

ORIGINAL RESEARCH

Comparison of spinal and epidural anesthesia for caesarean section following epidural labor analgesia

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ABSTRACT

Background: Epidural labor analgesia (ELA) can be extended for use as epidural surgical anesthesia (ESA) for intrapartum caesarean section. The present study was conducted to compare spinal and epidural anesthesia for caesarean section following epidural labor analgesia.

Materials & Methods: 84 parturients admitted for vaginal deliveries were divided into 2 groups of 42 each. In group I, epidural painless labor was maintained by continuous infusion and patient-controlled epidural analgesia (PCEA) using 0.125% bupivacaine with fentanyl 1.25 mg/mL. In group II, SA was performed, a standardized dose of hyperbaric bupivacaine 10-12 mg with or without 100-300 mg morphine was administered through a 26-gauge spinal needle.

Results: In group I and group II, parity found to be nullipara in 30 and 34 and multipara in 12 and 8, ASA status was I in 4 and 5, II in 32 and 30 and III in 6 and 7. Cervical os was 2.9 cm and 3.0 cm, block level T2-T3 was seen in 0 and 2 and <T4 in 42 and 40 respectively. Failure rate was seen in 4 in group I and 6 in group II. A to S time (min) was 17.4 and 13.2. Medicine given was Ephedrine (mg) as 1.26 and 10.2, Meperidine (mg) as 11.4 and 9.2, Fentanyl (mg) as 0.014 and 0.0052, Midazolam (mg) as 0.81 and 0.23, Propofol (mg) as 8.7 and 4.6 and Ketamine (mg) as 3.16 and 1.92 in group I and II respectively. The difference was significant ($P < 0.05$).

Conclusion: The failure rate of sequential SA and EA for CS following successful epidural painless labor was similar.

Key words: epidural labor analgesia, cesarean section, spinal anesthesia

INTRODUCTION

Well-functioning epidural labor analgesia (ELA) can be extended for use as epidural surgical anesthesia (ESA) for intrapartum caesarean section (CS).¹ ESA using the epidural catheter for ELA might be a reliable and effective anesthetic method for emergency CS. However, ESA for CS has been associated with unsatisfactory outcomes, including conversion to another anesthetic method or failure to achieve a satisfactory block.²

Epidural labor analgesia may complicate emergency CS compared with scheduled CS. Most anesthesiologists prefer the method of leaving the epidural tube in situ for emergency CS in parturient with epidural labor analgesia who failed to deliver vaginally.³ Some

anesthesiologists still use spinal anesthesia (SA) instead of EA not only for its rapid onset and adequate motor blockade but also because of the high failure rate of EA in scheduled CS (EA 23.5% vs. SA 2.7%). However, SA following EA might result in an unexpected high-level blockade or even total SA although there is no statistical difference compared to SA only.⁴ The GA conversion rate and complications of SA after ELA without attempting to perform ESA were comparable to cases only using SA without ELA. In addition, SA after ELA may be preferred given its rapid induction and adequate muscle relaxation.⁵ The present study was conducted to compare spinal and epidural anesthesia for cesarean section following epidural labor analgesia.

MATERIALS & METHODS

The present study comprised of 84 parturients admitted for vaginal deliveries. The consent was obtained from all enrolled patients.

Patients were divided into 2 groups of 42 each. In group I, epidural painless labor was maintained by continuous infusion and patient-controlled epidural analgesia (PCEA) using 0.125% bupivacaine with fentanyl 1.25 mg/mL. In group II, SA was performed, a standardized dose of hyperbaric bupivacaine 10-12 mg with or without 100-300 mg morphine was administered through a 26-gauge spinal needle. Patients with successful EA and SA were then compared with each other. Parameters such as age, height, weight, nullipara or multipara, cervical os, and American Society of Anesthesiologists (ASA) physical status, perioperative events, including time from anesthesia to surgical incision, total anesthetic time for cesarean delivery, hypotension episodes during induction and the amount of perioperative intravenous drug administration, Apgar scores of the neonate recorded at 1 minute and 5 minutes, maternal satisfaction, postdural puncture headache (PDPH) rate and visual analog scale (VAS) pain scores on postoperative day was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Demographic characteristics

Variables	Parameters	Group I	Group II	P value
Parity	Nullipara	30	34	0.01
	Multipara	12	8	
ASA	I	4	5	0.02
	II	32	30	
	III	6	7	
Cervical os (cm)		2.9	3.0	
Block level	>T1	0	0	0.01
	T2-T3	0	2	
	<T4	42	40	

Table I, graph I shows that in group I and group II, parity found to be nullipara in 30 and 34 and multipara in 12 and 8, ASA status was I in 4 and 5, II in 32 and 30 and III in 6 and 7. Cervical os was 2.9 cm and 3.0 cm, block level T2-T3 was seen in 0 and 2 and <T4 in 42 and 40 respectively. The difference was significant (P < 0.05).

