales. Chi 2014 measured pain intensity one hour after the procedure using a visual analogue score. Khan 2012 had patients grade their score as mild, moderate or severe and measured proportions. Younas 2015 compared the percentage of patients who had resolution of pain by five days after the intervention. Stringer 1988 scored patients according to a scale out of 5 (1 = eating normally, minimal to moderate pain; 2 = eating impaired, moderate pain; 3 = unable to eat solids, moderate to severe pain; 4 = unable to eat solids or liquids, severe pain; 5 = unable to eat solids or liquids, severe pain, volume depletion).

Excluded studies

After initial screening six studies did not meet the inclusion criteria (see Characteristics of excluded studies). One was classified as a retrospective study (Wolf 1994). Two were classified as review papers (Herzon 1995; Khayr 2005). One study was classified as a commentary (Fry 1987). We considered one study (Stringer 1986) an earlier publication of data in one of the included studies (Stringer 1988). One study was found to be non-randomised (Kulkarni 2013).

Risk of bias in included studies

The risk of bias of the included studies is shown in the Characteristics of included studies table and summarised in Figure 2.

Figure 2. 'Risk of bias' summary: review authors' judgements about each risk of bias item for each included study.

Allocation

All 11 included studies were reportedly randomised. However, it was not clear that proper random sequence generation had been used in any of the studies (Chi 2014; Khan 2011; Khan 2012; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Younas 2015), other than Stringer 1988 and Khokhar 2015 who used a random numbers table. Additionally, two studies allocated participants on an alternate basis (Khan 2012; Maharaj 1991), and one based on hospital number (Spires 1987). Allocation concealment was not specified to have been used in any of the studies (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Younas 2015). Stringer 1988 reported not using any allocation concealment.

Blinding

Blinding of participants or study personnel was either not used (Stringer 1988), or not specifically mentioned in any of the included studies (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Younas 2015).

Incomplete outcome data

Most studies did not specifically report losses to follow-up. Several studies had patients admitted to hospital and we assumed in these cases that there were no losses unless specifically stated (Chi 2014; Khan 2011; Khan 2012; Rafi 2007; Sheikh 2012). Maharaj 1991 lost 18% of patients to follow-up on day one and 37% at day seven. Patient losses were unclear in Spires 1987 and Nwe 2000. Khokhar 2015 excluded patients who failed to return for follow-up. No mention of intention-to-treat analysis was made in any of the studies (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Stringer 1988; Younas 2015). In Younas 2015, there was a discrepancy between the number of patients reportedly randomised (62) and the number reported in the results (64); therefore, there is a possibility of incomplete or missing data.

Selective reporting

None of the included studies had published study protocols with pre-specified outcomes. Stringer 1988 communicated that all measured outcomes were reported in the published manuscript and, therefore, we deemed it at low risk of bias in this category. We judged all the other studies to have an unclear risk of bias in this category (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Stringer 1988; Younas 2015).

Other potential sources of bias

We assessed all studies except one (Maharaj 1991) as having an unclear risk of bias in this category due to concerns about methodology. Specifically, five studies did not provide a definition for recurrence or criteria for re-intervention (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Rafi 2007; Spires 1987). Two studies had subjective definitions of recurrence, including persistent trismus (Nwe 2000), "failure to improve visual symptoms score", "visual evidence of a persistent abscess" (Stringer 1988) and "a reduction in supra tonsillar swelling along with decrease in pain and also improvement in odynophagia" (Sheikh 2012). Four studies did not specify the timing of assessment for recurrence (Chi 2014; Khan 2011; Khan 2012; Rafi 2007).

Effects of interventions

See: **Summary of findings for the main comparison** Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess

See Summary of findings for the main comparison.

Primary outcomes

Recurrence rate (proportion of patients needing repeat intervention)

Ten out of 11 of the included studies reported recurrence rate following needle aspiration versus incision and drainage (Chi 2014; Khan 2011; Khan 2012; Khokhar 2015; Maharaj 1991; Nwe 2000; Rafi 2007; Sheikh 2012; Spires 1987; Stringer 1988). There was wide variability in the recurrence rate in both groups. Recurrence in the needle aspiration group ranged from 4.9% to 80.0%. In the incision and drainage group recurrence ranged from 0% to 20%. The studies that reported recurrence all reported a comparable or higher recurrence rate with needle aspiration.

Timing of assessment for recurrence was inconsistent. Specifically, timing of assessment for recurrence ranged from one day to seven days for initial post-intervention assessment. The timing of follow-up was not actually specified in four of the studies (Chi 2014; Khan 2011; Khan 2012; Rafi 2007). One study did not specifically report recurrence rate (Younas 2015). An "initial success rate" was reported; however, this was not defined.

When we pooled data from the 10 studies the recurrence rate was higher in the needle aspiration group compared with incision and drainage: risk ratio (RR) 3.74 (95% confidence interval (CI) 1.63 to 8.59; 612 participants). We detected moderate heterogeneity in this analysis (I^2 = 48%). In interpreting the pooled result it is important to note that the quality of evidence for this outcome was *very low*.

Adverse effects/events associated with the interventions

Only one study reported an adverse outcome associated with the intervention (Khan 2012). In this study "reactionary haemorrhage" was described in one of 28 patients (3.6%) in the incision and drainage group. Chi 2014 and Khokhar 2015 stated that no complications were seen in either group. No other studies reported characterising adverse effects/events associated with the intervention.

Secondary outcomes

Time to resumption of normal diet

Two studies specifically compared time to resumption of normal diet (Spires 1987; Younas 2015). Spires 1987 found no difference in the average time to resumption of a normal diet between the needle aspiration versus the incision and drainage group (3.7 days, range 1 to 14 days in the needle aspiration group versus 3.7 days, range 1 to 10 days in the incision and drainage group; no standard deviation or statistics provided). Younas 2015 compared the percentage of patients that had returned to a semisolid or solid diet within a certain time frame. They found that 87% of patients treated with needle aspiration returned to semisolid food within two days and solid food within four days. Comparatively, they found that 88% of patients treated with needle aspiration returned to semisolid food by two days and solid food by four days. Two studies described "duration of symptoms" (Stringer 1988) or

"period of recovery" (Rafi 2007), but did not specifically define these terms.

Complications of the disease process

Complications relating to the disease process were generally not reported. Only one study described a complication in two patients (6.7%) who required admission to hospital for dehydration (following incision and drainage) (Maharaj 1991). Chi 2014 stated that no complications were seen in either group. No other study specifically reported measuring complications of the disease process.

