ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 16, Issue 4, 2023

Online - 2455-3891
Print - 0974-2441

Research Article

A COMPARISON OF POST-OPERATIVE PAIN RELIEF AFTER ELECTIVE LSCS WITH LOCAL AND INTRAPERITONEAL ROPIVACAINE INSTILLATION AGAINST LOCAL ROPIVACAINE INFILTRATION ALONE

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Received: 12 January 2023, Revised and Accepted: 18 March 2023

ABSTRACT

Objectives: For an anesthesiologist, the post-operative phase is just as crucial as the pre-operative and intraoperative periods. Whether a surgery is performed under regional or general anesthesia, the goal should always be to provide patients with a pain-free and comfortable recovery. Spinal anesthesia is frequently used during caesarean sections, but its effects only last for a few hours. As a result, various multidisciplinary analgesia strategies with few side effects have been attempted for postpartum patients to relieve pain because they may also be harmful to the newborn baby's health. It has already been proven; injecting ropivacaine is a far safer alternative to injecting bupivacaine. We compared local infiltration of injectable ropivacaine alone to both intraperitoneal instillation and local infiltration for post-operative analgesia in individuals who had cesarean surgery. In the present study, intraperitoneal instillation and local infiltration of ropivacaine 0.5% were compared to local infiltration of ropivacaine 0.5% alone for the management of post-operative pain following elective cesarean section under spinal anesthesia.

Methods: Pregnant women in ASA Grades I and II who were having a planned caesarean section under spinal anesthesia were divided into two groups at random (R1 and R2 group, each have 30 patients). Patients in Group R1 received a 15 mL injection of 0.5% ropivacaine at the incision site. Patients in Group R2 had intraperitoneal injections of 0.5% ropivacaine in 5 mL before to peritoneal closure and local infiltrations of 10 mL ropivacaine at the site of the incision before skin closure. The duration of the analgesia was calculated by timing the start of the sensory block to a point at which rescue analgesia was sought throughout the post-operative period. Pain intensity was measured using the visual analog scale (VAS). Data on the hemodynamics and side effects of the patients were also gathered.

Results: Group R2 analgesia lasted much longer than that of Group R1 ($p<0.05$). The mean (±SD) analgesic duration in the R1 and R2 groups was 147.17±4.67 and 170.33±3.69 min, respectively. The mean (SD) VAS scores for Group R1 and Group R2 at the moment of the first analgesic demand were 36.7±5.14 and 32.6±6.52, respectively.

Conclusion: When combined with intraperitoneal instillation during spinal anesthesia, inj. ropivacaine 0.5% local infiltration enhances post-operative analgesia in cesarean section procedures.

Keywords: Spinal anesthesia, Ropivacaine, Local infiltration, Intraperitoneal instillation.

 DOI: http://dx.doi.org/10.22159/ajpcr.2023v16i4.47694. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

Cesarean sections are used a lot more often now to deliver babies [1]. About 15–20% of all births worldwide are performed through cesarean section, with the percentage increasing to 40% in underdeveloped nations [2]. With cesarean sections, we can employ a variety of anesthetic methods, including spinal, epidural, or general anesthesia. Like to any surgery, a cesarean section has a significant post-operative pain component that can be managed with opioids, non-steroidal anti-inflammatory medications, or a combination of the two. As parturients need to care for their newborn child and IV opioids are linked to adverse effects such nausea, vomiting, respiratory depression, pruritus, and urine retention, we cannot administer opioids to mothers [1,3]. The discomfort of the post-operative period is increased by the post-operative pain, which also interferes with the emotional bonding process and nursing. The length of the hospital stay and the cost of the stay are also increased [3,4].

Despite the fact that epidural analgesia requires close monitoring and that opioids are required for the management of severe pain, non-opioid systemic painkillers are inadequate at relieving pain [1,5]. Long-acting local anesthetic ropivacaine is a complete left isomer with reduced cardiovascular and central nervous system toxicity possibility than bupivacaine. By preventing painful impulses from the location of the injury through the reversible hyperpolarization of distal nerve fibers, ropivacaine reduces the need for opioids [6].

METHODS

After approval from the Institutional Ethics Committee and patient consent, this prospective, randomized, and clinical study involving 60 ASA Grade I and II pregnant women who were scheduled for elective cesarean sections under spinal anesthesia was conducted. The study's exclusion criteria included patients with known sensitivity to local anesthetics of the amide type, patient refusal, local skin infection, patients taking opioids, valvular cardiovascular issues, elevated intracranial pressure, endocrine disorders, metabolic disturbances, coagulopathy, and hepatorenal syndrome, as well as caesarean sections performed under epidural or general anesthesia. All patients were kept unaware regarding their group assignment. The patients were split into two groups at random using the envelope method.

