



Effect of Adding Magnesium Sulphate to Bupivacaine in Ultra-Sound Guided Transversus abdominus Plane Block (TAP) as Post Operative Analgesia in Lower Abdominal Surgeries

Thesis

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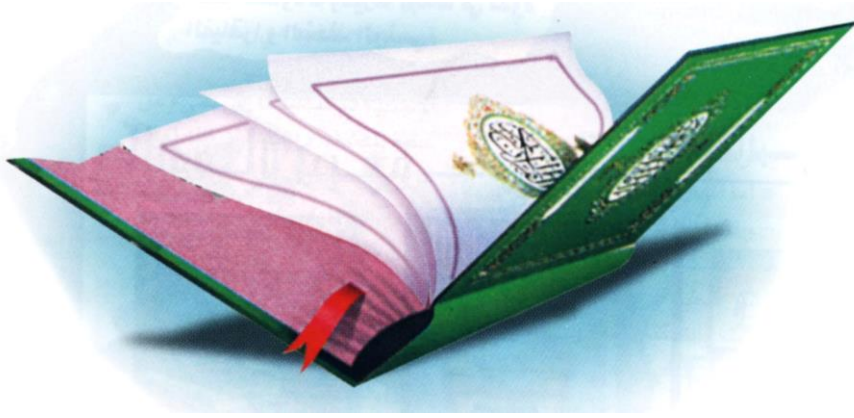
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بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

وَقُلْ اَعْمَلُوا فِیْ سَبِیْلِ اللّٰهِ
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List of Abbreviations

Abb.	Full term
%	Percent
δ	Delta
γ	Gamma
κ	Kappa
$^{\circ}$	Degree
μ	Mue / Micron
μg	Microgram
1ry	Primary
5-HT	Serotonin
ABP	Arterial Blood Pressure
ACTH	Adrenocortico-trophic hormone
ASA	American Society of Anesthesiologists
AVP	Arginine vasopressin.
bpm	Beats per minute
Ca ⁺⁺	Calcium
CGRP	Calcitonin Gene-Related Peptide
cm	Centimeter
CM	Costal margin
CNS	Central Nervous System
COO	Ester linkage
COX2	Cyclooxygenase2
DBP	Diastolic Blood Pressure
DM	Diabetes mellitus
DRG	Dorsal Root Ganglion
E	Enkephalinergic interneurons
ECG	Electrocardiogram
ed	Edition
EOM	External oblique muscle
et al.	And colleagues
FDA	Food and Drug Administration
FSH	Follicle-stimulating hormone
G	Gauge
G	Gram

List of Abbreviations cont...

Abb.	Full term
<i>GABA</i>	<i>Gamma Amino Butyric Acid</i>
<i>HR</i>	<i>Heart Rate</i>
<i>hr</i>	<i>Hour</i>
<i>hrs</i>	<i>Hours</i>
<i>HS</i>	<i>Highly significant</i>
<i>HTN</i>	<i>Hypertension</i>
<i>I.M.</i>	<i>Intramuscular</i>
<i>I.V.</i>	<i>Intravenous</i>
<i>IASP</i>	<i>International Association for the Study of Pain</i>
<i>IC</i>	<i>Iliac crest</i>
<i>IL-1β</i>	<i>Interleukin-1</i>
<i>IL-6</i>	<i>Interleukin-1</i>
<i>IOM</i>	<i>Internalobliqmuscle</i>
<i>J.</i>	<i>Journal</i>
<i>Kg</i>	<i>Kilogram</i>
<i>L1-5</i>	<i>Lumbar spinal roots</i>
<i>LAs</i>	<i>Local Anesthetics</i>
<i>LH</i>	<i>Luteinizing hormone</i>
<i>mA</i>	<i>Milliamperes</i>
<i>Mg</i>	<i>Milligram</i>
<i>min</i>	<i>Minute</i>
<i>ml</i>	<i>Milliliter</i>
<i>mmHg</i>	<i>Millimeters of Mercury</i>
<i>-NHCO</i>	<i>Amide linkage</i>
<i>NHS</i>	<i>The National Health Service</i>
<i>NMDA</i>	<i>N-Methyl-D-Aspartate</i>
<i>NMDA</i>	<i>N-Methyl-D-Aspartate</i>
<i>NRS</i>	<i>Numeric rating scale</i>
<i>NS</i>	<i>Non-significant</i>
<i>NSAIDs</i>	<i>Non steroidal anti-inflammatory drugs</i>
<i>P</i>	<i>Probability value</i>
<i>PC</i>	<i>Peritoneal cavity</i>

