Reviewer’s report

Title: Adjunctive Corticosteroid Therapy for Inpatients with Mycoplasma pneumoniae Pneumonia

Version: 0 Date: 14 Aug 2017

Reviewer: Keith Wong

Reviewer's report:

The authors present a retrospective observational study of patients admitted with confirmed mycoplasma pneumonia, examining the effect of low or high doses of corticosteroids, compared with no steroids. The key outcomes of interest were mortality and length of stay. The data derives from a very large national database of pneumonia presentations.

Contrary to the study hypothesis, the authors found that corticosteroids did not reduce mortality, and led to much longer length of stay (6-9 days). Other outcomes such as the prevalence of hyperglycaemia and the duration of antibiotic therapy were also worse in those receiving steroids.

There remains uncertainty as to whether steroids are beneficial as an adjunct to antibiotic therapy in community acquired pneumonia. Whether the benefit varies according to the responsible organism (such as mycoplasma) is also unclear, although there appears to be some suggestion that some types of infections such as influenza will do worse with steroids. There is justification to do a study such as this, with a randomised trial being indicated if there were positive results.

The key limitation is that this is not a randomised trial, and hence the study is potentially liable to biases such as confounding by indication. Those receiving steroids (less than 200 in total) comprise a minority of those not receiving steroids. We can see in the unmatched results that the steroid groups differ in several ways from those who did not receive steroids - with comorbidities such as diabetes, other comorbid conditions for which steroids might have been indicated such as asthma and interstitial lung disease, and also they were more severely ill as shown by the higher rates needing ventilatory support or ICU care. To mitigate this, analysis was also performed on propensity score matched subgroups, but this cannot fully replace a randomised trial in ensuring all known and unknown confounders are accounted for. This limitation is acknowledged by the authors in the discussion.

A strength of the study is the large dataset, but only 2200 of nearly 19000 patients with suspected mycoplasma pneumonia could be included in the analysis, mostly because the diagnosis of mycoplasma could not be confirmed. The organism was confirmed in most cases only by paired serology testing. I think this may limit generalisability and potential applicability of the findings in clinical practice.
Questions / issues

The research question concerned severe pneumonia - could the authors describe how the was population selected? The population studied was very unwell, with a long length of stay, but the participant inclusion criteria (Patient selection section, lines 135 onwards) make no mention of pneumonia severity.

Practically, in applying this knowledge, how will we know if the patient has mycoplasma pneumonia at the time we would like to commence steroids? Perhaps in future the authors could look at whether the findings are similar using less strict definitions for mycoplasma pneumonia, and also looking at pneumonia in general.

Regarding 30-day mortality could some of these events have been missed if patients died after their discharge from hospital? On line 127 it is stated that follow up ended at the time of discharge, transfer or death.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
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Yes

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