Postoperative analgesia with intrathecal Midazolam in caesarean section deliveries

Suwalka U, Patel J, Mehta K

ABSTRACT

Background: It is a challenge to provide postoperative analgesia without much sedation, respiratory depression or problems like nausea and vomiting after caesarean section delivery, in order to facilitate early baby acceptance and care by mother.

Aim: To evaluate the postoperative analgesic effect of intrathecal Midazolam-Lignocaine mixture in patients undergoing caesarean section.

Material and Methods: Fifty healthy women of ASA grade I/II scheduled for caesarean section were randomly allocated to receive either lignocaine 5% heavy 1.2 ml with normal saline 0.4 ml with adrenaline rinsed syringe intrathecally (group L, n=25); or lignocaine 5% heavy 1.2 ml with midazolam 0.4 ml (2mg) preservative free with adrenaline rinsed syringe intrathecally (group LM, n=25). Vital signs, sensory level, motor blockade, sedation score, pain score and side effects were observed intraoperative and postoperatively. APGAR score of babies in 1st and 5th minute of delivery was also assessed.

Results: Mean duration of pain free period in group L was 95+ 24.90 min., whereas in group LM, it was 207+68.85 min., the difference was statistically highly significant (p<0.001). No cardio-respiratory depressant effect was observed in the neonates of the mothers receiving intrathecal midazolam. Incidence of nausea and vomiting was less observed in midazolam group.

Conclusion: Addition of midazolam provided an enhanced post-operative analgesia without affecting mother and baby.

Key words: Visual Analogue Scale, antinociceptive receptor, rescue analgesic, GABA

INTRODUCTION

Discovery of benzodiazepine receptor in spinal cord prompted the anesthesiologists to use it intrathecally for analgesia. With the advent of first water soluble benzodiazepine- Midazolam, it becomes possible to use it directly over nerve tissue without using any neuro-toxic vehicle. Since then it had been tried widely and by now its antinociceptive effect with neurological safety has been well established in animal and man. The use of midazolam for postoperative analgesia by intrathecal route was first studied by Valentine JM et al., in 1996.³

Midazolam is a potent short acting, water soluble non-opiate benzodiazepine which has been used for potentiating the analgesic effect of local anaesthetic induced neuro-axial blockade.³ Spinal analgesic effect of midazolam is mediated through benzodiazepine-GABA receptor complex within the spinal cord.³ Its antinociceptive effect is mediated via spinal δ opiate receptors.⁴ Normal doses of benzodiazepine through conventional routes, due to high blood concentration, produces profound sleep and tranquility of mind. Thus proper assessment of analgesic effect is hindered.

This study was undertaken to observe the effect of intrathecal Midazolam on onset and duration of sensory and motor blocks, its effect on cardiovascular and respiratory system, study of postoperative analgesia, incidence of complications and side effects, and also to compare the APGAR score of babies between the two groups.

MATERIAL AND METHODS

Having obtained approval from Hospital Ethics Committee, a prospective randomized comparative clinical study was conducted in patients (n= 50) belonging to ASA grade I/II scheduled to undergo caesarean section.
Exclusion criteria: Patients with history of alcoholism and other substance abuse, drug allergy; having major systemic illness, chronic headache, backache, neurological deficit, epilepsy; on benzodiazepines; and also those with gestational age <36 weeks were excluded from the study.

All patients were subjected to thorough pre-anaesthetic assessment. Informed written consent was sought after briefing about Visual Analogues Scale (VAS). Patients were then randomly allocated into two groups- group L and group LM of 25 each. Patients in Group L received inj. lignocaine 5% heavy 1.2 ml with normal saline (0.4 ml) by adrenaline rinsed syringe intrathecally; while Group LM patients were administered inj. lignocaine 5% heavy 1.2 ml with midazolam 0.4ml (2mg) preservative free adrenaline rinsed syringe intrathecally.

All patients were premedicated with inj. ranitidine 1 mg/kg and ondansetron 0.1 mg/kg IV, 30 minutes prior to subarachnoid block. They were placed in supine position with a wedge placed under right hip immediately after subarachnoid injection. All patients received supplementation oxygen (3 lit/min) by oxygen mask till the delivery of baby. Vitals were recorded immediately after intrathecal injection. The segmental sensory level of anaesthesia was assessed by the patient’s response to pinprick and motor block was assessed by using modified Bromage scale. APGAR score of the babies were recorded at 1 and 5 minute after delivery.

On completion of surgery, the patients were monitored for vital signs, SpO₂, level of sedation, duration of motor blockade, duration of sensory blockade and total duration of analgesia up to 24 hours. Each patient was carefully questioned about pain relief in the form of complete analgesia and it was assessed by VAS. Rescue analgesic on demand or with a pain score of more than four on the VAS was provided in the form of diclofenac sodium 75 mg IM.

