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Original Research

Comparative Analysis of Ropivacaine with Sufentanil for Epidural Anesthesia and Spinal-Epidural Anesthesia in Labor Analgesia: An Institutional Based Study

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Abstract

Background: Pain management during labor has long been enveloped in myths and controversies. Consequently, the quest for effective and safe analgesia during this critical period has posed a persistent challenge. It was shown that an epidural infusion of ropivacaine 0.1% with sufentanil 1 μg mL^{-1} was highly effective in preventing pain with the specific aim of avoiding motor block. Hence; the present study was conducted for comparative analysis of ropivacaine with sufentanil for epidural anesthesia and spinal-epidural anesthesia in labor analgesia.

Materials & Methods: A total of 50 patients were enrolled and were randomized into two study groups as follows: Group 1- Epidural anesthesia group, and Group 2- Spinal-epidural anesthesia group. When the patients were in an advanced stage with no contraindication, we infused 750 mL ringer lactate as an isotonic solution. All the patients received anesthesia according to their respective study groups. The sensory block and pinprick test were assessed for both lower limbs. The motor block was evaluated by modified Bromage scores. Pain was assessed by VAS. The VAS was assessed at the intervals of 5, 10, 30, 60, 90 and 120 min after injection in both groups.

Results: Mean age of the patients of group 1 and group 2 was 31.6 years and 28.7 years respectively. Mean weight of the patients of group 1 and group 2 was 78.3 years and 74.9 years respectively. Mean onset of analgesia among patients of group 1 and group 2 was 12.9 mins and 5.9 mins respectively. The mean duration of analgesia among patients of group 1 and group 2 was 118.3 mins and 139.4 mins respectively. The maximum sensory block duration among patients of group 1 and group 2 was 23.9 mins and 10.7 mins respectively. Mean VAS among patients of group 1 was significantly higher in comparison to patients of group 2.

Conclusion: Spinal analgesia for labor pain represents a rational and secure approach that not only facilitates a swift recovery in the postpartum period but also ensures effective pain management for the parturient.

Key words: Epidural, Anesthesia, Spinal, Ropivacaine.

INTRODUCTION

Pain management during labor has long been enveloped in myths and controversies. Consequently, the quest for effective and safe analgesia during this critical period has posed a persistent challenge. The history of obstetric anesthesia can be traced back to James Young Simpson, who introduced ether to a woman with a deformed pelvis during childbirth. His notion of "etherization of labor" faced significant opposition from critics. Additionally, the religious discourse surrounding the moral implications of using

anesthesia during labor further complicated the issue.[1- 3] Women vary in their needs and desire for pain relief during labour, with some aiming for non-neuraxial or neuraxial methods for labor analgesia. However, the fact needs to be emphasized that most non-neuraxial methods do not provide complete pain relief, but they do allow a woman to cope with her labour pain. Postoperative pain relief can be achieved by a variety of techniques, but pain control during the immediate postoperative period still remains difficult. It was shown that an epidural infusion of ropivacaine 0.1% with sufentanil 1 μg mL^{-1} was highly effective in preventing pain with the specific aim of avoiding motor block.[4, 5] Hence; the present study was conducted for comparative analysis of ropivacaine with sufentanil for epidural anesthesia and spinal-epidural anesthesia in labor analgesia.

MATERIALS & METHODS

The present study was conducted for comparative analysis of ropivacaine with sufentanil for epidural anesthesia and spinal-epidural anesthesia in labor analgesia. A total of 50 patients were enrolled and were randomized into two study groups as follows:
Group 1- Epidural anesthesia group, and
Group 2- Spinal-epidural anesthesia group.
The inclusion criteria were patients in the advanced labor stage referred to our center, nulliparous or multiparous American Society of Anesthesiologists (ASA) physical status II, and those interested in painless delivery. Exclusion criteria included patient refusal, drug abuse, intracranial hypertension, spinal or epidural failure, coagulopathy, or local infection, and patients who needed an emergency cesarean section. There were primigravid and multi gravid pregnant women in both groups. When the patients were in an advanced stage with no contraindication, we infused 750 mL ringer lactate as an isotonic solution.
All the patients received anesthesia according to their respective study groups. The sensory block and pinprick test were assessed for both lower limbs. The motor block was evaluated by modified Bromage scores. Pain was assessed by VAS. The VAS was assessed at the intervals of 5, 10, 30, 60, 90 and 120 min after injection in both groups. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

Mean age of the patients of group 1 and group 2 was 31.6 years and 28.7 years respectively. Mean weight of the patients of group 1 and group 2 was 78.3 years and 74.9 years respectively. Mean onset of analgesia among patients of group 1 and group 2 was 12.9 mins and 5.9 mins respectively. The mean duration of analgesia among patients of group 1 and group 2 was 118.3 mins and 139.4 mins respectively. The maximum sensory block duration among patients of group 1 and group 2 was 23.9 mins and 10.7 mins respectively. Mean VAS among patients of group 1 was significantly higher in comparison to patients of group 2.

Table 1: Demographic data

Variable	Group 1	Group 2
Mean age (years)	31.6	28.7
Weight (Kg)	78.3	74.9
Height (cm)	157.9	155.9
Gestational age (wks)	37.1	37.9

Table 2: Anesthetic effect

Variable	Group 1	Group 2	p-value
Onset of analgesia (mins)	12.9	5.9	0.001*
Duration of analgesia (mins)	118.3	139.4	0.005*
Maximum sensory block duration (mins)	23.9	10.7	0.000*

*: Significant

Table 3: VAS

Variable	Group 1	Group 2	p-value
5 mins	4.8	2.1	0.001*
10 mins	3.5	1.9	0.005*
30 mins	3.1	1.8	0.000*
60 mins	5.9	2.1	0.000*
90 mins	4.7	2.2	0.004*
120 mins	6.2	1.8	0.000*

*: Significant

DISCUSSION

The process of childbirth is frequently characterized as a form of rebirth for mothers. The intensity of pain associated with this experience is often beyond verbal description. Such pain may lead to complications that deviate from the typical obstetric trajectory, posing potential risks to both the mother and the fetus. The evolution of labor analgesia has progressed from the use of ether in the 18th century to contemporary practices that utilize advanced regional techniques. A variety of regional methods, alongside nonpharmacological approaches and systemic analgesia, have transformed pain management for parturients, resulting in enhanced satisfaction levels. Initially, obstetricians were primarily responsible for administering labor analgesia; however, the advent of regional techniques has integrated anesthesiologists into the management of labor pain.[8- 11] Hence; the present study was conducted for comparative analysis of ropivacaine with sufentanil for epidural anesthesia and spinal-epidural anesthesia in labor analgesia..

Mean age of the patients of group 1 and group 2 was 31.6 years and 28.7 years respectively. Mean weight of the patients of group 1 and group 2 was 78.3 years and 74.9 years respectively. Mean onset of analgesia among patients of group 1 and group 2 was 12.9 mins and 5.9 mins respectively. The mean duration of analgesia among patients of group 1 and group 2 was 118.3 mins and 139.4 mins respectively. The maximum sensory block duration among patients of group 1 and group 2 was 23.9 mins and 10.7 mins respectively. Mean VAS among patients of group 1 was significantly higher in comparison to patients of group 2. Kampe S et al assessed the analgesic efficacy of postoperative epidural infusions of ropivacaine 0.1 and 0.2% combined with sufentanil 1 microg mL(-1). After surgery, the epidural infusion commenced. Eleven patients in each group received either an epidural infusion of ropivacaine 0.1% with 1 microg mL(-1) sufentanil (Group 1) or ropivacaine 0.2% with 1 microg mL(-1) sufentanil (Group 2) at a rate of 5-9 mL h(-1). All patients had access to intravenous pirinatrimide (piritramide) via a patient-controlled analgesia (PCA) device. Motor block was negligible for the study duration in both groups. There was no significant difference with the 100 mm visual analogue scale (VAS) scores, with the consumption of rescue analgesia or with patient satisfaction. Patients in Group 1 experienced significantly less nausea ($P < 0.05$) than those in Group 2. Both treatment regimens provided effective postoperative analgesia with only a minimal use of supplemental opioid PCA. They recommend the use of ropivacaine 0.1% with 1 microg mL(-1) sufentanil for postoperative analgesia after total knee replacement as it provides efficient pain relief with no motor block.[12]

