Original article:

Comparison of intrathecal Dexmedetomidine and Midazolam as adjuvants to 0.5% hyperbaric Bupivacaine for lower abdominal surgeries

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Abstract

Background: The study was planned to assess the comparative efficacy, safety and duration of effective analgesia produced by dexmedetomidine and midazolam when used as adjuvant for spinal anesthesia

Study Design: Hospital based, randomized, double blind, placebo controlled study

Method: 120 ASA grade I & II undergoing lower abdominal surgeries like appendicectomy, herniorrhaphy, abdominal hysterectomy etc. (duration 60-90 min) were randomly allocated into three groups. Control Group (Group A): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml of normal saline. Dexmedetomidine Group (Group B): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml of (5µg) of dexmedetomidine (1:20 dilution). Midazolam Group (Group C): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml (2 mg) of midazolam (1:2.5 dilutions). The groups were compared to the regression time of sensory block, duration of effective analgesia (defined as the time interval between administration of intrathecal drug to the time of first analgesic request or a numeric rating scale ≥ 4.0), duration of motor block, highest level of block, sedation score and side effects in the first 24 hours

Statistics: One way-ANOVA, Kruskal Wallis test, and Chi-square test (χ²), significance level p < 0.05.

Results: The duration of effective analgesia was significantly prolonged in the dexmedetomidine group (298.1±14.1 minutes) when compared with midazolam group (242.6±18.0 minutes) and the control group (223.4± 12.8 minutes). The time for two segment regression was significantly prolonged in Group B (143.1± 6.2 minutes) as compared to Group A and C. Motor block was significantly prolonged with the addition of intrathecal dexmedetomidine (451.6 ± 25.4 minutes) as compared with midazolam and control group. No clinically significant difference observed in the haemodynamic parameters, sedation and adverse effects among the three groups.

Conclusion: The addition of dexmedetomidine (5 mcg) to 3 mL of intrathecal hyperbaric bupivacaine (0.5%) significantly prolongs the duration of effective analgesia in comparison to 2 mg midazolam or placebo (0.9% normal saline) with a comparable incidences of side effects.

Key words: spinal anaesthesia, dexmedetomidine, midazolam, intrathecal, postoperative pain, lower abdominal surgery

INTRODUCTION

Spinal anesthesia, a common technique in anesthesia practice, has got inherent advantages like intense motor and sensory blockade, good relaxation, reliability, avoids side effects of multiple drugs used in general anesthesia, no
postoperative respiratory depression, nausea, vomiting, drowsiness etc. It also has good patient and surgeon acceptability as well as safe enough for early discharge from the hospital. (1) Postoperative pain control is still a major problem because spinal anesthesia using only local anesthetics is associated with relatively short duration of action and thus early analgesic intervention is needed in the postoperative period. Neuraxial adjuvants are used to improve or prolong analgesia and decrease the adverse effects associated with high doses of a single local anesthetic agent. In addition to their dose sparing effects, neuraxial adjuvant are also utilized to increase the speed of onset of neural blockade (reduce latency), improve the quality and prolong the duration of neural blockade. Examples of neuraxial adjuvant include Opioids (Morphine, Fentanyl, Nalbuphine, and Buprenorphine), Sodium bicarbonate, vasoconstrictors (epinephrine), α2-adrenoceptor agonists (clonidine(2), dexmedetomidine(3)), and cholinergic agonists, N-methyl-d-aspartate (NMDA) antagonists (Ketamine) and γ-aminobutyric acid (GABA) receptor agonists (Midazolam).(4)

Because of some side effects like sedation, hypotension, respiratory depression, pruritus, nausea, vomiting and convulsions, there is a constant search about the drug which provides or prolongs the analgesia duration in postoperative period with minimal side effects.

