

Intraperitoneal Instillation of Ropivacaine Hydrochloride 0.20% for Postoperative Analgesia in Caesarean Section under Spinal Anaesthesia - A Randomised Study

Anju Gautam¹, Nidhi Sharma^{2*}, Bhupendra Muzalda³, Neelima Tandon⁴¹Assistant Professor, Department of Anaesthesiology, G.R. Medical College, Gwalior, Madhya Pradesh, India²Senior Resident, G.R. Medical College, Gwalior, Madhya Pradesh, India³Consultant Anaesthesiologist, Indore, Madhya Pradesh, India⁴Professor, Department of Anaesthesiology, G.R. Medical College, Gwalior, Madhya Pradesh, India

Original Research Article

*Corresponding author

Nidhi Sharma

Article History

Received: 21.10.2018

Accepted: 01.11.2018

Published: 07.11.2018

DOI:

10.21276/sjmeps.2018.4.11.10



Abstract: Postoperative period is very crucial from recovery point of view. For fast and smooth recovery, postoperative period should be free of complications especially pain. It became more important in case of caesarean section as patient also has to look after her baby. Cautious use of analgesic drugs has to be made in postoperative caesarean section patient as they can adversely affect health of the baby also. Intraperitoneal instillation of ropivacaine is effective analgesic and has lesser side effects than pharmacological drugs. Our hypothesis is that intraperitoneal instillation of ropivacaine reduces postoperative pain in patients undergoing caesarean section. This randomized control study was conducted on 60 patients of ASA grade 1 and 2 after taking ethics committee approval. Group I (n=30) is control group with no local infiltration and Group II (n=30) Local infiltration of 15 ml at incision site and intraperitoneal instillation of 5ml Inj. Ropivacaine 0.2%. Diastolic, systolic and mean blood pressure, heart rate were measured throughout the procedure. Time of rescue analgesia and VAS score was recorded postoperatively. Intraperitoneal instillation of 0.2% ropivacaine provides postoperative analgesia. Mean duration of rescue analgesia in group I was 115.67±4.09 that was significant (p<0.05) in comparison to group II 170.33±3.69. Intraperitoneal instillation of 0.2% ropivacaine reduces postoperative pain in patients of caesarean section under spinal anaesthesia.

Keywords: Analgesia, Caesarean section, Intraperitoneal instillation, Ropivacaine, Spinal anaesthesia.

INTRODUCTION

Pain is unpleasant sensory and emotional experience associated with actual and potential tissue damage [1]. Patients undergoing any surgery feared most of the pain associated with it.

Caesarean section is different from other surgeries as it has huge emotional component of the pregnant female and her family associated with it. There is desire and also the physiological need of patient's body to start taking care of the newborn as soon as possible which can happen comfortably if post-operative is complications free most dreadful of which is pain.

There are so many methods of giving post-operative analgesia and traditionally maximum are pharmacological like opioids, NSAIDS, acetaminophen etc. Other methods are continuous epidural local anaesthesia, continuous spinal, epidural etc [2].

Opioids like morphine, pethidine and other drugs provide pain relief but they also get secreted in breast milk and may cause adverse sedative effect in the newborn. Commonly used local anaesthetic agents have side-effects, although these are very rare, ranging from allergy to cardiovascular and central nervous system effects. Local anaesthetics eventually get absorbed systemically and secreted in breast milk, but their effects on breastfed babies have not yet been documented.

Ropivacaine is a long acting amide type local anaesthetic with chemical properties similar to that of bupivacaine but it is less toxic than bupivacaine [3].

In this present study ropivacaine hydrochloride 0.2% used as intraperitoneal infiltration at local site for postoperative pain relief.

MATERIALS AND METHODS

The present study was carried out in the Department of Anaesthesiology, G. R. Medical College and J.A. Group of hospitals, Gwalior (M.P) after obtaining approval from the ethics committee. The present study was carried out in 60 patients of ASA grade I & II.

Criteria for selection pregnant women undergoing Caesarean section of ASA grade I & II scheduled under spinal anaesthesia.

Exclusion Criteria for patients

- Known history of sensitivity to local anaesthetics of amide type.
- Patient's refusal.
- Skin site infection.
- Patients on opioids.

Group I (n=30)	Control group with no local infiltration
Group II (n=30)	Local infiltration of 15 ml at incision site and intraperitoneal instillation of 5ml Inj. Ropivacaine 0.2%

PREPARATION OF THE PATIENT

Preoperative assessment

A thorough preoperative evaluation was done including history, general physical examination, systemic examination, airway and spine. Counseling was done and informed consent was taken.