List of Abbreviations *cont...*

Abb.	Full term
<i>PGE2</i>	<i>Prostaglandins E2</i>
<i>pp</i>	<i>Pages</i>
<i>SC</i>	<i>Subcutaneous tissue</i>
<i>SD</i>	<i>Standard Deviation</i>
<i>Sig.</i>	<i>Significance</i>
<i>SpO₂</i>	<i>Peripheral Oxygen Saturation</i>
<i>SSR</i>	<i>Surgical Stress Response</i>
<i>T₁₋₁₂</i>	<i>Thoracic spinal roots</i>
<i>TAM</i>	<i>Transversusabdominis muscle</i>
<i>TAP block</i>	<i>Transversusabdominis plane block</i>
<i>TENS</i>	<i>Transcutaneous Electrical Nerve Stimulation</i>
<i>TSH</i>	<i>Thyroid-stimulating hormone</i>
<i>USG</i>	<i>Ultra Sound Guidance</i>
<i>VAS</i>	<i>Visual Analogue Scale</i>
<i>VRS</i>	<i>Four-point verbal rating scale</i>
<i>Vs.</i>	<i>Versus</i>
<i>A</i>	<i>Alpha</i>
<i>B</i>	<i>Beta</i>

INTRODUCTION

The Transversus abdominus block considered as an ideal approach in alleviating postoperative pain, especially when used as a part of multi modal analgesia regimen as has been reported by the American society of Regional Anesthesia (*Sharkey et al., 2014*).

The duration of TAP block is limited to the effect of administered local anaesthetics (LAs). However, recently adjuvants such as epinephrine, ketamine and clonidine are added to LA solution in concentrations advocated for other peripheral blocks to prolong the effect of TAP block with promising results. Evidence supporting the presence of N-methyl-D-aspartate (NMDA) receptors in skin and muscles have led to the use of magnesium sulphate ($MgSO_4$) (NMDA antagonist) via different routes for brachial plexus block (*Lee et al., 2012*) and via neuraxial route.

Beside the effect of magnesium sulphate on NMDA receptor, its anti-nocioceptive could be explained also by being regulator for ca influx inside the cells (*Agrawal et al., 2014*).

NMDA receptors found in many parts of the body including the nerve endings, and plays a well-defined role in modulating pain and number of inflammatory responses (*Barbosa et al., 2010*). NMDA receptor anatagonists could prevent central

sensitization that occur due to the peripheral nociceptive stimulation (*Buvanendran et al., 2007*).

Local anesthetics like bupivacaine act in different way as they bind to intracellular portion of voltage-gated sodium channels.

AIM OF THE WORK

In this thesis we aim to study the effect of adding magnesium sulphate to bupivacaine in ultrasound guided TAP block for lower abdominal surgeries.

REVIEW OF LITERATURE

Pain Pathway

Definition:-

Pain is a subjective experience. The International Association for the Study of Pain (IASP) defines pain as an “unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. This definition demonstrates that pain, as well as having physiological basis, has also psychological or subjective component (*LeResche et al., 2005*).

Pain can be adjunct and simultaneous to nociception, the system which carries information to the spinal cord and brain about damage or near-damage in tissue. Nociception conveys somatic information without conscious awareness, while pain is a perception of sensorial information. As a part of the body's defense system, pain triggers mental and physical behaviors that seek to end the painful experience (*Wahezi et al., 2013*).

Pain is also a feedback system that promotes learning, making repetition of the painful situation less likely. The nociceptive system may transmit signals that trigger the sensation of pain, it is a critical component of the body's ability to react to damaging stimuli and it is part of a rapid-warning relay instructing diverse organs and principally the central

nervous system to initiate reactions for minimizing injury (*Wahezi et al., 2013*).

Pain can be classified into

- 1) Acute pain primarily due to nociception
- 2) Chronic pain which may be due to nociception pain pathway but in which psychological and behavioral factors play a major role (*Aasvang et al., 2016*).

Acute pain is a signal of impending or ongoing tissue damage that provokes the patient to seek treatment or escape from the painful stimulation. Its most common forms include post traumatic, postoperative and obstetrical pain, as well as that associated with acute medical illness such as myocardial infarction, pancreatitis and renal calculi (*Gregory et al., 2016*).

Chronic pain is defined as pain that persists in spite of therapy beyond the usual course of an acute disease or after a reasonable time for healing to occur, This period varies between one to six months in most definitions. Chronic pain may result from peripheral nociceptors or peripheral or central nervous system dysfunction (*Aronoff et al., 2016*).

Traditionally, the distinction between acute and chronic pain has relied upon an interval of time from the onset, the pain that lasts less than 30 days is called acute while that lasting more than six months is chronic type of pain. Sub-acute pain is the one which lasts from one to six months (*Walters et al., 2015*).