Dexmedetomidine, a new highly selective α2-agonist, is under evaluation as a neuraxial adjuvant as it provides stable hemodynamic conditions, good quality of intraoperative and prolonged postoperative analgesia with minimal side effects.(5,6) Midazolam is potent short acting, water soluble benzodiazepine, which has been used for potentiating the analgesic effect of local anesthetic induced neuraxial blockade.(7) Its use as postoperative analgesic by intrathecal route was first studied by Valentine J.M,Lyon.(7) Spinal analgesic effect of midazolam is mediated by benzodiazepine-GABA receptor complex within the spinal cord. GABA receptors are abundant in dorsal root nerve cells and maximum concentration found in lamina-II of dorsal horn ganglia.(8,9,10) Intrathecal Midazolam also has anti-nociceptive effect mediated via spinal opiate receptors.(9)

Addition of intrathecal midazolam to bupivacaine significantly improves the duration and quality of spinal anesthesia and provides prolonged preoperative analgesia without any significant side effects.

This study was designed to compare the effect of dexmedetomidine and midazolam added to hyperbaric bupivacaine intrathecally on onset and duration of sensory and motor block, duration of analgesia and incidence of side effects in patients undergoing lower abdominal surgeries like TAH, appendicectomy, herniorrhaphy etc

MATERIAL AND METHODS
This Hospital based randomized double blind interventional study was conducted after approval of the research review board from February 2016 till the designed sample size was complete. Due permission from institutional ethical committee and informed written consent from all the patients was obtained before participation. One hundred twenty ASA grade I & II patients of either sex and Age group between 20 and 55 years, presenting for lower abdominal surgeries like appendicectomy, herniorrhaphy, abdominal hysterectomy etc. were enrolled in the study. Patients with psychiatric disorders, chronic pain or any condition that precludes spinal anesthesia were excluded. Standard monitors (ECG, non invasive blood pressure and pulse oximetry) applied and baseline parameters noted. An 18 gauge intravenous (IV) cannula was inserted at the forearm level, lactated Ringer’s solution was administered as a bolus of 10 ml/kg before subarachnoid block to all patients.
Conduct of study

One hundred twenty patients were randomly assigned into one of the three treatment groups by simple random technique through chit in box method.

Control Group (Group A): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml of normal saline.

Dexmedetomidine Group (Group B): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml of (5µg) of dexmedetomidine (1:20 dilution) intrathecally.

Midazolam Group (Group C): Patients received 3 ml of 0.5% hyperbaric bupivacaine + 1 ml (2 mg) of midazolam (1:2.5 dilutions) intrathecally.

The test solutions were prepared in identical syringes by anesthesiologist not involved in patient monitoring. Spinal anesthesia was performed at L3-L4 interspace with the patient in left lateral position by using a 25 G Quincke needle under strict aseptic conditions. Anesthetic solution (4 ml volume) was administered over 30 seconds. All patients were immediately placed in a supine position following the injection with a 15° head down tilt to achieve level of block up to T5-T6. Monitoring was done using continuous electrocardiography (lead II & V), heart rate, non-invasive blood pressure and continuous pulse oximetry and patients were given 4.0 L/min of oxygen by venti-mask.

Vitals were recorded every 5 minutes for first 30 minutes then every 10 minutes till surgery and then every 30 minutes for 4 hours postoperatively.

When adequate level & depth of spinal block was achieved, the patient was positioned for planned surgery.

The level of sensory block was tested by pin prick bilaterally at mid-clavicular line which was done every minute till the maximum sensory level was achieved and then after one hour at half an hour interval.

Primary outcome was duration of postoperative analgesia was measured as the time from intrathecal drug administration to the administration of rescue analgesic either in the recovery room or the ward and was recorded in minutes. Patient’s VAS > 3 or administration of rescue analgesia on patient request constituted the end point of the study. Diclofenac (75mg) IV was given as rescue analgesic. Data was collected regarding the Onset of sensory block (the time taken to attain a sensory level of T6 dermatome), The highest level of sensory block (thoracic segment), duration of sensory block (time taken for the sensory block to regress up to 2 segments of dermatome from the highest level achieved) and Time of onset of motor block (time taken to achieve Bromage grade 3 block from the time of subarachnoid injection). Adverse effects such as bradycardia, hypotension, nausea, vomiting, shivering, and respiratory depression were recorded as and when they occurred.

