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[Intervention Review]

Antibiotics for exacerbations of chronic obstructive pulmonary disease

Felix SF Ram¹, Robert Rodriguez-Roisin², Alicia Granados-Navarrete³, Judith Garcia-Aymerich⁴, Neil C Barnes⁵

¹School of Health Sciences, Massey University - Auckland, Auckland, New Zealand. ²Servei de Pneumologia, Hospital Clínic, Universitat de Barcelona, Barcelona, Spain. ³Respiratory and Environmental Health Research Unit, Institut Municipal d'Investigació Mèdica, University of Barcelona, Barcelona, Spain. ⁴Centre for Research in Environmental Epidemiology (CREAL), Barcelona, Spain. ⁵Department of Respiratory Medicine, London Chest Hospital, London, UK

Contact address: Felix SF Ram, School of Health Sciences, Massey University - Auckland, 24 Portsea Place, Chatswood, North Shore, Auckland, New Zealand. fsfram@yahoo.co.uk. (Editorial group: Cochrane Acute Respiratory Infections Group.)

Cochrane Database of Systematic Reviews, Issue 3, 2009 (Status in this issue: *Unchanged*)
Copyright © 2009 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.
DOI: 10.1002/14651858.CD004403.pub2

This version first published online: 19 April 2006 in Issue 2, 2006.

Last assessed as up-to-date: 19 December 2005. (Help document - [Dates and Statuses](#) explained)

This record should be cited as: Ram FSF, Rodriguez-Roisin R, Granados-Navarrete A, Garcia-Aymerich J, Barnes NC. Antibiotics for exacerbations of chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews* 2006, Issue 2. Art. No.: CD004403. DOI: 10.1002/14651858.CD004403.pub2.

ABSTRACT

Background

Most patients with an exacerbation of chronic obstructive pulmonary disease (COPD) are treated with antibiotics. However the value of their use remains uncertain. Some controlled trials of antibiotics have shown benefit ([Berry 1960](#); [Pines 1972](#)) while others have not ([Elmes 1965b](#); [Nicotra 1982](#)).

Objectives

To conduct a systematic review of the literature estimating the value of antibiotics in the management of acute COPD exacerbations.

Search strategy

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library*, 2005, issue 4) which contains the Acute Respiratory Infections Group's Specialized Register; MEDLINE (1966 to December 2005); EMBASE (1974 to December 2005); Web of Science (December 2005), and other electronically available databases.

Selection criteria

Randomised controlled trials (RCTs) in patients with acute COPD exacerbations comparing antibiotic (for a minimum of five days) and placebo.

Data collection and analysis

Data were analysed using Review Manager software. Continuous data were analysed using weighted mean differences (WMD) and 95% confidence intervals (CI). Relative risks (RR) (and 95% CI) were calculated for all dichotomous data. Where appropriate, number needed to treat to benefit (NNT) and 95% CI were calculated.

Main results

Eleven trials with 917 patients were included. Ten trials used increased cough, sputum volume and purulence diagnostic criteria for COPD exacerbation. Eight-hundred and fifty-seven patients provided data for outcomes including mortality, treatment failure,

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increased sputum volume, sputum purulence, PaCO₂, PaO₂, peak flow and adverse events. Antibiotic therapy regardless of antibiotic choice significantly reduced mortality (RR 0.23; 95% CI 0.10 to 0.52 with NNT of 8; 95% CI 6 to 17), treatment failure (RR 0.47; 95% CI 0.36 to 0.62 with NNT of 3; 95% CI 3 to 5) and sputum purulence (RR 0.56; 95% CI 0.41 to 0.77 with NNT of 8; 95% CI 6 to 17). There was a small increase in risk of diarrhoea with antibiotics (RR 2.86; 95% CI 1.06 to 7.76). Antibiotics did not improve arterial blood gases and peak flow.

Authors' conclusions

This review shows that in COPD exacerbations with increased cough and sputum purulence antibiotics, regardless of choice, reduce the risk of short-term mortality by 77%, decrease the risk of treatment failure by 53% and the risk of sputum purulence by 44%; with a small increase in the risk of diarrhoea. These results should be interpreted with caution due to the differences in patient selection, antibiotic choice, small number of included trials and lack of control for interventions that influence outcome, such as use of systemic corticosteroids and ventilatory support. Nevertheless, this review supports antibiotics for patients with COPD exacerbations with increased cough and sputum purulence who are moderately or severely ill.

PLAIN LANGUAGE SUMMARY

Despite their widespread use, the value of antibiotics in exacerbations of chronic obstructive pulmonary disease (COPD) remains controversial

Exacerbations of COPD are often bacterial in origin and antibiotic therapy seems appropriate for suspected bacterial exacerbations. It is increasingly recognised that exacerbations are also caused by viral infections of the upper respiratory tract, or even by no infection, when antibiotic treatment does not seem warranted. In addition, there is a growing incidence of resistance to common antibiotics. Therefore, limiting unnecessary use of antibiotics in exacerbations of COPD is important to help control the incidence of antibiotic resistance. Eleven trials with 917 patients with moderate to severe COPD were included in this review. Use of antibiotics (regardless of the type) reduced the risk of patient deaths by 77% and the risk of the patient not responding to medical intervention by 53%. In addition, the chances of sputum remaining coloured (green-yellow) were reduced by 44%. As expected with antibiotic use there was an increased risk of diarrhoea. This review supports using antibiotics (regardless of the type) for patients with COPD exacerbations who are moderately or severely ill with increased cough and coloured sputum.