Reviewer’s report

Title: The predictive value of diaphragm ultrasound for weaning outcomes in critically ill children

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Reviewer: Andrew Gill

Reviewer's report:

This study documenting the application of diaphragmatic ultrasound measurements in infants weaning from mechanical ventilation fairly closely replicates the work of Farghaly et al but in a paediatric population. The study has been thoughtfully conceived, well executed and is a pleasure to read. In particular I am confident the ultrasound measurements could be replicated from the descriptions provided. I am very happy to recommend publication but offer the following suggestions that the authors and editors may consider.

Abstract.

The abbreviation DTF is introduced in the abstract without explanation, it should be worded out on first use.

Eligible population.

The authors state that only patients passing a 30 minute SBT were eligible yet the ultrasound was done at 5 minutes into the SBT. Did any patients fail the SBT after an ultrasound had been performed, if so, data on these patients may be informative. I am also a little confused about patient deaths. Death during MV was an exclusion (obviously) but 3 patients died in the failure group and 1 in the success. I assume this occurred after 48 hours of successful extubation, this could be explicitly stated.

Handling of ultrasound measurements.

TDF would be a unidimensional measurement and therefore applicable across the population studied. Contrary to an adult population, intuitively one would expect DT and DE to be size dependent and therefore statistically normalised to body weight, SA or a similar measure. This relationship certainly holds for term infants. Rehan VK, McCool FD. Diaphragm dimensions of the healthy term infant. Acta Paediatrica 2007;92(9):1062-67. doi: 10.1111/j.1651-2227.2003.tb02578.x. This methodology may have improved the predictive values of these measures.
Seeking associations.

The authors have looked for a relationship between DTF, DE, DT and Pimax. Again failure to standardise these measurements for varying body size may have influenced this negative outcome. I would have also liked to see a correlation with duration of MV as the authors correctly state, and clearly reference, it's association with diminishing diaphragmatic function. I would be keen to know if the predictive function of duration of MV was improved by the addition of ultrasound. This would be a key factor in determining the utility of ultrasound and the main authors claim that "diaphragmatic ultrasound has great value in predicting weaning".

Table 1.

I am curious that height is given as mean and sd while other continuous parameters age and weight are given median and range. Even though height may be normally distributed this itself would be a statistical quirk as one would intuitively expect a non normal distribution from the population studied.

I am unclear when the other measurements were made. I suspect at the commencement of the SBT, but this should be explicit in the table.

P/F should be explained. I am not sure what this term means.

Figures.

The ultrasound images are clear and well labelled.

The axes on the ROC curves should be limited to 1.0 and extension past this is meaningless.

As mentioned previously I would like to see the performance of MV duration assessed in this way with the incremental addition of diaphragmatic ultrasound.

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.

Unable to assess

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes
Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

Quality of written English
Please indicate the quality of language in the manuscript:

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