Pre medication

Intradermal sensitivity test for ropivacaine was performed

- Uniform premedication of inj. Glycopyrrolate 0.2 mg I.M was given 30 minutes before induction of anaesthesia, inj. ranitidine 50mg, inj metoclopramide 10mg.
- Preloading with Ringer Lactate in a dose of 10ml/kg BW with 18 G cannula ½ an hour before start of anaesthesia.

Anaesthesia technique Noninvasive sphygmanometer, ECG monitors and pulse oximeter were placed After careful aseptic cleaning and draping, a midline subarachnoid block was performed at L2/3 or L3/4 intervertebral space with the patients in the lateral decubitus position using a 25- gauge Quincke spinal needle. After free flow of CSF inj. Bupivacaine 0.5% 2 ml was injected intrathecally. Thereafter the patients were placed in the supine position for surgery. At the end of the surgery in group II, subcutaneous infiltration done with 15ml and 5ml was instilled peritoneally while in group I, nothing was given.

Monitoring

Baseline observations were recorded before spinal anaesthesia. Pulse rate, electrocardiogram, systolic and diastolic blood pressure, respiratory rate and SPO2 were monitored perioperatively. Data

- Raised intracranial tension, valvular heart diseases, renal diseases, endocrinal diseases, metabolic diseases, hepatic diseases, coagulopathy and bleeding disorders.
- Pregnant women undergoing Caesarean section under general anaesthesia or epidural anaesthesia.

CONSENT

Details of procedure were explained to all the patients during preanaesthetic assessment and an informed and written consent was obtained.

PATIENTS' GROUPING

60 female patients of ASA grade I & II scheduled for caesarean section under spinal anaesthesia were divided into 2 groups (n=30 each) randomly using envelope technique depending upon the infiltration.

monitoring performed continuously but for statistical analysis. Data were recorded at 0,5,10, 20, 30, 45, 60, minutes after intrathecal injection and thereafter every hour up to 8 hours.

Analgesia

- Duration of analgesia i.e. the time taken from the onset of sensory block to the first request for supplemental analgesia.
- Intensity of pain and VAS score at the time of first analgesia request:

Assessment of pain was done by Visual Analogue Scale (VAS) which is a 10 cm scale with 100 divisions drawn on white paper representing pain. The top of the scale at 100 represents very severe pain while the baseline value-0 represents no pain.

Side effects and complications

Patients were closely observed in the intraoperative and postoperative period for complications like nausea, vomiting, dyspnoea, respiratory depression, chest pain, shivering, dysrhythmia, bradycardia, hypotension and any other.

The observations were recorded and subjected to statistical analysis using student's "t" test and for qualitative variables chi square test was used. The observations recorded in all the three groups were tabulated and statistical analysis was carried out by using SPSS version 17 statistical software. For intergroup comparison, $p > 0.05$ and $p < 0.05$ were considered as insignificant & significant respectively. $p < 0.01$ was considered as highly significant.

RESULTS

Data obtained from the patients involved in study were analyzed. The mean age, weight, height, sex, type of surgery and duration of anaesthesia were comparable in the two study groups as shown in table 1.

Preoperative and intraoperative heart rate, systolic, diastolic and mean blood pressure level, SPO2 were comparable in both the groups.

Table-1: Showing demographic variables of in two groups

Demographic data	Group I	Group II
Age(yrs)	26.37±3.95	25.1±4.4
Weight(kg)	55.6±4.31	57.3±5.57
Sex (female)	100%	100%
Height(cms)	152.7±5.21	150.97±2.73
Duration of surgery(min)	46.66±9.87	45.83±8.81

Table-2: Mean (±SD) time for first rescue analgesia in two groups

Variable	Group I (n=30)	Group II (n=30)
	Mean± SD	Mean± SD
Time for first Rescue Analgesia (mins)	115.67±4.09	170.33±3.69

Table-3: Comparison of mean (± SD) vas scores in two groups

Variable	Group I (n=30)	Group II (n=30)
	Mean± SD	Mean± SD
VAS score	56.27±5.099	32.6±6.52

Significantly ($p < 0.05$) low VAS scores in Group II compared to Group I.

DISCUSSION

The present study entitled “intraoperative instillation of ropivacaine hydrochloride 0.20% for postoperative analgesia in caesarean section under spinal anaesthesia - a randomised study” was conducted to assess the duration of analgesia between two groups. A total of 60 pregnant women (ASA grade I and II) posted for caesarean section under spinal anaesthesia were randomly divided into two groups according to the drug received as shown below:

Group I (n=30) –Control group with no local infiltration
Group II (n=30) –Local infiltration of 15 ml at incision site and intraoperative instillation of 5ml Inj. Ropivacaine 0.2%

Pain is the most feared component associated with any surgical procedure. A good anaesthesia is that when it makes patient pain free throughout the surgery and in the post-operative period too.

