

Antibiotic prophylaxis for mammalian bites (Review)

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TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	2
OBJECTIVES	2
METHODS	2
RESULTS	4
DISCUSSION	5
AUTHORS' CONCLUSIONS	6
ACKNOWLEDGEMENTS	6
REFERENCES	7
CHARACTERISTICS OF STUDIES	7
DATA AND ANALYSES	13
Analysis 1.1. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 1 Incidence of infection grouped according to type of animal.	14
Analysis 1.2. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 2 Incidence of infection grouped according to type of wound.	15
Analysis 1.3. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 3 Incidence of infection grouped according to site of the wound.	16
WHAT'S NEW	16
HISTORY	17
CONTRIBUTIONS OF AUTHORS	17
DECLARATIONS OF INTEREST	17
SOURCES OF SUPPORT	17
INDEX TERMS	18

[Intervention Review]

Antibiotic prophylaxis for mammalian bites

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ABSTRACT

Background

Bites by mammals are a common problem and they account for up to 1% of all visits to hospital emergency rooms. Dog and cat bites are the most common and people are usually bitten by their own pets or by an animal known to them. School-age children make up almost a half of those bitten. Prevention of tetanus, rabies and wound infection are the priorities for staff in emergency rooms. The use of antibiotics may be useful to reduce the risk of developing a wound infection.

Objectives

To determine if the use of prophylactic antibiotics in mammalian bites is effective in preventing bite wound infection.

Search methods

Relevant RCTs were identified by electronic searches of MEDLINE, EMBASE, LILACS and the Cochrane Controlled Trials Register databases in November 2000.

Selection criteria

We included randomised controlled trials which studied patients with bites from all mammals. Comparisons were made between antibiotics and placebo or no intervention. The outcome of interest was the number of infections at the site of bite.

Data collection and analysis

Two reviewers extracted the data independently. All analyses were performed according to the intention-to-treat method.

Main results

Eight studies were included. The use of prophylactic antibiotics was associated with a statistically significant reduction in the rate of infection after bites by humans. Prophylactic antibiotics did not appear to reduce the rate of infection after bites by cats or dogs. Wound type, e.g. laceration or puncture, did not appear to influence the effectiveness of the prophylactic antibiotic. Prophylactic antibiotics were associated with a statistically significant reduction in the rate of infection in hand bites (OR 0.10, 95% CI 0.01 to 0.86; NNT = 4, 95% CI 2 to 50).

Authors' conclusions

There is evidence from one trial that prophylactic antibiotics reduces the risk of infection after human bites but confirmatory research is required. There is no evidence that the use of prophylactic antibiotics is effective for cat or dog bites. There is evidence that the use of antibiotic prophylactic after bites of the hand reduces infection but confirmatory research is required.

PLAIN LANGUAGE SUMMARY

Antibiotics for reducing the rate of infection after bites by mammals such as humans

Bite wounds may become infected due to the transfer of bacteria from the mouth of mammals into the skin. There was a decrease in the risk of developing an infection after a human bite when given antibiotics. Antibiotics also decreased the chance of developing a wound infection after a bite on the hand. Further studies are required to confirm these findings.

BACKGROUND

Human and other mammalian bite wounds are a common problem and they account for up to 1% of all visits to hospital emergency rooms (Weiss 1998, Goldstein 1992). American statistics estimate that almost half of all children have been bitten by a dog at some point of their lives (Weiss 1998). The direct health care costs associated with the care of these wounds can be estimated to exceed \$30 million (Elenbaas 1982).

A large percentage of bite wounds are superficial abrasions. Most of these wounds are inflicted by dogs and cats. In more than 70% of cases, people are bitten by their own pets or by an animal known to them. School-age children constitute 30-50% of all those sustaining mammalian bite injuries (Willey 1990).

There is a small but definite morbidity and mortality associated with infection in the more serious lacerated and puncture wounds. Human bites have long been considered as having a very high infection rate, and the usual explanation was that the normal human oral flora harbours more pathogens than that of animals. However, some authors have found data that indicate that human bites occurring anywhere else than the hand do not have any higher risk than animal bites, and they consider the high rate of complications as being due to their location and initial delay in medical attention (Callanham 1988).

Prevention of tetanus and rabies where appropriate, together with adequate cleansing of such wounds, are universally accepted measures, whereas the prophylactic use of antibiotics to reduce wound infections is controversial. That controversy can be traced primarily to the paucity of well-designed, prospective studies that examine the efficacy of treatment for bite wounds. The few currently published prospective studies of antibiotic prophylaxis suffer from small numbers of patients and low infection rates, in either the

control or the treatment groups and this diminishes the statistical significance of the results. It has been estimated that three hundred and seventy patients in each group would be required to test the efficacy of antibiotic prophylaxis with a probability of type II error of 10% (Jones 1985).

Review articles have advocated the use of antibiotics in certain cases, such as patients aged over 50 years, those with puncture wounds and hand wounds, and those delaying presentation to medical attention for over 24 hours, while accepting that further information was required (Snook 1982). In order to gather a bigger number of cases to try to provide the information required, we need to make a systematic study of randomised trials considering the value of antibiotic prophylaxis in human and other mammalian bites.

