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The use of the Boussignac CPAP device during cardiogenic pulmonary edema (CPE): why add air to the oxygen gas source?

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Dear Editor,

We have read with great interest S. Nouira et al.'s [1] multicenter study comparing the use of CPAP and NIPSV in the management of cardiogenic pulmonary edema (CPE) in the emergency department (ED). Several similar studies on the topic have been performed in the ED [2]. Nouira et al.'s study has the advantages of having associated noninvasive ventilation (NIV) with the currently recommended medical treatment (nitrite bolus), and having used the Boussignac CPAP device (Vygon, 95440 ECOUEN France) in the CPAP group, a highly effective and user-friendly device [3]. The authors chose to adjust the air-to-oxygen ratio to keep SpO₂ above 90%. For the Boussignac CPAP device, this was obtained by using an air-oxygen mixture as the gas generating the continuous pressure.

As previous studies have shown, the authors conclude that the two NIV techniques have similar effects on intubation rate and mortality reduction. However, NIPSV was associated with a shorter symptom resolution time compared to CPAP (159 ± 54

vs. 210 ± 73 min; $p < 0.01$). Resolution was defined as a respiratory rate $< 30 \text{ min}^{-1}$ and SpO₂ $> 96\%$ under O₂ supplementation $< 3 \text{ L/min}$ in the CPAP group or under FiO₂ $< 35\%$ in the NIPSV group.

We are surprised at the substantial amount of time necessary before symptomatic improvement with CPAP, as described by the authors. This resolution appears particularly long and does not correspond to our experience nor that of Moritz et al. in the use of Boussignac CPAP device, where patients' symptoms are generally improved in less than 1 h [3, 4]. The authors did not describe in detail what medical treatment the patients actually received. We could ask the question as to whether the medical treatment received was optimal. Another element that could explain this prolonged resolution time is having limited the FiO₂ administered to patients. The authors chose to administer oxygen for an SpO₂ of 90%, without detailing the actual FiO₂ delivered to the patients in both the CPAP and NIPSV groups. Yet CPE is principally a hypoxemic form of respiratory distress. The benefit of NIV is well-established and that of high concentration oxygen remains valid. Among the different free flow CPAP systems recommended, the advantage of the Boussignac CPAP device lies in allowing for the administration of oxygen at high FiO₂ values yet with less consumption of oxygen than with CPAP devices using the Venturi system [5], without increasing the risk of hypercapnia [4]. Furthermore, the use of high concentration oxygen as the only gas source simplifies the use of the Boussignac CPAP device.

For the management of CPE in the ED, contrary to Nouira et al., we would recommend the use of the Boussignac CPAP device with oxygen as the only gas source. This not only simplifies the use of the device

but could promote a more rapid resolution of symptoms.

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