

Title: NEUROMUSCULAR BLOCKADE AFTER SURGERY: COMPARISON OF CLINICAL ASSESSMENT AND EVOKED TWITCH RESPONSES

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Introduction. The use of neuromuscular blocking drugs (NMBD) during anesthesia continues to be associated with residual paralysis on arrival in the recovery room (PAR).<sup>1,2</sup> However, in these studies residual paralysis was defined arbitrarily as a train-of-four (TOF) ratio of  $<0.7$ . The purpose of the present study was to correlate clinical tests of neuromuscular function with measurement of TOF in patients on arrival in the PAR.

Methods. After appropriate institutional approval, 150 unselected adult patients who had received a nondepolarizing NMBD during anesthesia and who were expected to resume spontaneous breathing after surgery were studied. The choice of agents for premedication, anesthesia, neuromuscular blockade and its reversal was made by the anesthesiologist who was unaware that the patient was to be assessed in the PAR. No patients were included who had received surgery to the head and neck or upper limb.

On arrival in the PAR, and after the anesthesiologist had left, the ulnar nerve was stimulated with supramaximal TOF stimuli and the twitch tension of the adductor pollicis was measured. Clinical assessment was made after TOF measurement and included the ability to lift head for 5 s, hand grip, tongue protrusion and open eyes. The patient's response was recorded as "normal" or "weak".

Results. One hundred and thirteen of the 150 patients were sufficiently awake and cooperative to allow clinical assessment and the results are presented from these patients. TOF  $<0.7$  was found in 26 patients.

Nine patients demonstrated weakness in at least one of the clinical tests (head lift 7/9, hand grip 6/9, tongue protrusion 4/9, eye opening 2/9).

Of these nine patients, six (67%) had TOF  $<0.7$ . Of the remaining three, one was between 0.7 and 0.8, and two were between 0.8 and 0.9. None of the 66 patients with TOF  $>0.9$  had clinical weakness.

Discussion. The results suggest that, when defined as TOF  $<0.7$ , residual paralysis on arrival in the PAR occurs in nearly 20% of patients. However, using TOF  $<0.7$  as an indicator of neuromuscular recovery was an insensitive test (sensitivity 0.67). Only 1/3 of patients with TOF  $<0.7$  exhibited clinical weakness. Its specificity was 88%. In clinical practice tests of persistent paralysis should be very sensitive: the consequences of missing a weak patient are much more serious than failing to recognize full recovery. Our data suggest the use of TOF  $>0.9$  as a cut-off.

It is concluded that detection of muscle weakness after surgery requires several tests to be conclusive. It is recommended that attempts be made to restore TOF to greater than 0.9 at the end of surgery.

#### References.

1. Viby-Mogensen J, Jorgensen BD, Ording H. Residual curarization in the recovery room. *Anesthesiology* 50: 539-541, 1979.
2. Beamer GH, Rozental P. Postoperative neuromuscular function. *Anaesth Intensive Care* 14: 41-45, 1986.