OBJECTIVES

To determine if the use of prophylactic antibiotics in mammalian (including human) bites is effective in preventing bite wound infection.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised and quasi-randomised controlled trials. The randomised controlled trials (RCTs) may be double blind, single-blind or unblinded. The RCTs may be unpublished or published as an article, an abstract or a letter, and no language limitations were applied.

Types of participants

Patients with injuries caused by mammalian or human bites attending hospital or health care provider within 24 hours of injury, without clinical signs of infection.

Types of interventions

Use of antibiotics within 24 hours of injury compared to the use of placebo or no intervention in order to prevent bite wound infection.

Types of outcome measures

Proven bacterial infection: clinical signs (temperature, induration, erythema, swelling, pain, warmth, pus, odour, adenopathy, lymphangitis, cellulitis) plus positive microbiological cultures (for aerobics and anaerobic) at the site of bite.

Presumptive bacterial infection: clinical signs of infection at the site of bite with negative culture (or culture not obtained).

Absence of infection: absence of the clinical signs described above.

Search methods for identification of studies

Relevant RCTs were identified by electronic search through MEDLINE (1966 to 2000), EMBASE (1980 to 2000), LILACS (1988 to 2000) and the Cochrane Controlled Trials Register databases. The following strategy was used to search the electronic databases:

1. animal [MESH] OR mammalian [TEXT WORD] OR cat [TEXT WORD] OR dog* [TEXT WORD] OR monkey* [TEXT WORD] OR donkey* [TEXT WORD] OR human [TEXT WORD] OR humans [TEXT WORD]

2. bites [TEXT WORD]

3. prophyla* [TEXT WORD]

4. #1 AND #2

5. #3 AND #4

The bibliographic references of identified RCTs, textbooks, review articles and meta-analyses were checked in order to find RCTs not identified by electronic search.

A hand search was undertaken to find RCTs presented in Brazilian Infectious Diseases Meetings (1980-1995).

Data collection and analysis

Selection of studies

The titles (and abstracts when available) in the MEDLINE, EMBASE, LILACS and hand search of RCTs and reviews were read by the two reviewers. Any article that appeared to meet the inclusion criteria was retrieved. All identified trials were listed and trials excluded from the review were identified with the reasons for exclusion.

Data extraction and management

The following data were extracted from the studies included: title, year of publication, design, generation of allocation concealment, number of participants, age and sex of participants, patients with underlying diseases, severity of the injury, body part of the injury, species of aggressor mammal, antibiotics used, time to antibiotic use, duration of antibiotic use, side-effects, assessment of patient compliance, infection rates in both groups of patients, assessment of the outcomes, local care (before and after the visit to emergency rooms), suture of the injury, time of follow-up, drop out, cost analysis.

Assessment of risk of bias in included studies

An assessment of the quality of the included studies (excluding abstracts) was performed independently by Humberto Saconato and Iara M de Medeiros. The reviewer was not blinded to author, institution and journal of publication of results. The two assessors then reviewed each study together. The following dimensions and criteria was used in a standard way adopted from the Cochrane Collaboration Handbook (Clark and Oxman 2000) and Schulz et al. (Schulz 1995).

A. Generation of allocation sequence

(a) Adequate sequence generation was regarded as use of computer random number generator, random number tables or shuffling.

(b) Does not report on one of the adequate forms of generation of allocation sequence mentioned above in (a), but mentions randomisation method.

(c) Other methods of allocation that appear to be unbiased (e.g. minimisation).

B. Allocation concealment

(a) Adequate measures taken to conceal allocation such as central randomisation, serially numbered, opaque, sealed envelopes, or other description that contains elements convincing of adequate concealment.

(b) Unclearly concealed trials, in which the authors either did not report an allocation concealment approach at all, or report an approach that did not fall into one of the categories in (a) above.

(c) Inadequately concealed trials, in which the method of allocation was not concealed, such as alternation methods or use of case numbers (quasi-randomisation).

C. Inclusion of all randomised participants

(a) Trials in which an intention-to-treat analysis is possible with only a few losses to follow-up.

(b) Trials which reported exclusions as listed in (a) above, but exclusions were less than 10%.

(c) Trials which reported exclusions, or exclusions greater than 10% or wide differences in exclusions between groups.

D. Blinded assessment

(a) Trials in which the double-blind or double-masked technique is used - i.e. both the health care professional and the patient are not aware whether the patient is receiving placebo or active drug.

(b) Trials trying to control information bias by other methods (e.g. single-blinded trials, in which the patient does not know whether they are receiving placebo or active drug but the health care professional does).

(c) Trials in which reduction of information bias is not employed.

Subgroup analysis and investigation of heterogeneity

The studies were stratified in subgroups according to:

- Animal species (dogs, cats, human)
- Types of wounds (lacerations, punctures, avulsions)
- Location of the wound (hands, arms, head/neck, trunk)

Statistical analysis:

Intention to treat analysis was performed. Heterogeneity between RCTs was tested using a chi-square test (with a p-value of less than 0.1 indicating significant heterogeneity) and by inspecting the graphical presentation. Odds ratio with respective confidence intervals (CI) using random effects model was reported. When appropriate, the number of patients that it was necessary to treat to prevent one case of bacterial infection was calculated (NNT = number needed to treat).

