

## **Controlled Trial of Wound Infiltration with Bupivacaine for Post Operative Pain Relief after Caesarean Section♥**

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**Objective:** The aim of this study was to prove that the use of 0.25% Bupivacaine infiltrated in the surgical wound, is effective for postoperative analgesia.

**Methods:** The study was conducted on 45 patients who underwent elective or emergency caesarean section at Prince Hashim Ben Al-Hussein hospital, between January and April 1999. Patients were allocated randomly to three groups, A, B and C respectively, to receive general anesthesia and Bupivacaine (Group A,n=15), spinal anesthesia and 0.25% Bupivacaine (group B,n=15), or only general anesthesia with no supplementation of Bupivacaine at the end of surgery (Control group C, n=15).

Patients were evaluated on an hourly basis for 24 hours using a visual analogue pain scale (VAS), starting from the end of the surgery. The dose for pethidine consumption was also recorded.

**Results:** It was found from the study that neither group A nor group B required any dose of pethidine (the traditional drug used), in the first 6 hours post operatively. While all patients from group C required at least one dose of pethidine. The time taken from the end of the surgery to the first request for analgesia was 6-8 hours for group A, 8-12 hours for group B (spinal), and 0 for group C (control).

**Conclusion:** The use of 0.25% Bupivacaine by wound infiltration is effective for post operative pain relief, as it reduces the requirements for additional post operative analgesia.

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Under treatment of post operative pain is well documented<sup>1</sup>. Reasons cited for inadequate pain relief include fear of opioid addiction and hypoventilation. To avoid such problems, physicians have used local anaesthetic for post operative pain relief with either an extradural or peripheral nerve block as an adjuvant to general anesthesia or as the sole anaesthetic for surgery<sup>2</sup>. The disadvantages of an extradural block include the possibility of sympathetic and motor block that may accompany sensory block. Peripheral nerve block usually does not produce significant autonomic effects, but motor block may be a problem if the nerve involved is a mixed nerve.

Moreover, if the skin infusion extends beyond the dermatome supplied by a peripheral nerve block, pain relief may be inadequate.

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Infiltration of the surgical wound with local anaesthetics avoids the problem of motor block and localization to specific dermatome, but its efficacy for postoperative analgesia has been controversial (3+4).

In this study, the efficacy of 0.25% Bupivacaine infiltration of the surgical wound at the end of the surgery after general or spinal anesthesia for caesarean section has been studied and compared to patients with no infiltration after general anaesthesia

## **METHODS**

This study was carried out on 45 patients according to the classification of American Society of Anaesthetists (ASA) class I ( healthy patients) or class II ( patients with mild systemic disease). The age ranges between 23-45 years. These patients underwent elective or emergency caesarian section under general or spinal anesthesia, at Prince Hashim Ben Al-Hussein Hospital in the period between January and April 1999.

Informed consent was obtained from all patients, and the study was approved by the local ethics committee. Premedication was given to all patients in the form of Sodium citrate 30ml of 0.3 mole/L 5 minutes before induction of anesthesia, and Ranitidine 50mg I.V slowly. All patients were placed in the supine position with a wedge under the right hip for left uterine replacement. Patients were allocated randomly to three groups A, B and C respectively.

Patients were evaluated every 4 hours for 24 hours after the operation using a visual analogue pain scale (VAS), where a 10 cm bar was constructed and the patients were asked to mark a point to indicate pain, having been instructed that one end represents no pain and the other worst pain imaginable, and to request analgesia as needed.

The policy was to give pethidine (1mg/kg) injection i.m as needed and to give Voltrol 75-100 mg injection i.m next morning after the operation.

Patients were allocated randomly to three groups A, B and C respectively.

### **Group A. General anesthesia + Bupivacaine Infiltration N=15**

After pre oxygenation for three minutes, general anesthesia was induced with Thiopentone 3-4 mls/kg. Intubation of the trachea was facilitated with Suxamethonium 100mg, and cricoid pressure was removed after intubation and inflation of the endotracheal cuff. Anesthesia was maintained with 0.5% Halothane and 50% nitrous oxide in oxygen. Fentanyl 100µmg was given to all patients soon after delivery. Additional neuromuscular block was achieved with Atracrium or Vecuronium as required.

At the end of the surgery, 20mls of 0.25% Bupivacaine was infiltrated into the wound and the skin closed. Neuromuscular block was antagonized with Neostigmine 2.5mg and Atropine 0.6mg.