Sample Size: Sample size was calculated 40 subjects for each of the 3 groups at α error 0.05 and Power 80% assuming minimal detectable difference in mean time to first analgesic request with dexmedetomidine, midazolam and control group to be 50 minutes with SD of 70 minutes (as per seed article) so for the study purpose 40 cases were taken in each group.

STATISTICAL ANALYSIS

Statistical analysis was performed with the SPSS, version 23.0 for Windows statistical software package (SPSS Inc., Chicago, USA). Categorical data i.e. type of surgery and the incidence of adverse events are presented as numbers (percentage) and analyzed with Chi-Square test. Groups are compared for demographic data (age, weight), duration of surgery, time for two segment regressions, VAS score, total duration of sensory and motor block and
duration of analgesia by analysis of variance (ANOVA) and pair-wise analysis by paired t-test. Probability was considered to be significant if less than 0.05. Data is represented as mean and standard deviation.

RESULTS
One hundred twenty patients were analyzed in three groups of 40 each. All blocks were tested before starting procedure and were deemed adequate for surgery. There was no dropout or departure from initial study protocol. The three groups of patients were comparable with respect to age, sex, weight, height and duration of surgery.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (mean ± SD)</th>
<th>Group B (mean ± SD)</th>
<th>Group C (mean ± SD)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>38.6 ± 6.6</td>
<td>38.8 ± 6.8</td>
<td>38.8 ± 6.5</td>
<td>0.993</td>
</tr>
<tr>
<td>Weight (Kgs)</td>
<td>57.0 ± 4.4</td>
<td>56.4 ± 5.3</td>
<td>56.6 ± 4.3</td>
<td>0.823</td>
</tr>
<tr>
<td>Height (cms)</td>
<td>157.6 ± 4.5</td>
<td>156.8 ± 3.7</td>
<td>157.7 ± 3.5</td>
<td>0.502</td>
</tr>
<tr>
<td>Duration of Surgery (mins)</td>
<td>77.8 ± 8.6</td>
<td>78.8 ± 9.2</td>
<td>74.7 ± 8.7</td>
<td>0.157</td>
</tr>
</tbody>
</table>

Table 2 describes the characteristics of spinal anesthesia. Mean onset of sensory and motor block was found to be similar in all the three groups. The mean time for 2 segment regression and duration of analgesia was significantly prolonged in both dexmedetomidine and midazolam group as compared to bupivacaine control group (p<0.05). But the prolongation was highly significant in dexmedetomidine group (p<0.0001). Mean duration of motor block was significantly prolonged in dexmedetomidine group as compared to midazolam and bupivacaine control group (P<0.0001). The addition of midazolam did not prolong the duration of motor block but the regression of motor block to Bromage 0 was significantly slower with the addition of dexmedetomidine.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (mean ± SD)</th>
<th>Group B (mean ± SD)</th>
<th>Group C (mean ± SD)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of sensory block (mins)</td>
<td>7.9 ± 1.0</td>
<td>7.0 ± 1.5</td>
<td>7.4 ± 1.4</td>
<td>0.111</td>
</tr>
<tr>
<td>Onset of motor block (mins)</td>
<td>8.9 ± 1.5</td>
<td>8.3 ± 1.4</td>
<td>8.6 ± 1.4</td>
<td>0.174</td>
</tr>
<tr>
<td>Time to 2 segment regression (mins)</td>
<td>85.4 ± 6.7</td>
<td>143.1 ± 6.2</td>
<td>101.0 ± 5.2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Duration of Analgesia (mins)</td>
<td>223.4 ± 12.8</td>
<td>298.1 ± 14.1</td>
<td>242.6 ± 18.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Duration of Motor Block (mins)</td>
<td>201.5 ± 33.8</td>
<td>451.6 ± 25.4</td>
<td>215.3 ± 12.2</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Table 3: Highest Level of Sensory Block Achieved

