



A COMPARATIVE STUDY ON POSTOPERATIVE PAIN RELIEF BY 0.25% PLAIN ROPIVACAINE AND 0.25% PLAIN BUPIVACAINE AS INTRAPERITONEAL INSTILLATION AND INCISIONAL INFILTRATION AT THE END OF CAESAREAN SECTION

Anesthesiology

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ABSTRACT

Background: Caesarean section is the most widely performed obstetric procedure. Caesarean section commonly induces moderate to severe pain lasting 48 hours after surgery. There are various modalities available for postoperative pain relief ranging from parenteral analgesia (NSAIDs and opioids), epidural analgesia etc. So, we have to compare whether 30 ml of 0.25% intraperitoneal instillation and incisional infiltration bupivacaine and ropivacaine can produce effective pain relief caesarian section.

Material & methods: A comparative study to be conducted on 50 patients undergoing elective as well as emergency caesareans section under spinal anaesthesia. After obtaining history, clinical examination and investigations, patients will be randomly allocated in two groups of 25 each as follows: Group R : Intraperitoneal instillation and incisional infiltration of 30 ml of 0.25% plain ropivacaine & Group B : Intraperitoneal instillation and incisional infiltration of 30 ml of 0.25% plain bupivacaine.

Results: Our study showed that no difference was found in age (35.3 ± 10.8 yr vs. 33.2 ± 12.3 yr), duration of surgery (1.38 ± 0.52 hrs vs. 1.29 ± 0.54 hrs) between Group R and Group B ($p > 0.05$). Statistically significant difference ($p < 0.05$) was found in pain intensity of the visceral and parietal pain within the groups during first 4-6 hrs in the postoperative period.

Conclusion: From present study it is concluded that Postoperative infiltration of the surgical incision in Caesarean section with 0.25% ropivacaine 30ml gives effective analgesia for several hours and decreases systemic analgesic consumption as compared to same dose of bupivacaine. This technique could be considered as an integral part of the analgesic protocol in patients scheduled for Caesarean section.

KEYWORDS

Caesarean surgery, Ropivacaine, Bupivacaine, VAS Score

Introduction:

Cesarean delivery patients have even more compelling reasons to achieve optimal postoperative pain relief, as they present with unique challenges; such as, a higher risk for thromboembolic events, which may also be precipitated by immobility from inadequate pain control or excessive sedation associated with the use of opioids. 1 Postoperative pain is multifactorial consisting visceral pain, somatic pain and peritoneal pain.

There are various modalities available for postoperative pain relief ranging from parenteral analgesia (NSAIDs and opioids), epidural analgesia, peripheral nerve blocks, incisional infiltration and intraperitoneal instillation using local anaesthetics^{2,3}. Prevention of transmission of nerve signals from the trauma site to the spinal cord and reduction of neurogenic local inflammation at the trauma site has been reported with the use of local anaesthetics.

The rationale for this route of administration is that the peritoneum is exposed to block of visceral nociceptive conduction, thereby providing an additional mechanism of analgesia.

Ropivacaine is FDA approved, long acting local anaesthetic with lower toxicity, fewer side effects, longer duration of action and better cardiovascular safety profile. 4 Ropivacaine, an amide local anesthetic, has similar efficacy to bupivacaine with reduced systemic and cardiac toxicity.⁵ The aim of this study was to compare whether 30 ml of 0.25% intraperitoneal instillation and incisional infiltration bupivacaine and ropivacaine can produce effective pain relief caesarian section and duration of post operative analgesia is compared.

Material & Methods:

After obtaining local ethical committee approval and a written informed valid consent, a cross sectional analytical study to be conducted on 50 patients undergoing elective as well as emergency caesareans section under spinal anaesthesia.

INCLUSION CRITERIA:

- 1) Age between 19 years to 35 years
- 2) ASA physical status II
- 3) Elective caesarean section
- 4) Previous caesarean section

EXCLUSION CRITERIA:

- 1) ASA physical status III AND IV
- 2) Hypersensitivity to amide-type local anesthetics
- 3) Contraindications to spinal anaesthesia

- 4) Emergency Caesarean-section

METHODOLOGY:

After obtaining history, clinical examination and investigation, patients will be randomly allocated in two groups of 25 each as follows:

Group R: 15 ml intraperitoneal instillation of 0.25% plain ropivacaine then incisional infiltration of 15ml of 0.25% plain ropivacaine given

Group B: 15 ml Intraperitoneal instillation of 0.25% plain bupivacaine then incisional infiltration of 15 ml of 0.25% plain bupivacaine given

PROCEDURE :

Spinal anaesthesia will be performed at L3-L4 with 8–10 mg of a hyperbaric bupivacaine 5 mg/mL solution. Adequate action will be noted by pin prick sensation.

All Caesarean sections were performed using a Pfannenstiel incision, with peritoneal opening, infiltration with 15 mL of ropivacaine 0.25% was performed in group R and prior to skin closure 15 mL incisional infiltration subcutaneously on each of the upper and lower edges of the incision, using a 30 mL syringe and a 23 G subcutaneous needle. Group B same procedure with 30 ml of 0.25% bupivacaine. In both groups further postoperative analgesia was administered in the recovery room or in the post-labour suite where pain score, evaluated systematically every 2 hours and rescue analgesic drug given on request by the patient when scores ≥ 4 on the VAS.