Sensitivity analysis

The following strategies were used for the sensitivity analyses:

1. Repeating the analysis taking account of study quality, excluding studies with poor quality
2. Repeating the analysis using different statistical models (fixed and random effects models).

RESULTS

Description of studies

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

Nine studies met the inclusion criteria, but only eight studies were included and analysed. One study was not included in the meta-analysis because this study analysed bites by dogs, cats, rabbits but the authors did not separate the infection rate according to animal species ([Brakenbury 1980](#)).

TYPES OF PARTICIPANTS

Two studies included only children, two studies analysed only adults and three studies included both children and adults. One study did not specify which age group was included.

TYPES OF INTERVENTION

The antibiotics used were: phenoxymethyl penicillin (two studies) ([Boenning 1983](#), [Skurka 1986](#)), oxacillin (two studies) ([Elenbaas 1984](#), [Elenbaas 1982](#)), dicloxacillin (two studies) ([Dire 1992](#), [Rosen 1985](#)), co-trimoxazole (one study) ([Jones 1985](#)). In two studies there was a choice of antibiotic for the treatment group. In one study ([Rosen 1985](#)) cephalexin or erythromycin were used and ceclor, kefzol or penicillin G were used in another ([Zubowicz 1991](#)).

Six studies used placebo, but only two described the placebo as identical in appearance to the active drug ([Elenbaas 1982](#), [Elenbaas 1984](#)). In two studies the control group did not have any intervention.

TYPES OF OUTCOMES

All studies analysed the incidence of infection. Four studies analysed incidence of infection according to part of the body injured ([Dire 1992](#), [Jones 1985](#), [Skurka 1986](#), [Zubowicz 1991](#)), separating hands from other parts. Three studies were analysed according to the type of wounds (lacerations, puncture, or avulsions) ([Dire 1992](#), [Elenbaas 1984](#), [Skurka 1986](#)). Only when it was possible to define which part of the body was injured, were the data extracted, therefore only three studies were included for this comparison.

Species of aggressor mammal

In six studies ([Boenning 1983](#), [Dire 1992](#), [Rosen 1985](#), [Skurka 1986](#), [Elenbaas 1982](#), [Jones 1985](#)), the bites were caused by dogs. In one study the aggressor animal was cat ([Elenbaas 1984](#)) and in another one humans ([Zubowicz 1991](#)).

Risk of bias in included studies

Randomisation methods

Seven studies were randomised controlled trials (RCTs). Only one was quasi-randomised ([Boenning 1983](#)). The allocation concealment was adequate in one study ([Rosen 1985](#)) and the method to generate the randomisation sequence was appropriate in two studies ([Dire 1992](#), [Skurka 1986](#)). There were no descriptions of the method of randomisation in the other studies.

Double-Blind Method

Six studies described double-blind methods. Two studies described a placebo of identical appearance (Elenbaas 1982, Elenbaas 1984).

Exclusions and lost of follow-up

Five studies reported the extent of loss to follow-up. Three studies reported losses to follow-up higher than 10% (Elenbaas 1982, Jones 1985, Rosen 1985). In four studies (Dire 1992, Elenbaas 1982, Jones 1985, Rosen 1985) it was not possible to perform intention to treat analysis because the authors did not report how many patients were lost in each group.

Effects of interventions

All results are presented using odds ratios (OR) and 95% confidence interval (95% CI) and are combined using a random effects model.

There was no statistically significant difference between the rates of infections depending on whether or not prophylactic antibiotics were used (OR 0.49, 95% CI 0.15 to 1.58). In this comparison there was statistically significant heterogeneity (chi-square 12.05, df=7, $P=0.099$). Combining the results using a fixed effects model resulted in an apparent benefit for the use of prophylactic antibiotics (OR 0.39, 95% CI 0.19 to 0.77).

When the trials were grouped according to the type of aggressor animal, only dog bites were studied in more than one trial. For dog bites, there was no statistically significant reduction of infection rate after the use of prophylactic antibiotics (4% (10/225)) compared to the control group (5.5% (13/238)); (OR 0.74, 95% CI 0.30 to 1.85). Heterogeneity was not observed in this sub-category. Excluding studies with losses to follow-up higher than 10% or excluding a quasi-randomised study (Boenning 1983) did not change the results.

Only one study (with 11 patients) analysed cat bites and this reported a higher infection rate in the control group (67% (4/6)) compared with the treatment group who received prophylactic antibiotics (0% (0/5)).

Only one trial analysed human bites and the infection rate in the antibiotic group (0/33) was significantly lower than the infection rate in the control group (47% (7/15)) (OR 0.02, 95% CI 0.00 to 0.33).

Wound type did not appear to influence the effect of prophylactic antibiotics on infection rate. Infection of puncture lesions occurred in 7% (1/14) of patients receiving prophylactic antibiotics compared with 31% (5/16) in the control group (OR 0.22, 95% CI 0.05 to 13.67). In lacerations, infection occurred in 3% (2/63) of those that used prophylactic antibiotics compared to 6% (4/66) in the control group (OR 0.80, 95% CI 0.05 to 13.67). Infections in avulsion wounds occurred in 5% (2/41) of patients in the group using prophylactic antibiotics compared to 3% (1/30) in the control group (OR 1.07, 95% CI 0.11 to 10.63).

