TOF-Cuff® for relaxometry during general anaesthesia

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Background and Goal of the Study

Relaxometry monitors the effect of neuromuscular blocking drugs administered during general anaesthesia. Currently, the clinical standard is accelerometry (e.g. by TOF-Scan®). TOF-Cuff® is a new relaxometry device which stimulates the brachial plexus at the level of the upper arm, recording evoked changes in pressure.[1] The goal of this study was to compare the time to complete neuromuscular blockade and subsequent recovery as assessed by TOF-Cuff® and TOF-Scan®.

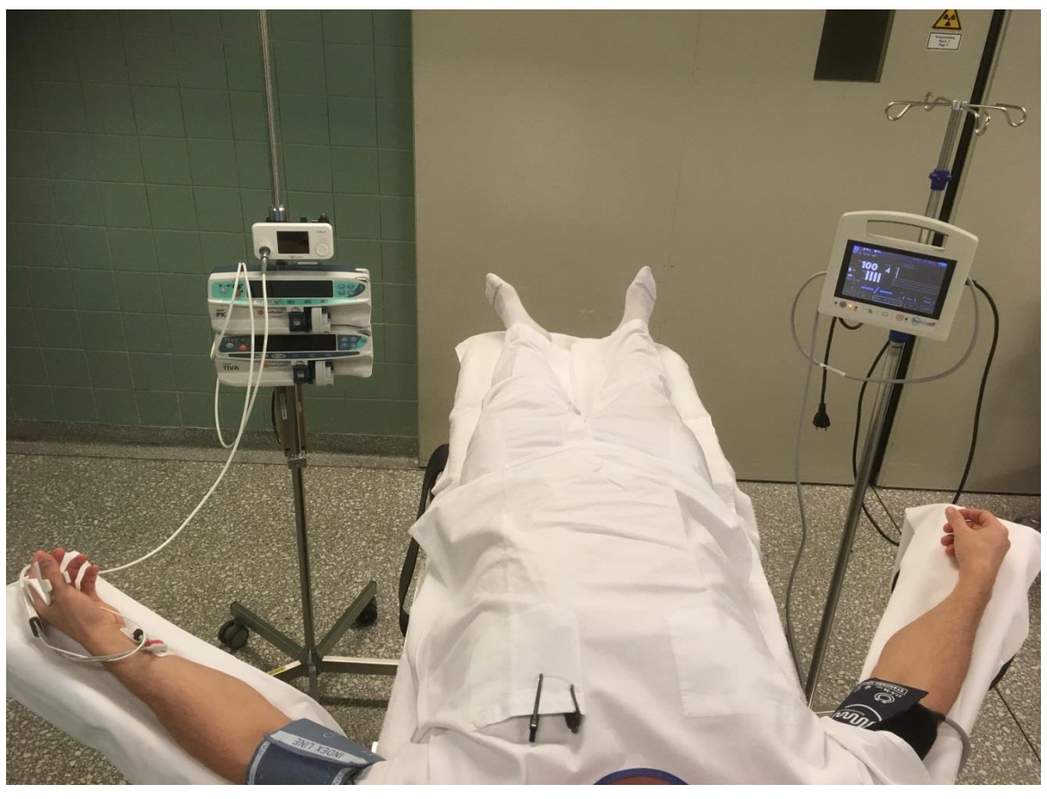
Materials and Methods

After obtaining approval from the Ethics Committee (Ethikkommission Ostschweiz; St. Gallen, Switzerland) and registration with the German register of clinical studies (www.drks.de), we prospectively obtained written, informed consent from patients. We sought adult patients undergoing TIVA/TCI-based general anaesthesia requiring neuromuscular blockade for tracheal intubation. Accelerometry in the form of train of four ((TOF); TOF-Scan®) was applied by monitoring the movement of the M. adductor pollicis after stimulation of the N. ulnaris at the wrist (TOF, 60 mA). On the contra-lateral arm, TOF-Cuff® monitoring was applied simultaneously (TOF, 40 mA). Patients with neuromuscular diseases, morbidly obese patients, patients already enrolled in this or another study, and pregnant patients were excluded. TOF was assessed every 12 to 15 sec (the minimum time interval was selected on both devices) until complete neuromuscular blockade, and every 5 min thereafter. Neuromuscular blockade was induced by a single dose of Atracurium i.v. The time from injection of Atracurium to complete neuromuscular block (TOF = 0) was recorded (T_0), as was time to recovery to TOF = 2 (T_2) and to complete recovery (TOF ≥ 90%; T_{90}). Technical problems were recorded.

Data are mean ± SD; the results from the two devices were compared using a paired t-test with $p < 0.05$ as the level for significance.

Results and Discussion

Fifty-six ASA II and III patients were included (35 female, 51 ± 19 years, BMI 31 ± 7 kg/m^2). We recorded T_0 in all patients, and in 19 patients T_2 and T_{90} were recorded. Patients received 0.5 ± 0.1 mg/kg Atracurium i.v. after induction of anaesthesia. No second dose of Atracurium was given. In 14 patients, at least 1 TOF-Cuff® measurement revealed a technical problem, compared to 7 patients for TOF-Scan®. Time to T_0 was 139 ± 50 s with TOF-Cuff® and 149 ± 47 s with TOF- Scan®. Time to T_2 and T_{90} using TOF-Cuff® was 49 ± 14 min and 73 ± 12 min, and using TOF-Scan® 54 ± 13 min and 79 ± 10 min, respectively. Differences for T_0 and T_{90} were statistically significant.



Conclusion

Our results comparing relaxometry during general anaesthesia using TOF-Cuff® and TOF-Scan® simultaneously differed statistically, but not necessarily clinically. Larger numbers of patients must be studied to further assess the utility of TOF-Cuff®, both in general and in different patient groups and clinical situations

Reference

Veiga Ruiz G et al.
Rev Esp Anestesiol Reanim 2017;64(10): 560-7