Caesarean section patients should be especially made pain free and comfortable as delivered female has to look after newborn also.

There are so many methods of giving post-operative analgesia and traditionally maximum are pharmacological like opioids, NSAIDs, acetaminophen etc. Other methods are continuous epidural local anaesthesia, continuous spinal, epidural etc [2].

Opioids like morphine, pethidine and other drugs provide pain relief but they also get secreted in breast milk and may cause adverse sedative effect in the

newborn. Commonly used local anaesthetic agents have side-effects, although these are very rare, ranging from allergy to cardiovascular and central nervous system effects. Local anaesthetics eventually get absorbed systemically and secreted in breast milk, but their effects on breastfed babies have not yet been documented.

Ropivacaine is a long acting amide type local anaesthetic with chemical properties similar to that of bupivacaine but it is less toxic than bupivacaine [3].

In present study, selected groups were comparable for the demographic variables like age, height, weight and sex parameters, type and duration of surgery and with $P > 0.05$. Heart rate, SBP, DBP and MAP were comparable in both the study groups throughout the perioperative period.

As shown in table 2, the mean (±SD) duration of analgesia in group I and II was 115.67±4.09 and 170.33±3.69min respectively. On comparison and application of statistical analysis there was significant prolongation in duration of analgesia in group II when compared to group I

Labaille T *et al.* [4] showed that intraoperative instillation of Ropivacaine before and after the laparoscopic surgery significantly reduces the postoperative pain compared to placebo.

Goldstein A *et al.* [5] showed that bupivacaine and ropivacaine for preventing postoperative pain by local anaesthetic instillation after laparoscopic

gynecologic surgeries reduces the morphine consumption.

Malhotra N *et al.* [6] observed in their study that the VAS score was significantly less at 2 and 4 hrs in women received bupivacaine intraperitoneal instillation in comparison to those who received saline.

Nguyen K *et al.* [7] showed that ropivacaine infiltration in caesarean section significantly increased the time interval to rescue analgesia compared to control group which did not receive any infiltration.

Mulroy M F *et al.* [8] showed that Ropivacaine infiltration (0.25% and 0.75%) into the wound following hernia surgery significantly provides pain relief compared to control group.

Pasqualucci *et al.* [9] showed that Bupivacaine as intraperitoneal local anesthetic blockade before or after surgery reduces the postoperative pain compared to placebo.

Bamigbooy A *et al.* [10] showed that ropivacaine used in abdominal wound infiltration and peritoneal spraying reduces amount of rescue analgesic as compared to the control group.

VAS score comparison between two groups showed lowered VAS score in group in which ropivacaine was infiltrated when compared with the control group.

Callesen T *et al.* [11] showed that ropivacaine for combined field block and intraperitoneal instillation for pain management after laparoscopic sterilization has significantly lesser cumulative pain score compares to placebo

Bonnet V *et al.* [12] showed that ropivacaine infiltration after hemorrhoid surgery the VAS scores at 1, 3 & 6 hrs after infiltration are lowered.

Dreher J *et al.* [13] showed women receiving ropivacaine had significantly lower pain scores 2 hrs post operatively (0.97 vs 2.03 $p < 0.05$) compared to the control group.

Kim T H *et al.* [14] showed that the VAS score was significantly lower in ropivacaine intraperitoneal instillation group than in control group at 4, 8 and 12 hrs.

Ducarne G *et al.* [15] observed in their study that the Numerical pain rating scale for pain evaluation was significantly lower ($p < 0.05$) in the ropivacaine group wound infiltration than in the control group at M0, M20, M40, M60, H2 and H4. But at H8, H12 and H24 there was no significantly difference in VAS score.

CONCLUSION

In the present study, the demographic data such as age, height and weight was statistically comparable between two groups (Group I and Group II). The Mean (\pm SD) duration of surgery was also comparable statistically between two groups ($p > 0.05$).

The mean (\pm SD) duration of analgesia in group I and II was 115.67 ± 4.09 and 170.33 ± 3.69 min respectively i.e. pain control was better in patients infiltrated with local anaesthetic than those given nothing along the suture line.

The mean (\pm SD) VAS score at first analgesic request in group I and II was 56.27 ± 5.009 and 32.6 ± 6.52 respectively. On statistical comparison there was significant reduction in VAS score in group I and II compared to group I ($p < 0.05$).