When the trials were grouped according to the site of the bite, it was found that four of them provided information on site (hands, trunk, arms and head/neck). The infection rates for hand bites were significantly reduced by antibiotics (2% in the antibiotic group versus 28% in the control group) (OR 0.10, 95% CI 0.01 to 0.86; NNT = 4, 95% CI 2 to 50), no heterogeneity between studies was detected (chi-square 3.00, df=2, $P=0.22$). In wounds of the head/neck, infection occurred in only one patient in the control group, compared with no patients in the experimental group (OR 0.31, 95% CI 0.01 to 7.77). In wounds of the trunk, infection was observed in only one patient in the experimental group and no patients in the control group (OR 1.80, 95% CI 0.04 to 79.4). One trial of five people with bites on the arm recorded no infections in either the antibiotic or control group.

DISCUSSION

The occurrence of bacterial infection after animal bites depends on several factors, such as species of animal aggressors (humans would be associated with a higher infection risk), type and site of the injuries (wounds located in hands have a higher infection risk), care given to the wound, inherent factors in the individual (greater risk in elderly, those with diabetes mellitus, vascular disease, etc).

The studies included in this systematic review did not demonstrate a reduction in the infection rate after mammalian bites among the individuals that received prophylactic antibiotics when compared to the control group. However, these results should be interpreted with caution because significant heterogeneity was observed in the meta-analysis. Furthermore, there were small numbers of patients in these trials and therefore they cannot rule out a beneficial effect of prophylactic antibiotics.

The impact of prophylactic antibiotic use may be more evident in situations of higher infection risk, therefore it is important to analyse according species of animal aggressor (some of which may have more pathogenic bacteria) and the type and location of the wound.

In terms of species, only dog bites had more than one study. Cat and human bites had only one study included for each comparison. The use of prophylactic antibiotics for dog bites is not associated with a statistically significant reduction in infection. Another systematic review performed by Cummings (Cummings 1994) reported a reduction in the infection rate after dog bites. With exception of one RCT (Brakenbury 1980), both systematic reviews included the same studies. This difference may be related to the use of different statistical analysis in these two systematic reviews. Because of the statistical heterogeneity between the studies, we used a random effects model. This gives a more conservative estimate of effect size as it also takes into account any differences between studies. The exclusion of the studies with drop-out higher than 10% (a sensitivity analysis) did not change the results.

There was only one trial with 48 patients that reported on human bites but this reported a significant reduction in the risk of developing an infection when antibiotics were given.

In relation to wound type, puncture wounds have been reported to have a higher infection rate after animal bites, possibly due to the deposition of bacteria deep in the skin. We found no statistically significant difference between the rates of infection with or without prophylactic antibiotics within puncture wounds. Prophylactic antibiotics appear to be effective when the wounds are located in the hands, as the rate of infection reduced from 28% to 2%. Unfortunately only three randomised controlled trials analysing wounds in the hand were identified in this systematic review.

The probability of publication bias appears small. The inspection of funnel plot did not demonstrate apparent asymmetry. We searched unpublished RCTs from Abstracts of Brazilian Infectious Diseases Meetings, but others sources of unpublished RCTs need to be searched.

Another problem in the interpretation of this review is the type of antibiotic used in the included studies. Recently, bacteriologic analysis of infected wounds from dog and cat bites have demonstrated that *pasteurella* species were the most common followed by streptococci, staphylococci, moraxella, corynebacterium and neisseria species (Talan 1999). Mixed infections of both aerobic and anaerobic pathogens were more frequent, and anaerobes were rarely found alone. This may mean that inappropriate antibiotics were used in the trials. Probably, beta-lactam antibiotic associated with beta-lactamase would have an important impact when used after mammalian bites than the types of antibiotics investigated (Talan 1999).

AUTHORS' CONCLUSIONS

Implications for practice

There is insufficient evidence that the use of prophylactic antibiotic is effective for dog bites, because most of the studies included were methodologically deficient and had small sample sizes. There is evidence that the use of antibiotic prophylactic after bites of the hand reduces infection. Weak evidence suggests that antibiotic prophylaxis after bites by humans reduces infection.

Implications for research

New randomised controlled trials of good quality are necessary to evaluate the effectiveness of prophylactic antibiotics after mammalian bites. Future randomised controlled trials should address the following aspects:

- OBJECTIVES:

1. Evaluate the effectiveness of antibiotic prophylaxis for mammalian bites to prevent wound infection.

2. To establish possible predictors of infection risk, such species of animal aggressor, location and severity of wound, age, previous morbidity of victims (diabetes mellitus, immunodeficiency disorders, peripheral vascular diseases).

- INCLUSION CRITERIA: Adults and children with mammalian-bite wounds who present to an emergency room within 24 hours of injury.

- EXCLUSION CRITERIA: superficial abrasions, clinical signs of infection, those having other medical problems requiring antibiotic treatment or allergies to antibiotic.

- TYPES OF INTERVENTION: The choice of antibiotics should be based on the flora of the oral cavity of mammalian aggressors (sensitivity obtained by swabbing the wound).

- OUTCOME MEASURES:

1. Incidence of infection, analysed and presented according to location and type of wound. Infection criteria described by Talan (Talan 1999) could be used. Wound should be considered infected if meets one of three major criteria:

- fever
- abscess
- lymphangitis.

