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REPLY:

I thank Drs. Vassiliadis and Barbetakis for their interest in the effects of lateral position on one-lung anaesthesia. In their study of 23 patients they were not able to demonstrate any difference in oxygenation between left and right thoracotomies. Our previous study¹ of 80 patients and another of 200 patients² found that the mean PaO₂ levels were higher during left thoracotomies.

Usually, the left lung is less perfused than the right and there is less shunt when the left lung is collapsed. Hurford *et al.*³ showed that the PaO₂ during one-lung anaesthesia varies with the proportion of perfusion to the ventilated lung. Given the data of Drs. Vassiliadis and Barbetakis, it would require 130 subjects to have adequate power to determine that the side of surgery did not have an effect on oxygenation during one-lung anaesthesia.⁴

These authors found a trend towards poorer oxygenation during both two- and one-lung ventilation in the right-lateral position. This may be due to shunt in the dependent lung. The authors used 66% N₂O in oxygen during two-lung ventilation. This mixture contributes to atelectasis, particularly in the dependent lung in the lateral position.⁵

Their observations on positioning and arterial end-tidal CO₂ (Pa-ETCO₂) gradients are interesting. At the onset of one-lung ventilation there is a sudden increase in deadspace that is ameliorated over the first several minutes as hypoxic pulmonary vasoconstriction redistributes blood flow back to the ventilated lung. The Pa-ETCO₂ gradient during one-lung anaesthesia is dynamic and measurements will depend on the time they are taken. Unfortunately the authors do not specify at what time during lung collapse they made their measurements.

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Assessment of neuromuscular blockade at the vastus medialis

To the Editor:

I would like to comment on the interesting experiment on neuromuscular blockade (NMB) monitoring by Saitoh *et al.*¹ Their article may be more interesting than they realize. The article alludes to the phenomenon of direct muscle stimulation, but fails to observe that the innervation of the vastus medialis is via a motor nerve entering the muscle from its deep surface.² There may be an additional small branch entering anteriorly. Nonetheless, all of the motor innervation enters the muscle near its midpoint,³ well above the placement of the stimulating electrodes.

This makes specific motor nerve stimulation impossible with the set-up illustrated, and suggests that the response is due to muscle stimulation. Thus, the changes in acceleration shown, which closely mirror the change in NMB, must be due to stimulation of small *im* branches of the vastus medialis nerve.

The implications are important. Traditional NMB monitoring uses the adductor pollicis because the muscle is remote from the site of stimulation and avoids direct muscle stimulation. The authors may have shown the way to using the accelerometer-based instrument on any muscle, anywhere, without regard to the anatomy of innervation. This hypothesis, of course, requires scientific study.

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REPLY:

We studied the accelerographic monitoring of neuromuscular block over the vastus medialis muscle.¹ However, we were unaware of the precise innervation of the vastus medialis muscle. As suggested, in our study, small im branches of the vastus medialis nerve may have been stimulated. Further studies will be required to evaluate the appropriateness of direct muscle stimulation to monitor neuromuscular blockade in anesthetized patients. The degree of neuromuscular block assessed accelerographically over the directly stimulated muscle should be compared to that evaluated mechanically, electromyographically, or accelerographically at the thumb or the adductor pollicis muscle. We thank Dr. McKay for his constructive suggestion.

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