Addition of intrathecal dexamethasone to bupivacaine for spinal anesthesia in cesarean section

Thesis

Submitted for the Partial Fulfillment of Master Degree

in **Obstetrics & Gynecology**

By

Hamda Abdelhamid Omar Mohamed

M.B.B.,Ch - 2011

Resident of Obstetrics & Gynecology at Sodfa General Hospital

Under Supervision of

Prof. Dr. Mahamoud Ali Ahmed El-shourbagy

Professor of Obstetrics & Gynecology

Faculty of Medicine–Ain Shams University

Dr. Ahmed Mohamed Mammdouh

Lecturer in Obstetrics & Gynecology

Faculty of Medicine–Ain Shams University

Dr. Mohamed Esmat Abbass Shawky

Lecturer in Obstetrics & Gynecology

Faculty of Medicine–Ain Shams University

Faculty of Medicine

Ain Shams University

2018

سورة البقرة الآية: ٣٢

First of all, thanks to Allah whose magnificent help was the main factor in completing this work.

I'm greatly indebted to Prof. Dr. Mahamoud Ali Ahmed El-shourbagy, Professor of Obstetrics & Gynecology, Ain Shams Faculty of medicine for his kind help and guidance throughout the whole work.

I wish to express my deepest gratitude and sincere appreciation to Dr. Ahmed Mohamed Mammdouh, Lecturer of Obstetrics & Gynecology, Ain Shams faculty of medicine, for his close supervision, encouragement and assistance.

Also I wish to express my deepest gratitude and sincere appreciation to Dr. Mohamed Esmat Abbass Shawky, Lecturer in Obstetrics & Gynecology, Ain Shams University Maternity Hospital, for his close supervision, encouragement and assistance.

Hamda Abdelhamid Omar Mohamed

Contents

List of Abbreviations

ACTH : Adrenocorticotrophic Hormone

AR : Androgen receptor

AVMs : Arteriovenous malformations

CDMR : Cesarean delivery on maternal request

COX : Cyclooxygenase

CS : Caesarean section

DVT : Deep venous thrombosis

GMSF : Granulocyte-macrophage colony-stimulating factor

GR : Glucocorticoid receptor

HAART : Highly active antiretroviral therapy

HPA : Hypothalmo-Pituitary Adrenal

HSP : Heat-shock protein

IASP : International Association for the Study of Pain

ICAM : Intercellular adhesion molecules

INFγ : Interferon gamma

INOS : Inducible nitric oxide synthase

IUGR : Intrauterine growth restriction

IV : Intravenous

MR : Mineralocorticoid receptor

NSAIDS : Non-steroidal anti-inflammatory drugs

PAG : Peri-Aqueductal Grey matter

PK-PD : Clinical pharmacokinetic and pharmacodynamics

PLA2 : Phospholipase

PR : Progesterone receptor

TED : Thromboembolic disease

TGFβ : Transforming growth factor

Th2 : T helper 2

TNFα : Tumor necrosis factor

VAS : Vas visual analog scale

VBAC : Vaginal birth after cesarean delivery

VCAM-1 : Vascular adhesion molecules

WDR : Wide Dynamic Range cell

WHO : World Health Organization

.

List of Figures

List of Tables

Introduction

Effective postoperative pain control is an essential component of the care of the surgical patient. Inadequate pain control may result in increased morbidity or mortality **(Naziri et al., 2013).**

Evidence suggests that surgery suppresses the immune system and that this suppression is proportionate to the invasiveness of the surgery **(Murali Krishna et al., 2008).** Good analgesia can reduce this deleterious effect. The advantages of effective postoperative pain management also include patient comfort and therefore satisfaction, earlier mobilization fewer pulmonary and cardiac complications, a reduced risk of deep vein thrombosis, faster recovery with less likelihood of the development of neuropathic pain, and reduced cost of care **(Michael and Ramsay, 2000) .**

Spinal anesthesia is the most commonly used technique for cesarean section as it is very economical and easy to administer. It reduces mortality rate associated with cesarean section by sixteen times when compared with general anesthesia. Spinal anesthesia avoids the risks of general anesthesia such as aspiration of gastric contents, difficulty with airway management and infant respiratory distress **(Naziri et al., 2013).**

At present, there is no drug able to control pain specifically without having side effects **(Naziri et al., 2013).** The use of corticosteroid compounds increases duration of anesthesia and analgesia in peripheral nerve blocks. In addition, intravenous (IV) and oral dexamethasone considerably alleviate postoperative pain **(Bisgaard et al., 2003)**.

Epidural and intrathecal steroids are used to reduce chronic pain **(Price et al., 2005)**. In some studies, intrathecal dexamethasone increased duration of sensory block and postoperative analgesia **(Bani-Hashem et al., 2011)**.

Although intrathecal dexamethasone is used to control chronic pain; few studies have been conducted on the effects of sensory block and postoperative pain in patients undergoing surgery **(Bani-Hashem et al., 2011)**.