Alternatively - they could be considered infected if they show four of five minor criteria:

- wound associated with erythema that extends more than 3 cm from the edge of the wound
- tenderness at the wound site
- swelling at the site
- purulent drainage
- a peripheral white-cell count of more than 12,000 per cubic millimeter.

2. Incidence of adverse events

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Boenning 1983

Methods	An alternate allocation was used. The groups were divided according to the date of the visit	
Participants	Fifty eight children with dog bites. Patients were included if wound occurred within the preceding 24 hours; if the wound did not require closure with sutures; if the injuries were not on the face; if the patient had no history of penicillin allergy; and no antibiotics were being administered at the time of the bite	
Interventions	1. Twenty five patients received phenoxymethyl penicillin 250 mg q.i.d. and local wound care for five days 2. Thirty patients received local wound care only	
Outcomes	Incidence of infection	
Notes	Species of offending animal: Dogs.	
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Dire 1992

Methods	Random allocation by a computer generation was described. Double blind.	
Participants	One hundred ninety one adults and children with dog bites were included. Six patients failed to return for follow-up. The patients were excluded if had hand, foot, or puncture wounds; wounds greater more 12 hours, the presence of clinical signs of infection; or a history of immunosuppression disorders or medications or if they were less than one year old; or if there was a history of antibiotic use within the previous seven days	
Interventions	1. Eighty nine patients received oral dicloxacillin or cephalexin or erythromycin 500 mg q.i.d (50 mg/kg/day for children) for seven days 2. Ninety six patients received placebo.	
Outcomes	Incidence of infection	
Notes	Species of offending animal: Dogs. It was not possible to perform intention to treat analysis.	
Risk of bias		
Item	Authors' judgement	Description

Dire 1992 (Continued)

Allocation concealment?	Unclear	B - Unclear
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Elenbaas 1982

Methods	Random allocation was described, but method of randomisation unspecified. Double blind.
Participants	Sixty three adults patients with dog bites and full-thickness injuries were included. Patients were excluded if had clinical signs of infection, patients requiring hospitalisation, having violation of the periosteum, already receiving antibiotics for other reasons, or having allergy to penicillin. Seventeen patients failed to return for follow-up
Interventions	1. Twenty-two patients received oxacillin 500 mg q.i.d. for five days 2. Twenty patients received placebo (identical appearance)
Outcomes	Incidence of infection according to the part of body injured
Notes	Species of offending animal: Dogs. It was not possible to perform intention to treat analysis.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Elenbaas 1984

Methods	Random allocation was described, but method of randomisation unspecified. Double blind.
Participants	Twelve adults patients with cat bites and full-thickness injuries were included. Patients were excluded if had clinical signs of infection, patients requiring hospitalisation, having violation of the periosteum, already receiving antibiotics for other reasons, or having allergy to penicillin. One patient failed to return for follow-up
Interventions	1. Five patients received oxacillin 500 mg q.i.d. for five days 2. Six patients received placebo (identical appearance)
Outcomes	Incidence of infection according to the part of body injured
Notes	Species of offending animal: Cats.

Risk of bias

Item	Authors' judgement	Description
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Elenbaas 1984 (Continued)

Allocation concealment?	Unclear	B - Unclear
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Jones 1985

Methods	Random allocation was described, but method of randomisation unspecified. Double blind.
Participants	One hundred and thirteen patients were included. Exclusion criteria: superficial abrasions, those having other medical problems requiring antibiotic treatment or allergies to co-trimoxazole, and children less than 3 years of age. Thirty-five patients failed to return for follow-up
Interventions	1. Fifty-five patients received co-trimoxazole 2. Fifty-eight patients received placebo
Outcomes	Incidence of infection and incidence of infection in hand wounds
Notes	Species of offending animal: Dogs. It was not possible to perform intention to treat analysis.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Rosen 1985

Methods	Random allocation was described. Allocation concealment by serially numbered sealed opaque envelopes Double blind.
Participants	One hundred fifty adults and children with dog bites were included. Patients were included if they had wounds that unequivocally penetrated the dermis, were presented to emergency department for treatment within 8 hours of the injury. Exclusion criteria: Wounds involving bone, tendon, tendon sheath, or major neurovascular structures. Eighteen patients failed to return for follow-up
Interventions	1. Seventy patients received cloxacillin or dicloxacillin 250 mg q.i.d. 2. Sixty-two patients received placebo
Outcomes	Incidence of infection according to the part of body injured (hand or not)
Notes	Species of offending animal: Dogs. It was not possible to perform intention to treat analysis.