Symptom scores

Pain

Two studies reported on pain associated with the intervention. Chi 2014 reported pain intensity one hour after the procedure with visual analogue scores (out of 10) and found a statistically lower amount of pain in the needle aspiration group (4.5 ± 0.8 in the needle aspiration group versus 5.3 ± 1.1 in the incision and drainage group; mean difference (MD) -0.8, 95% CI -1.16 to -0.44, 10-point scale). Khan 2012 compared postoperative pain as measured by a "mild/moderate/severe" subjective grade. They reported a statistically significant higher proportion of patients with higher pain scores in the incision and drainage group (needle aspiration: 50.0% mild, 28.6% moderate, 21.4% severe; incision and drainage: 17.9% mild, 21.4% moderate, 60.7% severe; P < 0.01). Outcome measures for these two studies were not comparable and, therefore, meta-analysis was not possible. Younas 2015 reported on pain five days after the intervention: 75% of patients in the needle aspiration group had no pain, whereas 78% of patients treated with incision and drainage had no pain.

Other symptoms

One study reported symptom scores that were not directly related to procedural pain (Stringer 1988). This study reported symptom scores at presentation and 48 hours (1 = eating normally, minimal to moderate pain; 2 = eating impaired, moderate pain; 3 = unable to eat solids, moderate to severe pain; 4 = unable to eat solids or liquids, severe pain; 5 = unable to eat solids or liquids, severe pain, volume depletion). They found averages of 3.4 (needle aspiration) versus 3.3 (incision and drainage) at presentation and 1.3 (needle aspiration) versus 1.4 (incision and drainage), and complete resolution of symptoms at 10 days post-treatment in all groups (no statistics or confidence intervals provided).

D I S C U S S I O N

Summary of main results

Peritonsillar abscess is one of the most common ear, nose and throat (ENT) emergencies presenting to acute ENT services and more often than not requires a procedural intervention as the mode of treatment. Despite this, there remains uncertainty about which technique - needle aspiration or incision and drainage - is more effective. There is an absence of high-quality evidence to show whether or not one technique is superior to the other. There is *very low-quality* evidence to suggest that there is a lower recurrence rate with incision and drainage compared with needle aspiration. At the same time, *very low-quality* evidence also suggests that needle aspiration may be less painful than incision and drainage. There is an absence of evidence to answer questions about adverse effects/

events associated with the intervention, time to resumption of normal diet, complications of the disease process and symptom scores for factors other than pain.

Overall completeness and applicability of evidence

Data from the studies identified are insufficient to allow us to address all of the objectives of this review and produce a clear and decisive answer. The included studies have enrolled the relevant types of participants. Whilst the studies do evaluate the interventions we sought to include, in some cases those interventions were part of a treatment plan involving periods of hospitalisation and courses of intravenous or oral antibiotics (or both) of varying length. This is relevant because in some healthcare settings patients are almost invariably managed as outpatients without being admitted to hospital. Not all outcomes that we felt were important had been investigated in the included studies. More significantly, the failure to define 'recurrence' and to include comprehensive information about the timing of any recurrence or its identification makes the evidence base incomplete. In all cases, for those outcomes for which we found data, the evidence was of *very low quality*.

There are likely to be geographic or institutional differences in the presentation of peritonsillar abscess. Six out of 11 studies originated from the same country (Pakistan) (see Characteristics of included studies). Different microbial patterns and choice of antimicrobial agents in different geographic areas could theoretically influence recurrence rates. The different settings in which patients were treated in the included studies highlights the potential for variation through different management protocols; over half of the included studies managed patients in an inpatient setting. Other factors of relevance include the likelihood of seeking medical attention, access to medical care and costs or thresholds for performing a repeat intervention.

In this review, we have not compared other treatment options for the management of patients with a peritonsillar abscess. So called 'quinsy tonsillectomy' or 'hot tonsillectomy' is another option available for treatment. We have not compared quinsy tonsillectomy, given that it is less commonly performed as a first-line treatment (Qureshi 2015), and that different practical considerations guide the decision to perform it (such as patient age and operating room resources). We have also not compared non-interventional options, such as antibiotic therapy alone. This was done in order to answer a specific clinical question of interest, as opposed to exploring all the available options for treating peritonsillar abscesses.

Quality of the evidence

Overall, the quality of evidence is *very low* for all the included outcomes (assessed using the GRADE criteria, see Summary of findings for the main comparison). The high risk of bias and flawed design of the studies reviewed is apparent when they are analysed using the Cochrane 'Risk of bias' tool (Figure 2). The descriptions of the methods used in most studies lacked the detail required to assess risk of bias completely. None of this review's predetermined outcome measures were well assessed by any of the trials. The specific criteria for determining recurrence were poorly defined in all of the studies.

A number of studies included in this review had recurrence rates higher than we might normally expect from day-to-day practice. In one study, the needle aspiration group had a recurrence rate as high as 80% (Rafi 2007). Khan 2012 had a recurrence rate as high as 64% in the needle aspiration group. Several studies had recurrence rates over 20% in the needle aspiration group (Khan 2011; Nwe 2000; Sheikh 2012). These recurrence rates differ significantly from the recurrence rates reported in other published studies and from our experience. In the review by Powell 2012, an overall recurrence rate for peritonsillar abscess of ˜10% was estimated with either needle aspiration or incision and drainage. This raises the question of the competence of the clinician or practitioner managing the condition and the criteria for defining recurrence, as well as the question of regional differences in peritonsillar abscess presentation and management. Ideally, recurrence should be confirmed by evidence of pus at a repeat incision or needle aspiration procedure. The absence of clearly stated diagnostic criteria for peritonsillar abscess recurrence in the studies makes it impossible to determine whether the same patients presenting to another clinician would be diagnosed as suffering from a recurrence or the more common post-inflammatory oedema associated with a recent abscess.

The heterogeneity encountered in our assessment of recurrence rate, whilst only moderate (I^2 = 48%), merits further discussion. As mentioned earlier, most of the studies did not clearly define 'recurrence' and varied widely in the timing of post-intervention recurrence assessment. Only four of the 10 studies that measured recurrence provided a definition for what constituted 'recurrence' or specified criteria for re-intervention. Definitions of recurrence included visual evidence of swelling (Stringer 1988), persistence of pyrexia/trismus (Nwe 2000), or persistent odynophagia (Sheikh 2012). Only one study defined recurrence with reference to the review's definition of an abscess, that is as "reaccumulation of pus" (Maharaj 1991). This study did not describe how the presence of pus was determined. Therefore, 'recurrence' in the studies reviewed could be anything along a spectrum from simply some residual symptoms to true reaccumulation of pus. Additionally, the timing of post-treatment assessment for recurrence was not stated in four of the studies and was variable amongst the remaining studies (ranging from post-procedure day 1 to 7). The inter-study variation in the timing of post-treatment review and the criteria used to diagnose peritonsillar abscess recurrence raises the question of whether 'recurrence' – unless much more clearly defined – is a valid outcome metric. Inter-study methodological variation could account for the majority of the heterogeneity in recurrence rates. However, other factors may have contributed; it would be reasonable to postulate that clinical variability also contributed to the heterogeneity, given that there was wide inter-study variation in treatment setting and adjunctive variables.

