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Criteria for Adequacy of Reversal of Neuromuscular Blockade

To the Editor:—In his editorial in which concern regarding the problem of residual neuromuscular blockade is expressed, Miller¹ concludes by stating that we should seek more sensitive indices of adequacy of reversal of neuromuscular blockade than those used at present. He lists the current criteria that include a maximum inspiratory force of 25 cm H₂O.

I would like to point out that the values of vital capacity and maximum inspiratory and expiratory mouth pressures quoted in the editorial as "normal" and "slightly depressed" are actually very low.

Normal values for vital capacity are usually quoted according to height, age, and sex, not weight, and the ability to achieve a vital capacity of only 15 ml/kg would give great cause for concern. For example, a 30-yr-old man, 160 cm tall, should have a vital capacity of 4 l, decreasing to 3 l at the age of 70.

Normal ranges for maximum inspiratory and expiratory pressures are broad and depend on the source used.²⁻⁴ Whatever the reference value used, the ability to achieve a maximum inspiratory or expiratory pressure of only 25 cm H₂O would alert a respiratory physician to the presence of severe global respiratory muscle weakness needing investigation and probably intervention. Typical values for maximum inspiratory pressure should be about 100 cm H₂O and for maximum expiratory pressure about 150 cm H₂O.⁵

On closer inspection of the reference quoted in the editorial,⁶ the values of 15–20 mg/kg for vital capacity and inspiratory and expiratory forces of 20–25 cm H₂O were described as, "clinically acceptable minimum limits required for adequate respiratory function." Not normal or near-normal values. I would suggest that instead of seeking other more sensitive tests of residual neuromuscular blockade, the adoption of higher acceptable values of vital capacity and respiratory muscle strength may be more sensible.

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In Reply:—I am encouraged that the overall concern expressed in my editorial has attracted the attention and agreement of Dr. Derrington. She is quite correct in her assertion that the vital capacity values listed in that editorial are not "normal." They are values that are frequently used to ascertain whether a patient can safely sustain adequate ventilation after endotracheal extubation.

The point of the editorial was to emphasize the possibility that current tests are not sensitive enough to detect residual neuromuscular blockade. If this conclusion is correct, either currently used tests can be altered to become more sensitive (as suggested by Dr. Derrington) or new tests can be created. Dr. Derrington has correctly pointed out

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REFERENCES

1. Miller RD: How should residual neuromuscular blockade be detected? (editorial). *ANESTHESIOLOGY* 70:379–380, 1989
2. Brand JB, Cullen DJ, Wilson NE, Ali HH: Spontaneous recovery from neuromuscular blockade: Correlation between clinical and evoked responses. *Anesth Analg* 56:55–58, 1977
3. Ringqvist T: The ventilatory capacity in healthy subjects: An analysis of causal factors with special reference to the respiratory forces. *Scand J Clin Lab Invest (Suppl 18)* 88:8–170, 1966
4. Black LF, Hyatt RE: Maximum respiratory pressures: Normal values and relationship to age and sex. *Am Rev Respir Dis* 89:214–235, 1964
5. Wilson SH, Cooke NT, Edwards RHT, Spiro SG: Predicted normal values for maximal respiratory pressures in caucasian adults and children. *Thorax* 39:535–538, 1984
6. Ali HH, Wilson RS, Savarese JJ, Kitz RJ: The effect of tubocurarine on indirectly elicited train-of-four muscle response and respiratory measurements in humans. *Br J Anaesth* 47:570–574, 1975

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that higher acceptable values of vital capacity and respiratory muscle strength than those currently used would be one approach to increasing the sensitivity of tests. In that regard, we are in complete agreement.

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Intracranial Hypertension Following Graft Reperfusion

To the Editor:—We read with interest the case report by Conaty *et al.*¹ regarding the acute elevation of intracranial pressure (ICP) following the release of a pneumatic tourniquet. We share their concern over intraoperative management of patients with decreased intracranial

compliance and wish to report a case of acute increase in ICP during orthotopic liver transplantation (OLT) immediately following reperfusion of the graft liver, suggesting the importance of intraoperative monitoring of ICP in these patients.