Risk of bias

Item	Authors' judgement	Description
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Rosen 1985 (Continued)

Allocation concealment?	Yes	A - Adequate
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Skurka 1986

Methods	Patients were assigned by a table of random numbers. Double blind method
Participants	Thirty nine children (one to 16 years of age) with history of dog bites penetrating the skin within 24 hours were included. Exclusion criteria: patients with infected wounds, allergy to penicillin, antibiotics administration within three days prior to the bites, and indications for hospitalisation
Interventions	1. Nineteen patients received oral phenoxymethyl penicillin 100,000 U/Kg/ day given every 6 hours for two days 2. Twenty patients received placebo
Outcomes	Incidence of infection
Notes	Species of offending animal: Dogs.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Zubowicz 1991

Methods	Random allocation was described, but method of randomisation unspecified. Double blind method not mentioned.
Participants	Forty-eight adults patients with human bites to the hand were included. The inclusion criteria: the bite was less than 24 hours old, the bite was not infected and no other infection was present on the body, the bite did not penetrate a joint capsule and the bite injured no tendon
Interventions	1. Thirty-eight patients received ceclor 250 mg t.i.d. via oral or kefzol 1 g q.i.d. intravenous or penicillin G 1.2 million units intravenous q.i.d. 2. Fifteen patients received oral placebo
Outcomes	Incidence of infection
Notes	Species of offending animal: Human.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

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

Study	Reason for exclusion
Callaham 1980	It is not a randomised controlled trial
Malinowski 1979	It is not a randomised controlled trial

DATA AND ANALYSES

Comparison 1. Antibiotics prophylaxis for mammalian bites

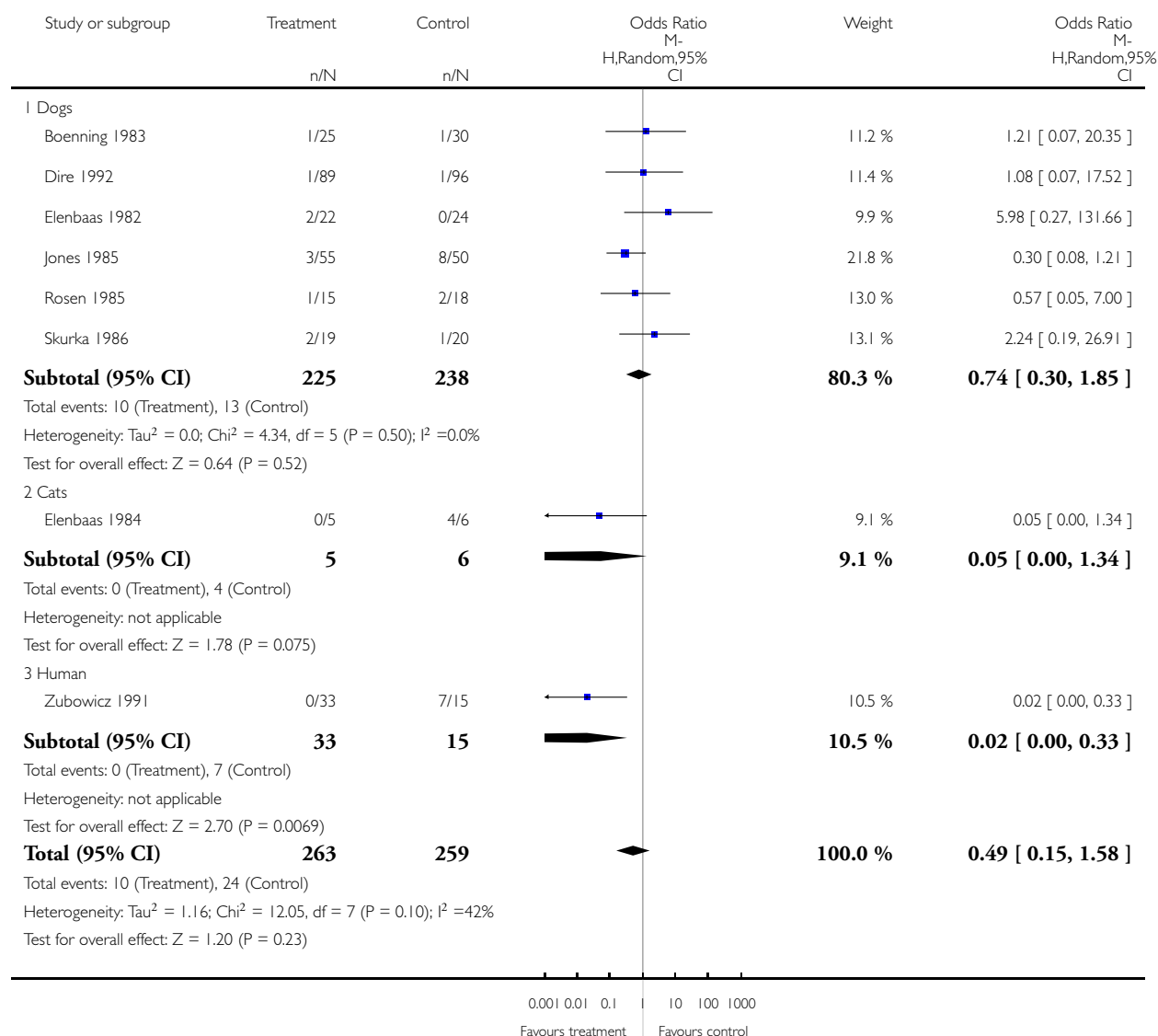
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Incidence of infection grouped according to type of animal	8	522	Odds Ratio (M-H, Random, 95% CI)	0.49 [0.15, 1.58]
1.1 Dogs	6	463	Odds Ratio (M-H, Random, 95% CI)	0.74 [0.30, 1.85]
1.2 Cats	1	11	Odds Ratio (M-H, Random, 95% CI)	0.05 [0.00, 1.34]
1.3 Human	1	48	Odds Ratio (M-H, Random, 95% CI)	Not estimable
2 Incidence of infection grouped according to type of wound	4		Odds Ratio (M-H, Random, 95% CI)	Subtotals only
2.1 Puncture	2	30	Odds Ratio (M-H, Random, 95% CI)	0.22 [0.01, 8.37]
2.2 Lacerations	2	129	Odds Ratio (M-H, Random, 95% CI)	0.80 [0.05, 13.67]
2.3 Avulsions	2	71	Odds Ratio (M-H, Random, 95% CI)	1.07 [0.11, 10.63]
3 Incidence of infection grouped according to site of the wound	4		Odds Ratio (M-H, Random, 95% CI)	Subtotals only
3.1 Trunk	2	32	Odds Ratio (M-H, Random, 95% CI)	1.8 [0.04, 79.42]
3.2 Head/neck	2	82	Odds Ratio (M-H, Random, 95% CI)	0.31 [0.01, 7.77]
3.3 Hands	3	104	Odds Ratio (M-H, Random, 95% CI)	0.10 [0.01, 0.86]
3.4 Arms	1	5	Odds Ratio (M-H, Random, 95% CI)	Not estimable

