Faculty of Medicine

Does The Combination Of Intrathecal Magnesium Sulfate And Fentanyl Improve Post Cesarean Section Analgesia?

Thesis

Submitted for Partial Fulfillment of the M.D Degree

in Anesthesiology

By

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هل مزج عقار كبريتات الماغنسيوم مع الفينتانيل للحقن تحت الأم العنكبوتية يحسن ألم ما بعد العمليات القيصرية؟

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توطئة للحصول على درجة الدكتوراة

فى التخدير

مقدمـــه من

طبيبة/ غادة غازى على خطاب

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Aim of work

To study the effect of adding intrathecal magnesium sulfate to bupivacaine, fentanyl in spinal anesthesia in parturients undergoing cesarean section.

The study will be based on the onset, duration and recovery of sensory and motor block, duration of analgesia and post operative analgesia requirements.

Introduction

Post cesarean pain is associated with neuroendocrinal responses and catecholamines release that may cause increase in blood pressure and tachycardia. Pain can also increase the risk of thromboembolic disease which is increased during pregnancy. Anxiety and pain may reduce the ability of mother to breast feed effectively so adequate post cesarean section analgesia decreases morbidity and improves parturient outcome ***(Gadsden et al., 2005).***

Co-administration of small doses of fentanyl (25microgram) and bupivacaine (0.5%) for spinal anesthesia increase the duration of anesthesia and may reduce postoperative analgesic requirements in parturients undergoing cesarean section ***(Buvanendran et al., 2002).*** However, its use may cause adverse effects such as prurities, urinary retention, respiratory depression, nausea and vomiting and relatively short duration of post operative analgesia ***(Unlugenc et al., 2009).***

Recently, (N-Methyl. D. Aspartate) NMDA receptor antagonists are thought to prevent the induction of central sensitization attributed to peripheral nociceptive stimulation. Magnesium sulfate blocks NMDA channels and so prevents the induction of central sensitization ***(Grab et al., 2009).***

Magnesium sulfate has been used in some studies to prolong duration of spinal anesthesia and reduce side effects observed when local anesthetics combined with opioids ***(Malleeswaran, et al., 2010).***

For Example:

1- The effects of adding magnesium to bupivacaine and fentanyl for spinal anesthesia in knee arthroscopy was investigated and the conclusion was: the time of first analgesic requirement was prolonged significantly by magnesium ***(Dayioglu et al., 2009).***

2- The effects of adding intrathecal magnesium sulfate to bupivacaine and fentanyl in spinal anesthesia in patients undergoing lower extremity surgery was investigated and the conclusion was: the addition of magnesium sulfate to bupivacaine and fentanyl in spinal anesthesia prolonged the period of anesthesia ***(Özalevli et al., 2005).***

Intrathecal administration of magnesium sulfate significantly potentiates opioid antinociception during spinal anesthesia ***(Unlugenc et al., 2009).***

Parturients and Methods

Selection of parturients:

This is a randomized clinical trial study, 60 parturients at full term gestation presenting for elective cesarean section will participate in the study. They will be undergoing spinal anesthesia. This study will be carried out in Ain Shams University hospitals. The parturients will be divided into two groups (30 parturients each):

Group (1): will receive 10mg of isobaric bupivacaine 0.5% (2ml), 25 microgram of fentanyl (0.5ml) and 50mg of $MgSO_4$ 5% (0.1ml) intrathecally.

Group (2): will receive 10mg of isobaric bupivacaine 0.5% (2ml), 25 microgram of fentanyl (0.5ml) and 0.1ml of preservative free 0.9% sodium chloride intrathecally.

Inclusion criteria:

1- Age 18-40 yrs.
2- Weight: 50-90 kg.
3- ASA (American society of Anesthesiolgoy) grade I, II.

Exclusion criteria:

1- Any contraindication to spinal anesthesia (Absolute or relative).
2- Allergy to opioids (family or personal hisroty).
3- Long term opioids use.
4- Significant co-existing disease such as pre-eclampsia.

All parturients will be assessed prior to surgery. Proper clinical evaluation will be performed before admission and parturients will be fasting for at 8 hours for food.

Anesthetic technique:

On arrival to the operating room, standard monitoring will be established. (Pluse oximetry, electrocardiography, non invasive arterial blood pressure monitoring and fetal heart rate monitoring). A 18-gauge IV cannula will be inserted in a peripheral vein under complete aseptic precautions. After preloading with 1000ml lactated ringer, the parturients will be placed in sitting position. A 23G Quincke needle will be inserted in the L3-L4 inter space under complete aseptic precautions.

In group (1): will receive 10mg of isobaric bupivacaine 0.5% (2ml), 25 microgram of fentanyl (0.5ml) and 50mg of $MgSO_4$ 5% (0.1ml) will be injected intrathecally.

In group (2): will receive 10mg of isobaric bupivacaine 0.5% (2ml), 25 microgram of fentanyl (0.5ml) and 0.1ml of preservative free 0.9% sodium chloride will be injected intrathecally.

Then the parturients will be placed supine with 15°-20° left tilt.

Anesthetic Assessment

- Demographic profile of the parturients will be recorded including age, height and weight.
- Hemodynamic parameters including pluse rate, blood pressure, oxygen saturation and respiratory rate will be recorded baseline before induction of spinal anesthesia then every 5 minutes after induction of spinal anesthesia for 15 minutes then every 15 minutes till the end of surgery.
- Onset, duration, height of sensory block, time taken for two segment regression, and time when parturients ask for analgesia will be noted, sensory block will be evaluated by pin prick sensation.
- Onset and duration of motor block will be assessed using modified Bromage's scale grading from 0 (no movements of legs and feet) to 3 (unable to move knees or feet) and noted.
- Sedation will be assessed by a sedation score with four point scale as per filos grading from 1 (awake and alert) to 4 (unarousable) and noted.
- The incidence of post operative nausea, vomiting and pruritis will be also be evaluated and any complication as bradycardia or hypotension will be noted.
- Pain score using verbal rating scale (VRS) from 0 to 10 (0 = no pain, 10 = maximum pain) every 15 min after the block until the end of surgery and 2, 4, 8, 12hr post operatively.