EDITORIAL NOTE

Editorial Note on: Respiratory CO₂ response in acute cervical spinal cord injury (CO₂ response in spinal cord injury)

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Respiratory failure requiring invasive ventilatory support is common after spinal cord injury (SCI). Most people are weaned uneventfully, but a minority progress to repeated weaning failure. Weaning failure involves an often complex combination of (i) inadequate ‘command’ from respiratory centres in the CNS, (ii) impaired ability to convert this output into oscillating intrathoracic pressure, (iii) increased resistance secondary to reduced respiratory system compliance or (iv) inefficiency of gas exchange.

In the January edition of *Spinal Cord*, Raurich *et al.*¹ describe novel data examining the ventilatory response to CO₂ and the P_{0.1} in acute tetraplegia compared with a group of able-bodied control patients. The ventilatory response to CO₂ can be considered a composite measure of (i), (ii), (iii) and (iv) above and while the P_{0.1} estimates respiratory centre output it is influenced by the function of the descending motor tracts, neuromuscular junctions, muscles and chest wall integrity.^{2,3} If these latter are normal, absolute magnitude of P_{0.1} has been advocated as a measure of respiratory centre output, albeit with caveats. In the Raurich paper, all subjects were intubated and undergoing a trial of spontaneous breathing the same day. The control subjects were all successfully extubated, whereas the SCI patients all failed. The SCI patients had somewhat lower P_{0.1} and higher PaCO₂ at baseline. The investigators observed markedly lower ΔP_{0.1}/ΔCO₂ slope in the SCI patients, yet similar ΔVE/ΔPCO₂.

Unfortunately, we believe it is very difficult to interpret these results. First, the authors themselves have previously shown these same parameters to differ according to subsequent length of weaning even in subjects with the same underlying pathology.^{3–5} Therefore, it is unclear how from the outset it could have been possible to distinguish whether any differences between the groups were due to

readiness to wean rather than diagnosis. Second, we cannot explain how ventilatory response can be preserved if P_{0.1} response is deficient, because one directly contributes to the other. This suggests that either some other unmeasured factor, perhaps related to respiratory mechanics, varied in the opposite direction or that these results are complicated by the technical limitations in their measurements acknowledged by the authors. Unpacking exactly why some people with SCI are unable to wean from ventilation will require significant further research.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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