Corticosteroids and pneumonia: time to change practice

Pneumonia is characterised by lung inflammation, with fluid filling the alveoli and preventing adequate oxygenation of the body, and can be acquired in the community or in hospital. In 2013, about one million children died from pneumonia, which was the leading cause of death in children aged 5 years or younger.¹ Annually, 15 adults per 1000 visit a doctor for symptoms of community-acquired pneumonia.²

In 2013, lower respiratory tract infections caused 2·7 million deaths.¹ Although the epidemiological burden of community-acquired pneumonia is highest in patients aged 65 years or older, the disease incurs substantial morbidity and health-care costs in working-age adults.³

Management of this disorder relies mainly on empirical antibiotic treatment, and so far no adjunct therapy is recommended.⁴ In The Lancet, Claudine Angela Blum and colleagues⁵ report that 7-day treatment with 50 mg oral prednisone daily hastened recovery and hospital discharge in adults with community-acquired pneumonia of any severity.⁵ Compared with controls (who received placebo), clinical stability was achieved 1·4 days earlier in the corticosteroid-treated patients (3·0 days in the prednisone group vs 4·4 days in the control group; hazard ratio [HR] 1·33, 95% CI 1·15–1·50), who subsequently spent 1 day less in hospital. Treatment with prednisone was well tolerated except for transient mild-to-moderate hyperglycaemia (76 [19%] vs 43 [11%]; OR 1·96, 95% CI 1·31–2·93). This trial was appropriately designed to minimise selection bias and possible confounding, and powered to show the efficacy of corticosteroids convincingly.

The favourable benefit-to-risk ratio noted with corticosteroids in this trial is in line with findings from trials done in Egypt,⁶ Italy,⁷ Japan,⁸ the Netherlands,⁹ and Spain.¹⁰ Only one trial¹¹ did not show benefit from corticosteroids. Data from five of these six trials accounting for 1379 adults with community-acquired pneumonia showed that adjunct treatment with corticosteroids reduced length of hospital stay (mean difference −1·10 days, 95% CI −1·86 to −0·34; figure), time on intravenous antibiotics (−0·69 days, −1·21 to −0·17; three trials, 1120 patients; appendix), and time to clinical stability (−1·41 days, −2·18 to −0·64; three trials, 1029 patients). In these trials, observed mortality of control patients in the short term ranged from 0% to 7% in patients not in the intensive care unit (ICU),⁵,⁶,⁸,¹¹ and from 15% to 30% in those in ICU.⁷,⁹,¹⁰

Corticosteroids might provide survival benefit for adults with community-acquired pneumonia requiring admission to the ICU (appendix). I believe that corticosteroids improve outcomes in patients with pneumonia mainly by alleviating lung and systemic inflammation without causing immune suppression. Indeed, they induce a rapid and sustained decrease in concentrations of circulating inflammatory markers such as C-reactive protein⁵–¹¹ and interleukin 6.⁸ Subsequently, inflammation-related symptoms such as fever, breathlessness, tachycardia, and hypoxia resolve faster in patients treated with systemic corticosteroids than in those treated with placebo.²–⁴ Owing to unaltered concentrations of anti-inflammatory molecules such as interleukin 10,⁵,¹⁰ adjunct treatment with corticosteroids do not increase the risk of secondary infections.²–⁴

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I calculated the pooled mean difference with a fixed-effects model and noted no heterogeneity for the analysis including all trials. In the forest plot, for each individual trial, the mean difference is represented as a black square in the centre of the black line corresponding to the 95% CI; the size of the black square is proportional to trial’s weight.

Figure: Mean difference of length of hospital stay in adults admitted to hospital with community-acquired pneumonia who received corticosteroid treatment or placebo

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In my experience, the transient increase in blood glucose concentrations following corticosteroid administration is unlikely to harm patients.

As the Northern hemisphere is entering the period of seasonal influenza, with recrudescence of lower respiratory tract infections, Blum and colleagues’ trial provides valuable evidence to recommend adjunct 7-day treatment with 50 mg oral prednisone for the management of adults admitted to hospital with community-acquired pneumonia. In my opinion, the accelerated recovery of wellbeing and reduction of hospital stay is of major added value. In European countries, the median estimated cost of median length of stay ranges from €1200 to €6900, with most of the expenses being related to hospital stay and staff. Therefore, the corticosteroid-associated reduction in length of hospital stay should translate into substantial cost savings. Likewise, reduction in the use of antibiotics is potentially of major added value for the community.

As UK Prime Minister David Cameron has said, the world could soon be “cast back into the dark ages of medicine unless action is taken to tackle the growing threat of resistance to antibiotics.”

Unanswered issues remain, on which researchers should focus their attention. First, evidence for a benefit from corticosteroids in outpatients with community-acquired pneumonia is still missing, although exploratory analyses done by Blum and colleagues did not suggest an interaction between disease severity and responses to corticosteroids. Second, the survival benefit of corticosteroids in patients with community-acquired pneumonia in the ICU still needs large confirmatory trials. Finally, researchers should also investigate any possible long-term benefit from corticosteroids owing to the growing evidence of long-term sequelae following severe infections.

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I declare no competing interests.


11 Snijders D, Daniels JM, de Graaff CS, van der Werf TS, Boersma WG. Efficacy of corticosteroids in community acquired pneumonia—a randomized double blinded clinical trial. Am J Respir Crit Care Med 2010; 181: 975-82.

