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Comparison of the Accuracy Between the TOF-Cuff[®] Neuromuscular Transmission Monitor and the TOF-Watch SX[™]

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Background: Quantitative monitoring of neuromuscular blockade for patients under general anesthesia necessitating muscle relaxants is now widely recommended. When the main neuromuscular blockade monitors are used, the operation field tends to become obstructed by the apparatus cables. Also, it might be difficult to perform measurements using these monitors in the closed arm physique and prone position. Therefore, wide use of quantitative neuromuscular blockade monitors may depend on how quickly and easily they can be installed. Recently, a new acceleromyography monitor has become commercially available (TOF-Cuff[®]). This monitor only requires placement of a single cuff on the patient's arm to monitor neuromuscular blockade. Response to nerve stimulation is detected as a change in cuff internal pressure. Attachment of a sensing part is not needed, and measurements can be made in any posture. This study was designed to investigate the agreement between TOF-Watch SX[™] and TOF-Cuff[®] during onset and recovery of neuromuscular blockade.

Methods: After approval for the protocol of the present study by the ethics committee of our institution, informed consent was obtained in writing from all participating patients. We enrolled 15 patients with American Society of Anesthesiologists (ASA) physical status I-II who were free from an underlying neuromuscular disorder or neuropathy. Patients who were younger than 15 yr, patients who were pregnant, patients for whom intraoperative access to an upper extremity was unattainable for monitoring the TOF count, and patients with hepatic or renal disorders were excluded. When total intravenous anesthesia was induced in all patients, each TOF-Cuff[®] and TOF-Watch SX[™] were attached to the arms of both sides. Then TOF count or TOF ratio was simultaneously measured every 30 seconds by each device before and after the administration of 0.6-1 mg/kg rocuronium. After the operation, measurement was performed by a similar method before and after the administration of 2-4 mg/kg sugammadex. Spearman's rank test was used to evaluate correlations between parameters. $p < 0.05$ was considered statistically significant. Data are presented as medians (25-75 percentiles).

Results: Data from 48 times in all of the 15 patients could be included in analyses. The age of the patients was 54 (46-60) yr. The ratio of males and females was 5/10. Body mass index of the patients was 24 (21-27). The duration of anesthesia was 233 (118-272) min. The induction dose of rocuronium was 50 (45-50) mg. In all patients, sugammadex was given at a TOF ratio of 1-2. Spearman's rank test of TOF ratio with rocuronium administration at the time of anesthesia induction showed that measurements by TOF-Cuff[®] significantly correlated with those by TOF-Watch SX[™] (correlation coefficient = 0.98, $p < 0.0001$). In the case of administration of sugammadex at the time of extubation, measurements by TOF-Cuff[®] also significantly correlated with those by TOF-Watch SX[™] (correlation coefficient = 0.91, $p < 0.0001$). Also, as for the TOF count ($n=5$), both correlated all

Conclusion: TOF ratio and TOF count measured by TOF-Cuff[®] correlated with those measured by TOF-Watch SX[™] at the time of induction of anesthesia and the time of reversal of neuromuscular blockade, and the results suggested that TOF-Cuff[®] can evaluate neuromuscular blockade more easily.