Reviewer’s report

Title: Epidemiology and risk factors in CKD patients with pulmonary hypertension: a retrospective study

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Reviewer: Justin Belcher

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Zhang et al. have performed a retrospective study of 705 patients with all stages CKD to assess for the prevalence and severity of pulmonary hypertension (PH) in this patient population.

This is an interesting study looking at a topic (PH in earlier stages of CKD) on which there is not much data. The same size is good as is the distribution of patients across stages and dialysis modalities. The finding that there was an equivalent prevalence of PH between PD and HD but that PD patients were much more likely to have severe PH is very interesting and may related to HD being able target more fine-tuned volume removal.

I do have a few questions/concerns.

Several major limitations were not mentioned. The biggest limitation in terms of extrapolating this data to the population at large is confounding by indication. In this retrospective only patients who had received echos were included. Clearly then there must have been a reason why a physician felt the patient should have an echo and in many cases that may have been symptoms related to PH.

A significant limitation not mentioned is that this is a single center study. I think this risk can actually be overblown in some cases but not here. As the authors note in several places in their discussions, there are different mechanisms whereby different diseases that lead to CKD can also lead to PH. Some diseases that causes CKD are more likely to also cause PH than others (despite lack of statistical significance for that here). The generalizability of a single center study looking at this then depends on the generalizability of causes of CKD at this hospital to the causes worldwide. While there is significant national variation, the finding here of 68% GN, 14% DM and 8% HTN clearly are at odds with many countries.

When looking at laboratory risk factors for PH, I would really like to see PO4 and Ca as these (along with PTH) are intimately associated with vascular calcification and may well associate with pulmonary small vessel disease. If the authors have data on these it would be great to see them included in the model.

Do the authors have any data about the prevalence of PH in non-CKD patients in their region? It would be nice to see if CKD Stage 1 actually has any increased risk vs the population at large.
In the discussion it states that patients with cardiac diseases were excluded. However, in the Methods section on exclusions, it only mentions patients with congenital cardiac disease were excluded. Is this what the Discussion is referring to by "cardiac disease"? This should be clarified.

Were there any patients with more than one echo during the study period? It would be interesting to see if any changes in their GFR tracked with any changes in their PH.

The paper reports there were 318 patients with Stage 5 CKD but also that there were 331 on dialysis. How do these numbers match up?

Just as a comment, I am surprised at how high the PTH levels are in Stage 1 and 2 CKD patients, they do not look any different from those in Stage 4 and Stage 5, which is certainly not what is usually seen.

**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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