Reviewer's report

Title: Pharmacotherapy and the risk for community-acquired pneumonia: A case-control study of hospitalized older adults

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Reviewer: Claudio Pedone

Reviewer's report:

This paper investigates the association between some medications (inhaled corticosteroids - IC, atypical antipsychotics - AA, proton pump inhibitors - PPI) and community acquired pneumonia (CAP). Using a case-control design, the authors confirmed what is already known in the literature (association between IC and AA and CAP) but did not find any association between PPI and CAP.

Major compulsory revisions:

1) The paper is somewhat disorganized and the underpinning logical hard to follow in places. For example, in the Introduction the authors report data on PPI, then data on IC, then again data on PPI. In table 1, the authors report the frequency of only two discharge diagnoses (heart failure and C. difficile infection) without providing any rationale for this choice. Also the way of analyzing smoke exposure is unclear: the authors state in the Results (last sentence) that the ORs were unchanged when current smoking status was used instead of previous smoking status in the model, but that is confusing: how were current smokers considered in the first model? Were they excluded?

2) If I understand the Methods right (page 8, second para), the authors excluded people with an admission diagnosis of pneumonia, but without the typical symptoms. If this is the case, it would be important to know how many people were excluded on this basis, as atypical presentation is rather typical in the elderly.

3) It would be important to know what were the most common discharge diagnoses in the control group. A high prevalence of gastro-intestinal diagnoses in this group could explain the lack of association between PPI and CAP (people admitted for GI symptoms are more likely to be on PPIs, and this would dilute the association between CAP and PPI).

4) The authors state that they adjusted their model for pneumonia... I am not sure I understand this: do they mean hospital-acquired pneumonia? That should not be included, as it cannot be a confounder in this setting.

5) The rationale behind the association between the drugs of interest and CAP should be clearly explained. For example, in the discussion the authors hint that the mechanism linking PPIs and CAP could be aspiration pneumonia. If this is the case, then people with aspiration pneumonia should not be excluded from the
study.

6) The authors state that there were missing data, and that information on the number of missing observations is reported in tables' footnotes. That is not the case in my copy of the manuscript.

7) The general logic behind the analytic plan should be better explained: why were some variables included (e.g. anti-hypertensive medications, diagnosis of atrial fibrillation...).

Minor Essential Revisions

1) The authors found an association between CAP and iron supplementation. Can they comment on this? What was the rationale for including this variable in the analysis?

2) In table 1, there is no need to use footnotes to indicate statistically significant results, as the P-value is reported.

3) In table 2, there is no need to use footnotes to indicate statistically significant results as the confidence intervals already convey this information.

**Level of interest:** An article of limited interest

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests.