

Study of the Effectiveness of local Anesthetic Wound Infiltration in Post Cesarean Section Pain Relief

Thesis
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List of abbreviations

ACC	Anterior Cingulated Cortex
ACLS	Advanced Cardiac Life Support.
ADP	Adenosine di-phosphate
AMP	Adenosine mono-hosphate
ATP	Adenosine tri-hosphatase
ASA	American society of anesthesiologists
Ca ⁺	Calcium ion
Cm	Minimum concentration of local anesthesia
Cox-2	Cyclooxygenase-2
C.V	Cardio Vascular.
DRG	Dorsal root ganglion
ECG	Electro Cardio gram
EMIA	Eutic easily Melted Mixture of Local anesthetic's
GABA	Gamma aminobutyric acid
H2 receptors	Histamine receptors
I.M	Intra Muscular
I.V	Intra venous
IVRA	Intra venous Regional Regional anesthesia
K ⁺	Potassium ion
LA	Local anesthesia

MFMU	Maternal-fetal medicine unit
Mg ²⁺	Magnesium
Mgso4	Magnesium sulphate
mmol\L	Milli mole per liter
Na+	Sodium ion
NMDA	N-Methyl D -Aspartate
NRM	Nucleus raphe magnus
NSAID	Non steroidal anti-iflamatory drug
PABA	Para-amino benzoic acid
PAG	Periaqueductal grey
PTH	Parathyroid hormone
PH	Power of hydrogen
pK _a	Acid dissociation constant
SI, SII	Somato sensory Cortices
SMT	Spinomesen cephalic tract
SRT	Spinoreticular tract
STT	Spinothalamic tract
S. dr	Sacral dermatome
TAP	Transversus abdominas plane
VAS	Visual analogue scale
α	Alpha.
β	Beta
μg	Microgram

ABSTRACT

BACKGROUND:

Cesarean section delivery is becoming more frequent. Childbirth is an emotion-filled event and the mother needs to bond with her newborn baby as early as possible. Any intervention that leads to improvement in pain relief is worthy of investigation. Large amounts of opioid analgesic drugs are often required in the management of intense post operative pain. However this option is associated with many side effects, including evident disruption of mother/newborn bonding. Local anesthetics, either on their own or in combination with opioids or nonsteroidal anti-inflammatory drugs, have been employed as an adjunct to other postoperative pain relief strategies.

Methodology:

100 healthy pregnant full term female going to have elective cesarean section, after explanation of its aim and details and after obtaining a written consent.

All patients had cesarean section under spinal anesthesia and received post-operative analgesia [pethidine] according to visual analogue scale value. Pain was assessed 15 minutes after skin closure using a 100 point visual analogue scale (VAS) which was continued in the ward at 1, 2, 4,8,16 and 24 hours postoperatively.

The amount of pethidine consumed after 1, 2, 4, 8, 16 and 24 hours was calculated.

They have been randomized into 3 groups

ABSTRACT

1-The 1st group C (n=50 women):

Patient had Routine cesarean section.

Patient only receive pethidine post-operative according to visual analogue scale.

2-The 2nd group B (n=25 women):

Patient had Routine cesarean section.

The wound was infiltrated during closure, with 30 ml of 0.5 % bupivacaine.

Patient received pethidine post-operative according to visual analogue scale.

3-The 3rd group B+M (n=25 women)

Patient had Routine cesarean section.

The wound was infiltrated during closure with 30 ml of 0.5 % bupivacaine plus 750 mg MgSO₄.

Patient received pethidine post-operative according to visual analogue scale.

Blood sample collected before surgery and after surgery by 2hours and level of magnesium in blood was calculated.

Results:

There was a statistically significant differences between group B using 0.5% Bupivacaine compared to control group as regard the total consumption of pethedine in 24 hour and lactation in first 12 hour. There was a statistically significant differences between group B+M using 0.5% Bupivacaine plus magnesium sulphate compared to control group as regard the total consumption of pethedine in 24 hour and lactation in first

ABSTRACT

12 hour. There was no significant difference between group B using 0.5% Bupivacaine and group B+M using 0.5% Bupivacaine plus magnesium sulphate , as regard the total consumption of pethedine in 24 hour or lactation in first 12hour.

Conclusion:

We concluded that infiltration of the surgical wound of a cesarean section with 0.5 % bupivacaine with or without the addition of magnesium sulphate after spinal anesthesia provided a significant degree of analgesia as shown by the smaller pain scores and pethidine consumption and earlier onset of lactation.

Key words

Cesarean section.

Post operative pain.

Magnesium.

INTRODUCTION

Cesarean section delivery is becoming more frequent. Childbirth is an emotion-filled event and the mother needs to bond with her newborn baby as early as possible. Any intervention that leads to improvement in pain relief is worthy of investigation (**Bamigboye et al; 2010**).

Large amounts of opioid analgesic drugs are often required in the management of intense postoperative pain. However this option is associated with many side effects, including evident disruption of mother/newborn bonding (**Tauzin-fin;2009**).

Local anesthetics, either on their own or in combination with opioids or nonsteroidal anti-inflammatory drugs, have been employed as an adjunct to other postoperative pain relief strategies, Conflicting reports were noted (**Rackelboom et al ; 2010**).

Magnesium is reported to have antinociceptive effects, which are primarily based on the regulation of calcium influx into the cell, and antagonism of the N – Methyl – D – Aspartate (NMDA) receptors. A recent study pointed to the potentially effective pain relieving effect of magnesium; either with systemic or as local infiltration (**Tauzin-fin;2009**).

Use of local anesthetic agent wound infiltration/irrigation, with or without the addition of magnesium, could significantly reduce the dose of narcotic/analgesic traditionally used for post-caesarean pain relief. Thereby it could allow the highly estimated early mother/newborn bonding in addition to providing a safe & effective method of pain relief.

INTRODUCTION

AIM OF WORK

The aim of the present prospective randomized study to assess the effectiveness of local anesthetic agent wound infiltration/irrigation on post-caesarean section pain and its effect on lactation.

Anatomy of Pain

ANATOMY OF PAIN

Pain is an unpleasant sensation that may be associated with actual or potential tissue damage and may contain physical and emotional components (*Renn et al ; 2005, Meyr& Steinberg; 2008*).

Pain can be classified as acute or chronic:-

1. Acute pain is defined as short-term, fast and sharp pain or pain with an easily identifiable cause. These types of pain usually function as endogenous protective mechanism that signals the brain of occurrence of tissue injury.

2. Chronic pain defined as pain can persists beyond point of tissue healing and develop into a chronic and debilitating state, Clinically, this pain has the characteristics of a disease state and can produce psychological disturbances (*Renn et al ; 2005*).

Pain transmission

The ascending pain pathway transmit nociceptive informations from peripheral tissues to cerebral cortex for interpretation; Ascending Pain pathways are complex structures, involving both peripheral and central nervous systems as in Fig (1) (*Renn et al ; 2005*).

Anatomy of Pain

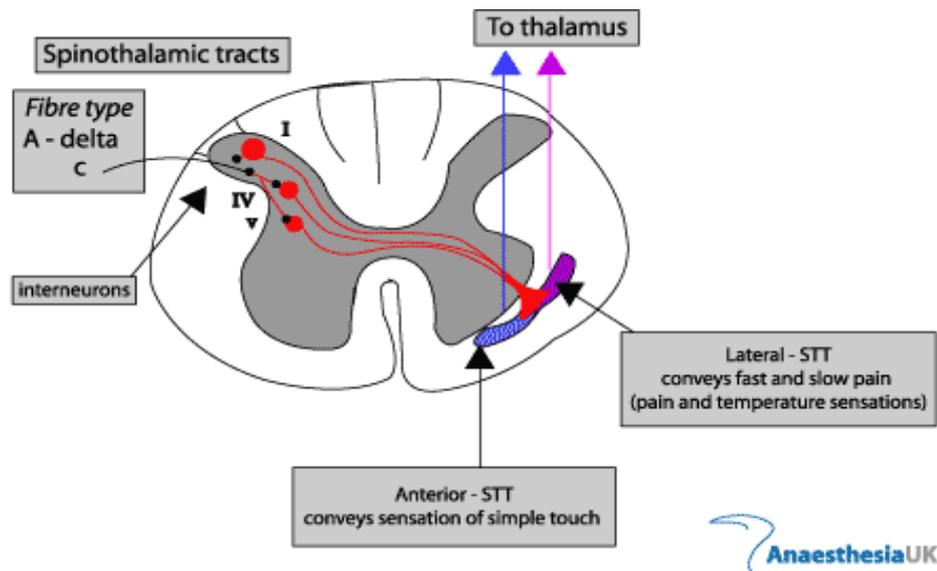


Fig (1) Ascending pain pathway

1. Nociceptors:

Nociceptors, or pain receptors, are free nerve endings that respond to painful stimuli. Nociceptors are found throughout all tissues except brain. They are stimulated by biological, electrical, thermal, mechanical, and chemical stimuli .

