

## Editorial – Neuromuscular block : our lessons should be learned

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The clinical practice regarding the perioperative and intra-operative management of neuromuscular blockade has seen major changes in the last decade, since the availability of sugammadex (1). This drug tackled most of the limitations inherent in the use of acetylcholinesterase inhibitors, by rapidly and completely reversing all levels of nondepolarizing neuromuscular block. This advance has helped to decrease the incidence of postoperative residual neuromuscular block (2), but has not been able to eliminate it. To further improve the outcome for our patients, several gaps in the management of neuromuscular blockade need to be addressed. One of these is the correct use of peripheral nerve stimulators, as neuromuscular monitoring is still essential to prevent residual block (3). Interestingly, the use of quantitative neuromuscular transmission monitoring has now become a requisite for safe practice in some international guidelines (4). Another focus point should be the knowledge gaps that need to be closed. A recent international survey by Naguib et al. demonstrated that many anesthesiologists still have a poor understanding of neuromuscular block and monitoring (5).

In this issue of the Acta Anaesthesiologica Belgica, a group of Belgian and international experts used this (slightly modified) questionnaire to evaluate the knowledge and self-confidence of Belgian anesthesiologists in neuromuscular monitoring. Even though the result was better than what was reported in the international survey (72% versus 57% of questions answered correctly), this should alert us. Almost a decade has passed since Glenn Murphy and Sorin Brull published their landmark manuscripts: 'Residual neuromuscular block: lessons unlearned' (6,7), and we have to conclude that some lessons remain unlearned. We applaud the authors' continued efforts to bring this to our attention in this issue.

There are some barriers to educating ourselves. It is often difficult to change practices that are almost institutionalized. Furthermore, teaching is time-consuming and requires expert personnel. To overcome this issue, some centers have started implementing e-learning modules

to increase the understanding of neuromuscular block and monitoring (8). The (scarce) evidence about internet-based learning seems to suggest that this is a valuable alternative to traditional methods (9). As postgraduate education for resident anesthesiologists in Belgium has also switched to e-learning, this is something to appreciate. Unfortunately, a more troublesome barrier is the one where anesthesiologists seem to be overconfident in their knowledge, therefore not feeling the need for continued education.

We see the solution for Belgium as twofold.

First, education about neuromuscular block for the resident anesthesiologists should remain as important as ever. Even though the availability of sugammadex has the potential to improve safety, it can only do so when used correctly. A substantial part of this curriculum should consist of teaching about the necessity and practical aspects of neuromuscular transmission monitoring. E-learning modules can be supplemented with hands-on training.

Second, increased training at the level of the individual hospital has the potential to improve patient outcome. Local initiatives have proven to be able to successfully overcome gaps in teaching and clinical practice. Triggered by an alarming number of patients with residual neuromuscular block in their postanesthesia care unit (31% of all admissions), Todd and coworkers introduced quantitative neuromuscular transmission monitoring to all operating theaters, combined with increased education efforts in their department. By doing so, they were able to almost eliminate incomplete reversal in their institution (10). Put differently, this proves that regardless of perceived barriers, change can happen at a local level when

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a team is committed to improving outcome. Large international studies can draft a general perspective, but smaller initiatives seem more successful in solving the problem. We think that the solution in Belgium can be situated at the local level as well.

The authors of this editorial remain optimistic. Recent advances in neuromuscular transmission monitoring tools like the TOF-Cuff®, TOFscan®, and monitor-integrated NMT modules will make monitoring easier to perform and more widely implemented (11). Furthermore, there is a strong incentive on both an international and local level to stimulate teaching about neuromuscular block, fueled by research about opioid-free anesthesia, surgical effects of deep neuromuscular block, and sugammadex. Studies like the one by Renew and coworkers further help us to make sure we learn our lessons.

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