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ORIGINAL ARTICLE

Effect of epidural clonidine on characteristics of spinal anaesthesia in gynaecological surgeries

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ABSTRACT:
Background: With the benefits of both spinal and epidural anesthesia, combined spinal–epidural (CSE) anesthesia provides a low-risk and safe method. The present study evaluated the effect of epidural clonidine on characteristics of spinal anaesthesia in patients undergoing gynaecological surgeries. **Materials &Methods:** 90 patients undergoing gynaecological surgerieswere divided into 2 groups of 45 each. Group II was given saline (S), while Group I was given clonidine (C). CSE anesthesia was administered to every patient. Group I got 150 µg of clonidine diluted to 5 ml in normal saline (NS) 10 minutes prior to subarachnoid block (SAB), while group II received NS epidurally. Following an epidural injection, both groups received an intrathecal dose of hyperbaric bupivacaine (15 mg). Both groups' hemodynamics, analgesia, sedation, and sensory and motor block features were noted. **Results:** The mean height in group I was 160.4 cm and in group II was 159.3 cm. The mean weight in group I was 67.2 Kgs and in group II was 66.4 Kgs. Duration of surgery was 79.4 minutes in group I and 78.2 minutes in group II. The difference was significant (P< 0.05). Onset of sensory block at L1 was 37.2seconds and 49.4seconds, time to bromage 3 was 57.4seconds and 104.3seconds, time to 2 segment regression was 190.3 minutes and 108.2 minutes, total duration of analgesia was 310.4 minutes and 157.4 minutes and duration of motor blockage was 340.6 minutes and 129.5 minutes in group I and group II. The difference was significant (P< 0.05).VAS at 30 minutes was 1.9 in group I and 2.3 in group II, at 60 minutes was 1.5 in group I and 1.7 in group II, at 120 minutes was 2.8 in group I and 2.9 in group II, at 180 minutes was 2.4 in group I and 2.2 in group II and at 240 minutes was 1.3 in group I and 1.8 in group II. The difference was significant (P< 0.05). **Conclusion:** When clonidine was administered epidurally ten minutes prior to SAB, motor blocking and analgesia began early and lasted for a long time.
Keywords: clonidine, protein kinases, Neuraxial

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INTRODUCTION

With the benefits of both spinal and epidural anesthesia, combined spinal–epidural (CSE) anesthesia provides a low-risk and safe method.[1] It extends the period of pain relief following surgery and offers a quicker onset of surgical anesthesia. A variety of adjuvants boost its effectiveness even more.[2] As a partial α2 adrenergic agonist, clonidine can increase the effects of local anesthetics and has antihypertensive properties. It works without the use of opioids, decreases substance-P release, and stimulates α2 adrenoreceptors, which lowers central neuronal transmission in spinal neurons.[3] It functions pre-synaptically by stimulating cholinergic interneurons and interfering with protein kinases and nitric oxide pathways. When clonidine was added to local anesthetics for peripheral nerve blocks, the duration of anesthesia was extended.[4]

Neuraxial (intrathecal or epidural) administration is preferred because the analgesic effect of clonidine is stronger following neuraxial injection, suggesting a spinal site of action.[5] By increasing the anesthetic action and lowering the dosage needed for volatile or injectable general or regional anesthetic drugs, clonidine administered epidurally or intrathecally has fewer adverse effects.[6] Both dexmedetomidine and clonidine, two α2 agonists, provide a similar lengthening in the duration of the motor and sensory block with preserved hemodynamic stability and sedation, according to studies evaluating their effects on spinal and epidural anesthesia.[7] The present study evaluated the effect of epidural clonidine on characteristics of spinal anaesthesia in patients undergoing gynaecological surgeries.

MATERIALS &METHODS

The present study comprised of 90 patients belonging to ASA physical status I and II undergoing gynaecological surgeries. All enrolled patients gave their written consent for the participation.

