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التوثيق الالكتروني والميكروفيلم

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The neuromuscular blocking effects of desflurane and isoflurane alone and combined with vecuronium and atracurium.

Thesis submitted for partial fulfillment of M.D. degree in Anaesthesia

By

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في [illegible]

تحت عنوان : باللغة الانجليزية The neuromuscular blocky effect of desflurane and isoflurane alone and combined with vecuronium and atracurium

: باللغة العربية : [illegible]

بناء على موافقة الجامعة بتاريخ ٢٠٠١/٤/٨ تم تشكيل لجنة الفحص والمناقشة للرسالة المذكورة أعلاه على النحو التالي :-

١) [illegible] عن المشرفين
٢) [illegible] ممتحن داخلي
٣) [illegible] ممتحن خارجي

بعد فحص الرسالة بواسطة كل عضو منفردا وكتابة تقارير منفردة لكل منهم إنعقدت اللجنة مجتمعة في يوم [illegible] بتاريخ ٢٠٠١/٢/١٢ بقسم [illegible] مدينة [illegible] بكلية الطب - جامعة القاهرة وذلك لمناقشة الطالب في جلسة علنية في موضوع الرسالة بالنتائج التي توصل إليها وكذلك الأسس العلمية التي قام عليها البحث .

قرار اللجنة : [illegible]

توقيعات أعضاء اللجنة :-

المشرف الممتحن
[illegible]
(عصام) [illegible]

الممتحن الداخلي
[illegible]

الممتحن الخارجي
[illegible]

ACKNOWLEDGEMENT

As a beginning, I kneel to God the most merciful and the most gracious for helping me so much throughout this work.

I would like to express my deep gratitude and thanks to Dr. SANAA ABDUL-KAREEM Ass. Prof. of Anaesthesia Cairo University, not only for her keen supervision and generous help but also for her sympathy and encouragement. She was so patient revising this thesis.

I wish to express my sincerest gratitude to Prof. Dr. MOSTAFA GAAFAR Prof. of Anaesthesia Cairo University, who helped me a lot and was always available to support, advise and supervise this work. His guidance and criticism were always valuable.

Moreover, I am very grateful and indebted to Prof. Dr. WESSAM FARAG Prof. of Anaesthesia, National Cancer Institute, Cairo University for her close support and assistance. Her advises were beneficial and meaningful.

Finally, I would like to thank my family for whom no words of praise or gratitude are sufficient.

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ABSTRACT

This study was designed to study the effect of equipotent concentrations (1 MAC) of desflurane and isoflurane on the neuromuscular blockade of vecuronium and atracurium. Desflurane caused more potentiation of vecuronium neuromuscular blockade than isoflurane. Mean (SD) onset time was significantly shorter [2.3 (0.6) vs. 3.7 (0.9) min] and clinical duration [40 (8) vs. 28 (4) min] and recovery index [22 (4) vs. 15 (5) min] were significantly longer in the desflurane with vecuronium vs. the vecuronium group ($p<0.05$). Equipotent concentrations of desflurane and isoflurane had no statistically significant effect on atracurium neuromuscular blockade. In the absence of neuromuscular blockers, there was a significant decrease ($p<0.05$) in T1 amplitude in the desflurane group at all times compared to the isoflurane group. In conclusion, in equipotent concentrations, desflurane caused more potentiation of vecuronium-induced neuromuscular blockade than isoflurane, while the effects of desflurane and isoflurane on atracurium-induced neuromuscular blockade were similar. In the absence of neuromuscular blocking agents desflurane causes significant neuromuscular blockade compared to isoflurane.

Keywords:

Anaesthetics; volatile, desflurane, isoflurane.

Neuromuscular blocking agents; nondepolarizing: vecuronium, atracurium.

INTRODUCTION AND AIM OF THE WORK

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Various volatile anaesthetics have been known for a long time to potentiate the neuromuscular (NM) blockade produced by non-depolarizing blocking agents to different degrees in a concentration-dependent manner. Volatile anaesthetics usually have little or no effect on the pharmacokinetics of a muscle relaxant, and this potentiation is supposed to be a pharmacodynamic one. This potentiation results from central depression as well as from peripheral inhibition of motor endplate depolarization.

When the volatile anaesthetics are eliminated, there is a rapid reversal of the potentiated NM blockade. The potentiation of NM blockade during administration of volatile anaesthetics and the reversal of this potentiation on their withdrawal are clinically relevant, as they may reduce the intraoperative NM blocking agent dose requirements for a given effect and decrease the risk of postoperative residual curarization.

Desflurane is a relatively newly introduced potent volatile anaesthetic derived from isoflurane by substitution of a single fluorine for a chlorine on the α-ethyl moiety, resulting in its lower solubility in blood and tissues and less potency. Desflurane produces a dose-related impairment of myoneural transmission and can be used to supply relaxation sufficient for endoscopy or intracavity procedures at deeper levels of anaesthesia. The

lower solubility of desflurane suggests that when it is rapidly eliminated from the NM junction the enhancing effect also is rapidly eliminated.

There are only a few previous studies comparing the potentiating effects of desflurane and isoflurane on the NM blocking action of vecuronium and atracurium and their results are inconclusive. Some previous studies suggested that desflurane and isoflurane potentiate the action of vecuronium and atracurium equally, while another report concluded that desflurane has more potentiating effect on vecuronium-induced NM blockade than isoflurane.

This study was designed to study the potentiating effect of equipotent concentrations of desflurane and isoflurane on the NM blockade produced by a single dose of vecuronium and atracurium. Also, the NM blocking effects of desflurane and isoflurane in the absence of NM blocking drugs were studied.

Physiological anatomy of the skeletal muscle and the neuromuscular junction