There is inherent operator variability in the delivery of the primary intervention itself. In many settings care for patients with quinsy is delivered by relatively junior doctors. We have defined the interventions as above (Types of interventions). However, differences in operator skill may partly explain differences in the outcome of the interventional studies. Variation in the timing of patient presentation for health care, co-treatment factors such as antibiotic choice, and access and compliance with the prescribed antibiotic regimen in these studies, which are drawn from countries with divergent healthcare resources, may also account for heterogeneous outcomes. Limited methodological descriptions and our inability to gain further information from the authors make it difficult to explore these possible explanations.

One of the theoretical arguments against incision and drainage is that it is a more painful procedure for patients. Given that incision and drainage often involves a diagnostic needle aspiration in addition to further procedural intervention, it is understandable that this theory exists. In our review, two studies (n = 166) did suggest that subjective pain scores were higher in patients who underwent incision and drainage compared to needle aspiration (Chi 2014; Khan 2012). One study showed comparable resolution of pain at five days post-treatment (Younas 2015). Given that this was assessed at five days after the procedure, it is difficult to separate the pain associated with the procedure from the resolution of pain associated with improvement of the disease process. Different measurement scales made pooled analysis impractical. However, the data are of limited quality for the reasons mentioned above and, therefore, this remains unclear.

Potential biases in the review process

We think it is unlikely that there have been significant biases in the review process itself. Whilst it is likely that all or most relevant studies have been identified, our failure to identify useable data from each included study has been universal. A few minor post hoc changes to the methods we had planned at protocol stage (Chang 2014) are described in Differences between protocol and review.

AUTHORS' CONCLUSIONS

Implications for practice

Currently, only *very low-quality evidence* is available to determine whether needle aspiration or incision and drainage is most effective for treating peritonsillar abscess. This suggests that incision and drainage is associated with a lower recurrence rate. The absence of high-quality evidence results in a dilemma for practitioners and patients. Through shared and informed decision-making, practitioners and patients must balance the potential - but uncertain - benefit of an incision and drainage procedure, which *may* be more painful, against needle aspiration, which may have of a greater chance of recurrence but be potentially less painful.

Implications for research

A sufficiently powered, well-designed, high-quality study is required to compare the effectiveness of needle aspiration with incision and drainage for the treatment of peritonsillar abscesses. If a randomised controlled clinical trial were conducted, it would be useful to compare recurrence (in a strictly defined manner), adverse events/effects associated with the intervention, time until resumption of normal diet, complications of the disease process and symptom scores.

ACKNOWLEDGEMENTS

necessarily reflect those of the Systematic Reviews Programme, NIHR, NHS or the Department of Health.

Keir J, Almeyda R, Bowyer D and Wilbourn M were authors of the original protocol (withdrawn in 2011). New authors took over the review in 2014, publishing a new protocol (Chang 2014).

REFERENCES

References to studies included in this review

Chi 2014 *{published data only}*

Chi TH, Yuan CH, Tsao YH. Comparison of needle aspiration with incision and drainage for the treatment of peritonsillar abscess. *WIMJ Open* 2014;**1**(1):11-3.

Khan 2011 *{published data only}*

Khan Q, Hamza A, Haleem G, Wahid FI. Comparative study of management of peritonsillar abscess by needle aspiration versus incision and drainage. *Pakistan Journal of Medical & Health Sciences* 2011;**5**(4):699-701.

Khan 2012 *{published data only}*

Khan MI, Iqbal K, Muhammad. Peritonsillar abscess: comparison of outcome of incision and drainage versus needle aspiration. *Gomal Journal of Medical Sciences* 2012;**10**(2):205-8.

Khokhar 2015 *{published data only}*

Khokhar MR, Raza SN, Ayaz SB. Comparison of efficacy of needle aspiration versus incision and drainage in management of peritonsillar abscess. *Pakistan Armed Forces Medical Journal* 2015;**65**:172-7.

Maharaj 1991 *{published data only}*

Maharaj D, Rajah V, Hemsley S. Management of peritonsillar abscess. *Journal of Laryngology and Otology* 1991;**105**:743-5.

Nwe 2000 *{published data only}*

Nwe TT, Singh B. Management of pain in peritonsillar abscess. *Journal of Laryngology and Otology* 2000;**114**:765-7.

Rafi 2007 *{published data only}*

Rafi T, Farooq MU, Sheikh HU. Comparative study of management of peritonsillar abscess by needle aspiration versus incision and drainage. *Journal of Surgery Pakistan* 2007;**12**(3):126-8.

Sheikh 2012 *{published data only}*

Sheikh ZA, Najam A, Ahmed A. Needle aspiration an equal to incision and drainage in management of peritonsillar abscess. *Pakistan Armed Forces Medical Journal* 2012;**62**(2):online.

Spires 1987 *{published data only}*

Spires JR, Owens JJ, Woodson GE, Miller RH. Treatment of peritonsillar abscess. *Archives of Otolaryngology - Head & Neck Surgery* 1987;**113**:984-6.

Stringer 1988 *{published data only}*

Stringer SP, Schaefer SD, Close LG. A randomized trial for outpatient management of peritonsillar abscess. *Archives of Otolaryngology - Head & Neck Surgery* 1988;**114**(3):296-8.

Younas 2015 *{published data only}*

Younas M. Satisfaction of patients with peritonsillar abscess with permucosal needle aspiration versus incision & drainage. *Medical Forum Monthly* 2015;**26**(3):37-9.

References to studies excluded from this review

Fry 1987 *{published data only}*

Fry TL. A randomized trial for outpatient management of peritonsillar abscess. *Archives of Otolaryngology -- Head and Neck Surgery* 1987;**113**(1):19.

Herzon 1995 *{published data only}*

Herzon FS. Peritonsillar abscess: incidence, current management practices, and a proposal for treatment guidelines. *Laryngoscope* 1995;**105**:1-17.

Khayr 2005 *{published data only}*

Khayr W, Taepke J. Management of peritonsillar abscess: needle aspiration versus incision and drainage versus tonsillectomy. *American Journal of Therapeutics* 2005;**12**:344-50.