Liu SS et al compared three solutions of ropivacaine/fentanyl for postoperative patient-controlled epidural analgesia. Thirty patients undergoing lower abdominal surgery were randomized in a double-blinded manner to receive one of three solutions: 0.2% ropivacaine-4 microg fentanyl 0.1% ropivacaine-2 microg fentanyl, or 0.05% ropivacaine-1 microg fentanyl for patient-controlled epidural analgesia after standardized combined epidural and general anesthesia. Motor block was significantly more common (30 vs. 0%) and more intense with the 0.2% ropivacaine-4 microg fentanyl solution. Other side effects were equivalent between solutions and mild in severity. A significantly smaller volume of 0.2% ropivacaine-4 microg fentanyl solution was used, whereas the 0.1% ropivacaine-2 microg fentanyl group used a significantly greater amount of ropivacaine and fentanyl. Lesser concentrations of ropivacaine and fentanyl provide comparable analgesia with less motor block despite the use of similar amounts of ropivacaine and fentanyl.[13] Dresner M et al performed a randomized, double-blind comparison of two epidural drug regimens for analgesia in labour. In the bupivacaine group (BUPIV), 101 healthy parturients received 0.1% bupivacaine with fentanyl 2 μg ml−1. In the ropivacaine group (ROPIV), 102 women received 0.2% ropivacaine. Both groups received an initial loading dose of 15 ml, a continuous infusion of 8 ml h−1, and top-ups of 10 ml. Breakthrough pain not responding to a routine top-up was treated with an ‘escape’ top-up of 10 ml 0.25% bupivacaine. The two groups were compared for complete analgesia at 30 min, routine and ‘escape’ top-up requirements, midwife assessment of analgesic efficacy, delivery mode, patient visual analogue scores (VAS) for first and second stage analgesia, overall satisfaction, and patient assessment of motor blockade. Patients receiving ropivacaine received fewer routine top-ups and fewer escape top-ups. The ropivacaine group was more likely to be pain free in the first stage. There were no significant differences in patients’ assessment of motor block or mode of delivery between the groups.[14]

CONCLUSION

Spinal analgesia for labor pain represents a rational and secure approach that not only facilitates a swift recovery in the postpartum period but also ensures effective pain management for the parturient.

REFERENCES

1. Cohen J. Doctor James Young Simpson, Rabbi Abraham De Sola, and Genesis, 1996. Chapter 3, verse 16. Obstet Gynecol. 1996;88:895–8.

2. Snow J. On administration of chloroform in during parturition. Assoc Med J. 1853;1:500–2.
3. Lieberman E, O'Donohue C. Unintended effects of epidural analgesia during labor: A systematic review. Am J Obstec Gynecol. 2002;186:S31–68.
4. Wong CA. Advances in labor analgesia. Int J Womens Health. 2009;1:139–54.
5. Kampe S, Weigand C, Kaufmann J, Klimek M, Konig DP, Lynch J. Postoperative analgesia with no motor block by the continuous epidural infusion of ropivacaine 0.1% and sufentanil after total hip replacement. Anesth Analg 1999; 89: 395–398.
6. Dickenson AH. Spinal cord pharmacology of pain. Br J Anaesth 1995; 75: 193–200.
7. Dickenson AH, Sullivan AF. Combination therapy in analgesia; seeking synergism. Curr Opin Anaesthesiol 1993; 6: 861–65.
8. Yentis S. The use of Entonox® for labour pain should be abandoned. Int J ObstetAnesth. 2001;10:25–8.
9. Rosen M. Recent advances in pain relief in childbirth. I. Inhalation and systemic analgesia. Br J Anaesth. 1971;43:837–48.
10. Burnstein R, Buckland R, Pickett JA. A survey of epidural analgesia for labour in the United Kingdom. Anaesthesia. 1999;54:634–40.
11. Watcha MF, White PF. Postoperative nausea and vomiting: its etiology, treatment, and prevention. Anesthesiology 1992; 77: 162–84.
12. Kampe S, Diefenbach C, Kanis B, Auweiler M, Kiencke P, Cranfield K. Epidural combination of ropivacaine with sufentanil for postoperative analgesia after total knee replacement: a pilot study. Eur J Anaesthesiol. 2002 Sep;19(9):666-71.
13. Liu SS, Moore JM, Luo AM, Trautman WJ, Carpenter RL. Comparison of three solutions of ropivacaine/fentanyl for postoperative patient-controlled epidural analgesia. Anesthesiology. 1999 Mar;90(3):727-33.
14. Dresner, M. et al. Ropivacaine 0.2% versus bupivacaine 0.1% with fentanyl: a double blind comparison for analgesia during labour. British Journal of Anaesthesia. 2000;85(6):826-29.