Analysis 1.1. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 1 Incidence of infection grouped according to type of animal.

Review: Antibiotic prophylaxis for mammalian bites

Comparison: 1 Antibiotics prophylaxis for mammalian bites

Outcome: 1 Incidence of infection grouped according to type of animal

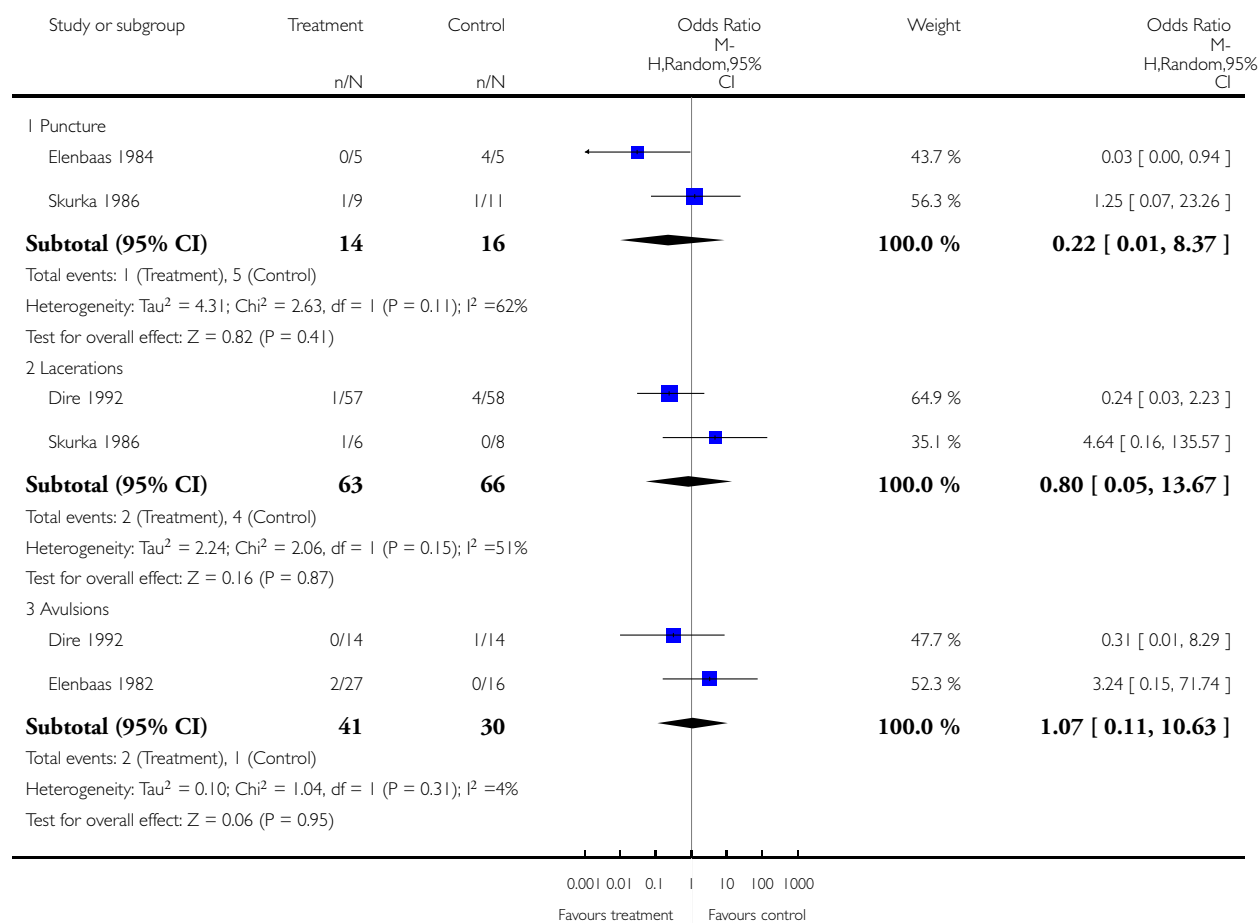


Analysis 1.2. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 2 Incidence of infection grouped according to type of wound.