Kulkarni 2013 *{published data only}*

Kulkarni V, Patel T. Management of peritonsillar abscess: comparative prospective study of needle aspiration and incision & drainage in central Indian population. *Asian Journal of Biomedical and Pharmaceutical Sciences* 2013;**3**(18):61-3.

Stringer 1986 *{published data only}*

Stringer SP, Schaefer SD, Close LG. A randomized trial for outpatient management of peritonsillar abscess. *Otolaryngology - Head and Neck Surgery* 1986;**114**(3):296-8.

Wolf 1994 *{published data only}*

Wolf M, Even-Chen I, Kronenberg J. Peritonsillar abscess: repeated needle aspiration versus incision and drainage. *Annals of Otology, Rhinology & Laryngology* 1994;**103**(7):554-7.

References to studies awaiting assessment

Tyagi 2011 *{published data only}*

Tyagi V, Kaushal A, Garg D, De S, Nagpure P. Treatment of peritonsillar abscess: a prospective study of aspiration versus incision and drainage. *Calcutta Medical Journal* 2011;**9**(3):e3.

Additional references

Hall 1990

Hall SF. Peritonsillar abscess: the treatment options. *Journal of Otolaryngology* 1990;**19**:226-9.

Handbook 2011

Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Johnson 2003

Johnson RF, Stewart MG, Wright CC. An evidence based review of the treatment of peritonsillar abscess. *Otolaryngology - Head and Neck Surgery* 2003;**128**(3):332-43.

Johnson 2005

Johnson RF, Stewart MG. The contemporary approach to diagnosis and management of peritonsillar abscess. *Current Opinion in Otolaryngology & Head and Neck Surgery* 2005;**13**:157-60.

Mehanna 2002

Mehanna HM, Al-Bahnasawi L, White A. National audit of the management of peritonsillar abscess. *Postgraduate Medical Journal* 2002;**78**(923):545-8.

Ong 2004

Ong YK, Goh YH, Lee YL. Peritonsillar infections: local experience. *Singapore Medical Journal* 2004;**45**(3):105-9.

Powell 2012

Powell J, Wilson JA. An evidence-based review of peritonsillar abscess. *Clinical Otolaryngology* 2012;**37**(2):136-45. [PUBMED: 22321140]

Qureshi 2015

Qureshi H, Ference E, Novis S, Pritchett CV, Smith SS, Schroeder JW. Trends in the management of pediatric peritonsillar abscess infections in the U.S., 2000-2009. *International Journal of Pediatric Otorhinolaryngology* 2015;**79**(4):527-31.

RevMan 2014 [Computer program]

The Nordic Cochrane Centre, The Cochrane Collaboration. Review Manager (RevMan). Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2014.

References to other published versions of this review

Chang 2014

Chang BA, Thamboo A, Diamond C, Nunez DA. Needle aspiration versus incision and drainage for the treatment of peritonsillar abscess. *Cochrane Database of Systematic Reviews* 2014, Issue 7. [DOI: 10.1002/14651858.CD006287.pub3]

CHARACTERISTICS OF STUDIES

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

Chi 2014

Methods	**Allocation:** randomised trial
	Design: parallel-group
Participants	**Number randomised:** 110
	Age range: 12 to 79
	Gender: 89% males
	Setting: hospital, Taiwan
	Inclusion criteria: diagnosis of peritonsillar abscess
	Exclusion criteria: none stated
	Participant characteristics: mean age = 31.0 ± 15.0 years, days of symptoms prior to presentation = 4.7 ± 2.8
Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 55
	Comparator group: incision and drainage
	n = 55
	Use of additional interventions: antibiotics, intravenous hydration
Outcomes	1. Recurrence rate
	2. Length of hospital stay
	3. Pain score

Cochrane
Library

Trusted evidence.
Informed decisions.
Better health.

Cochrane Database of Systematic Reviews

Chi 2014 *(Continued)*

(Outcomes not specified as primary/secondary)

Funding sources	Not specified
Declarations of interest	Not specified
Notes	**Participants lost to follow-up:** none

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence genera-tion (selection bias)	Unclear risk	Quote: "Patients were randomly divided into two groups..." Comment: specific method of randomisation not stated
Allocation concealment (selection bias)	Unclear risk	Allocation concealment not specified
Blinding of participants and personnel (perfor-mance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome as-sessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients presumably accounted for (admitted as inpatients); no dropouts stated
Selective reporting (re-porting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias. Incomplete methodological de-scription (definition of recurrence/criteria for re-intervention not described, timing of assessment for recurrence not described).

Khan 2011

Methods	**Allocation:** randomised trial, alternation **Design:** parallel-group
Participants	**Number randomised:** 62 **Age range:** 15 to 35 **Gender:** 74% males **Setting:** hospital, Pakistan **Inclusion criteria:** not specifically stated **Exclusion criteria:** other associated illness **Participant characteristics:** mean age = 24.6 years

Khan 2011 *(Continued)*

Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 31
	Comparator group: incision and drainage
	n = 31
	Use of additional interventions: antibiotics (injection benzyl penicillin and metronidazole), analgesics
Outcomes	1. Recurrence rate
	2. Length of hospital stay
	(Outcomes not specified as primary/secondary)
Funding sources	Not specified
Declarations of interest	Not specified
Notes	Needle aspiration failures treated with incision and drainage
	Participants lost to follow-up: none

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation method not specified
Allocation concealment (selection bias)	Unclear risk	No allocation concealment specified
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients presumably accounted for (admitted as inpatients); no dropouts stated
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias. Incomplete methodological description (definition of recurrence/criteria for re-intervention not described, timing of assessment for recurrence not described).

Khan 2012

Methods	**Allocation:** randomised trial, alternation
	Design: parallel-group
Participants	**Number randomised:** 56
	Age range: 16 to 50
	Gender: 71% males
	Setting: hospital, Pakistan
	Eligibility criteria: age > 15 years with peritonsillar abscess
	Exclusion criteria: patients with bleeding disorders, acute follicular tonsillitis
	Participant characteristics: mean age = 31.2 years
Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 28
	Comparator group: incision and drainage
	n = 28
	Use of additional interventions: antibiotics (intravenous amoxicillin/clavulanate and metronidazole), povidone-iodine (Pyodine) mouth wash, intravenous crystalloid (if necessary)
Outcomes	1. Recurrence rate
	2. Symptom score
	3. Length of hospital stay
	(Outcomes not specified as primary/secondary)
Funding sources	None stated
Declarations of interest	None declared
Notes	Alternate basis randomisation
	Participants lost to follow-up: none

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Alternate basis randomisation
Allocation concealment (selection bias)	High risk	Alternate basis randomisation
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding made; probably not done

Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients presumably accounted for (admitted as inpatients); no dropouts stated
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias. Incomplete methodological description (definition of recurrence/criteria for re-intervention not described, timing of assessment for recurrence not described)

Khokhar 2015

Methods	**Allocation:** randomised trial
	Design: parallel-group
Participants	**Number** randomised: 70 (data reported on 60)
	Age range: 17 to 53
	Gender: 76.7% males
	Setting: military hospital, Pakistan
	Inclusion criteria: "clinical diagnosis of PTA was made on clinical features of unitonsillar erythema, swelling, odynophagia (pain on swallowing), uvular deviation towards the opposite direction and trismus", age ≥ 15
	Exclusion criteria: "patients with a history of bleeding disorders or diabetes mellitus, on anticoagulant drugs or diagnosed with immunodeficiency disorders or who refused to undergo the procedure under local anesthesia"; "Patients failing to follow up were excluded from this study"
	Participant characteristics: mean age 32.7
Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 35
	Comparator group: incision and drainage
	n = 35
	Use of additional interventions:
	Use of additional interventions: antibiotics and analgesia ((a) co-amoxiclav 1.2 g intravenously 8-hourly and metronidazole 500 mg intravenously 8-hourly for 3 days, followed by oral co-amoxiclav 1 g twice daily and metronidazole 400 mg 3 times a day for the next 4 days, (b) paracetamol 1 g 8-hourly orally "for fever and analgesia")
Outcomes	1. Time of resolution of odynophagia (days)
	2. Fever – time to resolution (days)

Khokhar 2015 *(Continued)*

Above information used to define "Recovery period" as "time taken to settle both odynophagia and fever"

3. Recurrence

4. Complications

Funding sources	Not specified
Declarations of interest	None declared
Notes	**Participants lost to follow-up:** "Patients failing to follow up were excluded from this study"

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Used a "random numbers table"
Allocation concealment (selection bias)	Unclear risk	Not certain if random numbers table was open
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding; probably not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	1. "Patients, who had cultured organisms resistant to [the] antibiotics [named above] were excluded from the study" 2. "Patients failing to follow up were excluded from this study"
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias

Maharaj 1991

Methods	**Allocation:** randomised, alternation **Design:** parallel-group
Participants	**Number randomised:** 60 **Age range:** "under 14" to "over 40" **Gender:** not specified **Setting:** hospital, South Africa **Inclusion criteria:** positive needle aspiration

Maharaj 1991 *(Continued)*

	Exclusion criteria: negative needle aspiration
	Participant characteristics: mean age not provided, "all patients presented with some degree of odynophagia and drooling of saliva", 47% had trismus and 27% had pyrexia
Interventions	Needle aspiration versus incision and drainage **Intervention group: needle aspiration** n = 30 **Comparator group: incision and drainage** n = 30 **Use of additional interventions:** antibiotics (penicillin), analgesics, mouthwash (unspecified)
Outcomes	1. Recurrence rate (Outcomes not specified as primary/secondary)
Funding sources	Not specified
Declarations of interest	Not specified
Notes	**Participants lost to follow-up:** 11 (18%) at day 1, 22 (37%) at day 7

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Randomised on alternate basis
Allocation concealment (selection bias)	High risk	Randomised on alternate basis
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	High risk	82% of patients followed up on day 1 post-treatment and 63% followed up on day 7
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Low risk	No other sources of bias identified

Nwe 2000

Methods	**Allocation:** randomised trial

Nwe 2000 *(Continued)*

	Design: parallel-group
Participants	**Number randomised:** 75 (only 50 patients were in groups compared in this review)
	Age range: 15 to 43
	Gender: 33% males
	Setting: South Africa
	Inclusion criteria: not described
	Exclusion criteria: none stated
	Participant characteristics: "unilateral swelling of the tonsil and soft palate, and medial displacement of the uvula", "all patients were pyrexial"
Interventions	Needle aspiration versus incision and drainage versus intravenous antibiotics alone
	Intervention group: intravenous antibiotics
	n = 25
	Comparator group 1: needle aspiration
	n = 25
	Comparator group 2: incision and drainage
	n = 25
	Use of additional interventions: single dose of intravenous antibiotics
Outcomes	1. Distance between upper and lower incisor teeth (degree of trismus)
	2. Body temperature
	3. Ability to drink water
	4. Microbiology cultures
	5. Treatment failures (recurrence)
Funding sources	None stated
Declarations of interest	None declared
Notes	**Participants lost to follow-up:** unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation method not specified
Allocation concealment (selection bias)	Unclear risk	No allocation concealment specified
Blinding of participants and personnel (performance bias)	High risk	No mention of blinding made; probably not done

Cochrane
Library

Trusted evidence.
Informed decisions.
Better health.

Cochrane Database of Systematic Reviews

Nwe 2000 *(Continued)*

All outcomes

Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition not clear, dropouts not mentioned
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias

Rafi 2007

Methods	**Allocation:** randomised trial **Design:** parallel-group
Participants	**Number randomised:** 50 **Age range:** 22 to 43 **Gender:** 94% males **Setting:** hospital, Pakistan **Inclusion criteria:** "peritonsillar abscess" **Exclusion criteria:** none stated **Participant characteristics:** "all the patients were otherwise healthy and young with no immune compromising disease", no patients with previous peritonsillar abscess
Interventions	Needle aspiration versus incision and drainage **Intervention group:** needle aspiration n = 25 **Comparator group:** incision and drainage n = 25 **Use of additional interventions:** antibiotics (lincomycin)
Outcomes	1. Recurrence rate 2. Length of hospital stay 3. "Period of recovery" (Outcomes not specified as primary/secondary)
Funding sources	Not specified
Declarations of interest	Not specified

Rafi 2007 *(Continued)*

Notes	**Participants lost to follow-up:** none

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation method not specified
Allocation concealment (selection bias)	Unclear risk	No allocation concealment specified
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients presumably accounted for (admitted as inpatients); no dropouts stated
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias. Incomplete methodological description (definition of recurrence/criteria for re-intervention not described, timing of assessment for recurrence not described)

Sheikh 2012

Methods	**Allocation:** randomised trial **Design:** parallel-group
Participants	**Number randomised:** 50 **Age range:** 18 to 51 **Gender:** 62% males **Setting:** hospital, Pakistan **Inclusion criteria:** "presented with peritonsillar abscess" **Exclusion criteria:** diabetics, less than 18 years old **Participant characteristics:** mean age = 32.7 years
Interventions	Needle aspiration versus incision and drainage **Intervention group: needle aspiration** n = 25

