Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Personalised mechanical ventilation in acute respiratory distress syndrome: the right idea with the wrong tools?

We read with great interest the report of the LIVE study by Jean-Michel Constantin and colleagues,[1] which assessed whether personalised mechanical ventilation according to lung morphology (focal *vs* non-focal) could improve acute respiratory distress syndrome (ARDS) survival outcomes compared with standard of care. The results for the primary outcome, 90-day mortality, were negative; however, misclassification of lung morphology occurred in 85 (21%) of 400 patients, and in the per-protocol analysis in which misclassified patients were excluded, mortality was significantly lower in the personalised ventilation group than in the control group. These findings support continued interest in the integration of lung morphology in ARDS management. However, the choice of imaging technique is a significant limitation of the study, and the methods used to investigate lung morphology need further consideration. Non-quantitative CT scanning was expected to be the reference technique, but most patients were assessed by chest x-ray, which has poor performance in ARDS.[2] No patient was studied with lung ultrasound, although it was allowed per protocol. Lung ultrasound might be the ideal bedside imaging technique, because lung loss of aeration can be quantified on the basis of the visualised artifacts, with strong association with lung tissue density as measured by quantitative CT scan.[3] To develop the skill of lung aeration assessment by ultrasound, at least 25 supervised examinations are required.[2] Focal and non-focal ARDS can then be distinguished reliably at the bedside; moreover, the effects on lung aeration of procedures such as recruitment manoeuvres, positive end-expiratory pressure (PEEP) titration, or prone positioning can be monitored.[2]

In the study by Constantin and colleagues,[1] integration of lung imaging with other bedside tools was not allowed per protocol. Once lung morphology is assessed and a non-focal ARDS is identified, the patient can reasonably be considered a PEEP responder. But what is the optimal PEEP value for a specific PEEP-responder patient? Furthermore, because of the variability of chest wall mechanics, the lung stress associated with a nominally safe 30 cm H_2O plateau pressure is often difficult to predict. Oesophageal pressure can help physicians in fine tuning of PEEP in non-focal ARDS to avoid atelectotrauma and derecruitment, as well in limiting lung stress in both focal and non-focal ARDS.[4] Disappointingly, an oesophageal pressure-guided mechanical ventilation strategy recently showed no effect on patients' outcomes.[5] However, the dedicated calibration procedure was not mandatory per protocol, a technical issue potentially affecting the reliability of measurements; furthermore, no assessment of lung recruitability was done, thus likely exposing patients with low potential for lung recruitment to unnecessarily high PEEP values.

To conclude, the subanalysis of this study[1] supports the interest in a ventilation strategy tailored to lung imaging; a combined approach based on bedside assessment of lung morphology and lung mechanics might have even greater potential to improve survival outcomes in ARDS.

We declare no competing interests.

*Silvia Mongodi, *Erminio Santangelo, Bélaïd Bouhemad, Rosanna Vaschetto, Francesco Mojoli*
erm.santangelo@gmail.com

Anestesia e Rianimazione I, Fondazione Istituto di Ricovero e Cura a Carattere Scientifico, Policlinico San Matteo, Pavia, Italy (SM); Department of Translational Medicine, Università del Piemonte Orientale, Novara 28100, Italy (ES, RV); Dijon et Université Bourgogne Franche-Comté, Lipides Nutrition Cancer Unité Mixte de Recherche 866, Dijon, France (BB); Département d'Anesthésie et Réanimation, Centre Hospitalier Universitaire Dijon, Dijon, France (BB); Anesthesia and Intensive care, Azienda Ospedaliero-universitaria "Maggiore della Carità", Novara, Italy (RV); Anestesia e Rianimazione I, Fondazione Istituto di Ricovero e Cura a Carattere Scientifico, Policlinico San Matteo, Pavia, Italy (FM); and Department of Clinical-Surgical, Diagnostic, and Pediatric Sciences, Unit of Anesthesia and Intensive Care, University of Pavia, Pavia, Italy (FM)

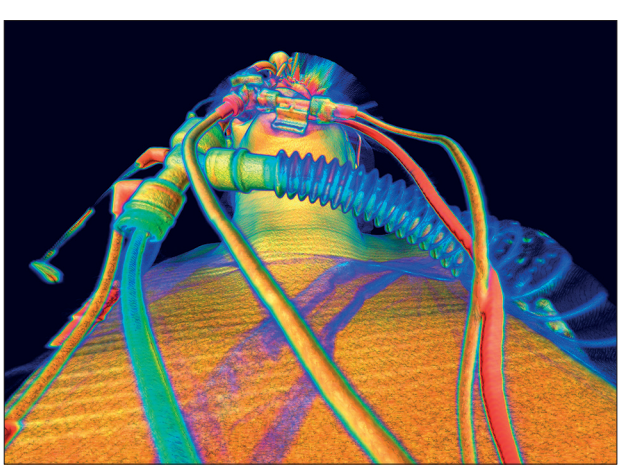
1 Constantin J-M, Jabaudon M, Lefrant J-Y, et al. Personalised mechanical ventilation tailored to lung morphology versus low positive end-expiratory pressure for patients with acute respiratory distress syndrome in France (the LIVE study): a multicentre, single-blind, randomised controlled trial. *Lancet Respir Med* 2019; **7:** 870–80.

2 Mojoli F, Bouhemad B, Mongodi S, Lichtenstein D. Lung ultrasound for critically ill patients. *Am J Respir Crit Care Med* 2019; **199:** 701–14.

3 Chiumello D, Mongodi S, Algieri I, et al. Assessment of lung aeration and recruitment by ct scan and ultrasound in acute respiratory distress syndrome patients. *Crit Care Med* 2018; **46:** 1761–68.

4 Mauri T, Yoshida T, Bellani G, et al. Esophageal and transpulmonary pressure in the clinical setting: meaning, usefulness and perspectives. *Intensive Care Med* 2016; **42:** 1360–73.

5 Beitler JR, Sarge T, Banner-Goodspeed VM, et al. Effect of titrating positive end-expiratory pressure (PEEP) with an esophageal pressure-guided strategy vs an empirical high PEEP-Fio2 strategy on death and days free from mechanical ventilation among patients with acute respiratory distress syndrome: a randomized clinical trial. *JAMA* 2019; **321**: 846–57.



K H Fung/Science Photo Library