Reviewer’s report

Title: Hypertension, mitral valve disease, atrial fibrillation and low education level predict delirium and worst outcome after cardiac surgery in older adults.

Version: 0 Date: 24 Oct 2017

Reviewer: alessandra marcone

Reviewer’s report:

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The paper, a prospective cohort observational study in patients with post-operative delirium, is interesting and well written.

I have some comments about the discussion of cognitive results.

First, I agree with the consideration that this cohort is peculiar for very low education level (from 3.59 to 2 years) (table 2). However, the rate of delirium is similar to that usually reported in the literature in post-cardiac surgery in elderly patients.

A very interesting (and curious) result is that the AAs found an association between delirium and low education level and not between delirium and cognitive decline (comparing pre- and post-op test scores). The patients do not seem to get worse over time or develop overt dementia.

Now, considering that the education level is a proxy of cognitive reserve and that a low level is a risk factor for cognitive decline, it can be deduced from the paper that the low education level alone can represent a risk factor for delirium, even in the absence of cognitive decline.

If this conclusion is correct, how can the AAs explain it?

Could the delirium be an expression of the reduced skills of low educated patients to cope with new, complex and stressful situations such as ICU?

I advise that the AAs would better explain their interpretation by adding to page 9 in the discussion section.

I would also make some methodological observation. MMSE alone, associated with a semantic verbal fluency test (a test sensitive to education level) is not enough to exclude cognitive decline. Lacking an extensive neuropsychological assessment of patients, the AAs should report the
absence of impairment in activities of daily living (ADL) in the cohort to exclude a dementia syndrome in the pre-operative phase.

Since the AAs did not observe any cognitive decline in their patients at 12 and 18 months follow-up, dementia could be excluded.

However, some of patients with lower test scores could fulfill the clinical criteria of Mild Cognitive Impairment (MCI) in the inclusion phase of study.

MCI is a clinical condition including cognitive deficit (in the single amnestic domain or in multiple domains) without overt functional impairment in ADL (no dementia). MCI may convert to dementia and the rate of transition from MCI to dementia is 10% to 20% per year. A risk factor for MCI, as for dementia, is a low education level. In conclusion, in some patients, MCI would be a risk factor for delirium.

The AAs should consider this hypothesis in the discussion.

**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?**
If not, please explain in your comments to the authors.

No

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