بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

The Effects of Dexamethasone versus Potassium Chloride as Additives to Local Anesthetic in Supraclavicular Brachial Plexus Block

Thesis

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Master Degree in ***Anesthesia***

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List of Contents

Title	Page No.
List of Tables	i
List of Figures	ii
List of Abbreviations	iv
Introduction	1
Aim of the Work	3
Review of Literature	4
Patients and Methods	40
Results	49
Discussion	62
Summary	68
Conclusion	71
References	72
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table 1:	Pharmacokinetics of dexamethasone	26
Table 2:	Complications of Supraclavicular Brachial Plexus Block	39
Table 3:	Patients' characteristics and surgical duration	49
Table 4:	Comparison of the quality of the block between dexamethasone and potassium chloride group	52
Table 5:	Comparison of the duration of analgesia between the study groups	55
Table 6:	Comparison of the time to the first and second rescue analgesic	57

List of Figures

Fig. No.	Title	Page No.
Figure 1:	Brachial plexus with terminal branches labeled	4
Figure 2:	Typical cervical vertebra	5
Figure 3:	Basic relationships of the brachial plexus to the axillary artery, which is a continuation of the subclavian artery	7
Figure 4:	The dermatomes covered by the brachial plexus and their nerve supply	9
Figure 5:	Anatomical relations of the brachial plexus	11
Figure 6:	Chemical structure of bupivacaine Hcl molecule	13
Figure 7:	Supraclavicular brachial plexus (BP) view by US	31
Figure 8:	Application of the US probe and needle insertion	32
Figure 9:	The entry point in conventional supraclavicular nerve block	35
Figure 10:	Entry point of nerve stimulator needle in supraclavicular nerve block	38
Figure 11:	Display of gender in the study groups	50
Figure 12:	Display of body weight between the study groups	50
Figure 13:	Display of age between the study groups	51
Figure 14:	Comparison of the onset of sensory block between the study groups.	53
Figure 15:	Comparison of the onset of motor block between the study groups.	53
Figure 16:	Comparison of the duration of sensory block between the study groups.	54
Figure 17:	Comparison of the duration of motor block between the study groups.	54
Figure 18:	Comparison of the duration of analgesia between the study groups	55

List of Figures cont...

Fig. No.	Title	Page No.
Figure 19:	Comparison of VAS between the study groups	56
Figure 20:	Comparison between the time to the first and second analgesic rescue in the study groups	57
Figure 21:	Comparison between systolic blood pressure readings in the study groups	58
Figure 22:	Comparison between diastolic blood pressure readings in the study groups	59
Figure 23:	Comparison between heart rate readings in the study groups	59
Figure 24:	Comparison between total narcotics given in both groups	60

List of Abbreviations

Abb.	Full term
5-HT	*5-Hydroxy tyramine (serotonin)*
AXI	*Axillary nerve*
BP	*Brachial plexus*
CNS	*Central nervous system*
COX	*Cyclooxygenase*
DBP	*Diastolic blood pressure*
DC	*Direct current*
GABA	*Gamma amino butyric acid*
HR	*Heart rate*
Hz	*Hertz*
LAs	*Local anesthetics*
LC	*Locus ceruleus*
MAOI	*Monoamine oxidase inhibitors*
MC	*Musculocutaneous nerve*
MEAV	*Minimum effective anesthetic volume*
MED	*Median nerve*
MSM	*Middle scalene muscle*
NO	*Nitric oxide*
NSAIDs	*Non-steroidal anti-inflammatory drugs*
PAG	*Peri-aqueductal grey area*
PNB	*Peripheral nerve blockade*
PNS	*Peripheral nerve stimulation*
RAD	*Radial nerve*
SA	*Subclavian artery*
SBP	*Systolic blood pressure*
SD	*Standard deviation*
SG	*Substantia gelatinosa*
ULN	*Ulnar nerve*
US	*Ultrasound*

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage ***(Abram, 2006).*** Regional anesthesia of the trunk and the extremities an alternative to general anesthesia in many situations ***(Michael, 2006).*** It avoids the unwanted effects of the anesthetic drugs used during general anesthesia and the stress of laryngoscopy and tracheal intubation ***(Henderson, 2009).***