Review: Antibiotic prophylaxis for mammalian bites

Comparison: 1 Antibiotics prophylaxis for mammalian bites

Outcome: 2 Incidence of infection grouped according to type of wound

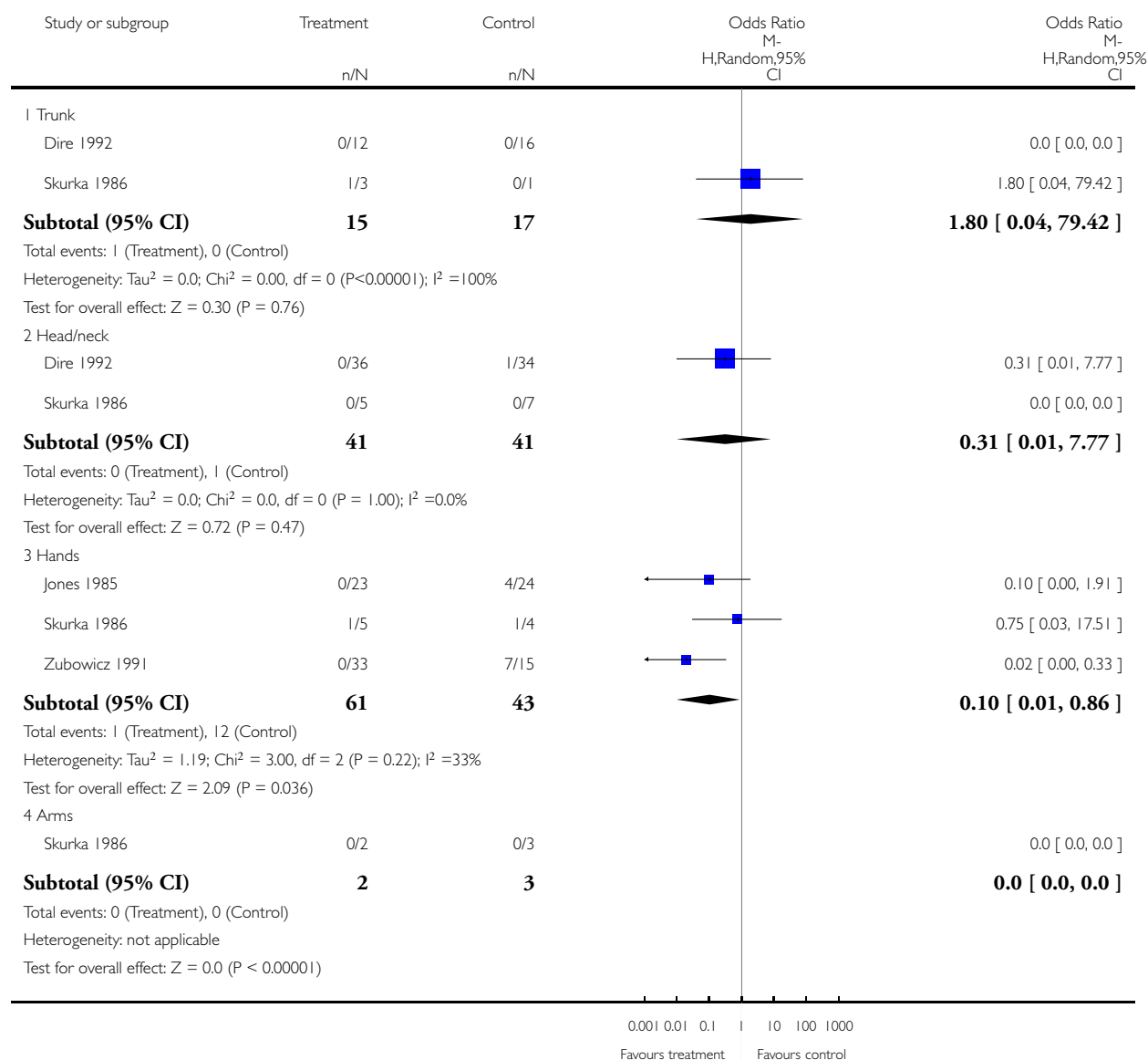


Analysis 1.3. Comparison 1 Antibiotics prophylaxis for mammalian bites, Outcome 3 Incidence of infection grouped according to site of the wound.

Review: Antibiotic prophylaxis for mammalian bites

Comparison: 1 Antibiotics prophylaxis for mammalian bites

Outcome: 3 Incidence of infection grouped according to site of the wound



WHAT'S NEW

Last assessed as up-to-date: 10 February 2001.

Date	Event	Description
2 April 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 1, 2000

Review first published: Issue 1, 2001

Date	Event	Description
11 February 2001	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

Iara Marques de Medeiros: Protocol development, literature searching, study selection, data extraction, statistical analysis, drafting of written submissions, development of final review,

Humberto Saconato : Protocol development, literature searching, study selection, data extraction, statistical analysis, development of final review

DECLARATIONS OF INTEREST

None

SOURCES OF SUPPORT

Internal sources

- Universidade Federal do Rio Grande do Norte, Brazil.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Antibiotic Prophylaxis; Bites and Stings [*complications; drug therapy]; Cats; Confidence Intervals; Dogs; Odds Ratio; Randomized Controlled Trials as Topic; Wound Infection [etiology; *prevention & control]

MeSH check words

Animals; Humans