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Risk of Postoperative Pulmonary Complications: Reply

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In Reply:

We appreciate Leslie *et al.*'s[1] interest in our recent single-center retrospective registry analysis of postoperative complications after neuromuscular blockade with neostigmine *versus* sugammadex,[2] and we certainly agree that a large randomized controlled trial would be beneficial in further elucidating the mixed results that have been published to date. We also agree that, ideally, retrospective studies should only use endpoints that were directly related to the condition or intervention under study, and that those endpoints should not be influenced by other factors. However, in constructing a retrospective study, one is immediately confronted with the problems of data availability and data quality and with the reality that all clinical endpoints are invariably influenced by multiple overlapping processes.

We chose to use a subset of outcomes, as defined by the American College of Surgeons' (Chicago, Illinois) National Surgical Quality Improvement Program, because of the robust validation and quality assurance processes that are an integral component of data collection in that program.[3] Data in the National Surgical Quality Improvement Program database undergo rigorous validation, including periodic audit and assessment of interrater reliability. Outcomes are defined using clear and consistent definitions. In light of this, we would contend that we used data significantly more robust than existing alternative options. Although we could have attempted to use the exact definitions proposed by Abbott *et al.*,[4] we do not believe it would have been feasible to reliably extract those outcomes as defined from the electronic health record, with aspiration pneumonitis and atelectasis being the most challenging. Additionally, although the Abbott *et al.* outcomes are mechanistically related to anesthesia, they may not be related to the question at hand. For instance, although inadequate neuromuscular blockade could lead to aspiration pneumonitis, recent guidelines aimed at decreasing the incidence of aspiration are focused largely on initial airway management, without even a mention of neuromuscular blockade reversal.[5] Whereas Leslie *et al.*'s[1] summary of the Abbott *et al.*[4] outcomes lists only acute respiratory distress syndrome, a closer examination of Abbott's *et al.*'s[4] recommendations for postoperative respiratory failure reveals that they also include mechanical ventilation, defined as either

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Competing Interests

Dr. Freundlich reports grant funding and consulting fees from Medtronic (Minneapolis, Minnesota) for work unrelated to the content of this letter and stock in 3M (Saint Paul, Minnesota) and Johnson & Johnson (New Brunswick, New Jersey). Dr. Li reports stock in Pfizer (New York, New York) and Johnson & Johnson.

reintubation or prolonged intubation after surgery. Those are two of the three outcomes that we included in our study. Our third outcome, pneumonia, is already one of the Abbott *et al.* outcomes that Leslie *et al.* mention. We contend that we used high-quality data to measure outcomes aligned with existing consensus definitions.

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