Aim of the Study

This study aims to assess the efficacy of adding dexamethasone to bupivacaine for spinal anesthesia in prolonging the duration and anesthetic effect in women undergoing cesarean section.

Research Hypothesis:

In women undergoing cesarean section adding dexamethasone to bupivacaine for spinal anesthesia may prolong and improve the anesthetic effect.

Research Question:

In women undergoing cesarean section, does adding dexamethasone to bupivacaine for spinal anesthesia have an effect on prolonging the anesthetic effect?

Chapter (1)

Post-operative Pain

Effective postoperative pain control is an essential component of the care of the surgical patient. Inadequate pain control, apart from being inhumane, may result in increased morbidity or mortality **(Katz, 1996).**

Evidence suggests that surgery suppresses the immune system and that this suppression is proportionate to the invasiveness of the surgery. Good analgesia can reduce this deleterious effect **(Pollock et al., 1991).**

Definition of Pain:

Pain is defined by the International Association for the Study of Pain (IASP) as:

"An unpleasant emotional and sensory experience associated with actual or potential tissue damage, or described in terms of such damage **(IASP /updated 2014 2015).**

Incidence of post-operative pain:

More than 80% of patients who undergo surgical procedures experience acute postoperative pain and approximately 75% of those with postoperative pain report

the severity as moderate, severe, or extreme **(Gan et al., 2014).** Evidence suggests that less than half of patients who undergo surgery report adequate postoperative pain relief **(Apfelbaum et al., 2003).**

Classifications of Pain:

Pain can be classified into: **(Ballantyne and Howard, 2006)**:

1. Acute pain, which is primarily due to nociception(traumatic or noxious stimuli stimulation like injury, a disease process, or abnormal function of muscle or viscera).

2. Chronic pain, which may be due to nociception but in which psychological and behavioural factors often play a major role.

Pain can also be classified according to (Ballantyne and Howard, 2006):

- Pathophysiology (e.g. nociceptive or neuropathic pain).
- Aetiology (e.g. postoperative or cancer pain).
- Affected area (e.g. headache or low back pain).

Pain Pathways:

Previously, pain pathways had three components **(Carabine et al., 2002)**:

1- First order neuron (cell body in dorsal root ganglion) which transmit pain from a peripheral receptor to…

2- Second order neuron in the dorsal horn of the spinal cord, which crosses the midline to ascend in the spinothalamic tract to the thalamus where…

3- Third order neuron projects to the postcentral gyrus (via the internal capsule).

But now, the following will be considered components of pain pathways **(Carabine et al., 2002)**:

1. Peripheral receptors.
2. Neural pathways.
3. Long tracts of Spinal cord.
4. Brain stem, thalamus, cortex & other areas.
5. Descending pathways.

1. Peripheral Receptors:

Most receptors on the peripheral endings of afferent nerves respond to a variety of stimuli. Their shape, location, and field of reception indicate that they are able to perceive one type of stimulus more efficiently than many other types. The reception of the pain is said to be un-encapsulated nerve ending. Although this receptor has a thin myelin covering, it is usually referred to as an unmyelinated or "naked" nerve ending **(Fig. 1)**.

The pain receptors are unorganized nerve endings and often have a weed like appearance and often overlaps the territory of other nerve endings from cord segments above and below it **(Rawal, 2000).**

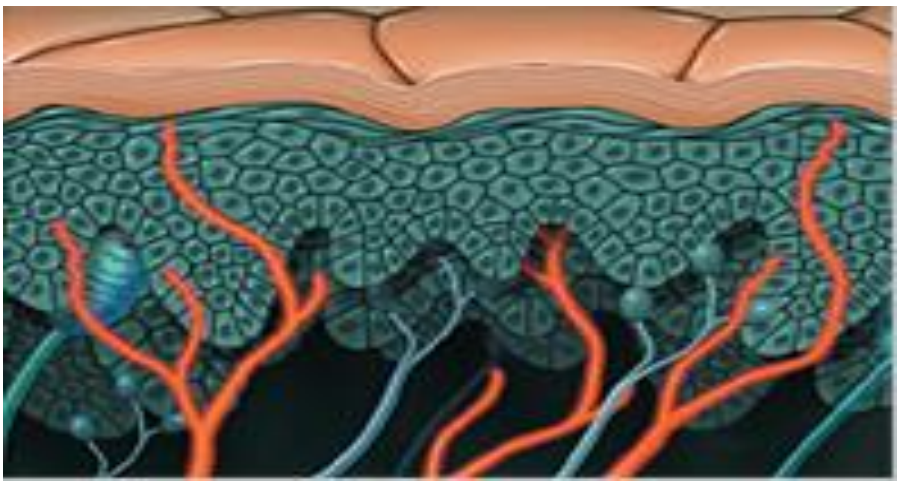

Figure (1): Peripheral receptors of pain **(Dhesi and Hurley, 2000).**