<table>
<thead>
<tr>
<th>Highest level of sensory block achieved</th>
<th>Grp A</th>
<th></th>
<th>Grp B</th>
<th></th>
<th>Grp C</th>
<th></th>
<th>Total</th>
<th></th>
<th>P Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>15</td>
<td>1</td>
<td>2.5</td>
<td>7</td>
<td></td>
<td>P&lt;0.0001</td>
<td>S</td>
</tr>
<tr>
<td>T4</td>
<td>6</td>
<td>15</td>
<td>21</td>
<td>52.5</td>
<td>16</td>
<td>40</td>
<td>43</td>
<td></td>
<td>P&lt;0.0001</td>
<td>S</td>
</tr>
<tr>
<td>T5</td>
<td>14</td>
<td>35</td>
<td>10</td>
<td>25</td>
<td>18</td>
<td>45</td>
<td>42</td>
<td></td>
<td>P&lt;0.0001</td>
<td>S</td>
</tr>
<tr>
<td>T6</td>
<td>20</td>
<td>50</td>
<td>3</td>
<td>7.5</td>
<td>5</td>
<td>12.5</td>
<td>28</td>
<td></td>
<td>P&lt;0.0001</td>
<td>S</td>
</tr>
</tbody>
</table>

In Group A no patient achieved highest sensory level up to T3, in Group B 6 (15%), and in Group C 1 (2.5%) achieved T3 level. Application of chi square test showed that this difference was statistically significant (P<0.001)

Graph 1

Patients in all three groups remained hemodynamically stable intraoperatively. In our study bradycardia and hypotension was more in the dexmedetomidine group than in the midazolam and control group, but it was not statistically significant. Degree of sedation was not statistically significant in the study groups.
Variation in vital parameters after intrathecal dexmedetomidine and midazolam when used as adjuvant to spinal anesthesia with hyperbaric bupivacaine
Table 4 DEGREE OF SEDATION

<table>
<thead>
<tr>
<th>Degree of Sedation</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>GRADE 1</td>
<td>38</td>
<td>95.0</td>
<td>33</td>
<td>82.5</td>
</tr>
<tr>
<td>GRADE 2</td>
<td>2</td>
<td>5.0</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td>GRADE 3</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>GRADE 4</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 5: Incidence of adverse effects after intrathecal dexmedetomidine and midazolam

<table>
<thead>
<tr>
<th>Side effects</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>P value</th>
<th>Significance value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>0.253</td>
<td>NS</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>0.350</td>
<td>NS</td>
</tr>
<tr>
<td>Respiratory depression</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0.359</td>
<td>NS</td>
</tr>
<tr>
<td>Nausea, Vomiting</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0.772</td>
<td>NS</td>
</tr>
</tbody>
</table>

DISCUSSION

Midazolam, despite of being the commonest benzodiazepine used in anaesthesia and perioperative care, is a relatively newer addition to the list of adjuvants used in subarachnoid block. Shadangi et al (2011) studied 100 patients scheduled for elective lower abdominal, lower limb and gynaecological procedures compared intrathecal midazolam (2 mg) with control group. Their observations showed that the duration of sensory blockade was prolonged in the midazolam group (90.8 versus 115.8 min, p-value is 0.001), while the duration of motor blockade was comparable (151.8 versus 151.3 min, p-value is 0.51). The duration of effective analgesia was significantly longer in the midazolam group compared to the control group (121.3 versus 221.1 min, p-value is 0.001). Bharti et al (2003) studied Forty patients undergoing lower abdominal surgery by adding 1 mg of midazolam to intrathecal bupivacaine. All the three parameters duration of sensory block (218 min vs. 165 min; P < 0.001), duration of motor block and duration of effective analgesia (199 vs. 103 min; P < 0.001) was longer in the midazolam group than in the control group. (12)

Dexmedetomidine, a new highly selective α2-agonist, is under evaluation as a neuraxial adjuvant as it provides stable hemodynamic conditions, good quality of intraoperative and prolonged postoperative analgesia with minimal side effects. It acts by binding to pre-synaptic C-fibers and post-synaptic dorsal horn neurons. Their analgesic action
is a result of depression effect of the release of C-fiber transmitters and hyperpolarisation of postsynaptic dorsal horn neurons.\(^{(13)}\) Intrathecal \(\alpha_2\)-receptor agonists have been found to have antinociceptive action for both somatic and visceral pain.\(^{(5)}\) The prolongation of effect may result from synergism between local anesthetic and \(\alpha_2\)-adrenoceptor agonist, while the prolongation of motor block of spinal anesthetics may result from the binding of \(\alpha_2\)-adrenoceptor agonists to motor neurons in the dorsal horn.

Memis et al\(^{(2004)}\) noted that the addition of 0.5\(\mu\)g/kg dexmedetomidine to lignocaine for intravenous regional anesthesia improve the quality of anesthesia and perioperative analgesia without causing side effects.\(^{(14)}\) Shaikh et al\(^{(2014)}\) and Al-Mustafa et al\(^{(2009)}\) studied to investigate the effect of intrathecal administration of dexmedetomidine 5 \(\mu\)g and 10 \(\mu\)g, as an adjuvant to bupivacaine 0.5\% and concluded that Dexmedetomidine added to hyperbaric bupivacaine intrathecally has a dose dependent favorable effect on the onset and regression of sensory and motor block.\(^{(15),(6)}\)

With this background a comparative study was conducted to find out the comparative effectiveness of intrathecal midazolam and dexmedetomidine as an adjuvant to hyperbaric bupivacaine in patients undergoing lower abdominal surgeries.

In our study we concluded that there was no significant difference between Groups A, B and C in the onset of sensory block or in the time for the onset of motor block \((p>0.05)\). Our results coincide with Gupta et al study \(\text{(2011)}\)\(^{16}\) and Al Ghanem et al \(\text{(2009)}\)\(^{14}\). A study by Sanwal et al \(\text{(2013)}\)\(^{17}\) showed that it’s the dose of bupivacaine and not the dose of adjuvant that determine the time to onset of sensory and motor block. In our study we used an equal amount of bupivacaine and all the three groups were comparable regarding the time of onset of sensory and motor block.

The time for two segment regression was significantly prolonged in Group B and C as compared to Group A. Although Group C showed significant longer time to two segment regression as compared to Group A \((p<0.05)\), but the prolongation was highly significant in Group B \((p<0.0001)\). In study by shukla et al \(\text{(2016)}\) The regression of sensory blockade in dexmedetomidine group \((126.4\pm14.2\text{min})\) was significantly slower when compared with midazolam \((116.2\pm7.2\text{ min})\) group as shown by 2 segment regression time, \((P\ 0.00)\). Time to first postoperative analgesia was significantly longer in dexmedetomidine group \((380.0\pm18.0\text{ min})\) when compared to midazolam Group \((220.1\pm14.8\text{ min})\) \((P\ 0.000)\).\(^{18}\)Samanarty et al \(\text{(2015)}\)studied 60 patients and found Time to 2-segment regression of sensory analgesia was significantly longer in the dexmedetomidine group \((131.9\pm35.2\text{ minutes}, 286\pm64\text{ minutes})\) in comparison to the midazolam group \((99.3\pm38.1\text{ minutes}, 171\pm77\text{ minutes})\) and the control group \((73.6\pm33.8\text{ minutes}, 167\pm73\text{ minutes})\) \((P\ =\ 0.001)\) with no significant difference between the midazolam and control group.\(^{19}\)Our study showed consistent results with both studies regarding two segment regression time.

Gupta et al \(\text{(2011)}\) study has shown that the addition of 5 \(\mu\)g dexmedetomidine with hyperbaric bupivacaine significantly prolongs both sensory and motor block. Both fentanyl and dexmedetomidine provided good quality intraoperative analgesia and hemodynamic stability.\(^{(16)}\) Al-Ghanem et al \(\text{(2009)}\) had studied the effect of addition of 5 \(\mu\)g dexmedetomidine or 25 \(\mu\)g fentanyl intrathecal to 10 mg isobaric bupivacaine in vaginal hysterectomy and concluded that 5 \(\mu\)g dexmedetomidine produces more prolonged motor and sensory block as

