Reviewer's report

**Title:** Ventilatory efficiency testing as prognostic value in patients with pulmonary hypertension

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**Reviewer:** Roland Wensel

**Reviewer's report:**

In their study Schwaiblmair et al. investigated the prognostic importance of measures of ventilatory efficiency in patients with pulmonary arterial hypertension.

The issue addressed is of high clinical and scientific relevance and the data are of high quality.

I have major concerns regarding the description of the background and methods, the data analysis and the conclusions drawn:

1. The authors should clearly differentiate ventilatory drive (first line of abstract) from ventilatory response.
2. How were blood gases measured?
3. What is functional dead space? I presume the authors mean physiological dead space (i.e anatomical [+mask] + alveolar) and I would suggest using this accepted terminology.
4. Clearly, dead space analysis requires arterial blood sampling as corresponding values for pCO2/FCO2 are required. This is impossible with capillary blood sampling.
5. What is the use of peakVO2 and VE/VCO2 slope cut-offs derived from a heart failure cohort (mentioned at the end of the CPET method section)?
6. I have serious concerns about the statistical analysis:
   a. The authors perform regression analysis on relative risk (which should be labelled Cox proportional hazard analysis!) only using predefined cut-off values. For peakVO2 this is the historical 10.4 and for VE/VCO2 slope this an arbitrary 55. This is clearly incorrect as the authors did not test (or describe) if these values reflect “optimal” cut-offs in their population.
   b. I would strongly recommend performing a univariate Cox analysis first using continuous rather than cut-off values. To analyze if a variable carries independent prognostic information a multivariate analysis should follow.
   c. Cut-off values for optimal prediction a very special to the population studied and they should therefore calculated by receiver operating curves, which will calculate the optimal value for prediction (i.e with the highest product of sensitivity and specificity).
7. Can the authors explain why no haemodynamic variables are prognostic in
their cohort, this clearly contradicts previous report.

I would suggest to recalculate the statistics and rewrite the discussion accordingly.

Level of interest: An article of importance in its field

Quality of written English: Not suitable for publication unless extensively edited

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

Declaration of competing interests:

I have no financial interests to declare.

I do, however, perform research in the same field with pending publications on the issue addressed in the study under discussion.