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## Equipment Monitoring Abstracts

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# Neuromuscular blockade antagonism and monitoring: a prospective single centre observational study

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## INTRODUCTION

Studies have shown that when neuromuscular blockers (NMBs) are employed in clinical practice, the incidence of residual neuromuscular blockade can be as high as 64%.<sup>1-3</sup> This may increase the risk of respiratory complications at extubation and in the immediate postoperative period.<sup>1,3</sup> Furthermore, clinically significant residual neuromuscular blockade cannot be consistently identified with subjective neuromuscular monitoring (NM) tests such as qualitative NM (classic train-of-four monitoring) or clinical signs.<sup>1-3</sup> The 2023 American Society of Anesthesiologists (ASA) guidelines recommend using quantitative NM when using NMBs.<sup>1</sup> Train-of-four ratios (T-ratios), a quantitative NM technique, objectively assess the degree of the residual neuromuscular blockade and are considered standard of care. T-ratios of  $\geq 0.9$  are the current standard for safe extubation irrespective of reversal agent use. This prospective single-centre observational study aimed to compare current neuromonitoring practice, at our institution, to ASA guidelines.

## METHODS

After ethics review board QA/QI waiver, data was prospectively collected on elective laparoscopic surgical procedures at our institution. Anesthetists were asked to answer a brief questionnaire including choice of NMB agent used, whether NM was employed (i.e., quantitative or qualitative) and perceived barriers to the use of NM during surgery. At our centre, accelerometers are readily available as a quantitative NM tool (GE HealthCare, NMT MechanoSensor, USA). Answers provided by anesthetists were subsequently cross-referenced to the electronic anesthetic chart to determine whether T-ratios were recorded, and if, Sugammadex or Neostigmine/Glycopyrrolate were administered as reversal agents.

## RESULTS

A total of 92 elective laparoscopic surgical procedures were included in this study. In 73 of 92 cases, rocuronium bromide was used. Of these 73 procedures using an NMB, 20/73 (27%) used no form of NM, only 43/73 (59%) used quantitative NM, and 10/73 (14%) used qualitative NM. Of those employing quantitative NM (43 cases), only 19/43 (44%) recorded T-ratios on the electronic anesthetic chart. Furthermore, reversal agents were used in 49/73 (67%) surgical procedures (12 Sugammadex and 37 Neostigmine/Glycopyrrolate), while no reversal was administered in 24/73 (33%) cases. Among those procedures using NMBs but no form of NM (20 cases), a reversal agent was given before extubation in only 13/20 (65%) cases while no reversal was given in 7/20 (35%) cases. Lastly, barriers to using quantitative NM included set-up time, equipment malfunction and inaccurate readings because of accelerometer positioning.

## DISCUSSION

Clinical practice at our institution does not entirely comply with ASA guidelines. Despite administering NMBs, quantitative NM was only used in 59% of cases and T-ratios were documented by an even smaller proportion of consultants (44%). This may be explained by barriers such as set-up time, equipment malfunction and inaccurate readings because of accelerometer positioning. The use of alternate technology such as Electromyography could promote the use of T-ratios among clinicians, as it provides reliable quantitative assessment of neuromuscular blockade despite thumb restriction.<sup>4</sup> Addressing these barriers will facilitate widespread adoption of quantitative NM in daily clinical practice.

## REFERENCES

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