Results:

Our study showed that no difference was found in age (35.3 ± 10.8 yr vs. 33.2 ± 12.3 yr), duration of surgery (1.38 ± 0.52 hrs vs. 1.29 ± 0.54 hrs) between Group R and Group B ($p > 0.05$) (table 1). Hemodynamic variables were comparable in both the groups (table 2).

Mean VAS score for parietal pain at 4 hrs was 1.5 ± 1.4 versus 1.6 ± 1.3 in Group R and B respectively. Mean VAS score for visceral pain at 4 hrs was 2.4 ± 1.3 versus 2.5 ± 1.2 in Group R and B respectively. Statistically significant difference ($p < 0.05$) was found in pain intensity of the visceral and parietal pain within the groups during first 4-6 hrs in the postoperative period but there was no statistically significant difference ($p > 0.05$) between the two groups. Time to first rescue analgesia was 4.45 ± 2.78 versus 3.67 ± 2.53 in Group R and B respectively and the total number of rescue analgesic doses were

similar in both the groups and statistically non-significant (table 3).

Discussion:

Intraperitoneal local anesthetic (IPLA) have been used as “visceral blocks” since as early as 1950 and IPLA has been used to reduce shoulder tip pain, overall pain, nausea and vomiting, and hospital stay.⁶ Recently peripheral use of local anesthetics for postoperative pain relief has become a popular practice after laparoscopy surgery. Among the several local anesthetic techniques for pain relief that are currently in practice like dipping local anesthetic solution into the fallopian tube, transcervical injection, mesosalpingeal, and rectus sheath blockade, the instillation of local anesthetic intraperitoneally has been most promising.⁷

The rationale for choosing the intraperitoneal route is to block the visceral afferent signaling and potentially modifying visceral nociception and provides analgesia. The local anesthetic inhibits nociception by affecting nerve membrane associated proteins and by inhibiting the release and action of prostaglandins and other agents that sensitize or stimulate the nociceptors and contribute to inflammation.⁷ However, absorption from large peritoneal surface may also occur, which may be a further mechanism of analgesia.

Initial studies used smaller doses of local anesthetic, in contrast, two studies have used large doses of intra-peritoneal bupivacaine and shown it to be effective.^{8,9}

Kucuk et al¹⁰ did a comparative study using intra-peritoneal bupivacaine (100mg) and ropivacaine. 150 mg) and found ropivacaine (150mg) to be more effective than bupivacaine (100 mg). Similar our results but concentration of drugs was 0.25% in our study.

Evidence for potency of ropivacaine compared with bupivacaine is clear cut with several minimum local analgesic concentration studies^{11,12} demonstrating that ropivacaine has 60% of potency of bupivacaine.

Other studies have previously demonstrated that incisional infiltration was effective after Caesarean section^{13,14}. In addition the technique is safe since several studies have demonstrated that the plasma concentration of ropivacaine remains below the toxic threshold provided the dose is limited to less than 300 mg^{15,16}. Incisional infiltration also has a limited duration of action (less than 5 hours) but it contributes to the decrease in demand for systemic analgesics thereafter. Nevertheless, this result suggests that a continuous parietal infiltration could be adapted to extend the duration of analgesia to the whole painful postoperative period. The use of this analgesic technique does not lead to any increase in wound dehiscence or infection.

In present study statistically significant difference ($p < 0.05$) was found in pain intensity of the visceral and parietal pain within the groups during first 4-6 hrs in the postoperative period but there was no statistically significant difference ($p > 0.05$) between the two groups. Time to first rescue analgesia was 3.80 ± 3.5 versus 4.4 ± 3.6 in Group R and B respectively and the total number of rescue analgesic doses were similar in both the groups and statistically non-significant.

Conclusion:

From present study it is concluded that intraperitoneal instillation and incisional instillation of the surgical incision in Caesarean section with 0.25% ropivacaine gives effective analgesia for several hours and decreases systemic analgesic consumption as compared to same dose of bupivacaine. This technique could be considered as an integral part of the analgesic protocol in patients scheduled for Caesarean section.

Table 1: Characteristics of different groups

Characteristics	Group R	Group B	P-value
Mean age (yrs)	35.3±10.8	33.2±12.3	>0.05
Duration of surgery (hrs)	1.38±0.52	1.29±0.54	>0.05
IAP	11.2±0.72	10.9±0.78	>0.05

Table 2: Hemodynamic variables in both the groups

Hemodynamic variables	Heart rate (/min.)		SBP (mm of Hg)		SpO2 (%)	
	Group R	Group B	Group R	Group B	Group R	Group B
0 min.	80	82	120	124	96	98
30 min.	76	78	114	124	97	96
1 hr.	74	76	118	122	97	95
2 hr.	78	80	120	122	97	97

Table 3: VAS Score and time to rescue analgesia

Pain	Group R	Group B
Mean VAS score (somatic pain) at 4 hr.	1.5±1.4	1.6±1.3
Mean VAS score (visceral pain) at 4 hr.	2.4±1.3	2.5±1.2
Time of rescue analgesia	4.45±2.78	3.67±2.53

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