Efficacy of Sacral Epidural Blockade as Perioperative Analgesia for Lumbar Laminectomy Surgeries

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

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2014

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Background: Patients undergoing lumbar laminectomy experience severe pain in the postoperative period, which may increase the incidence of postoperative morbidity and complications. Adequate pain relief hastens rehabilitation, and decreases the incidence of chronic pain. This study was designed to compare the efficacy of caudal image guided epidural- bupivacaine administration at low concentrations that doesn't cause any motor block, versus the caudal morphine administration with comparison to a control group on the attenuation of the stress response during (intra) and after (post) lumbar laminectomy surgeries.

Methods: Ninety consecutive patients undergoing single level lumbar discectomy, without posterior spinal instrumentation, were included in the study. were randomly assigned into three study groups (30 patients in each); while GA administered to all groups, group **(A)**received caudal bupivacaine 0.125 %, 30ml and group**(B)**received caudal morphine at a dose of 50 μg/kg. Group (C) received caudal 30ml 0.9% normal saline solution.After induction, and before surgery, Patients were placed prone on Relton-Hall frame or padded bolsters. A 21-gauge hypodermic needle was then introduced into the caudal epidural space. Accurate placement was also confirmed by injection of 3 ml of contrast material and using the image intensifier C-arm, Surgery was started 20 minutes after caudal block. Intraoperative vital data (heart rate, systolic and diastolic blood pressure) was collected. Postoperative VRS score, need for rescue analgesia, Pasero sedation score, respiratory rate and occurrence of side effects were recorded every hour till 24 hours after surgery.

Results: Total VRS score and need of rescue analgesia were significantly less in group (A) and group (B) than in group (C) denoting better analgesia, there was no significant difference between the three groups concerning to itching or sedation score. There was significant difference in side effects with more vomiting in group (C) than group (A) and (B), there was delayed ambulation in group (A) than both groups (B) and (C).

Conclusion: single caudal epidural injection of morphine is a safe, simple and effective technique provides prolonged postoperative duration of analgesia with less pethidine analgesic requirements postoperatively with earlier patients' ambulation without occurrence of any hemodynamic changes or increased incidence of adverse effects.

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List of Abbreviations

Abbrev.	*Full term*
µ	: Microgram
ASA	: American society of anesthesiologists
Bupiv	: bupivacaine
CAMP	: Cyclic adenylyl monophosphate
CNS	: central nervous system
CYP	: cytochrome p
DBP	: Diastolic blood pressure
DEA	: Drug Enforcement Administration
ECG	: Electrocardiogram
F	: Female
HR	: Heart rate
i.v.	: Intravenous
L	: lumbar vertebra
LAs	: local anesthetics
MAP	: Mean arterial blood pressure
M	: Male

List of Abbreviations

Abbrev.	*Full term*
Morp	**:** morphine
M3G	: morphine-3glucuronide
M6G	: Morphine-6 glucuronide
mmHg	: millimeter mercury
NMDA	: *N*-methyl-d-aspartate
NSAIDs	: Nonsteroidal anti-inflammatory drugs
PABA	: para-aminobenzoate
RR	: Respiratory rate
SBP	: Systolic blood pressure
SD	: Standard deviation
SPSS	: Statistical package for social science
T	: Thoracic vertebra
VAS	: Visual analogue score
VRS	: Verbal rating scale

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Acknowledgment

First and foremost thanks to **ALLAH**, *the Most beneficent and Merciful.*

I would like to express my deepest appreciation and sincere gratitude to ***Prof. Dr. / Gihan Seif El Nasr Mohammed,*** *Professor of Anesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for her supervision, continuous help and patience. It was a great honor to work under her supervision.*

I wish to express my sincere thanks and deep gratitude to ***Prof. Dr./ Ahmed Nagah Elhassanin El Shaer,*** *Professor of Anesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for his eminent guidance, encouragement and revision throughout the whole work.*

Special appreciation is extended to ***Dr./ Abdel Aziz Abdulla Abdel*** *who suggested this subject for reviewing and* ***Dr./ Assem Adel Moharram*** *Lecturers of Anesthesia and Intensive Care, Faculty of Medicine, Ain Shams University, for their active cooperation, deep concern, enthusiastic encouragement, the effort and time they have devoted to the fulfillment of this work.*

Last but not least, I would like to present a lot of thanks to my ***Family, specially my great parents and my wife****, without their help and support, this work could not come to birth.*

Eid Mansy Mohammed Hussien

Introduction

Caudal anesthesia was introduced in 1901 by Sicard and Cathelin, who injected local anesthetic solutions into the epidural space through the sacrococcygeal hiatus. It was used as the only means of administering epidural anesthesia until the lumbar approach was described by Page in 1921 and Dogliotti in 1927 **(Figueira *et al,* 2003).** Since then, caudal anesthesia has fallen from favor compared with the lumbar epidural technique **(Drips *et al,*1982)**.

Adult caudal blockade has fallen from favor in the anesthesia community. The majority of anesthesia providers now use lumbar epidurals and spinals for surgeries that can be done with caudals. Many claim the procedure is difficult to perform and the outcome of the block is unpredictable **(Drips *et al,*1982)**.

Patients undergoing lumbar laminectomy experience severe pain in the postoperative period, which may increase the incidence of postoperative morbidity and

complications. Adequate pain relief hastens rehabilitation, and decreases the incidence of chronic pain **(Macnil and Anderson, 2002).**

Stress responses associated with surgical trauma may cause subtle changes in some vital and hormonal parameters. Increased plasma cortisol level and suppressed anabolic hormones, such as insulin, may have deleterious effects during the perioperative period **(Burton *et al,* 2004)**.

It has been suggested that regional anesthesia and high-dose intravenous (i.v.) opioid injections can reduce stress response associated with surgical trauma **(Weismann, 1990).**

Preemptive analgesia has been advocated as an effective way of managing postoperative pain on the basis of the theory of preventing central sensitization after injury **(Gaitini *et al,* 2000).**

Spinal opiates can alter both processes by reducing the preterminal release of neurotransmitters and hyperpolarizing the postterminal second-order neurons ***(Figueira et al, 2003).***

The postoperative pain state results from afferent C-fiber input generated by the tissue injury and the central facilitation from the continuing stimulus **(Kim and Harbott, 2004).**

N-methyl-d-aspartate (NMDA) receptor activation is essential for central facilitation after nociceptive stimulation and is a key factor in the generation and maintenance of persistent pain states. Spinal NMDA antagonists might alter postoperative pain by removing the facilitatory component **(Gulec *et al*, 1998).**

Epidural opioid can antagonize these two distinct components and provide adequate control of postoperative pain. Spinal potentiation of opiate receptor activity by NMDA antagonism has been also reported **(Burton *et al*, 2004).**

Caudal block is widely used to provide perioperative analgesia in pediatric practice. However, it has only a limited application for some anal surgeries in adults, because its success rate is only 70−80 % **(Tsui *et al, 1999*).**

therefore Image intensifiers, which are readily available at the operating theatres, can be effectively used to verify the accurate position of the hypodermic needle in the caudal epidural space. The advantages of image