

the same finding would have been expected if the subjected pantomimed or imagined the same activities.<sup>6</sup>

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### In Reply:

The questions about the duality and hemispheric functional specializations of the human brain have occupied interested scientists for decades. Experimental findings from split-brain and binocular rivalry research strongly suggest that the two hemispheres of the brain are both actively engaged in constructing and representing different aspects of the content of human consciousness. The seminal research by Sperry<sup>1</sup> and Gazzaniga<sup>2</sup> in the 1960s on split-brain patients led to a novel understanding of functional lateralization of the brain. It is well known that under special circumstances, the two hemispheres can show an amazing amount of autonomy and cognitive functions associated with different contents of internal and external realities. In binocular rivalry experiments with normal participants, visual perception of each eye alternates to become the content of consciousness, which is mediated primarily by one of the hemispheres. Although evidence for functional lateralization is measurable, broad generalization of lateral dominance has yet to be treated carefully. Evidence

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from various cognitive experiments collectively suggests that hemispheric dominance is related to task,<sup>3</sup> rather than to handedness or the sites for representation of conscious contents. For example, as in the majority of population, when we are speaking and reading, the left brain privileged in language and verbal reporting is dominant, but when we are navigating or appreciating music or an artwork, the right brain is dominant.

The handedness of our study participants was unfortunately not recorded at the time when the experiments were conducted.<sup>4</sup> Nonetheless, we know that the left hemisphere is dominant for speech in approximately 95% of right-handed people and in approximately 70% of left-handed people.<sup>5</sup> This raises the question whether handedness can be regarded as a reliable, authentic representation of hemispheric functional specialization. Moreover, working memory and semantics have been reported to involve mainly left-lateralized brain networks.<sup>6,7</sup> This may explain why in our experiments the task-induced brain activity and connectivity patterns showed pronounced lateralization to the left in the wakeful baseline condition and the absence of this lateralization during deep sedation.<sup>8</sup> In our experiments, there was no motor action performed during imaging scan; behavioral evaluations were conducted only during the interval between scans to assess the level of sedation. However, auditory stimuli were continuously presented during scanning. Thus, it is conceivable that during deep sedation, nonspecific thalamocortical connectivity had to be more suppressed in the left than in the right hemisphere, preventing the incoming stimuli to become the dominant content of consciousness. In other situations, where the nature of task demands a predominant involvement of the right hemisphere, the results could be dramatically different (*e.g.*, a prominent suppression of right hemisphere activity or connectivity). Thus, we consider our observations of more pronounced suppression of nonspecific thalamocortical connectivity in the left hemisphere, as reported in our publication, to be task related. We thank Dr. Derakhshan for commenting on our work and offering interesting interpretations of the results.

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## Postanesthesia Evaluation of Neuromuscular Function

### To the Editor:

The American Society of Anesthesiologists' recently published Practice Guidelines for Postanesthetic Care<sup>1</sup> contains a statement that is at best puzzling and at worst I believe sends the wrong message to the anesthesia community. To quote: "Assessment of neuromuscular function primarily includes physical examination and, on occasion, may include neuromuscular blockade monitoring."

There is now overwhelming evidence that traditional bedside or clinical tests of neuromuscular function such as head-lift, tidal volume, tongue protrusion, and others are very insensitive tests for the detection of residual neuromuscular weakness.<sup>2–5</sup> To cite just one recent study "a reliable clinical test for detection of significant residual block... will probably remain elusive."<sup>6</sup> Thus one must ask what clinical signs the Task Force is referring to when they recommend a "physical examination"?

The answer to the problem of postoperative residual neuromuscular block lies not with a postanesthesia evaluation, but with intelligent intraoperative monitoring of neuromuscular function ideally with a quantitative monitor.

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### In Reply:

We thank Dr. Kopman for his comments regarding the Practice Guidelines for Postanesthetic Care.<sup>1</sup> This guideline document consisted of an update rather than a comprehensive revision of the 2001 version<sup>2</sup> and examined new evidence from literature, surveys, and other sources as applied to the existing evidence model. Of note, there were no changes to the recommendations. Had we obtained substantive new findings as applied to the original evidence linkages, we would likely have proceeded with a full revision and had the opportunity to reconsider the issue raised by Dr. Kopman.

Regarding traditional bedside or clinical tests of neuromuscular function, we agree with Dr. Kopman that this area does straddle the topics of intraoperative and postoperative care, and our literature search focused primarily on postoperative care. In this case, our findings were observational as opposed to Category A (randomized controlled trial) evidence and believe that more research is needed in this important area. These observational studies did indicate that neuromuscular blockade monitoring is effective in detecting neuromuscular dysfunction. We also agree that intraoperative monitoring of neuromuscular function (ideally with a quantitative monitor) would be valuable, particularly during emergence and recovery.

As with all of the American Society of Anesthesiologists (ASA) evidence-based practice parameters, the ASA endeavors to conduct an exhaustive literature search and invites comments and contributions from Task Force members, expert consultants, and other contributors during the several months the preapproval draft is posted on the internet. Though no queries similar to those raised by Dr. Kopman were received when the draft of this document was available for comment, we plan to again review these Guidelines in the future and will consider the query at that time. Again, we thank Dr. Kopman for his thoughtful and informative letter indicating his concerns.

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