Data were analyzed by using unpaired “t” test and p value < 0.05 was considered statistically significant. Data was presented as mean ± standard deviation and number (Percentage).

RESULTS
All patients were observed up to 24 hours post operatively and the following results were recorded in both the groups L and LM respectively. Demographic variables were comparable between two groups i.e., P value > 0.05 (Table-1). The mean onset of sensory blockade in Group L was 133.75±14.68 sec and in group LM was 115.21±15.35 sec which was statistically significant in favour of Midazolam group (p value <0.001). Mean onset of motor blockade in group L and LM is statistically comparable with p value >0.05. (Table-2) Intraoperative pulse rate was higher at 1 hour and 1.30 hour in group L patients than the group LM (p<0.001). After 90 minutes of post intrathecal injection, rise in systolic blood pressure in group L was statistically significant (p<0.05) as compared to group LM. VAS pain score was lower in group LM up to 2 hours as compared to group L. There was no statistically significant difference in SpO₂ in both the groups.

Table 1. Demographic variables and duration of Surgery

<table>
<thead>
<tr>
<th>Events</th>
<th>Group L</th>
<th>Group LM</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>25</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Mean age (years)</td>
<td>24.72±3.93</td>
<td>24.08±3.23</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Mean weight (kg)</td>
<td>54.24±5.40</td>
<td>54.56±4.84</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Mean Height (cm)</td>
<td>157.48±5.35</td>
<td>152.32±4.84</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Duration of Surgery (minutes)</td>
<td>60.20±10.75</td>
<td>60.80±12.04</td>
<td>&gt;0.05 (NS)</td>
</tr>
</tbody>
</table>

Table 2. Analgesic Profile

<table>
<thead>
<tr>
<th>Events</th>
<th>Group L</th>
<th>Group LM</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of Sensory block (in sec)</td>
<td>133.75±14.68</td>
<td>115.21±17.35</td>
<td>&lt;0.001 (S)</td>
</tr>
<tr>
<td>Onset of Motor block (in sec)</td>
<td>210±23.48</td>
<td>166.8±19.52</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Duration of Sensory block (in minutes)</td>
<td>103±12.49</td>
<td>178±18.83</td>
<td>&lt;0.05 (S)</td>
</tr>
<tr>
<td>Duration of Motor block (in minutes)</td>
<td>86.2±6.54</td>
<td>83.2±13.22</td>
<td>&gt;0.05 (NS)</td>
</tr>
<tr>
<td>Duration of pain free period (in minute)</td>
<td>95±24.90</td>
<td>207.2±68.85</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
DISCUSSION
In our study, the onset and time to reach highest sensory level blockade was significantly less in midazolam group LM (p<0.001) compared to group L, whereas, onset of motor blockade was comparable in both the groups. Duration of sensory blockade was also statistically significant (p<0.05) in group LM which is in accordance with similar studies conducted by different researchers.1,8

There was no observable difference in the depth of sedation between the two groups. Most of the patients in group L were talkative while in group LM they were calm and sleepy albeit responsive. These findings were earlier emphasized in various other studies.1,4 This is because midazolam given through intrathecal route acts on spinal cord GABA-Benzodiazepine receptor complex and produce segmental effect.4

Duration of pain free period was significantly prolonged in group LM (mean=207.2 ± 68.25 min compared to 95 ± 24.90 in group L; p<0.001). Rescue analgesic on demand was administered to all the patients in group L within two and half hours, whereas only 24% of group LM demanded so. Thus, addition of midazolam to lignocaine provides longer duration of analgesia as it combines with GABA receptors after intrathecal administration.1,4,6

Incidence of nausea and vomiting was lower in group LM compared to group L (1:8). Similar to previous studies, we also could not observe any significant differences in pulse rate, blood pressure, respiratory rate, SpO2 between the two groups.2,5,6,8 APGAR score of the babies was observed at 1st and 5th min. in both groups which was also statistically insignificant (p>0.05).

Spinal anesthesia with lignocaine heavy has been popular for short surgical procedures as it has predictable onset and provides dense sensory and motor block of moderate duration. Unfortunately, in the past decade some reports of neurotoxicity have casted doubts on the use of lignocaine. The phenomenon of transient neurologic symptoms (TNS) is reportedly 7-9 times higher following lignocaine than with bupivacaine.10 We could not find any evidence of neurotoxicity in our study. The patients were categorically asked leading questions regarding paraesthesia, radiating pain in legs, buttocks or thighs or any other neurological symptoms. Certainly none of the risk factors that increase the likelihood of TNS were present in our patients except the drug, lignocaine.

CONCLUSION
Addition of preservative free Midazolam to intrathecal lignocaine for spinal anaesthesia provides an enhanced and increased duration of effective sensory analgesia without delaying recovery and ambulation, without any side effects like nausea, vomiting, and with a calm mental state thus promoting early mother-baby room-in with an added advantage of low cost.
REFERENCES