A systematic review of prophylactic antibiotics in the surgical treatment of maxillofacial fractures

Andreasen J O, Jensen S S, Schwartz O, Hillerup Y

CRD summary
This review concluded that 1-shot or 1-day administration of prophylactic antibiotics appears to reduce infections in the treatment of mandibular fractures not involving the condylar region. Several limitations in the conduct of the review increase the potential for bias in these results, so these conclusions should be interpreted with caution.

Authors' objectives
To find evidence for prophylactic administration of antibiotics in relation to treatment of maxillofacial fractures.

Searching
MEDLINE and the Cochrane Library were searched for relevant studies; the search terms were reported. In addition, German language journals and the reference lists of potentially eligible studies were handsearched to identify further studies.

Study selection
The authors appear to have restricted inclusion to randomised controlled trials (RCTs) and non-randomised controlled trials evaluating the effects of antibiotic prophylaxis on the incidence of post-trauma infections in jaw fracture treatment. The authors stated that a range of different antibiotics were used in the included studies. Where reported, the duration of treatment ranged from '1-shot' prophylaxis prior to surgery, to a 3-day course of antibiotic treatment. Details of the population and antibiotic regimens were not reported.

The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The quality of the included studies was assessed according to a predefined set of six criteria relating to randomisation, blinding, accounting for withdrawals, definition of outcome measures and statistical methods.

The authors did not state how the quality assessment was performed.

Data extraction
Data on study characteristics and reported infection rates were extracted.

The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
The authors summarised the included studies in a narrative synthesis, with study characteristics and results presented in the text and tables.

Results of the review
A total of six RCTs (n=603) were included in the review. Four of these compared antibiotics against control (n=483) and two compared different antibiotic regimens (n=120). Only two RCTs reported blinding of the patients and/or outcome assessors.

The included studies met between one and five of the six quality assessment criteria. All stated that they were randomised, but five of the six did not state a method of randomisation. None of the studies accounted for withdrawals.
Of the four studies categorised as RCTs, three reported statistically significant reductions in infections associated with antibiotic prophylaxis when compared with no antibiotics: 53% versus 6% (p=0.001), 43% versus 14% (p=0.01), and 22% versus 2%, 6% or 8% (for 1-day treatment, '1-shot' prophylaxis and 3-day treatment, respectively; p=0.001). One RCT reported a benefit of antibiotic prophylaxis of borderline statistical significance (20% versus 5%, p=0.06; for up to 48 hours coverage).

One RCT found no difference between infection rates for two different antibiotic regimens, while a second reported no significant difference between 1- and 5-day treatment with penicillin (although the data were based only on the results from 30 patients).

Authors' conclusions
One-shot or 1-day administration of prophylactic antibiotics appears to reduce infections in the treatment of mandibular fractures not involving the condylar region.

CRD commentary
This review was based on a question vaguely defined in terms of the participants, interventions and outcomes. Major electronic databases were searched, as were some supplementary sources. However, the search appears to have been limited to articles in English and German, so the potential for language bias cannot be ruled out. Similarly, unpublished studies were not specifically sought, so publication bias cannot be ruled out. It is not clear whether any attempts were made to minimise error and bias during the study selection, validity assessment and data extraction processes. The validity assessment was undertaken according to a predefined checklist of relevant criteria. The included studies were generally small and did not report whether they were blinded. The synthesis consisted primarily of brief descriptions of the included studies, but not all the same characteristics were presented for all the studies, making it difficult for the reader to establish the degree of clinical heterogeneity between these studies. These limitations may have biased the findings of the review, so the authors' conclusions should be interpreted with caution.

Implications of the review for practice and research
Practice: The authors stated that, despite its effectiveness in compound mandibular fractures, because of the very low infection rate in maxillary fractures and zygoma fractures, and the non-existence of infection complications in condylar fractures, antibiotic treatment in these fractures is not indicated.

Research: The authors did not state any implications for further research.

Funding
Not stated.

Bibliographic details

PubMedID
17052593

DOI
10.1016/j.joms.2006.02.032

Indexing Status
Subject indexing assigned by NLM

MeSH
Antibiotic Prophylaxis /utilization; Humans; Mandibular Fractures /surgery; Maxillary Fractures /surgery; Randomized Controlled Trials as Topic; Surgical Wound Infection /prevention & control; Zygomatic Fractures /surgery
AccessionNumber
12006007759

Date bibliographic record published
04/07/2007

Date abstract record published
01/12/2008

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.