Sheikh 2012 *(Continued)*

	Comparator group: incision and drainage
	n = 25
	Use of additional interventions: antibiotics, chlorhexidine mouth wash
Outcomes	**Primary outcome:** recurrence rate
	Secondary outcomes: none
Funding sources	Not specified
Declarations of interest	Not specified
Notes	Needle aspiration failures treated with incision and drainage
	Participants lost to follow-up: none

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation method not specified
Allocation concealment (selection bias)	Unclear risk	No allocation concealment specified
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients presumably accounted for (admitted as inpatients); no dropouts stated
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risk of bias. Subjective definition of recurrence/criteria for re-intervention

Spires 1987

Methods	**Allocation:** randomised trial
	Design: parallel-group
Participants	**Number randomised:** 62
	Age range: 12 to 53
	Gender: "2:1 male predilection"

Spires 1987 *(Continued)*

	Setting: hospital, USA
	Inclusion criteria: not specified
	Exclusion criteria: not specified
	Participant characteristics: median age = 24; 1 patient with bilateral abscesses
Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 41
	Comparator group: incision and drainage
	n = 21
	Use of additional interventions: analgesics, antibiotics (penicillin V or cephalexin or erythromycin)
Outcomes	1. Recurrence rate
	2. Time to resumption of normal diet
	(Outcomes not specified as primary/secondary)
Funding sources	Not specified
Declarations of interest	Not specified
Notes	Only partial randomisation
	Participants lost to follow-up: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence genera-tion (selection bias)	High risk	First 15 participants treated with needle aspiration, then patients were subse-quently randomised
Allocation concealment (selection bias)	High risk	Randomised by hospital number
Blinding of participants and personnel (perfor-mance bias) All outcomes	High risk	No mention of blinding made; probably not done
Blinding of outcome as-sessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition not clear, dropouts not mentioned
Selective reporting (re-porting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk

Spires 1987 *(Continued)*

Other bias	Unclear risk	Not enough data to assess other risk of bias. Incomplete methodological description (definition of recurrence/criteria for re-intervention not described)

Stringer 1988

Methods	**Allocation:** randomised trial
	Design: parallel-group
Participants	**Number randomised:** 52
	Age range: 13 to 60
	Gender: 60% males
	Setting: hospital, USA
	Inclusion criteria: positive needle aspiration
	Exclusion criteria: negative needle aspiration
	Participant characteristics: mean age = 27 years average duration of symptoms prior to presentation = 5.3 days
Interventions	Needle aspiration versus incision and drainage
	Intervention group: needle aspiration
	n = 24
	Comparator group: incision and drainage
	n = 28
	Use of additional interventions: antibiotics (initial dose of intramuscular penicillin G followed by intramuscular penicillin G or oral penicillin V for 10 days), erythromycin/cephalosporin/clindamycin if allergic
Outcomes	1. Recurrence rate
	2. Symptom score
	(Outcomes not specified as primary/secondary)
Funding sources	Not specified
Declarations of interest	Not specified
Notes	Authors contacted and further information/clarification obtained
	Participants lost to follow-up: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random numbers table

Stringer 1988 *(Continued)*

Allocation concealment (selection bias)	High risk	No allocation concealment performed
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding not performed
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding made; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	No dropouts mentioned
Selective reporting (reporting bias)	Low risk	All measured outcomes stated to have been reported
Other bias	Unclear risk	Not enough data to assess other risk of bias. Subjective definition of recurrence/criteria for re-intervention.

Younas 2015

Methods	**Allocation:** randomised trial **Design:** parallel-group
Participants	**Number randomised:** 62 (discrepant total = 64 in results) **Age range:** 8 to 57 **Gender:** 61.3% male **Setting:** hospital, Pakistan **Eligibility criteria:** "clinically diagnosed for peritonsillar abscess" **Exclusion criteria:** none stated **Participant characteristics:** average duration of symptoms prior to presentation = 6 days; 84% treated with antibiotics prior to presentation
Interventions	**Intervention group:** needle aspiration n = 32 **Intervention group:** incision and drainage n = 32 **Use of additional interventions:** not stated
Outcomes	1. "Success" – not defined 2. Length of time to return to semisolid/solid food (days) 3. Proportion with "no pain by 05 days" (%)

Younas 2015 *(Continued)*

4. Length of hospital stay (days)

Funding sources	Not specified
Declarations of interest	Not specified
Notes	**Participants lost to follow-up:** unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Randomisation method not specified
Allocation concealment (selection bias)	Unclear risk	No allocation concealment specified
Blinding of participants and personnel (performance bias) All outcomes	High risk	No mention of blinding; probably not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention of blinding; probably not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition not clear; dropouts not mentioned; numbers in methods and results do not match
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit a judgement of high or low risk
Other bias	Unclear risk	Not enough data to assess other risks of bias

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

Study	Reason for exclusion
Fry 1987	Commentary
Herzon 1995	Review paper
Khayr 2005	Review paper
Kulkarni 2013	Participants were not randomised: "All patients were divided in two groups according to surgical procedures carried out". While the study states that this was a prospective study, it seems that outcomes were assessed retrospectively.
Stringer 1986	Considered a duplicate publication of Stringer 1988
Wolf 1994	Retrospective study

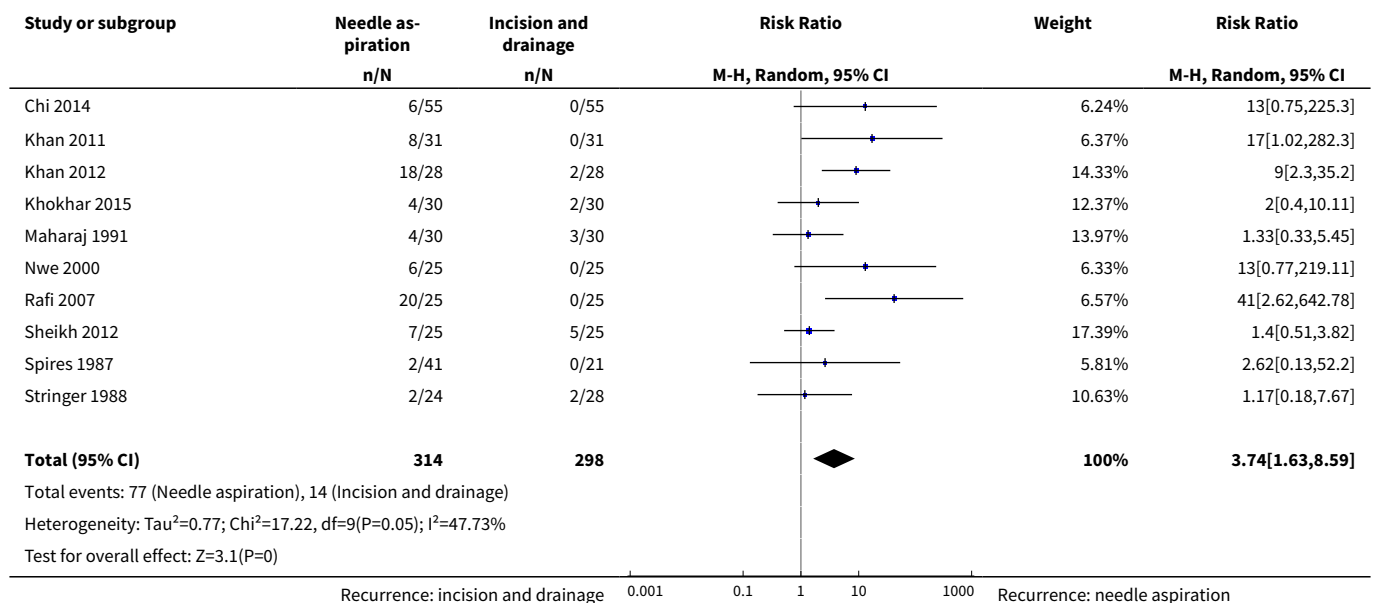## Characteristics of studies awaiting assessment [ordered by study ID]