On hemodynamic parameters, there was no significant change in mean (\pm SD) pulse rate, systolic blood pressure, diastolic blood pressure and respiratory rate both the groups at various time intervals.

Thus we conclude that intraperitoneal instillation and local infiltration with 0.2% ropivacaine after completion of caesarean section results in better and prolonged pain control.

REFERENCES

1. Merskey, H., Bogduk, N. (1994). Classification of chronic pain, second edition IASP Task force of Taxonomy. 2:209-214.
2. Sharma, P. (2013). Evaluation of postoperative analgesic efficacy of transversus abdominis plane block after abdominal surgery: A comparative study. *Journal of natural science, biology, and medicine*. 4(1), 177.
3. Bafna, U., Rajarajeshwaran, K., Khandelwal, M., & Verma, A. P. (2014). A comparison of effect of preemptive use of oral gabapentin and pregabalin for acute post-operative pain after surgery under spinal anesthesia. *Journal of anaesthesiology, clinical pharmacology*, 30(3), 373.
4. Labaille, T., Mazoit, J. X., Paqueron, X., Franco, D., & Benhamou, D. (2002). The clinical efficacy and pharmacokinetics of intraperitoneal ropivacaine for laparoscopic cholecystectomy. *Anesthesia & Analgesia*. 94(1), 100-105.
5. Goldstein, A., Grimault, P., Henique, A., Keller, M., Fortin, A., & Darai, E. (2000). Preventing postoperative pain by local anesthetic instillation after laparoscopic gynecologic surgery: a placebo-controlled comparison of bupivacaine and ropivacaine. *Anesthesia & Analgesia*. 91(2), 403-407.
6. Malhotra, N., Roy, K. K., Chanana, C., & Kumar, K. S. (2006). Post-operative pain relief after operative gynaecological laparoscopic procedures

- with intra peritoneal bupivacaine. *Internet J Gynaecol Obstet.* 5(2), 1-4.
7. Nguyen, N. K., Landais, A., Barbaryan, A., M'barek, M. A., Benbaghdad, Y., McGee, K., & Lanba, P. (2010). Analgesic efficacy of pfannenstiell incision infiltration with ropivacaine 7.5 mg/mL for caesarean section. *Anesthesiology research and practice*, 2010.
 8. Mulroy, M. F., Burgess, F. W., & Emanuelsson, B. M. (1999). Ropivacaine 0.25% and 0.5%, but not 0.125%, provide effective wound infiltration analgesia after outpatient hernia repair, but with sustained plasma drug levels. *Regional anesthesia and pain medicine*, 24(2), 136.
 9. Pasqualucci, A., De Angelis, V., Contardo, R., Colo, F., Terrosu, G., Donini, A., & Bresadola, F. (1996). Preemptive Analgesia Intra-peritoneal Local Anesthetic in Laparoscopic Cholecystectomy. *Anesthesiology: The Journal of the American Society of Anesthesiologists.* 85(1), 11-20.
 10. Bamigboye, A. A., & Justus, H. G. (2008). Ropivacaine abdominal wound infiltration and peritoneal spraying at cesarean delivery for preemptive analgesia. *International Journal of Gynecology & Obstetrics*, 102(2), 160-164.
 11. Callesen, T., Hjort, D., Mogensen, T., Schouenborg, L., Nielsen, D., Reventlid, H. (1999). Combined field block and intra-peritoneal instillation of ropivacaine for pain management after laparoscopic sterilization. *British journal of anesthesia.* 82 (4): 586-90
 12. Vinson-Bonnet, B., Coltat, J. C., Fingerhut, A., & Bonnet, F. (2002). Local infiltration with ropivacaine improves immediate postoperative pain control after hemorrhoidal surgery. *Diseases of the colon & rectum.* 45(1), 104-108.
 13. Dreher, J. K., Nemeth, D., & Limb, R. (2000). Pain relief following day case laparoscopic tubal ligation with intra-peritoneal ropivacaine: a randomised double blind control study. *Australian and New Zealand Journal of Obstetrics and Gynaecology.* 40(4), 434-437.
 14. Kim, T. H., Kang, H., Park, J. S., Chang, I. T., & Park, S. G. (2010). Intraperitoneal ropivacaine instillation for postoperative pain relief after laparoscopic cholecystectomy. *Journal of the Korean Surgical Society.* 79(2), 130-136.
 15. Ducarme, G., Sillou, S., Wernet, A., Davitian, C., Poujade, O., Ceccaldi, P. F., & Luton, D. (2012). Single-shot ropivacaine wound infiltration during cesarean section for postoperative pain relief. *Gynecologie, obstetrique & fertilité.* 40(1), 10-13.