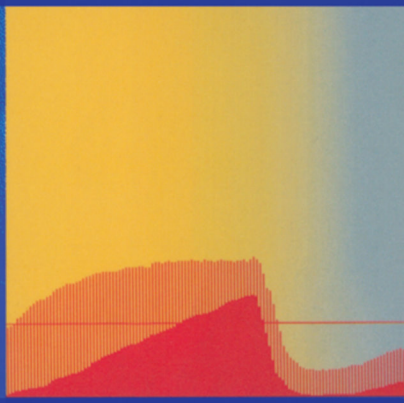
Notes in Medicine

Fuchs-Buder



Neuromuscular Monitoring in Clinical Practice and Research

Springer

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With 50 figures and 16 tables

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Foreword

More than 25 years ago, at a time when neuromuscular function monitoring was only seldom used, it was documented that postoperative residual curarization (PORC), also referred to as residual paralysis, was frequent in three university hospitals in Copenhagen. The initial response of colleagues was that this finding most probably was due to insufficient training of anesthesiologists in Denmark and therefore did not apply to other departments in other parts of the world. Over the next years, it was documented that the high incidence of PORC was not solely a Danish problem: It was seen in other places of the world, when a neuromuscular block was not monitored and sufficient recovery of neuromuscular function was sought ensured using only clinical criteria, such as sustained eye opening, tongue protrusion or sustained head or arm lift. Soon it became apparent that the sole use of subjective evaluation of the response to peripheral nerve stimulation also did not exclude PORC and that the only reliable way to detect PORC was by the use of objective neuromuscular monitoring. This time the response among many anesthesiologists was that it might be true, but it did not matter, as PORC does not pose a threat to the patient. However, Professor Lars I. Eriksson and his group at Karolinska Hospital in Sweden showed that even moderate degrees of residual block decrease the chemoreceptor sensitivity to hypoxia. They also showed that PORC is associated with functional impairment of the muscles of the pharynx and upper esophagus, most probably leading to regurgitation and aspiration. Most recently, Dr. Eikermann and colleagues documented that partial neuromuscular block, even to a degree that does not evoke dyspnea or hypoxemia, may decrease inspiratory airway volume and can cause partial inspiratory airway collapse[1]. In accordance with this, it has been documented that PORC is a significant risk factor for the development of postoperative pulmonary complications and may lead to increase morbidity and mortality[2],[3]. In spite of the above, many clinicians still do not monitor regularly. In USA it is still more the exception than

[1] Eikermann et al. Am J Respir Crit Care Med. 2007;175: 9–15.

[2] Berg H et al. Acta Anaesthesiol Scand. 1997;41:1095–1103.

[3] Murphy GS et al. Anesth Analg. 2008;107:130–137.

the rule that the anesthesiologists use a nerve stimulator. In UK 60% state that they never or seldom use a nerve stimulator and only 9-10% monitor neuromuscular function routinely.[4] Somewhat better is the situation in Denmark and Germany, where recent surveys have shown that 40-45% of all anesthesiologists use a nerve stimulator regularly. Personally, I support the notion recently expressed in an editorial in Anesthesiology that objective monitoring is an evidence-based practice that should consequently be used whenever a neuromuscular blocking drug is administered. I hope that this book will convince the skeptics by spreading the above message. At least the editor has done his share. I wish the book all the best of luck.

Jørgen Viby-Mogensen

[4] Grayling M, Sweeney BP. Recovery from neuromuscular blockade: a survey of practice. Anaesthesia. 2007 Aug;62(8):806–809

Preface

Compared to their precursors, the current generation of neuromuscular blocking agents features improved controllability. This improvement was accomplished by optimizing the metabolic pathways where, now, no more pharmacologically active metabolites are formed as well as by achieving more reliable elimination, even in patients whose organ function is limited. These properties have made it possible to reduce the risk of cumulative effects, particularly after repeated doses of relaxant.

Notwithstanding these improvements, the pharmacodynamic action of today's neuromuscular blocking agents is still subject to pronounced individual variations. Both the onset and duration of action as well as neuromuscular recovery have only limited predictability in the individual patient. Moreover, the action of neuromuscular blocking agents is influenced by numerous external factors such as concomitant diseases, drug interactions and pharmacogenetic factors. In particular, the incidence of residual neuromuscular blockade – a proven risk factor for severe postoperative complications – continues to be unacceptably high.

Even the most clinically relevant residual blockade is often imperceptible to anesthesiologists if they have to rely on their mere senses, and can generally only be made visible by neuromuscular monitoring. Thus, the willingness to reverse is also accordingly heightened. So, it is not surprising that the preclusion to monitor neuromuscular function counts as a critical, independent risk factor for the occurrence of postoperative residual blockades.

While its benefits remain uncontested, the use of neuromuscular monitoring in clinical practice often lags behind expectations.

The present textbook contains information that is essential for the judicious application of neuromuscular monitoring and also discusses the merits of neuromuscular monitoring in clinical settings. Special importance has been placed on a comprehensive presentation of acceleromyography.

T. Fuchs-Buder

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