Data such as name, age, etc. was recorded. Patients were divided into 2 groups of 45 each. Group II was given saline (S), while Group I was given clonidine (C). CSE anesthesia was administered to every patient. Group I got 150 µg of clonidine diluted to 5 ml in normal saline (NS) 10 minutes prior to subarachnoid block (SAB), while group II received NS epidurally. Following an epidural injection, both

groups received an intrathecal dose of hyperbaric bupivacaine (15 mg). Both groups' hemodynamics, analgesia, sedation, and sensory and motor block features were noted. The results were compiled and subjected for statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Demographic data

Parameters	Group I	Group II	P value
Height (cm)	160.4	159.3	0.94
Weight (Kgs)	67.2	66.4	0.18
Duration of surgery (minutes)	79.4	78.2	0.35

Table I shows that the mean height in group I was 160.4 cm and in group II was 159.3 cm. The mean weight in group I was 67.2 Kgs and in group II was 66.4 Kgs. Duration of surgery was 79.4 minutes in group I and 78.2 minutes in group II. The difference was significant (P< 0.05).

Table II Assessment of neuraxial blockade profile

Parameters	Group I	Group II	P value
Onset of sensory block at L1 (s)	37.2	49.4	0.05
Time to bromage 3 (s)	57.4	104.3	0.01
Time to 2 segment regression (mins)	190.3	108.2	0.05
Total duration of analgesia (mins)	310.4	157.4	0.01
Duration of motor blockage (mins)	340.6	129.5	0.01

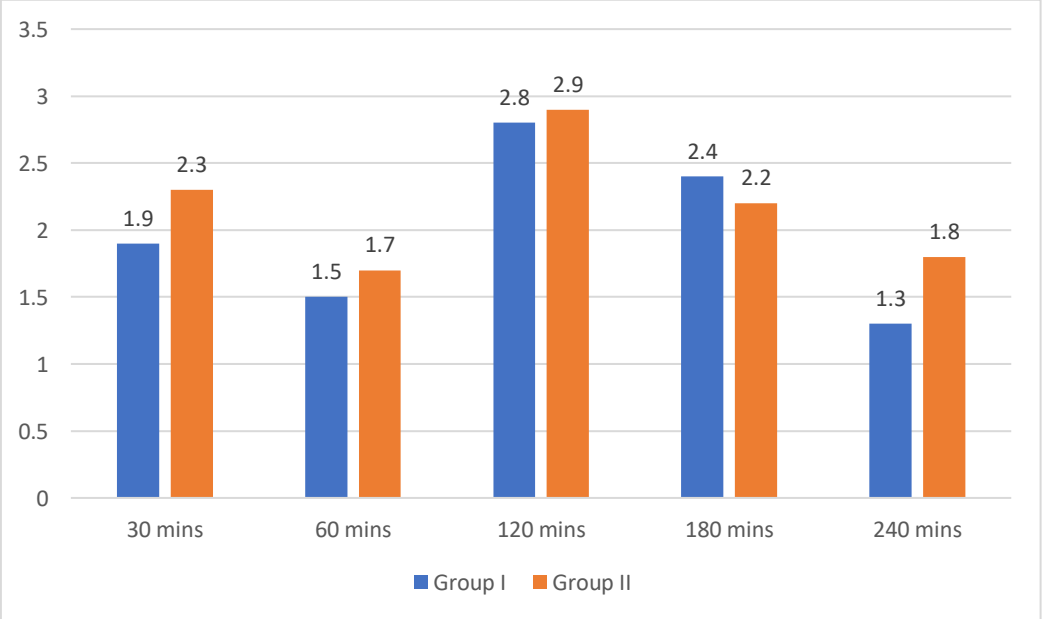
Table II shows that onset of sensory block at L1 was 37.2secondsand 49.4seconds, time to bromage 3 was 57.4secondsand 104.3seconds, time to 2 segment regression was 190.3 minutes and 108.2 minutes, total duration of analgesia was 310.4 minutes and 157.4 minutes and duration of motor blockage was 340.6 minutes and 129.5 minutes in group I and group II. The difference was significant (P< 0.05).

Table III Comparison of pain in both groups

VAS	Group I	Group II	P value
30 mins	1.9	2.3	0.01
60 mins	1.5	1.7	0.82
120 mins	2.8	2.9	0.25
180 mins	2.4	2.2	0.92
240 mins	1.3	1.8	0.03

Table III, graph I shows that VAS at 30 minutes was 1.9 in group I and 2.3 in group II, at 60 minutes was 1.5 in group I and 1.7 in group II, at 120 minutes was 2.8 in group I and 2.9 in group II, at 180 minutes was 2.4 in group I and 2.2 in group II and at 240 minutes was 1.3 in group I and 1.8 in group II. The difference was significant (P< 0.05).