Graph I Demographic characteristics

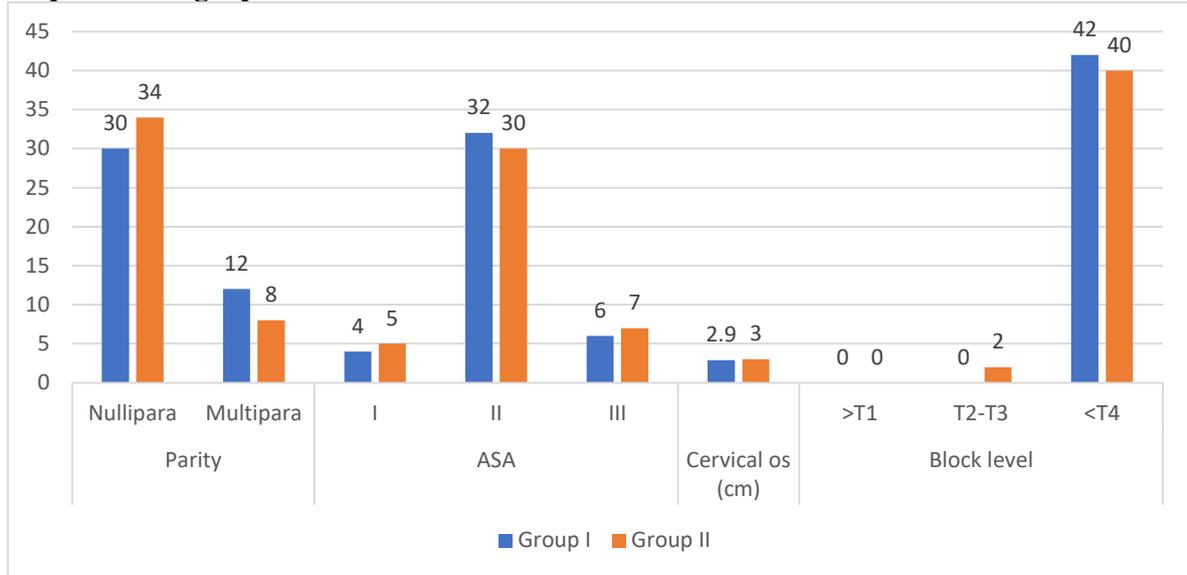
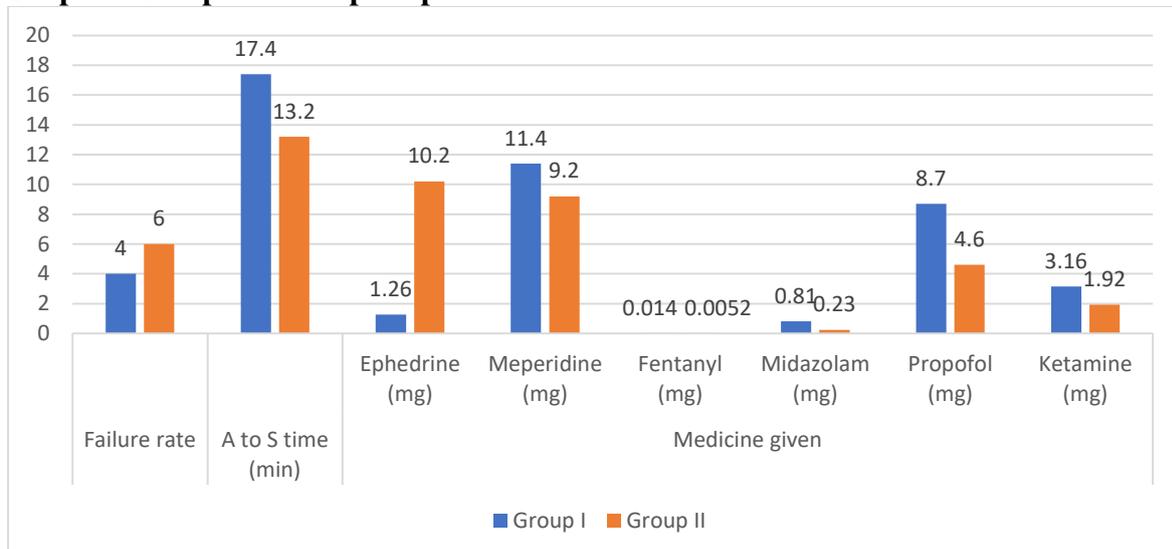


Table II Comparison of perioperative event

Variables	Parameters	Group I	Group II	P value
Failure rate		4	6	0.82
A to S time (min)		17.4	13.2	0.05
Medicine given	Ephedrine (mg)	1.26	10.2	0.01
	Meperidine (mg)	11.4	9.2	0.05
	Fentanyl (mg)	0.014	0.0052	0.01
	Midazolam (mg)	0.81	0.23	0.04
	Propofol (mg)	8.7	4.6	0.03
	Ketamine (mg)	3.16	1.92	0.02

Table II, graph I shows that failure rate was seen in 4 in group I and 6 in group II. A to S time (min) was 17.4 and 13.2. Medicine given was Ephedrine (mg) as 1.26 and 10.2, Meperidine(mg) as 11.4 and 9.2, Fentanyl (mg) as 0.014 and 0.0052, Midazolam (mg) as 0.81 and 0.23, Propofol (mg) as 8.7 and 4.6 and Ketamine (mg) as 3.16 and 1.92 in group I and II respectively. The difference was significant ($P < 0.05$).