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Group R1 (n=30): 15 mL of local infiltration ropivacaine 0.5% was injected at the site of the incision.

Group R2 (n=30): Local infiltration of ropivacaine 0.5% injections of 10 mL and intraperitoneal injections of 5 mL are administered.

An intradermal ropivacaine sensitivity test was carried out on each patient before to surgery. All patients received premedication injections of metoclopramide 10 mg, ranitidine 50 mg, and glycopyrrolate 0.2 m iv. Before the induction of anesthesia, ringer lactate 10 ml/kg was preloaded with an 18G cannula. The patient was taken into the operating room on the day of the procedure, and a multipara monitor with an ECG, BP, SpO2, and HR was attached. In the left lateral position, a 25-guage Quincke spinal needle was inserted to perform a midline spinal block at L3-4 or L2-3 IVS, under all the aseptic precautions. Intrathecally, 2 ml of inj. bupivacaine 0.5% was administered following the outflow of cerebrospinal fluid. The patients were then prepared for the surgery by being placed in a supine position. Following surgery, Group R1 received 15 ml inj. ropivacaine 0.5% subcutaneously, while Group R2 received both intraperitoneal instillation and local infiltration. The extent of sensory block was measured using a 26-gauge needle, and the findings were presented as insensitivity to a pinprick. Motor blockages were noted using the Bromage scale. The goal was to assess the effectiveness of ropivacaine used as local alone with ropivacaine used in combination for pain relief. The "visual analog scale" [VAS] measures the intensity of pain, which was already been described to all patients. The minimum value on the scale, 0, represents no pain at all, while the peak on the scale, 100, represents extremely severe agony.

Assessment of VAS score

0: No pain
1–25: Mild pain
26–50: Moderate pain
51–75: Severe pain
76–100: Very severe pain.

Bromage scale grades

Grade 0 – The ability to flex hips, knees and feet freely.
Grade 1 – The inability to lift the leg freely but ability to flex knees and feet.
Grade 2 – The inability to flex the hips and knees but ability to flex and the feet.
Grade 3 – The inability to flex hips, knees and feet but ability to move the toes.
Grade 4 – Complete paralysis.

Baseline measurements were done before spinal anesthesia. An ECG, SpO_2, respiratory rate, heart rate, systolic, and diastolic blood pressure was all measured before surgery. Data were gathered at 0, 5, 10, 20, 30, 45, and 60 min after intrathecal injection, and then every hour for the following 8 h. Patients were monitored closely both during surgery and for the first 24 h subsequently for concerns such as nausea, vomiting, respiratory distress, hypotension, shivering, arrhythmia, and additional symptoms. In this study, no incidences of adverse consequences were noted.

Statistical analysis

The observations were processed through Student's "t-test" statistical analysis, and the "Chi-square test" was used for qualitative parameters. Statistics Package for the Social Sciences version 17 statistics software was used to conduct statistical analysis on the data gathered from both the study groups and provided in tabular form. $p<0.05$ and $p>0.05$ were regarded as significant and insignificant, respectively, for the intergroup comparison. The significance level in this situation was set at $p<0.01$.

RESULTS

Parturient in both groups is similar with regard to bodyweight, mean ages, sex, height, anesthesia duration, and type of surgery (Table 1).

HR, systolic blood pressure, diastolic blood pressure, mean blood pressure, and SpO_2 were similar in both groups preoperatively and intraoperatively.

The mean (±SD) VAS scores for Group R1 were 36.7±5.14 and Group R2 were 32.6±6.52 at the moment of the first demand for analgesic (Tables 2 and 3).

DISCUSSION

Once the effects of the spinal anesthetic have worn off, a cesarean section is linked with moderate pain. The multimodal method is very effective at easing the parturient's post-operative pain. Preemptive analgesia is a recent emphasis for anesthesiologists, which refers to administering enough analgesics before they experience pain. This reduces post-operative pain severity and reduces the need for painkillers. The simplest and safest procedure is incision infiltration using longer or intermediately acting local anesthetics, which is employed by anesthesiologists worldwide.