Tyagi 2011

Methods	—
Participants	—
Interventions	—
Outcomes	—
Notes	Study not available at this time. This study was inaccessible by all attempted means, including contact with the journal editor

DATA AND ANALYSES

Comparison 1. Needle aspiration versus incision and drainage

Outcome or subgroup title	No. of studies	No. of partici-pants	Statistical method	Effect size
1 Rate of recurrence	10	612	Risk Ratio (M-H, Random, 95% CI)	3.74 [1.63, 8.59]

Analysis 1.1. Comparison 1 Needle aspiration versus incision and drainage, Outcome 1 Rate of recurrence.

Study or subgroup	Needle as-piration	Incision and drainage	Risk Ratio	Weight	Risk Ratio
	n/N	n/N	M-H, Random, 95% CI		M-H, Random, 95% CI
Chi 2014	6/55	0/55		6.24%	13[0.75,225.3]
Khan 2011	8/31	0/31		6.37%	17[1.02,282.3]
Khan 2012	18/28	2/28		14.33%	9[2.3,35.2]
Khokhar 2015	4/30	2/30		12.37%	2[0.4,10.11]
Maharaj 1991	4/30	3/30		13.97%	1.33[0.33,5.45]
Nwe 2000	6/25	0/25		6.33%	13[0.77,219.11]
Rafi 2007	20/25	0/25		6.57%	41[2.62,642.78]
Sheikh 2012	7/25	5/25		17.39%	1.4[0.51,3.82]
Spires 1987	2/41	0/21		5.81%	2.62[0.13,52.2]
Stringer 1988	2/24	2/28		10.63%	1.17[0.18,7.67]
Total (95% CI)	**314**	**298**		**100%**	**3.74[1.63,8.59]**

Total events: 77 (Needle aspiration), 14 (Incision and drainage)

Heterogeneity: Tau²=0.77; Chi²=17.22, df=9(P=0.05); I²=47.73%

Test for overall effect: Z=3.1(P=0)

Recurrence: incision and drainage   0.001   0.1   1   10   1000   Recurrence: needle aspiration

ADDITIONAL TABLES

Table 1. Definition of recurrence and timing

Study ID	Definition of recurrence or criteria for re-intervention described	Timing of assessment of recurrence
Spires 1987	No	2, 7 days (2x returned day 1)
Stringer 1988	"Failure to improve symptom scale score; visual evidence of a persistent abscess"	1, 2 days (24, 48 hours)
Maharaj 1991	"reaccumulation of pus"	1, 7 days
Nwe 2000	"patients in whom the trismus and pyrexia persisted 48 hours after the initial treatment"	2 days (48 hours)
Rafi 2007	No	Not stated
Khan 2011	No	Not stated
Khan 2012	No	Not stated
Sheikh 2012	Yes*	0, 1, 2 days
Chi 2014	No	Not stated
Khokhar 2015	No	"during the course of the study", 7, 14 days
Younas 2015	N/A	N/A

* "Improvement in patients was determined by examining the patient the next day after the procedure, a reduction in supra tonsillar swelling along with decrease in pain and also improvement in odynophagia were taken as criteria of improvement and termination of surgical attempts."
N/A: not available

APPENDICES

Appendix 1. Search strategies

CENTRAL	Ovid MEDLINE	EMBASE
#1 MeSH descriptor: [Peritonsillar Abscess] explode all trees	1 exp Peritonsillar Abscess/	1 exp Peritonsillar Abscess/
#2 abscess* near tonsil* or abscess* near peritonsil* or abscess* near retrotonsil* or abscess* near peri-tonsil*	2 ((abscess* adj5 tonsil*) or (abscess* adj5 peritonsil*) or (abscess* adj5 retrotonsil*)).ab,ti.	2 ((abscess* adj5 tonsil*) or (abscess* adj5 peritonsil*) or (abscess* adj5 retrotonsil*)).ab,ti.
#3 suppurat* near tonsil* or suppurat* near peritonsil* or suppurat* near retrotonsil* or suppurat* near peri-tonsil*	3 ((suppurat* adj5 tonsil*) or (suppurat* adj5 peritonsil*) or (suppurat* adj5 retrotonsil*) or (suppurat* adj5 peri-tonsil*)).ab,ti.	3 ((suppurat* adj5 tonsil*) or (suppurat* adj5 peritonsil*) or (suppurat* adj5 retrotonsil*) or (suppurat* adj5 peritonsil*)).ab,ti.
#4 sepsis near tonsil* or sepsis near peritonsil* or sepsis near retrotonsil* or sepsis near peri-tonsil*	4 ((sepsis adj5 tonsil*) or (sepsis adj5 peritonsil*) or (sepsis adj5 retrotonsil*) or (sepsis adj5 peri-tonsil*)).ab,ti.	

