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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Comparative study between Intravenous and Intrathecal Dexmedetomidine in Spinal Anaesthesia in Patients undergoing Elective Infra-Umbilical Surgery: the Effect on Haemodynamic Parameters and Postoperative Analgesia

Thesis

Submitted for Partial Fulfillment of M.Sc. Degree in Anaesthesiology, Intensive Care and Pain Management

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Afnan Sameh Soliman Mahmoud

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Abb.	Full term
ASA	*American Society of Anaesthesiologists classification*
BMI	*Body mass index*
CSF	*Cerebrospinal fluid*
DBP	*Diastolic blood pressure*
HS	*Highly significant*
IQR	*Inter-quartile range*
MAP	*Mean arterial pressure*
NS	*Non significant*
PABA	*Paraamino benzoic acid*
PACU	*Postoperative care unit*
PDPH	*Postdural puncture headache*
POUR	*Postoperative urinary retention*
S	*Significant*
SPO_2	*Oxygen saturation*
SPSS	*Statistical Package for Social Science*
VAS	*Visual analogue scale*

INTRODUCTION

Spinal anaesthesia is currently preferred in infra-umbilical surgeries due to its reliability, safety and fewer complications when compared to general anaesthesia. The most commonly used anaesthetic is bupivacaine, which acts by blocking voltage-gated sodium channels ***(Khosravi et al., 2020)***.

Postoperative analgesia plays a crucial role in the postoperative outcomes of patients. Therefore, there is emphasis on multiple techniques that have a beneficial effect on the pain score resulting in decreased need of postoperative analgesic requirement ***(Sharma et al., 2020)***.

Analgesia for post-operative pain control is essential and insufficient postoperative pain control can produce various effects on quality of life, prolong the recovery time and decreases patient satisfaction ***(Paudel et al., 2020)***.

Multiple studies have confirmed the efficacy of dexmedetomidine for prolonging the duration of perineural nerve blocks. More specifically, perineural dexmedetomidine enhances sensory, motor and analgesic block characteristics ***(Paramasivan et al., 2020)***.

Dexmedetomidine, a highly selective α_2 receptor agonist, has a sympatholytic, sedative, amnestic and opioid sparing effect. It does not cause respiratory depression and can

therefore be used as an adjuvant in certain clinical settings ***(Verghese et al., 2019)***.

When dexmedetomidine was added to intrathecal bupivacaine, it resulted in the prolongation of the duration of spinal anaesthesia. Dexmedetomidine also lengthened the duration of spinal anaesthesia when it was given intravenously before spinal anaesthesia or as a loading dose followed by continuous infusion during surgery ***(Senapati and Samanta, 2018)***.

Systemic and intrathecal injection of dexmedetomidine produces analgesia by acting at spinal level, laminae VII and VIII of the ventral horns of the spinal cord. Furthermore, analgesia is produced by depressing the release of C-fiber transmitters and by hyperpolarization of pure-synaptic dorsal horn neurons ***(Jain, 2017)***.

Intrathecal dexmedetomidine shows haemodynamic stability and strong analgesic properties. The time of onset of the motor blockade with the intrathecal route is short and patients consume less analgesia in the first 24 hours postoperatively ***(Santpur et al., 2016)***.

It has also been demonstrated that dexmedetomidine would not increase the risk of side effects, such as nausea, headache, vomiting, shivering and hypotension ***(Niu et al., 2013)***.

AIM OF THE WORK

The objective of this study was to compare the efficacy of intrathecal dexmedetomidine as an adjuvant to hyperbaric bupivacaine to the intravenous route in patients who were undergoing elective infra-umbilical surgeries under spinal anaesthesia.

The duration of analgesia and effect on haemodynamic parameters were evaluated. Moreover, undesirable side effects along with the effect on Ramsay sedation score were studied.

ANATOMY OF THE SPINAL CORD AND THE VERTEBRAL COLUMN

Origin: the spinal cord originates from the medulla oblongata in the brain stem at the level of the occiput passing through the foramen magnum.

End: at the level of the first or second lumbar vertebrae in adults while at birth it extends down to second and third lumbar vertebrae as conus medullaris below this level cauda equine (Horse′s tail) is founded **(collection of spinal nerves to emerge from the corresponding vertebral opening)** ***(Olawin et al., 2019).***

Segments: The spinal cord is a cylindrical structure of nervous tissue composed of white and gray matter, it is 40 to 50 cm long and 1 to 1.5 cm in diameter and is uniformly organized and divided into four regions: cervical (C), thoracic (T), lumbar (L) and sacral (S), each of which is comprised of several segments. There are 31 segments, defined by 31 pairs of nerves exiting the cord. These nerves are divided into 8 cervical, 12 thoracic, 5 lumbar, 5 sacral, and 1 coccygeal nerve. The spinal nerve contains motor and sensory nerve fibers to and from all parts of the body. Each spinal cord segment innervates a dermatome (**Figure 1)** ***(Olawin et al., 2019).***

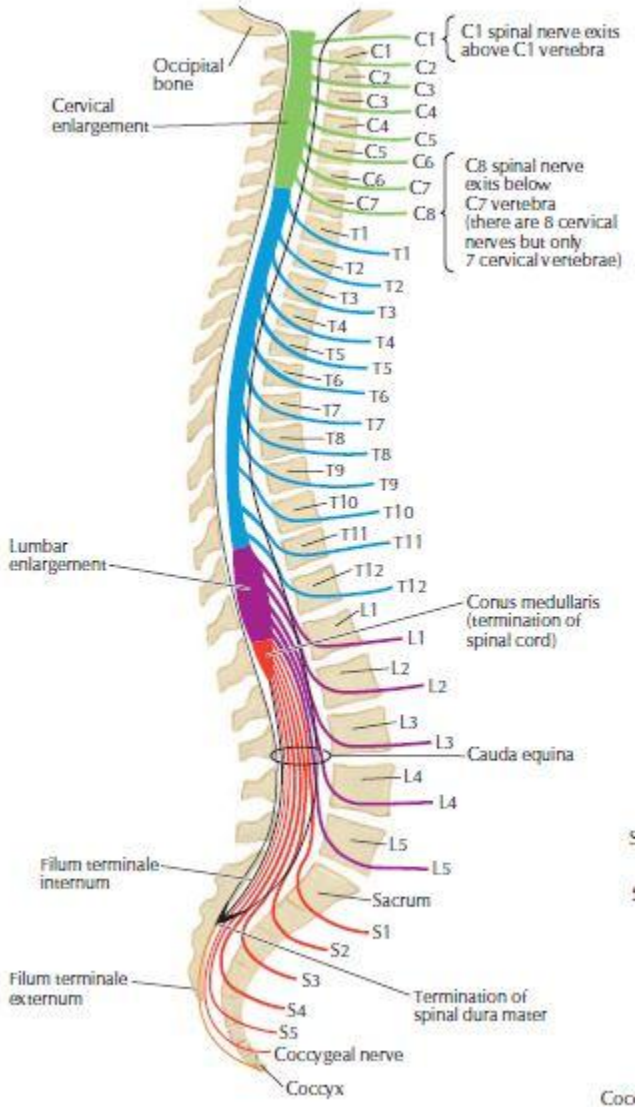

Figure 1: Nerve roots exit the vertebral column each from its corresponding vertebrae and their supply ***(Netter's Anatomy, 2018).***

Coverings: surrounding the spinal cord in the bony vertebral column are three membranes **(from inside to the periphery)**: the pia mater, arachnoid mater, and dura mater. The pia mater is a highly vascular membrane that closely