### **Group B. Spinal Anaesthesia + Bupivacaine Infiltration N=15**

In the operating theater an i.v canula gauge 16 was inserted and Hartmans solution 13ml/kg was administered rapidly (pre load) to maintain a systolic pressure greater than 100 mm Hg measured non-invasively.

All patients were in sitting position, and under aseptic conditions, L2-L3 or L3-L4 level was identified. Local infiltration was done with Lignocaine 1%. A 23-gauge Whitcare spinal needle was introduced into the subarachnoid space (SAS) and 0.5% of hyperbaric Bupivacaine 2.2-2.5 mls (according to body height) was administered. Oxygen was given by a facemask or a nasal canula at the rate of 4L/minute. At the end of the surgery 20mls of Bupivacaine 0.25% was infiltrated into the wound.

**Group C (control) only general anaesthesia (no infiltration with Bupivacaine) N=15**

All patients received only general anaesthesia (as mentioned previously in group A), without supplementation (infiltration) with Bupivacaine at the end of the surgery. Neuromuscular block was antagonized with Neostigmine 2.5mg + Atropine 0.6mg.

**RESULTS**

Postoperative analgesia and pain score (VAS) are shown in Table 1.

**Table 1. Postoperative analgesia and pain score (VAS)**

	Group A GA+WI*	Group B n=15 Spinal+WI*	Group C n=15 Control only GA
Time to next analgesia (hrs)	6-8 hrs	8-12 hrs	0.0 hrs (immediately after the operation)
Duration after operation	Pain degree according to the VAS (cm)		
0 hrs	0.0	0.0	9.0
4 hrs	1.6	1.0	7.5
8 hrs	3.9	2.8	6.0
12 hrs	2.6	3.0	5.2
16 hrs	2.2	2.8	4.5
20 hrs	2.9	2.0	3.6
24 hrs	2.0	1.2	3.2

*\*WI - Wound infiltration with bupivacaine*

From the study, it was found that neither group A nor group B required any dose of Pethidine in the first 6 hours post operatively, while all patients from group C required at least one dose.

Time taken to the first request for analgesia -starting from the end of surgery- was 6-8 hours for group A, 8-12 hours the longest period for group B, and no time at all for group C (immediately after the operation).

Five patients from group A and 12 patients from group B (spinal) did not receive any dose of pethidine in the first 24 hours post operatively, while the rest from both groups (A & B) received one dose of pethidine only.

**DISCUSSION**

Infiltration of the surgical wound with 0.25% Bupivacaine at the end of the surgery after general or spinal anaesthesia provided a significant degree of analgesia as shown by the

smaller pain scores and pethidine consumption. This is in keeping with the prolonged duration of action of Bupivacaine<sup>5</sup>.

In a controlled trial of wound infiltration with Bupivacaine for post operative analgesia after appendectomy in children, analgesia proved to be effective. An analysis revealed significantly less pain ( $p < 0.03$ ) in the post operative period in the treated group<sup>6</sup>.

Another trial of bilateral ilioinguinal nerve block and wound infiltration with 0.5% Bupivacaine for post operative analgesia after caesarean section proved to reduce significantly the pain scores and the analgesic requirements in the post operative period ( $p < 0.05$ )<sup>7</sup>.

The results obtained suggest that, after caesarean section, infiltration of the edges of the surgical wound with Bupivacaine before skin closure provides equally good analgesia, as that produced by a nerve block, which is consistent with the results of Thomas D F M, Lambert W G and Lloyd-Williams<sup>4</sup>.

It is worth mentioning that some of the patients could not explain if it was a true pain (at the surgical wound incision) or the colicky abdominal pain which normally occurs due to the contraction of the uterus. Furthermore, the pain threshold may also differ from one patient to another.

There is a lack of epidural services and PCA machines in the hospital where the study was carried out, therefore this technique was chosen as it is simple, quick and can be performed by both the surgeon and the anaesthetist. Moreover, the results show that it is a good method for post operative pain relief.

Spinal anaesthesia has become a very popular method for delivery, because many women would like to remain conscious and observe the childbirth. In these patients infiltration of the wound with long acting local anaesthetics would give encouraging results.

All women who received spinal anaesthesia and wound infiltration with Bupivacaine were happy and said that they would use it again if they need to.

## CONCLUSION

**The use of 0.25% Bupivacaine for wound infiltration is effective for post operative pain relief, especially after spinal anaesthesia, as it reduces the requirements of additional postoperative analgesia.**

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