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Implementation of Pharmaceutical Practice Guidelines

To the Editor: — Lubarsky *et al.*[1] are to be congratulated on a very nice and timely study on the implementation of pharmaceutical practice guidelines. However, their study was only concerned with immediate postanesthesia care (PACU) outcomes, and as they themselves point out in the discussion, this does not necessarily reflect the entire perioperative course for inpatients. Anesthetic agents and not the lesser muscle relaxants may have significant effects that last beyond the PACU period. I would like to draw attention to our resent randomized controlled trial of postoperative pulmonary complications after the use of pancuronium, atracurium, and vecuronium in nearly 700 adult patients undergoing abdominal, orthopedic, and gynecologic operations.[2,3] All patients were monitored during anesthesia using tactile evaluation of the response to train-of-four nerve stimulation, and all were blindly evaluated for postoperative pulmonary complications 2, 4, and 6 days after surgery. Not only was the incidence and the degree of residual block in the PACU significantly increased in the pancuronium group, but also significantly more patients in this group developed postoperative pulmonary complications in the ward (16.9%) as compared with the two other groups (5.4%). The findings may not apply directly to other departments using other methods of administration of muscle relaxants. They do, however, indicate that any investigation of the effect of practice guidelines on clinical outcome (and including cost-benefit analyses) should include the period *after* the patients are discharged to the ward.

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In Reply: — Dr. Viby-Mogensen makes an important point, namely, that all significant complications do not occur immediately postoperatively. The paper to which he refers clearly documents the fact that inadequate neuromuscular blockade can occur. However, the doses of neostigmine given to patients in his pancuronium group, or the time interval after the last pancuronium dose, may have been insufficient. The authors documented this by noting that patients often arrived in the PACU with low train-of-four ratios. We believe that it is the adequacy of reversal, not the use of pancuronium *per se*, which influences the clinical outcome in the PACU and beyond.

The practice guidelines we proposed regarding the use of pancuronium are sound as long as enough medication is administered to achieve appropriate reversal. Reversal should be monitored by standard train-of-four monitoring, making sure a twitch is present before reversal, and one should assess the ability to sustain tetanus for 5 s in addition to having 4/4 twitches of near equal magnitude (>0.7 T4/T1).

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