Graph I Comparison of pain in both groups



DISCUSSION

Clonidine is a partial α2 adrenoceptor agonist that acts centrally and has a 200:1 selectivity ratio. It binds to postsynaptic α2 receptors (G-protein coupled inhibitory receptors) in the spinal cord's dorsal horn to provide its analgesic effect.[8] The effects of noradrenaline, which is released from the central nervous system's descending inhibitory pathways, are mimicked by this.[9] As a result, the dorsal horn's second-order and large dynamic range neurons become less active, which weakens the input from peripheral nociceptive Aδ and C fibers.[10] It doesn't cause motor blockage or interfere with proprioception. Rat studies reveal that clonidine decreases the production of action potentials in tonic firing spinal dorsal horn neurons and partially blocks voltage-gated sodium and potassium channels.[11]

We found that the mean height in group I was 160.4 cm and in group II was 159.3 cm. The mean weight in group I was 67.2 Kgs and in group II was 66.4 Kgs. Duration of surgery was 79.4 minutes in group I and 78.2 minutes in group II. Van de Velde et al[12]tested the hypotheses that initial spinal labour analgesia is prolonged by administering clonidine and neostigmine epidurally whilst the hourly local anaesthetic consumption is reduced. Seventy labouring patients received spinal analgesia with ropivacaine and sufentanil. Fifteen minutes after spinal injection, 10 mL of study solution was administered epidurally. The study solution was plain saline or neostigmine 500 lg combined with clonidine 75 lg. Outcome parameters were duration of spinal analgesia, local anaesthetic consumption and number of patients delivering without additional epidural analgesia. Epidural clonidine and neostigmine significantly prolonged initial analgesia: 144 (105–163) min vs. 95 (70–120) min in the placebo group and reduced hourly ropivacaine consumption: 7.5 (3.0–11.9) mg vs. 12.7 (9.6–16.9) mg. More patients in the experimental group delivered before the first request for additional analgesia (9 vs. 2). Epidural administration of neostigmine 500 lg and clonidine 75 lg, following the intrathecal injection of ropivacaine and sufentanil, prolongs analgesia and reduces hourly ropivacaine consumption.

We found that onset of sensory block at L1 was 37.2seconds and 49.4seconds, time to bromage 3 was 57.4seconds and 104.3seconds, time to 2 segment regression was 190.3 minutes and 108.2 minutes, total duration of analgesia was 310.4 minutes and 157.4 minutes and duration of motor blockage was 340.6 minutes and 129.5 minutes in group I and group II. Jellish et al[13]evaluated the addition of epidural clonidine and/or bupivacaine, injected at the incision site, on postoperative outcome variables in patients undergoing lower spine procedures using spinal anesthesia. 120 patients having lumbar spine surgery received bupivacaine spinal anesthesia supplemented by 150 microg of epidural clonidine with or without incisional bupivacaine, epidural placebo plus incisional bupivacaine, or placebo with incisional saline. Demographic data, intraoperative hemodynamics, blood loss, pain, nausea, urinary retention, hospital discharge, and other variables were compared. IV fluids, blood loss, incidence of intraoperative bradycardia, and hypotension were not different among groups. Postanesthesia care unit pain scores were lower and demand for analgesics was less in patients who received both the clonidine and subcutaneous bupivacaine. Patients who received epidural clonidine also had improved postoperative hemodynamics. Hospital discharge, urinary retention, and other variables were not different.

We found that VAS at 30 minutes was 1.9 in group I and 2.3 in group II, at 60 minutes was 1.5 in group I and 1.7 in group II, at 120 minutes was 2.8 in group I and 2.9 in group II, at 180 minutes was 2.4 in group I and 2.2 in group II and at 240 minutes was 1.3 in group I and 1.8 in group II.Eisenach et al[14] showed that 160 μg clonidine decreases arterial blood pressure by 18% and reduces HR by 5–20% and concluded that epidural clonidine does not induce haemodynamic instability.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that when clonidine was administered epidurally ten minutes prior to SAB, motor blocking and analgesia began early and lasted for a long time.

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