Compared to ropivacaine 0.5% local injection alone, ropivacaine 0.5% peritoneal instillation and local infiltration prolongs the analgesic duration and provides adequate relief (reduced VAS score). Local infiltration nears the site of the incision and even further into the surgical cavity during surgery may prevent the production and dissemination of injury-induced release. The capacity of some local anesthetics to inhibit nociception transmission in addition to sensitization stages may play a role in how effective they are. Local anesthetics can prevent inflammatory and local immune-stimulatory reactions on the affected area by inhibiting specific stages of inflammation (including such neutrophil priming) and blocking a number of the neuronal pathways stimulated by inflammation (including certain G protein-coupled receptor proteins and protein kinase C) [7,8]. Nguyan *et al*. [1] also found that, in compared to the control group, the time it required to acquire rescue analgesia following cesarean surgery was significantly increased by ropivacaine infusion. The chemical characteristics of

Table 1: Demographic variables of two groups

Demographic data	Mean±SD		p
	Group R1	Group R2	
Age (years)	26.5±5.87	25.1±4.4	0.300 (NS)
Weight (kg)	58.2±5.1	57.3±5.57	0.516 (NS)
Sex (female) (%)	100	100	-
Height (cm)	150.73±3.16	150.97±2.73	0.745 (NS)

NS: Non-significant, SD: Standard deviation

Table 2: Mean (±standard deviation) time for first rescue analgesia in two groups

Variable	Mean±SD		p
	Group R1 (n=30)	Group R2 (n=30)	
Time for first rescue analgesia (min)	147.17±4.67	170.33±3.69	<0.0001 (HS)

HS: Highly significant, SD: Standard deviation

Table 3: Comparison of mean (±standard deviation) Visual Analog Scale scores in two groups

Variable	Mean±SD		p
	Group R1 (n=30)	Group R2 (n=30)	
VAS score	36.7±5.14	32.6±6.52	<0.009 (HS)

VAS: Visual analog scale, HS: Highly significant, SD: Standard deviation

ropivacaine, a long-acting amide local anesthetic, are similar to those of bupivacaine, but it is less hazardous [9,10].

In an earlier study by Labaille *et al*., intraperitoneal injections of ropivacaine before and following laparoscopy significantly reduced post-operative discomfort compared to a placebo. 10 Table 3 shows that the mean (SD) analgesia duration in the R1 and R2 groups, respectively, was 147.17±4.67 and 170.33±3.69 min. According to comparisons and statistical analysis, the R2 group's analgesia lasted significantly longer than that of the R1 group ($p<0.0001$).

According to Gautam *et al*. [11], intraperitoneal injection of both local and intraperitonealropivacaine 0.2% under spinal anesthesia led to higher post-operative analgesia following cesarean section than only local ropivacaine 0.2% injection alone. To reduce pain during laparoscopic cholecystectomy, Yong *et al*. [12] performed a systematic review and meta-analysis trying to compare ropivacaine instillation intraperitoneally versus no instillation. They found that pain at 4–8 h and 9–24 h was significantly reduced with ropivacaine instillation intraperitoneally.

In a different investigation, Kaushal-Deep *et al*. [13] evaluated the efficacy of 0.2% ropivacaine infiltrated intraincisionally and intraperitoneally in surgery patients a relatively simple laparoscopic cholecystectomy and discovered that this was a cost-effective strategy for discharging approximately nine out of ten patients on the same day. Similar findings have arisen from other investigations [14-16].

The mean (SD) VAS scores for Group R1 and Group R2 at the moment of the first request for analgesia were 36.7 ± 5.14 and 32.6±6.52, respectively ($p=0.009$). According to Vinson-Bonnet *et al*., ropivacaine infiltration after hemorrhoids surgery significantly decreased VAS scores and decreased overall morphine consumption [17]. For pain relief after laparoscopic sterilization, Callesen *et al*. [18] showed that ropivacaine combined with a field blockade and intraperitoneal instillation leads in a noticeably decreased cumulative pain rating when compared to the placebo group after coughing and movement. One hour after the surgery, there was the biggest difference in pain scores; however, after four hours, there was not any difference between groups. Similar findings have been made by a number of other researchers [19-22].

CONCLUSION

According to the results of the clinical study, ropivacaine 0.5% local injection and intraperitoneal instillation both provided better post-operative analgesia after cesarean section than ropivacaine 0.5% local injection by itself while the patient was already under spinal anesthesia. Compared to 0.5% local infiltrate of ropivacaine alone, intraperitoneal instillation of ropivacaine 0.5% also prolonged analgesia and provided improved analgesia (lower VAS scores).

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