There are two types of fibers for conducting pain impulses which are (A delta) and C fibres (**Janifer *et al*; 2008**).

A delta are relatively large myelinated, faster fibers, and of two types depending on specificity of their responses. The mechanoreceptors respond to intense and harmful mechanical stimulations and The polymodal A delta fibers respond to, thermal and chemical stimuli.

C fibers are of small slower and un-myelinated and represent 3 quarters of the sensory afferent input (**Marchand; 2008**).

Anatomy of Pain

Nociceptors are also stimulated by neurotransmitters and inflammatory mediators as K, serotonin, bradikinin, histamine, prostaglandins, substance P and others which are released after injury or tissue damage (*Renn et al; 2005*).

Nociceptors are located next to mast cells and blood vessels, the 3 components function together in response to injury and inflammatory process.

These neurochemicals stimulate mast cells and the resulting cascade of chemicals ultimately activates protein receptors in nociceptors membrane causing ion channel to open positively charged ion channels as Na^+ and Ca^{2+} flow into nociceptor lowering the voltage across the membrane leading to generation of electrical impulses and transmitted along nerve fibers towards the spinal cord as in Fig (2) (*Marchand; 2008*).

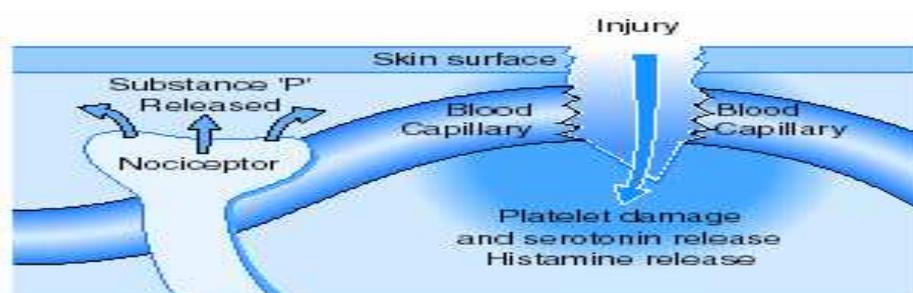


Fig (2) Nociceptor stimulation.

Anatomy of Pain

2. Spinal Dorsal Horn:

When noxious stimulus is transduced by nociceptors a signal is generated that transmitted as an electrical action potential along A-delta fibers and C fibers (*Renne et al; 2005*).

On cross section, the spinal gray matter form butterfly shape and can be divided into 10 laminae as in figure(3). A-delta fibers enter lamina I and V and synapse on a second set of neurons (*Farquhar ;2007*). These neurons will carry the signal to the thalamus and are part of the spinothalamic tract (STT). The C fibers enter the spinal cord and synapse on lamina I cells and lamina II interneurons - neurons that make synaptic connections with other cells within the local environment. The interneurons convey the signal to the STT cells that reside mainly in laminae I, IV and V. The axons of the STT cells project across the spinal cord to the STT, which is located in the ventrolateral quadrant of the contralateral spinal cord white matter (*Renn et al; 2005*).

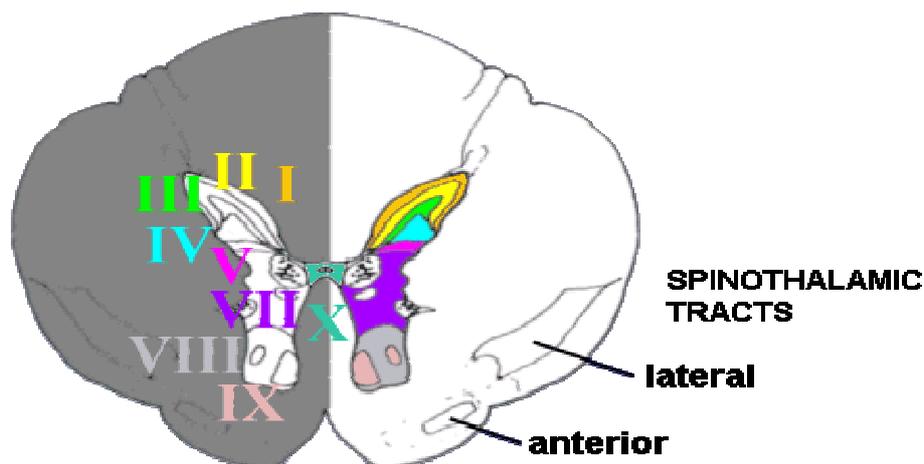


Fig (3) Cross section in spinal gray matter.