It was William Halsted who performed the first brachial plexus block using a surgical approach in the neck and he applied cocaine to the brachial plexus**.** The first percutaneous supraclavicular block was performed in 1911 by the German surgeon, Diedrich Kulen Kampff ***(Reghunthan et al., 2016).***

Supraclavicular approach to brachial plexus block is routinely used all over the world for surgeries of upper limb because of the anatomical ease of blocking nerve roots at this level. Typical features of this block include rapid onset and dense analgesia along with high success rate ***(Karpal et al., 1994).***

Ultrasound guidance is a reliable and safe technique in peripheral nerve blocks. It also plays a crucial and an increasing role in medicine nowadays due its low cost, the absence of

ionizing radiation and its high temporal resolution ***(Jerrold et al., 2010).***

Nowadays, different drugs have been used as adjuvants with local anesthetics in supraclavicular blocks to prolong intra-operative anesthesia and postoperative analgesia. The commonly used adjuvants are clonidine, opioids like buprenorphine and fentanyl, epinephrine, potassium chloride, sodium bicarbonate, dexamethasone, and magnesium chloride. Of these additives, potassium chloride, dexamethasone, and clonidine have been shown to have minimal side effects ***(Sing et al., 2010).***

Movements of ions through the nerve membrane are considered one of the main steps in the process of excitation and propagation of nerve stimuli. A nerve impulse can be effectively blocked by accumulation of potassium ions outside the neuron**.** Thus, administration of exogenous potassium chloride will reinforce and prolong the blockade produced by bupivacaine ***(Khosaet al., 1990).***

Dexamethasone, a steroid with anti-inflammatory properties blocks the nociceptive impulse transmission along the unmyelinated C fibers and suppressing ectopic neuronal discharge. It might bring about this effect by altering the function of potassium channels in the excitable cells ***(Shresta et al., 2007)***.

AIM OF THE WORK

To compare the clinical efficacy of addition of dexamethasone or potassium chloride to local anesthetic solution of bupivacaine and lignocaine on the onset, duration, quality of analgesia, and quality of sensory and motor blockade in supraclavicular brachial plexus block in patients undergoing upper extremity surgeries.

REVIEW OF LITERATURE

Anatomy of the Brachial Plexus

Brachial plexus is a complex network of nerves supplying the whole upper limb, including its motor and sensory supply, arising from the neck and passing through the axilla to the upper limb. Itis composed of 5 roots, 3 trunks, 6 divisions, 3 cords, and terminal branches **(Figure 1)** (***Andres and Sala, 2001).***

1- Roots:

The ventral rami of spinal nerves from C5 to T1 are referred to as the roots of the brachial plexus. The typical spinal nerve root results from the union of the ventral nerve rootlets originating in the anterior horn cells of the spinal cord and the dorsal nerve rootlets (***Andres and Sala, 2001).***

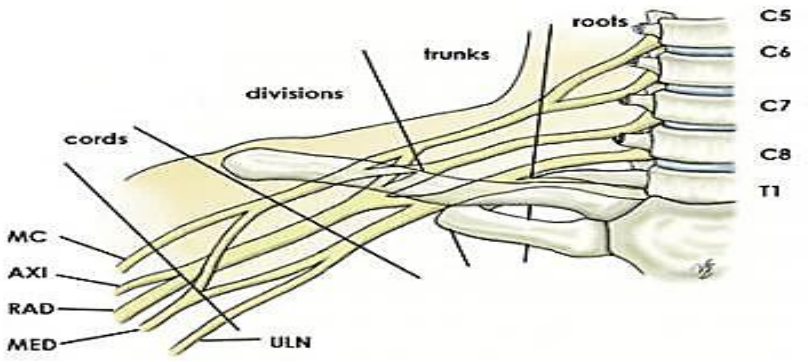

Figure 1: Brachial plexus with terminal branches labeled: MC is musculocutaneous nerve, AXI is axillary nerve, RAD is radial nerve, MED is median nerve, and ULN is ulnar nerve (***Andres & Sala, 2001)***.