



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكرو فيلم



MONA MAGHRABY



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التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY



A comparative study between dexmedetomidine and dexamethasone as adjuvants to bupivacaine in ultrasound guided supraclavicular brachial plexus block in upper limb surgeries

Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

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INTRODUCTION

Brachial plexus blocks are one of the most commonly performed peripheral nerve blocks for upper extremity surgeries in clinical practice for its many advantages over general anesthesia in upper limb surgeries such as sympathetic block, better postoperative analgesia, high success rate and fewer side effects (*Kooloth et al., 2015*).

There are different approaches to the brachial plexus which have been described. However, the supraclavicular approach is the easiest and the most consistent method for anaesthesia and perioperative pain management in upper limb surgery below the shoulder joint. Local anaesthetics can be used alone in supraclavicular brachial plexus block, which provides good operative conditions. However, it has shorter duration of intra and postoperative analgesia. Using long-acting local anaesthetics like bupivacaine or using adjuvants in regional anaesthesia improved the block characteristics. Adding adjuvants to brachial plexus block should prolong the analgesia, without having systemic side effects, prolong motor block and should also reduce the total dose of local anaesthetic. Different studies have investigated several adjuvants including opioids, clonidine, neostigmine, bicarbonate added to local anaesthetics in brachial plexus block to achieve quick, dense and prolonged block, but the results are either inconclusive or associated with side effects (*Dhumane and Shakir, 2016*).

Methylprednisolone is a highly potent corticosteroid which has a powerful anti-inflammatory as well as analgesic property. They suppress inflammation through inhibition of phospholipase A2. Local application of methylprednisolone has been found to block transmission in nociceptive C-fibers but not in myelinated A-beta fibers. The effect was reversible, suggesting a direct membrane action of steroids. Perineural injection of glucocorticoid along with local anesthetics is reported to influence the onset and duration of sensory and motor block (**Biradar et al., 2013**).

Dexmedetomidine is a selective α -2 agonist, a pharmacological active d-isomer of medetomidine. One of the highest densities of α -2 receptors have been located in locus ceruleus. The hypnotic and sedative effects of α -2 adrenoreceptor activation have been attributed to this site in CNS. It is also the site of origin of the descending medullospinal noradrenergic pathway, known to be an important modulator of nociceptive neurotransmission. In the region of the brain, α -2 adrenergic and opiodergic system have common effector mechanisms, indicating that dexmedetomidine has a supraspinal site of action. Presynaptic activation of α -2 adrenoreceptor in CNS inhibits the release of norepinephrine, terminating the propagation of pain signals and their postsynaptic activation inhibits sympathetic activity (**Kaur et al., 2018**).

AIM OF THE WORK

The aim of our study is to compare the efficacy of bupivacaine (20ml 0.5%) plus dexamethasone (1ml 4mg) versus bupivacaine (20ml 0.5%) plus dexmedetomidine(0.5ml 50mcg) as adjuvants on the block characteristics including: onset and duration of sensory and motor blockade, duration of postoperative analgesia, the first analgesic request time, adverse effect and hemodynamic parameters of patients.

Chapter 1

SUPRACLAVICULAR BRACHIAL PLEXUS BLOCK

Anatomy of brachial plexus

The brachial plexus is formed by the convergence of the ventral rami of the spinal nerve roots from C5 to T1. Common variations include contributions to the plexus by the C4 nerve root (described as a pre-fixed plexus) or the T2 nerve root (a post-fixed plexus). The 5 roots normally contributing to the plexus merge into 3 trunks, each of which splits into anterior and posterior divisions. The divisions become 3 cords which give rise to the terminal branches (*Gregory et al., 2009*).

The anterior rami of C5 and C6 unite near the lateral border of the middle scalene muscle to form the superior trunk. The 7th cervical rami (C7) forms the middle trunk, and the C8 and T1 contributions unite and form the inferior trunk (*Bollini and Wikinski, 2006*).

As the three trunks run down and laterally just above or behind the clavicle, each split into anterior and posterior divisions. As a general rule of thumb, the anterior division tends to supply the anterior or flexor parts of the upper limb, while the posterior division tends to supply the posterior or extensor parts of the upper limb. The posterior divisions of all

three trunks unite above and then behind the axillary artery, to form the posterior cord. The posterior cord is smaller than the other cords. The anterior divisions of the superior and middle trunk unite on the lateral side of the axillary artery, to form the lateral cord. The anterior division of the lower trunk continues as the medial cord (**Johnson et al., 2006**).

It passes down behind and then on the medial side of the axillary artery. Each cord divides into two terminal branches. The lateral cord divides into the musculocutaneous and the lateral root of the median nerve. The medial cord gives the ulnar nerve and the medial root of the median nerve. The posterior cord divides into the axillary nerve and radial nerve (**Johnson et al., 2006**).

The subclavian artery becomes the axillary artery and changes its relationship with the plexus. The subclavian artery is located anterior to and in direct contact with the trunks. Instead, the axillary artery is in the middle of the three cords. The cords are named according to this relationship (**Bollini and Wikinski, 2006**).