Adaptive Support Ventilation From Intubation to Extubation

A Word of Caution

To the Editor:

In a recent issue of CHEST (June 2015), we read with interest the randomized controlled trial (RCT) by Kirakli et al1 comparing adaptive support ventilation (ASV) with pressure assist/control ventilation (P-ACV) for the entire duration of mechanical ventilation (MV) in a cohort of 229 patients in the medical ICU. The study showed a shorter duration of the weaning process and total MV in the ASV group. We believe that some aspects of this RCT deserve further discussion.

Various authors have previously shown the benefit of ASV in the weaning phase2-4: This is the first study, to our knowledge, that investigates the efficacy of ASV as the unique ventilation mode in patients in the medical ICU. Because ASV was shown to reduce total length of MV, the authors claimed that this additional benefit as an effect of the application of ASV from the beginning of MV. However, the protocol in the control group provided P-ACV for the whole length of MV, and pressure support ventilation (PSV) was contemplated only after the failure of the third spontaneous breathing trial (SBT), despite a general consensus and a strong support of the literature5 for the use of PSV as a weaning mode after an initial failed SBT. Robust evidence indicates the beneficial effects of PSV in patients able to trigger the ventilator compared with assisted/controlled modes,6,7 and these may be of even greater relevance in patients at risk for scarce patient-ventilator interaction. Interestingly, more than one-half of enrolled patients had COPD and, thus, were prone to the development of asynchronies. Unfortunately, no data on this issue were presented, although a poorer patient-ventilator interaction may have seriously affected the results. We believe that the choice of not switching to PSV as soon as patients triggered the ventilator hampers the understanding of to what extent the benefit described in patients receiving ASV is due to the use of an assisted/controlled mode in the control group, notably because patients on ASV received totally assisted ventilation as soon as possible.

In addition, no data were provided regarding sedation during MV, which was possibly different between groups because patients receiving P-ACV could have required more sedation to achieve adequate patient-ventilator interaction. Sedation dosing, discontinuation, or both may have consistently affected the decision to consider weaning for the single patient, even with weaning and extubation done according to physician decision and regardless of a standard protocol. In this sense, we recognize that it is still debated whether the use of systematic protocols for weaning may reduce the duration of MV8; nevertheless, we believe that the use of such protocols should be considered mandatory when RCTs regarding duration of MV and weaning success are performed, especially when physician blinding is impossible. Finally, despite that cardiac decompensation and fluid overload are recognized as the most common causes of SBT failure,9 a standardized fluid protocol was not applied, data on fluid balance and cardiac function were not provided, and perhaps most importantly, data clarifying the reasons of weaning failure were not presented.

In conclusion, we believe that the results of the present RCT should be interpreted with caution. We strongly suggest that in the field of MV, careful clinical judgment should still be considered the best way to treat patients, at least before the initiation of the weaning process.

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References

the cycling parameter (time in P-ACV and PSV in spontaneously breathing patients is only difference regarding synchronization between be inferior compared with PSV. There are also data to patients parameter is set with caution and adjusted according mode in these patients, but we believe that if the cycling Theoretically, PSV could be selected as the ventilation support ventilation and pressure assist/control for their interest in our study comparing adaptive-ventilation (generally either assist-control or PSV) as SBT should receive a nonfatiguing mode of mechanical ventilation with a T-tube for extubation. Patients who fail the initial SBT receive a nonfatiguing mode of mechanical ventilation (generally either assist-control or PSV) as suggested in the Weaning Task Force of the European Respiratory Society.2 We selected P-ACV as the ventilation mode in patients failing the first SBT. The only difference regarding synchronization between P-ACV and PSV in spontaneously breathing patients is the cycling parameter (time in P-ACV and flow in PSV). Theoretically, PSV could be selected as the ventilation mode in these patients, but we believe that if the cycling parameter is set with caution and adjusted according to patients’ needs in P-ACV, synchrony would not be inferior compared with PSV. There are also data regarding better patient ventilator interaction or hemodynamic effects with time cycling compared with flow cycling in patients undergoing noninvasive ventilation.3,4 Although the clinicians in charge were cautious when adjusting the cycling parameter (inspiratory time) in P-ACV according to patient ventilator synchrony, the automatic switch to PSV provided by ASV with no intervention from the clinician as soon as the patient triggered the breath may have had an impact on the outcome. Even if patients in the P-ACV mode were switched to PSV, this intervention could have been delayed owing to late recognition of the actively breathing patient, especially during night shifts in centers with a low ratio of nurses to patients, as in ours. We think that this is one advantage of automatic closed-loop modes in these kinds of ICUs with a high workload. There are also data showing that extubation readiness cannot be recognized in a timely manner in at least 15% of patients recovering from respiratory failure, even in the presence of a ventilation protocol.5 In our study, we could not evaluate physiologic data that could affect patient ventilator interaction because of technical limitations, so this issue deserves further research to be clarified.

Regarding the sedation used for both groups, our policy is to use little or no sedation, especially in actively breathing patients. Instead, physicians in charge try to set the triggering and cycling parameters according to individual patients’ needs. Besides, a similar strict weaning protocol was used in the control group as in the ASV group.

Fluid overload is one of the most common causes of SBT failure. We used standard protocols to assess fluid responsiveness and same fluid and nutrition therapies for both groups, as described in the Methods section of the study. As this was a randomized controlled trial, patients who could be affected by fluid overload, such as those with cardiac failure and sepsis, were equally distributed in both groups, so we might expect that this issue could not have an impact on the overall outcome.

This study reflects the outcomes of a single center experienced in ASV, so the results should be interpreted with caution, as suggested. Although automatic closed-loop modes might help ICU physicians to wean and extubate patients earlier, the clinical judgment of an experienced intensivist is still important, and we believe that the use of these new technologies needs further evaluation with multicenter studies to increase the external validity of the results.