Graph II Comparison of perioperative event



DISCUSSION

Epidural analgesia is a popular method of pain relief for labor, although it may not always be effective throughout labor.⁶ When patients with suboptimal epidural blockade need cesarean delivery, the epidural catheter is typically bolused with concentrated local anesthetic in an attempt to achieve surgical anesthesia, but this is not always successful.⁷ To avoid general anesthesia in these situations given the increased risk of maternal morbidity and mortality,⁸ some anesthesiologists have administered spinal anesthesia but have reported high blocks.⁸ The advantages of regional anesthesia in this situation may thus be negated if a high block results in conversion to general anesthesia.⁹ The present study was conducted to compare spinal and epidural anesthesia for cesarean section following epidural labor analgesia.

We found that in group I and group II, parity found to be nullipara in 30 and 34 and multipara in 12 and 8, ASA status was I in 4 and 5, II in 32 and 30 and III in 6 and 7. Cervical os was 2.9 cm and 3.0 cm, block level T2-T3 was seen in 0 and 2 and <T4 in 42 and 40 respectively. Yoon et al¹⁰ compared the rate of painfree surgery between ESA and SA following ELA for intrapartum CS. Both groups received continuous epidural infusions for labor pain at a rate of 10 ml/h. In the ESA group (n = 163), ESA was performed with 17 ml of 2% lidocaine mixed with 100 µg fentanyl, 1: 200,000 epinephrine, and 2 mEq bicarbonate. In the SA group (n = 160), SA was induced with 10 mg of 0.5% hyperbaric bupivacaine and 15 µg fentanyl. The failure rate of achieving pain-free surgery was higher in the ESA group than the SA group (15.3% vs. 2.5%, P < 0.001). There was no statistical difference between the two groups in the rate of conversion to general anesthesia; however, the rate of analgesic requirement was higher in the ESA group than in the SA group (12.9% vs. 1.3%, P < 0.001). The incidence of high block, nausea, vomiting, hypotension, and shivering and Apgar scores were comparable between the two groups.

We found that failure rate was seen in 4 in group I and 6 in group II. A to S time (min) was 17.4 and 13.2. Medicine given was Ephedrine (mg) as 1.26 and 10.2, Meperidine (mg) as 11.4 and 9.2, Fentanyl (mg) as 0.014 and 0.0052, Midazolam (mg) as 0.81 and 0.23, Propofol (mg) as 8.7 and 4.6 and Ketamine (mg) as 3.16 and 1.92 in group I and II respectively. Huang et al¹¹ investigated different types of regional anesthesia for cesarean section (CS) following epidural labor analgesia that could lead to various perioperative and postoperative outcomes. In all, 2341 of 6609 parturients underwent painless labor, and 334 of them converted to CS. Spinal anesthesia (SA) was used with 163 parturients, and epidural anesthesia (EA) with 96; the two groups were then compared. No high-level block or total SA was noted. The primary outcome revealed that the time from anesthesia to surgical incision and the total anesthesia time were shorter, hypotension episodes were more frequent, the rate of perioperative ephedrine administration was higher, and the rate of midazolam was lower in the SA group. With regard to secondary outcomes, the Apgar scores of the neonates recorded at 1 minute and 5 minutes and maternal satisfaction were similar. The neuraxial morphine dose was converted to parenteral morphine equivalent dose (MED), which revealed that the parturients in the spinal morphine group had lower dosages and visual analog scale (VAS) pain scores on postoperative Day 1.

Dadarkar et al¹² in their study the records of 115 women with inadequate epidural labor analgesia who required cesarean section were studied. No epidural boluses were administered in the 30 min preceding spinal anesthesia and a reduced spinal dose, median (range) 9.38 mg (7.5-11.3 mg) of 0.75% hyperbaric bupivacaine and fentanyl 15 microg (10-25 microg) was used. Patients were left sitting for 2 min and then positioned supine with left uterine displacement and were closely monitored for symptoms or signs that would suggest a high block. No parturient developed a high spinal necessitating intubation, and there was no adverse neonatal outcome. These findings do not conclusively establish this method as safe, but should spinal anesthesia for cesarean section following suboptimal labor epidural

analgesia be considered, avoiding epidural boluses immediately preceding spinal injection, using a lower spinal dose, and delayed supine positioning following spinal injection may be advisable.

CONCLUSION

Authors found that the failure rate of sequential SA and EA for CS following successful epidural painless labor was similar.

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