(Continued)

#5 septic near tonsil* or septic near peritonsil* or septic near retrotonsil* or septic near peri-tonsil*	5 ((septic adj5 tonsil*) or (septic adj5 peritonsil*) or (septic adj5 retrotonsil*) or (septic adj5 peri-tonsil*)).ab,ti.	4 ((sepsis adj5 tonsil*) or (sepsis adj5 peritonsil*) or (sepsis adj5 retrotonsil*) or (sepsis adj5 peri-tonsil*)).ab,ti.
#6 pus near tonsil* or pus near peritonsil* or pus near retrotonsil* or pus near peri-tonsil*	6 ((pus adj5 tonsil*) or (pus adj5 peritonsil*) or (pus adj5 retrotonsil*) or (pus adj5 peri-tonsil*)).ab,ti.	5 ((septic adj5 tonsil*) or (septic adj5 peritonsil*) or (septic adj5 retrotonsil*) or (septic adj5 peri-tonsil*)).ab,ti.
#7 infect* near peritonsil* or infect* near retrotonsil* or infect* near peri-tonsil*	7 ((infect* adj5 peritonsil*) or (infect* adj5 retrotonsil*) or (infect* adj5 peri-tonsil*)).ab,ti.	6 ((pus adj5 tonsil*) or (pus adj5 peritonsil*) or (pus adj5 retrotonsil*) or (pus adj5 peri-tonsil*)).ab,ti.
#8 acute near peritonsil* or acute near retrotonsil* or acute near peri-tonsil*	8 ((acute adj5 peritonsil*) or (acute adj5 retrotonsil*) or (acute adj5 peri-tonsil*)).ab,ti.	7 ((infect* adj5 peritonsil*) or (infect* adj5 retrotonsil*) or (infect* adj5 peri-tonsil*)).ab,ti.
#9 quinsy or "interval tonsil*"	9 (quinsy or "interval tonsil*").ab,ti.	8 ((acute adj5 peritonsil*) or (acute adj5 retrotonsil*) or (acute adj5 peri-tonsil*)).ab,ti.
#10 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9	10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9	9 (quinsy or "interval tonsil*").ab,ti.
		10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9

CINAHL	Web of Science	ClinicalTrials.gov
S10 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9	#1 TOPIC: (abscess* near/5 tonsil* or abscess* near/5 peritonsil* or abscess* near/5 retrotonsil* or abscess* near/5 peri-tonsil*)	((abscess OR sepsis OR septic OR pus OR infect OR acute) AND (tonsil* OR peritonsil* OR retrotonsil* OR per-tonsil*)) OR quinsy OR "interval tonsil"
S9 quinsy or "interval tonsil*"	#2 TOPIC: (suppurat* near/5 tonsil* or suppurat* near/5 peritonsil* or suppurat* near/5 retrotonsil* or suppurat* near/5 peri-tonsil*)	
S8 acute N5 peritonsil* or acute N5 retrotonsil* or acute N5 peri-tonsil*	#3 TOPIC: (sepsis near/5 tonsil* or sepsis near/5 peritonsil* or sepsis near/5 retrotonsil* or sepsis near/5 peri-tonsil*)	
S7 infect* N5 peritonsil* or infect* N5 retrotonsil* or infect* N5 peri-tonsil*	#4 TOPIC: (septic near/5 tonsil* or septic near/5 peritonsil* or septic near/5 retrotonsil* or septic near/5 peri-tonsil*)	
S6 pus N5 tonsil* or pus N5 peritonsil* or pus N5 retrotonsil* or pus N5 peri-tonsil*	#5 TOPIC: (pus near/5 tonsil* or pus near/5 peritonsil* or pus near/5 retrotonsil* or pus near/5 peri-tonsil*)	
S5 TX septic N5 tonsil* or septic N5 peritonsil* or septic N5 retrotonsil* or septic N5 peri-tonsil*	#6 TOPIC: (infect* near/5 peritonsil* or infect* near/5 retrotonsil* or infect* near/5 peri-tonsil*)	
S4 TX sepsis N5 tonsil* or sepsis N5 peritonsil* or sepsis N5 retrotonsil* or sepsis N5 peri-tonsil*	#7 TOPIC: (acute near/5 peritonsil* or acute near/5 retrotonsil* or acute near/5 peri-tonsil*)	
S3 TX suppurat* N5 tonsil* or suppurat* N5 peritonsil* or suppurat*i N5 retrotonsil* or suppurat* N5 peri-tonsil*	#8 TOPIC: (quinsy or "interval tonsil*")	

(Continued)

S2 TX abscess* N5 tonsil* or abscess* N5 peri-tonsil* or abscess* N5 retrotonsil* or abscess* N5 peri-tonsil*	#9 #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
S1 (MH "Peritonsillar Abscess")	

HISTORY

Protocol first published: Issue 4, 2006
Review first published: Issue 12, 2016

Date	Event	Description
30 June 2014	New citation required and major changes	New authors. Withdrawn protocol redrafted, updated and republished.

CONTRIBUTIONS OF AUTHORS

Brent A Chang: literature searching, study selection, data collection, data management, 'Risk of bias' assessment, data analysis, data interpretation, drafting the protocol and review.

Andrew Thamboo: literature searching, study selection, data collection, data management, 'Risk of bias' assessment, data analysis, data interpretation, drafting the protocol and review.

Chris Diamond: protocol design, content expertise, revising the protocol and review, critical appraisal and study selection.

Martin J Burton: content expertise, data interpretation, revising the review.

Desmond A Nunez: protocol design, 'Risk of bias' assessment, content expertise, revising the protocol and review.

DECLARATIONS OF INTEREST

Brent A Chang: none to declare.

Andrew Thamboo: none to declare.

Chris Diamond: none to declare.

Martin J Burton: Professor Martin Burton is joint Co-ordinating Editor of Cochrane ENT, but had no role in the editorial sign-off this review, which was carried out by Cochrane ENT's second Co-ordinating Editor.

Desmond A Nunez: none to declare.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- National Institute for Health Research, UK.

  Infrastructure funding for Cochrane ENT

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We widened the age criteria for participants in included studies based on post hoc review. A number of studies included older child (generally ≥ 8 years old), adolescent and adult participants. Stratified data by age group (adults versus adolescents) were not available in any of the studies. Given that adolescents and older children with peritonsillar abscess are often managed similarly to adults, we thought

that the review would also be applicable to this age group. Younger patients typically require a general anaesthetic for management and, therefore, have different practical considerations for intervention. We therefore made a decision to include trials with older children (age ≥ 8), adolescents and adults.

We added the methods for the creation of a 'Summary of findings' table and GRADE assessment to the review after the protocol was published.

We also added a standard statement to clarify the role of outcomes in the review (Types of outcome measures).

NOTES

The original protocol was withdrawn from Issue 11, 2011 of the *Cochrane Library* onwards as the authors were unable to continue with the review. A new protocol by new authors was published in 2014 (Chang 2014).

INDEX TERMS

Medical Subject Headings (MeSH)

*Needles; Drainage [adverse effects] [*methods]; Eating; Peritonsillar Abscess [complications] [*therapy]; Recurrence; Retreatment; Suction [adverse effects] [*methods]; Symptom Assessment; Time Factors

MeSH check words

Adolescent; Adult; Child; Humans