Reviewer’s report

Title: Mid-term effect of balloon aortic valvuloplasty on mitral regurgitation in aortic stenosis

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Reviewer: Yong Hyun Park

Reviewer's report:

In this manuscript, the authors tried to investigate the mid-term effect of BAV on mitral regurgitation (MR) in patients with severe AS.

They concluded that BAV provides a useful therapeutic strategy for elderly patients with severe AS who are not candidates for surgical or transcatheter aortic valve replacement, especially in those with significant MR.

I have some concerns about this study.

1) I felt uncomfortable to see the sentences "Moreover, the Awaji Medical Center is not currently accredited for TAVR; thus, &gt;40 BAVs are performed annually at our center, which may have introduced some bias in the indications for BAV for patients with severe AS." in the limitations section. I am not sure whether it is a reasonable practice not to refer patients for TAVR just because the authors' hospital is not accredited for TAVR. I would like to ask the authors to provide the number of patients who had BAV due to the bias of Awaji Medical Center being not accredited for TAVR.

2) According to the data provided, the mortality rate even within 3 months after BAV is about 22.8% (32/140). Therefore, I want to make sure that BAV is not a reasonable treatment option for severe AS in elderly patients, especially even in biased medical circumstances.

3) Despite the ethical issue, this rare data is worth publishing.

4) I would like to ask the authors to provide the changing percentage of MR severity as well as MR jet area (average +/- SD) in Figure 3.

5) I would like to ask the authors to provide the box plot for MR jet area in each categories of Carpentier's classification. And also I would like to know how many type IIIa MR (rheumatic) were included in 15 of non-improved MR patients in MR group.

6) Contrary to the authors' comments that MR tended to improve after BAV regardless of the etiology of MR in the MR group (with the improvement being significant for patients Type I, II and IIIb MR), Figure 4 showed us that Type II (organic MR such as prolapse, flail) had worst outcome at 3 months after BAV. The authors may want to comment on this issue.
7) I would like to ask the authors to provide the baseline parameters to predict significant MR at 1 month after BAV because change between baseline and 1-month after BAV is practically not useful to identify patients with severe AS for whom BAV could be of benefit to decrease MR.

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