

PEER REVIEW HISTORY

BMJ Paediatrics Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	What CPAP to use in the delivery room? Bench comparison of two methods to provide continuous positive airways pressure in neonates
AUTHORS	Gruber, Viktoria; Morakeas, Stephanie; Hinder, Murray; Drevhammar, Thomas; Dronavalli, Mithilesh; Tracy, Mark

VERSION 1 - REVIEW

REVIEWER NAME	<i>Daniel O'Reilly</i>
REVIEWER AFFILIATION	Rotunda Hospital, Paediatrics
REVIEWER CONFLICT OF INTEREST	
DATE REVIEW RETURNED	19-Aug-2024

GENERAL COMMENTS	<p>Many thanks for this bench comparison of rPAP versus Neopuff T-piece delivered CPAP. While this paper is well written and experimentally sound, it is difficult as a practicing clinician to derive the relevance of these changes to neonatal patients.</p> <p>Is there any existing in-vivo evidence that lower iWOB and higher pressure stability improves the stabilisation of infants, as the final line suggests? There is a single study offered as evidence which was a non-blinded RCT showing increased delivery room intubation using the NP device.</p> <p>Suggest either</p> <p>1) Edit out suggestion that devices with higher pressure stability and lower iWOB might be preferential in the stabilisation of newborn infants as this is not what this study is set up to demonstrate, it simply demonstrates that rPAP is superior in this regard to Neopuff devices.</p> <p>OR</p> <p>2) Include substantially more research indicating that this may be the case, ideally in the introduction so the clinician reading this paper can understand the context with which you are approaching this question from.</p>
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REVIEWER NAME	<i>Arun Prasath</i>
REVIEWER AFFILIATION	UT Southwestern Medical Center, Pediatrics
REVIEWER CONFLICT OF INTEREST	
DATE REVIEW RETURNED	20-Sep-2024

GENERAL COMMENTS	Excellent work on understanding the tidal volume and pressure differences in a non invasive respiratory such as CPAP. This
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	<p>interface could be beneficial in a premature infant who is already on the CPAP due to respiratory distress syndrome. However, in a delivery room situation when resuscitating a premature infant or term infant there is dynamic change in compliance and the variable pressure and tidal volume from neopuff t piece could be protective to some extent from preventing hyper expansion and air leaks. However, the air leaks are demonstrated in neopuff devices from previous studies. This rPAP system would be interesting to compare with other standard devices in delivery room studies. Overall the study was well designed and the methodology and analysis were well written and the flow volume, pressure loops help understand the concept. I look forward to more delivery room and clinical studies using rPAP devices with clinical outcomes such as need for intubation, air leaks, and also even PPV using rPAP.</p>
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VERSION 1 – AUTHOR RESPONSE

Reviewer 1 – Dr. Daniel O'Reilly:

“Many thanks for this bench comparison of rPAP versus Neopuff T-piece delivered CPAP. While this paper is well written and experimentally sound, it is difficult as a practicing clinician to derive the relevance of these changes to neonatal patients.

Is there any existing in-vivo evidence that lower iWOB and higher pressure stability improves the stabilisation of infants, as the final line suggests? There is a single study offered as evidence which was a non-blinded RCT showing increased delivery room intubation using the NP device.

Suggest either

1) Edit out suggestion that devices with higher pressure stability and lower iWOB might be preferential in the stabilisation of newborn infants as this is not what this study is set up to demonstrate, it simply demonstrates that rPAP is superior in this regard to Neopuff devices.

OR

2) Include substantially more research indicating that this may be the case, ideally in the introduction so the clinician reading this paper can understand the context with which you are approaching this question from.”

We have changed following phrases in discussion and conclusion to comply with reviewers suggestion.

Discussion:

Previous sentence “We hypothesize that pressure stability of CPAP systems may be of importance in the early phase during transition to breathing in newborns requiring airway pressure support. In-vivo studies are needed to assess the actual imposed (inspiratory and expiratory) WOB with relation to dynamic changes of lung compliance and resistance during transition.”

Now changed to “Whether pressure stability of CPAP systems is of importance in the early phase during transition to breathing in newborns requiring airway pressure support needs further investigation. In-vivo studies are required to assess the actual imposed (inspiratory and expiratory) WOB with relation to dynamic changes of lung compliance and resistance during transition.”

Conclusion:

Previous sentence “This bench test supports the theory that devices with higher pressure stability and lower iWOB might be preferential in the stabilization of newborn infants, particularly term infants.”
Now changed to “The clinical impact of higher pressure stability and lower iWOB in the stabilization of newborn infants needs further investigation in in-vivo studies. “

Reviewer 2:

“Comments to the Author

Excellent work on understanding the tidal volume and pressure differences in a non invasive respiratory such as CPAP. This interface could be beneficial in a premature infant who is already on the CPAP due to respiratory distress syndrome. However, in a delivery room situation when resuscitating a premature infant or term infant there is dynamic change in compliance and the variable pressure and tidal volume from neopuff t piece could be protective to some extent from preventing hyper expansion and air leaks. However, the air leaks are demonstrated in neopuff devices from previous studies. This rPAP system would be interesting to compare with other standard devices in delivery room studies.

Overall the study was well designed and the methodology and analysis were well written and the flow volume, pressure loops help understand the concept. I look forward to more delivery room and clinical studies using rPAP devices with clinical outcomes such as need for intubation, air leaks, and also even PPV using rPAP.”

We agree with reviewer 2 astute comments re dynamic lung changes in newborn resuscitation during the transition of fluid filled lungs to fully aerated. We are already underway in examining these factors. We look forward to offering these publications to BMJ Paed Open in due course.