In Group A no patient achieved highest sensory level up to T3, in Group B 6 (15%), and in Group C 1 (2.5%) achieved T3 level. Application of chi square test showed that this difference was statistically significant (P<0.001). It shows that adding dexmedetomidine affect the cephalad spread of local anaesthetic maximum. Similar results were obtained in other patients receiving dexmedetomidine, T4 level reached in 21 patients (52.5%) was also statistically significant different from Group A and Group C. In group A maximum number of patients (20 i.e. 50%) getting T6 level as the highest level of sensory block, while in Group C 18 patients (45%) were achieving T5 level as highest level. This statistically significant difference shows that dexmedetomidine when used as an adjuvant to bupivacaine intrathecal, achieves greater dermatome level of sensory block. By their action on the α2 pre synaptic receptors in the spinal cord, dexmedetomidine block nociceptive stimuli leading to more pronounced sensory block. Synergism with local anaesthetics may also enhance this effect. The finding were similar to Parmar et al (2014) who found that dexmedetomidine increase the highest level of sensory block as compared to placebo.

Our study has shown that motor block was significantly prolonged with the addition of intrathecal dexametomidine as compared with midazolam and control group (p<0.0001).This result is consistent with Rajni Gupta et al(2011). In 2011, Rajni Gupta et al conducted a study on 60 patients undergoing lower abdominal surgeries and observed that the total duration of motor blockade was prolonged in dexametomidine group as compared to fentanyl group (421±21 min vs. 149.3±18.2 min, P value<0.0001)(16). Nitish Parmar et al (2014) studied the effect of intrathecal ropivacaine and dexametomidine and demonstrated that dexametomidine significantly prolongs the motor blockade (258.55±30.46 min)(21). Kim and Lee (2001) and Prakash et al (2006) observed analgesic effects of intrathecal midazolam 1 mg or 2 mg along with bupivacaine and concluded that duration of postoperative analgesia was significantly prolonged with the addition of intrathecal midazolam in a dose dependent manner. Our study also reports prolonged duration of sensory and motor blockade in midazolam group as compared to control group.

Our study demonstrated no clinically significant difference in the haemodynamic parameters and incidence of adverse effects among the three groups coinciding with Rajni Gupta et al (2011)(16) and shukla et al(2016)(18) study. Joshi et al (2012), in their study, compared 2 mg midazolam to 30mcg of clonidine added to 15 mg of 0.5% hyperbaricbupivacaine and found a higher incidence of hypotension/bradycardia in the clonidine group compared to the midazolam group (44%/36% versus 16%/0%) (24). Considering the Kanazi et al (2006)study (25) we assumed that 5 mcg of dexametomidine used in our study would be equipotent to 40 – 50 mcg clonidine when used to supplement spinal bupivacaine. One study demonstrated that the higher dose of bupivacaine is responsible for perioperative hypotension rather than the use of midazolam . Our study results are in accordance to the finding of Joshi et al and the dexametomidine group resulted in the highest incidence of hypotension and bradycardia. Although the 3 groups were comparable regarding the occurrence of hypotension and bradycardia, the higher incidence of hypotension and bradycardia could be due to avoidance of preloading and a higher dose of hyperbaric bupivacaine. In our study, Grade 2 sedation was seen in 2 patients in Group A, 7 patients in Group B and in 6 patients in Group C. However, the number of patients sedated was more in Group B but it was statistically not
significant. Intrathecal α-2 receptor agonists and midazolam, both have intra-operative sedative effects, but similar to Kalso et al (1991) and Bharti (2003) et al no patients in either group were heavily sedated as is evident by overall sedation level between 0 and 2.

CONCLUSION

Intrathecal 5µg dexmedetomidine seems to be an attractive alternative to 2 mg midazolam as an adjuvant to 0.5% hyperbaric bupivacaine in spinal anesthesia in lower abdominal surgeries. It is associated with prolonged motor and sensory block, provides good quality of intraoperative analgesia and excellent quality of postoperative analgesia as compared to midazolam. Although no major side-effects were reported in this study, larger studies are required to rule out any short term or long term adverse effects. The study population included was otherwise healthy and young patients and the effect in old patients with cardiovascular co-morbidities or other medically compromised population are yet to be investigated.

References: