Comparative Study of Intravenous Dexmedetomidine Versus Intravenous Midazolam in Prolonging Spinal Anaesthesia with Ropivacaine

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Abstract

Problem: Spinal anaesthesia is the preferred choice of anaesthesia for the surgery below the umbilicus mainly due to easy of administration, rapid onset, efficient sensory and motor blockage, minimal cost and safety. The study's aim is to examine the effects of intravenous dexmedetomidine against midazolam on motor and sensory block duration, as well as analgesia, in patients having lower abdomen and lower extremities procedures using in trathecalropivacaine an aesthesia. **Appoarch**: Cross section analytical study conducted for a time period of 1 year 5 months from January 2020 to May 2021. **Findings**: A total of 70 participants were listed in the study. The mean age (years)in the dexmedetomidine and midazolam group were identified as 45.17 ± 15.23 and 45.86 ± 15.9 respectively. The average onset of sensory block was identified as 3 (2 to 4) and 4 (3 to 4) in the dexmedetomidine and midazolam group. Whereas, the average onset of motor block was identified as 9 (8 to 9) and 8 (8 to 9) in the dexmedetomidine and midazolam group. Duration of analgesia (mins) was high in the dexmedetomidine group with 173.89 ± 14.81 as compared to the midazolam group with 142.83 ± 17.31. **Conculsion:** Our findings showed that intravenously administered dexmedetomidine and midazolam may both prolong the duration of sensory and motor blockade, but dexmedetomidine has a longer duration of analgesia than midazolam. As a result, we recommended it for use under spinal anaesthesia, albeit heart rate should be closely monitored.

Keywords: Spinal anaesthesia, Ropivacaine, Midazolam, Dexmedetomidine

Introduction:

Spinal anaesthesia emerged as most favored anaesthesia for surgeries below the umbilicus area due to its sensory and motor blockage with a quick onset. with spared spontaneous respiration,considerable easeof administration, low cost,reduced blood loss, safety in patients with full stomach and the intestines and abdominal wall are completely relaxed, making surgery easier., eliminating the need for Intubation, and earlier return of intestinal motility.[1]Haemodynamic disturbances, failed spinal block, and failure to last for the duration of extended surgery are all problems of spinal anaesthesia that make it inappropriate for psychologically disturbed individuals. Total high spinal or spinal anaesthesia, headache, postdural puncture waist and back pain, and urine retention are few of the consequences.[2]

Different adjuvants like opioids, GABA agonist, calcium channel antagonist, adrenergics, NMDA receptor antagonist, cholinesterase inhibitors have been utilized to increase duration of spinal anaesthesia, with the decreased postoperative analgesic requirements .[34] Additionally, these agents help to ease the anxiety and fear of the patient with their calming effects.

The α-2 adrenergic agonists are being widely utilized as adjuvants as they deliver sedation, hypnosis, analgesia and sympatholysis without leading to respiratory depression. Previous studies has reported significant increase in thethe extent of the sensory and motor blockade with intrathecal addition of α-2 adrenergic agonists on local anaesthetics and hence, synergistic interaction between the two.[5],[6].Although, there exists dearth of literature regarding effects of intravenous α-2 agonists on the time period of spinal anaesthesia with ropivacaine.

Midazolam is an ideal supplemental sedative due of its quick onset and quick recovery.It delivers consistent depth of amnesia, effective anxiolysis, no signs of cumulation, and a speedy and clear-headed recovery, all with minimum side effects.[7]

Dexmedetomidine is a strong alpha 2 agonist with a high specificity for alpha 2 receptors. Analgesia, sedation, sympatholysis, and anxiolysis are all regulated by receptors in the locus coeruleus.. They can be found in various places throughout the body, including the spinal cord, peripheral tissues, and the central nervous system (CNS). The activation of alpha 2 receptors in the dorsal horn's substantiagelatinosa suppresses substance P release in the spinal cord.. Despite evidence for both supraspinal and peripheral sites of action, the spinal mechanism is the most important for dexmedetomidine's analgesic effects.[8]

Methods:

The research was conducted out at Sri Devaraj Urs Academy of Higher Education And Research, Tamaka, Kolar-563101, at the Department of Anaesthesiology. All the eligible patients admitted for elective surgery done under Spinal anaesthesia in the Department of Anaesthesiology at Sri Devaraj Urs Academy Of Higher Education And Research were considered as study population.

The current study was a cross section analytical study. Two groups of 35 subjects each. All the eligible subjects were recruited into the study consecutively by convenient sampling till the sample size is reached.The study was approved by the human ethics committee of the university.

Study duration**:** The data collection for the study was done between January 2020 to May 2021 for a period of 1 year 5 months

Inclusion Criteria:

1. Age 18 to 60 years
2. ASA physical status 1 or 2
3. Lower limb surgeries and below umbilicus surgery

Exclusion criteria:

1. Patients Who are critically ill or haemodynamically unstable or emergency surgeries.
2. Any pathology of spine or spinal related disease.
3. Patients at increased risk of Bleeding disorder, impaired coagulation and anti coagulation therapy
4. Patients on MAO inhibitors, Anti Depressants and beta blockers
5. Musculocutaneous abnormalities affecting the vertebrae.

Prospective randomized study was planned in patients aged between 18 to 60 years of both sexes belonging to ASA physical status 1 & 2, undergoing elective surgery under spinal anesthesia expected to last less than 2 hours were included in the study after ethical clearance from the college ethical committee.

Each patient was visited pre-operatively and procedure was explained, written and informed consent was obtained. All the routine investigations required for pre-operative evaluation was done for the proposed surgery.

Tab Alprazolam 0.5 mg on previous night and Tab Ranitidine 150mg on the morning of surgery will be given. Patients were allowed for period of fasting for atleast 8 hours. They were allocated into 2 groups

On arrival in the operating room I.V line was secured and the patient was shifted to the OT room ,under aspectic precaution patient was painted and draped, spinal was given in L3-L4 space. After checking the CSF back flow Drug administered. For all patients were administered Ropivacaine 0.5% (3ml) for spinal anesthesia and patient received oxygen 4 l/min through out the procedure.

- Group A – IV dexmedtomidine(A loading dose of 0.5 mcg/kg over 10 minute followed by maintenance dose of 0.5 mcg/kg/hr in form of infusion).
- Group B – Intravenous midazolam(A loading dose of 0.02 mg/kg, followed by infusion rate of 0.02 mg/kg/hr).
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Parameters Observed:

1. Onset , Duration and action of drugs.
2. Number of insertion attempts and Time taken for each attempt i.e. procedure time.
3. Any technical difficulty and complications.
4. Sensory blockade and recovery time for sensory blockade.
5. Motor block was assessed by Modified BromageScale(MBS).Its action and duration was noted.
6. The patient's post-operative pain was assessed using a visual analogue scale (VAS).
7. SPO_2,,HR, BP and RR were recorded. Intraoperatively , the vitals were measured every 5 minutes for 30 minutes after injection , thereafter every 10 minutes through out surgery.

Any complication was detected in the preoperative and postoperative periods.

Results:

A total of 70 participants were included in the final analysis with 35 participants in group A and 35 participants in group B.

Table 1: Comparison of baseline parameters between study group (N=70)

Parameter	Group (Mean± SD)		P value
	A (N=35)	B (N=35)	
Age (in years)	45.17 ± 15.23	45.86 ± 15.9	0.854$
Weight (in kg)	60.8 ± 5.47	61 ± 6.08	0.885$

In group A, the mean age among the study population was 45.17 ± 15.23 years and in group B, it was 45.86 ± 15.9 years. The mean weight among the study population in group A and group B was found to be60.8 ± 5.47 kg and 61 ± 6.08 kg respectively. There was statistically insignificant difference between mean age and mean weight between study group (P Value>0.05). (Table 1)

Table 2: Comparison of gender between study group (N=70)

Gender	Study Group		Chi square	P value
	A (N=35)	B (N=35)		
Female	12 (34.29%)	15 (42.86%)	0.543	0.461
Male	23 (65.71%)	20 (57.14%)		

Among the study population, there were 12 (34.29%) females and 23 (65.71%) males in group A and there were 15 (42.86%) females and 20 (57.14%) males in group B. There was not any difference that is statistically significant in gender between study group (P Value>0.05). (Table 2)

Figure 1: Clustered bar chart for comparison of gender between study group

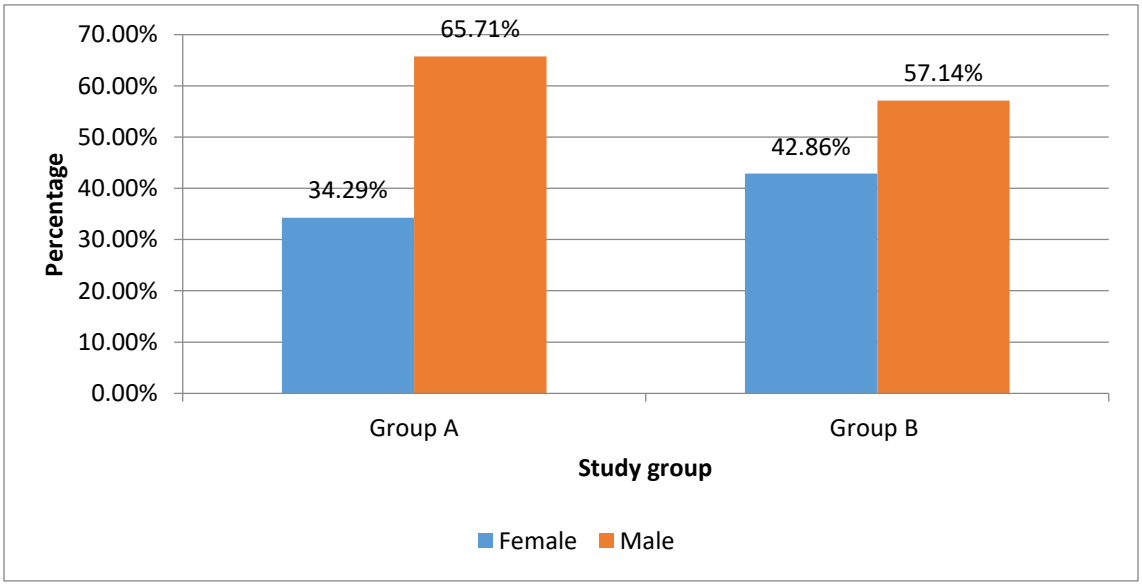


Table 3: Comparison of onset sensory and onset motor parametersbetween study group (N=70)

Parameters	Study Group [Median (IQR)]		P Value
	A (N=35)	B (N=35)	
Onset Sensory	3 (2 to 4)	4 (3 to 4)	0.001
Onset Motor	9 (8 to 9)	8 (8 to 9)	0.009

Among the study population, the median onset sensory was 3 (2 to 4) in group A and 4 (3 to 4) in group B. The median onset motor was 9 (8 to 9) in group A and 8 (8 to 9) in group B. There was a statistically significant difference in onset sensory and motor between study group (P Value<0.05). (Table 3)

Figure 2: Box plot for comparison of onset of sensory between study group

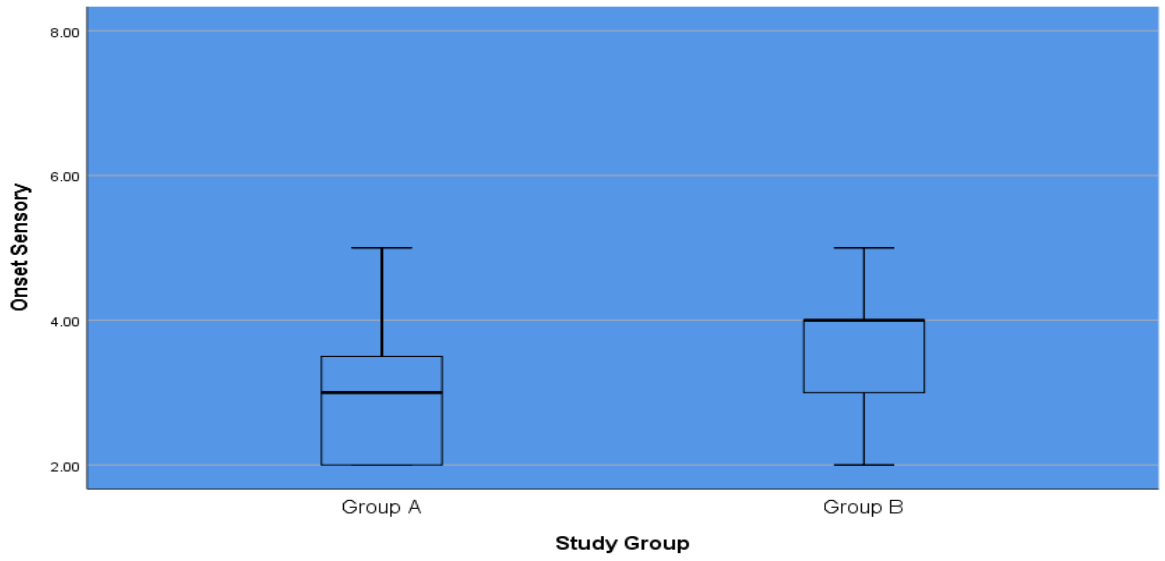


Figure 3: Box plot for comparison of onset of motor between study group

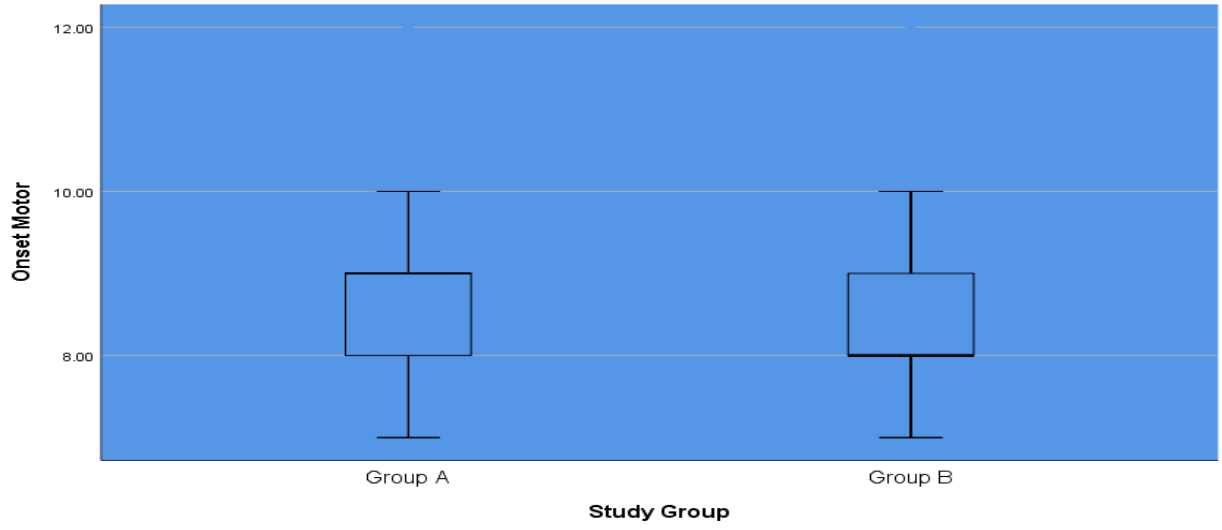


Table 4: Comparison of time span of sensory and motor block between study group (N=70)

Parameters	Study Group [Median (IQR)]		P Value
	A (N=35)	B (N=35)	
Time span of sensory block (in minutes)	180 (175 to 186)	150 (140 to 170)	<0.001
Time span of motor block (in minutes)	150 (145 to 155)	130 (110 to 148)	<0.001

Among the study population, the median (IQR)timespan of sensory block was 180 (175 to 186) minutes in group A whereas it was150 (140 to 170) minutes in group B. The median (IQR)timespan ofmotorblock was 150 (145 to 155) minutes in group A and 130 (110 to 148) minutes in group B. There was a statistically significant difference in timespan of sensory and motor block between the two study group (P Value<0.05). (Table 4)

Figure 4: Box plot for comparison of timespan of sensory block between study group

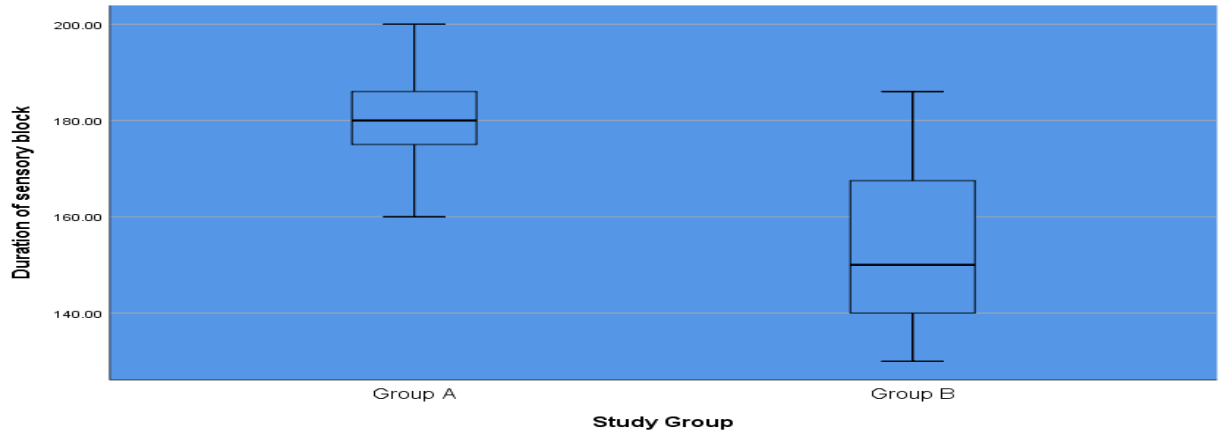


Figure 5 Box plot for comparison of timespan of motor block between study group

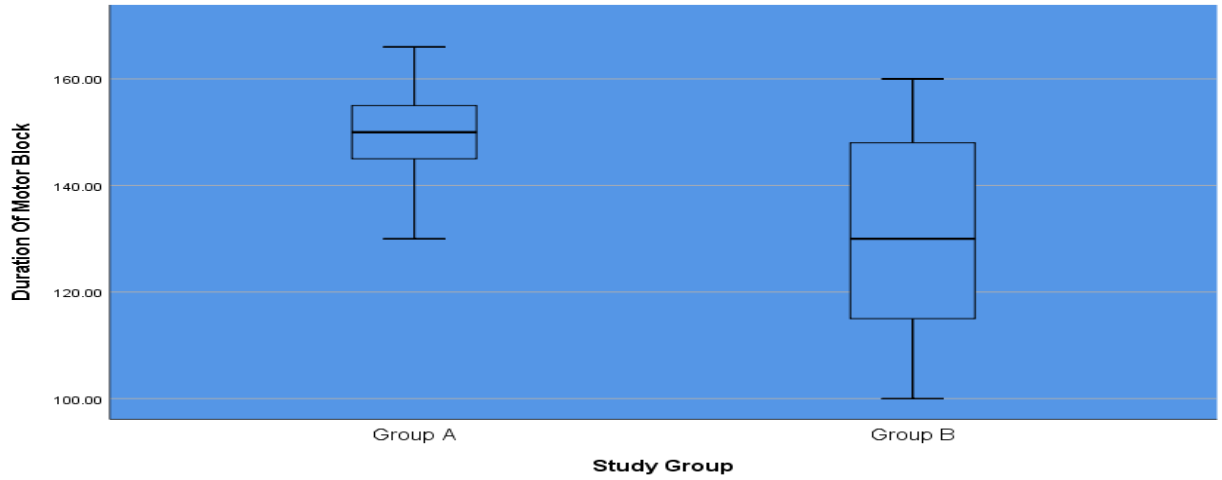


Table 5: Comparison of vital parameters at pre-operative between study group (N=70)

Parameter	Study Group		P value
	A (N=35)	B (N=35)	
Pulse Rate (bpm)	90 (83 to 98)	90 (82 to 98)	0.769#
Systolic Blood Pressure (mm/hg)	127 (118 to 134)	127 (121 to 134)	0.746#
Diastolic Blood pressure (mm/hg)	80 (76 to 89)	82 (76 to 89)	0.136#
Mean arterial pressure (mm/hg)	96.46 ± 8.49	97.97 ± 8.19	0.450$

#: Mann Whitney U test; $:IST

Among the study population at pre-operative stage, the median (IQR) pulse rate was 90 (83 to 98)bpm in group A and 90 (82 to 98)bpm in group B. The median (IQR)SBPwas 127 (118 to 134) mm/hg in group A and 127 (121 to 134) mm/hg in group B. The median (IQR)DBP was 80 (76 to 89) mm/hg in group A and 82 (76 to 89) mm/hg in group B.The mean arterial pressurewas 96.46 ± 8.49mm/hg in group A and 97.97 ± 8.19 mm/hg in group B. There was not a statistically significant difference in vital parameters (PR, SBP, DBP, MAP) at pre-operative stage between study group (P Value>0.05). (Table 5)

Table 6: Comparison of vital parameters at different time periods between study group (N=70)

Parameter	Study Group [Median (IQR)]		P value
	A (N=35)	B (N=35)	
At 1 minutes			
Pulse Rate (bpm)	81 (74 to 94)	86 (76 to 93)	0.588#
Systolic Blood Pressure (mm/hg)	120 (114 to 124)	121 (114 to 126)	0.681#
Diastolic Blood pressure (mm/hg)	78 (71 to 85)	79 (74 to 84)	0.689#
Mean arterial pressure (mm/hg) (Mean±SD)	90.23 ± 8.13	92.37 ± 8.89	0.296$
At 5 minutes			
Pulse Rate (bpm)	75 (70 to 80)	78 (75 to 86)	*0.020#*
Systolic Blood Pressure (mm/hg)	116 (109 to 118)	112 (108 to 120)	0.495#
Diastolic Blood pressure (mm/hg)	75 (71 to 78)	77 (70 to 79)	0.495#
Mean arterial pressure (mm/hg) (Mean±SD)	87.71 ± 5.5	87.29 ± 8.62	0.805$
At 10 minutes			
Pulse Rate (bpm)	72 (68 to 75)	78 (70 to 85)	*0.004#*
Systolic Blood Pressure (mm/hg)	108 (104 to 115)	107 (103 to 113)	0.962#
Diastolic Blood pressure (mm/hg)	72 (64 to 76)	71 (66 to 77)	0.733#
Mean arterial pressure (mm/hg) (Mean±SD)	81.6 ± 8.14	82.43 ± 7.03	0.650$
At 15 minutes			
Pulse Rate (bpm)	70 (68 to 75)	74 (68 to 80)	*0.033#*
Systolic Blood Pressure (mm/hg)	107 (104 to 113)	106 (103 to 110)	0.778#
Diastolic Blood pressure (mm/hg)	69 (63 to 72)	72 (65 to 74)	0.136#
Mean arterial pressure (mm/hg) (Mean±SD)	79.83 ± 9.6	82.31 ± 5.85	0.195$

At 30 minutes			
Pulse Rate (bpm)	70 (68 to 75)	76 (70 to 78)	*0.003#*
Systolic Blood Pressure (mm/hg)	110 (105 to 115)	108 (105 to 110)	0.140#
Diastolic Blood pressure (mm/hg)	73 (64 to 75)	69 (64 to 72)	0.122#
Mean arterial pressure (mm/hg) (Mean±SD)	83.6 ± 9.51	81.37 ± 4.17	0.208$
At 60 minutes			
Pulse Rate (bpm)	72 (66 to 77)	78 (74 to 80)	*0.001#*
Systolic Blood Pressure (mm/hg)	116 (113 to 119)	116 (111 to 118)	0.524#
Diastolic Blood pressure (mm/hg)	71 (67 to 76)	75 (69 to 81)	0.125#
Mean arterial pressure (mm/hg) (Mean±SD)	84.91 ± 8.39	88.09 ± 5.54	0.066$
At 120 minutes			
Pulse Rate (bpm)	74 (68 to 78)	80 (74 to 85)	*0.002#*
Systolic Blood Pressure (mm/hg)	122 (120 to 123)	123 (120 to 126)	0.304#
Diastolic Blood pressure (mm/hg)	80 (77 to 80)	80 (74 to 82)	0.793#
Mean arterial pressure (mm/hg) (Mean±SD)	93.49 ± 3.44	93.4 ± 5.63	0.939$

#:Mann Whitney U test; $:IST

Among the study population at 1 minute, the median pulse rate was 81 (74 to 94)bpm in group A and 86 (76 to 93)bpm in group B. The median (IQR) SBPwas 120 (114 to 124) mm/hg in group A and 121 (114 to 126) mm/hg in group B. The median (IQR) DBPwas 78 (71 to 85) mm/hg in group A and 79 (84 to 74) mm/hg in group B. The mean arterial pressure was 90.23 ± 8.13mm/hg in group A and 92.37 ± 8.89 mm/hg in group B.
At 5 minutes, the median pulse rate was 75 (70 to 80)bpm in group A and 78 (75 to 86)bpm in group B. The median (IQR) SBPwas 116 (109 to 118) mm/hg in group A and 112 (108 to 120) mm/hg in group B. The median (IQR) DBPwas 75 (71 to 78) mm/hg in group A and 77 (70 to 79) mm/hg in group B. The mean arterial pressure was 87.71 ± 5.5mm/hg in group A and 87.29 ± 8.62mm/hg in group B.
At 10 minutes, the median pulse rate was 72 (68 to 75)bpm in group A and 78 (70 to 85)bpm in group B. The median (IQR) SBPwas 108 (104 to 115) mm/hg in group A and 107 (103 to 113) mm/hg in group B. The median (IQR) DBPwas 72 (64 to 76) mm/hg in group A and 71 (66 to 77) mm/hg in group B. The mean arterial pressure was 81.6 ± 8.14mm/hg in group A and 82.43 ± 7.03 mm/hg in group B.
At 15 minutes, the median pulse rate was 70 (68 to 75)bpm in group A and 74 (68 to 80)bpm in group B. The median (IQR) SBPwas 107 (104 to 113) mm/hg in group A and 106 (103 to 110) mm/hg in group B. The median (IQR) DBPwas 69 (63 to 72)mm/hg in group A and 72 (65 to 74) mm/hg in group B. The mean arterial pressure was 79.83 ± 9.6mm/hg in group A and 82.31 ± 5.85 mm/hg in group B.
At 30 minutes, the median pulse rate was 70 (68 to 75)bpm in group A and 76 (70 to 78)bpm in group B. The median (IQR) SBPwas 110 (105 to 115)mm/hg in group A and 108 (105 to 110) mm/hg in group B. The median (IQR) DBPwas 73 (64 to 75)mm/hg in group A and 69 (64 to 72) mm/hg in group B. The mean arterial pressure was 83.6 ± 9.51mm/hg in group A and 81.37 ± 4.17 mm/hg in group B.
At 60 minutes, the median pulse rate was 72 (66 to 77)bpm in group A and 78 (74 to 80)bpm in group B. The median (IQR) SBPwas 116 (113 to 119)mm/hg in group A and 116 (111 to 118)mm/hg in group B. The median (IQR) DBPwas 71 (67 to 76)mm/hg in group A and 75 (69 to 81) mm/hg in group B. The mean arterial pressure was 84.91 ± 8.39mm/hg in group A and 88.09 ± 5.54 mm/hg in group B.

At 120 minutes, the median pulse rate was 74 (68 to 78)bpm in group A and 80 (74 to 85)bpm in group B. The median (IQR) SBPwas 122 (120 to 123)mm/hg in group A and 123 (120 to 126) mm/hg in group B. The median (IQR) DBPwas 80 (77 to 80)mm/hg in group A and 80 (74 to 82) mm/hg in group B.The mean arterial pressure was 93.49 ± 3.44mm/hg in group A and 93.40 ± 5.63 mm/hg in group B.
There was not a statistically significant difference in vital parameters (PR, SBP, DBP, MAP) at at all the time periods (1 min, 5 min, 10 min, 15 min, 30 min, 60 min and 120 min) between study group (P Value>0.05) except for the pulse rate at 5 min, 10 min, 15 min, 30 min, 60 min and 120 min between the study group (P Value<0.05). (Table 6)

Figure 6: Trend line for comparison of median pulse rate at different time periods between study group

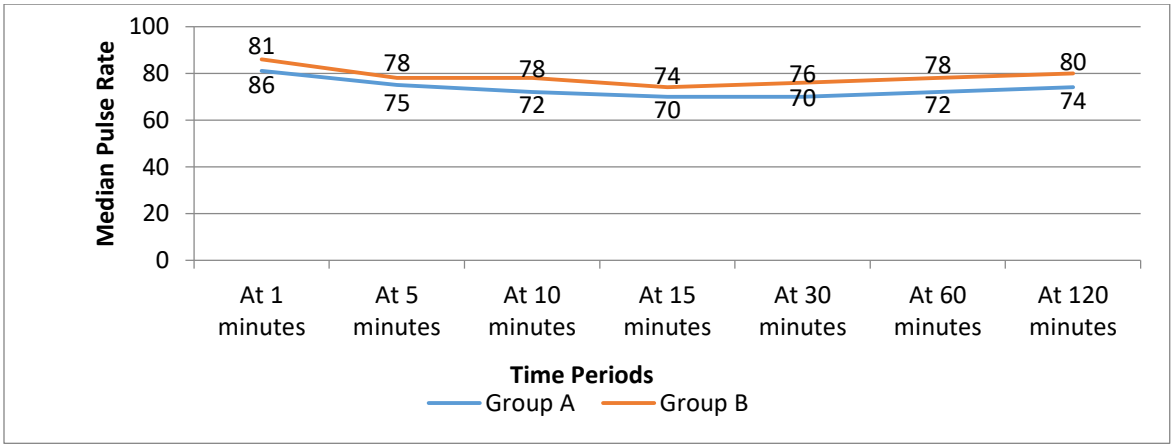


Figure 7: Trend line for comparison of mean arterial pressure at different time periods between study group

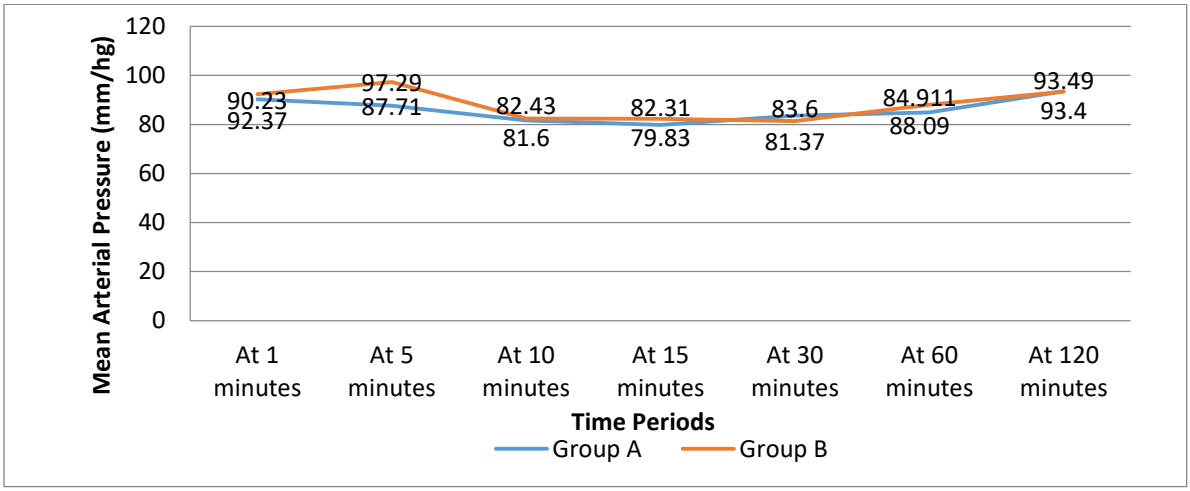


Figure 8: Box plot for comparison of pulse rate at 5 minutes between study group

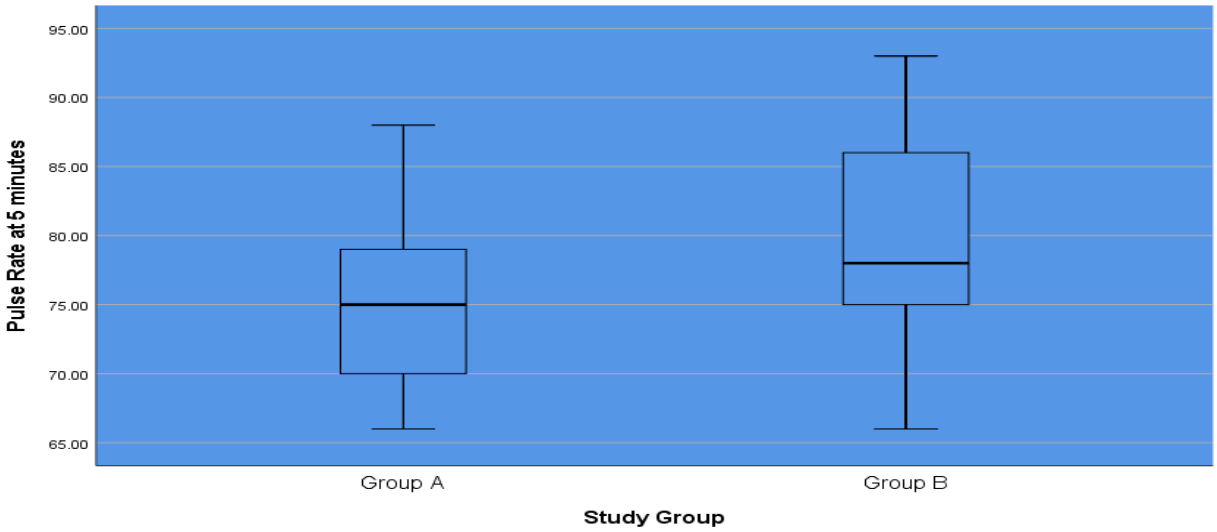


Figure 9: Box plot for comparison of pulse rate at 15 minutes between study group

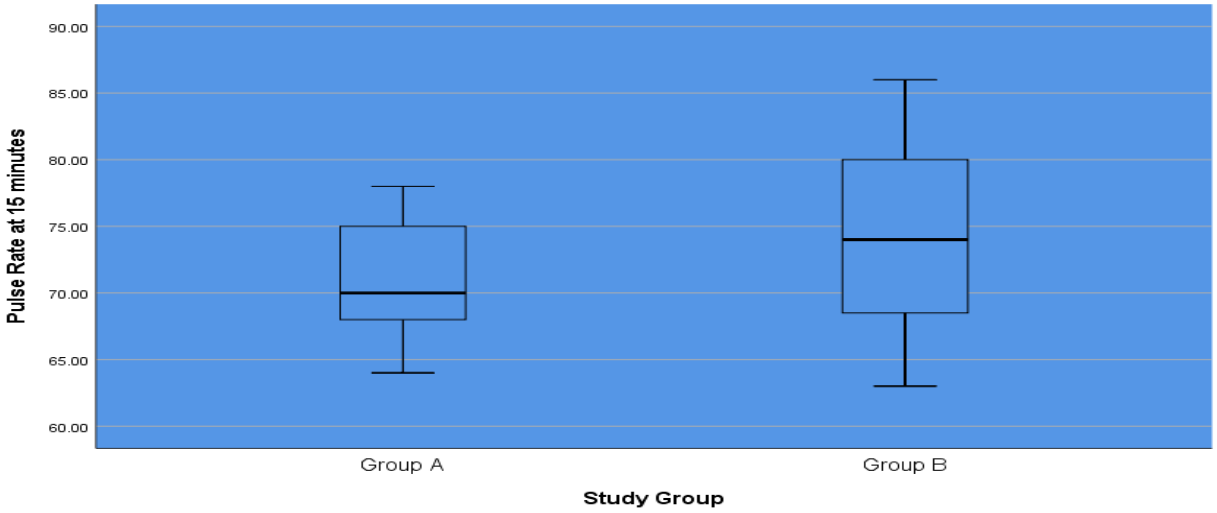


Figure 10: Box plot for comparison of pulse rate at 120 minutes between study group

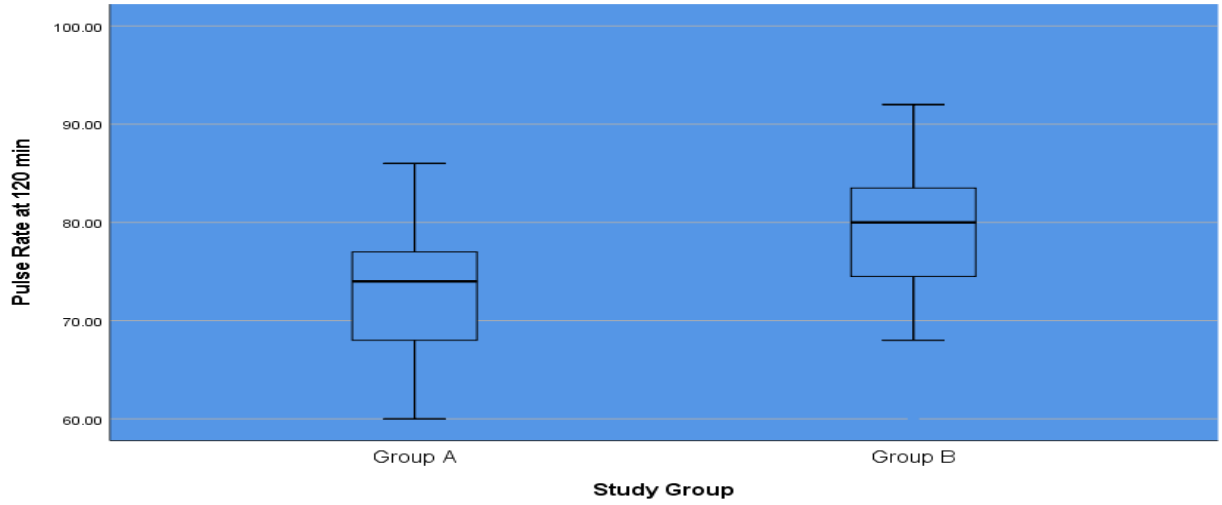


Table 7: Comparison of timespan of surgery between study group (N=70)

Parameter	Group (Mean± SD)		P value
	A (N=35)	B (N=35)	
Duration of surgery (in minutes)	63.57 ± 15.37	63.29 ± 15.24	0.938

In group A, the mean timespan of surgery among the study population was 63.57 ± 15.37 minutes where as it was 63.29 ± 15.24 minutes in group B. There was not any statistically significant difference in mean timespan of surgerybetween study group (P Value>0.05). (Table 7)

Figure 11: Error bar chart for comparison of timespan of surgery between study group

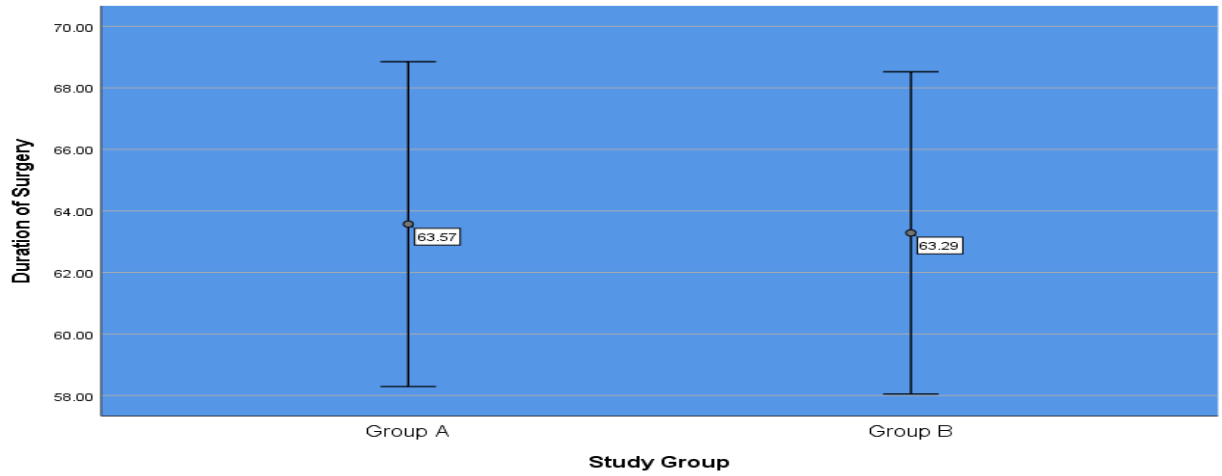


Table 8: Comparison of timespan of analgesia between study group (N=70)

Parameter	Group (Mean± SD)		P value
	A (N=35)	B (N=35)	
Duration of analgesia (in minutes)	173.89 ± 14.81	142.83 ± 17.31	<0.001

In group A, the mean timespan of analgesia among the study population was 173.89 ± 14.81 minutes and it was 142.83 ± 17.31 minutes in group B. There was a statistically significant difference in mean timespan of analgesiabetween study group (P Value<0.05). (Table 8)

Figure 12: Error bar chart for comparison of timespan of analgesia between study group

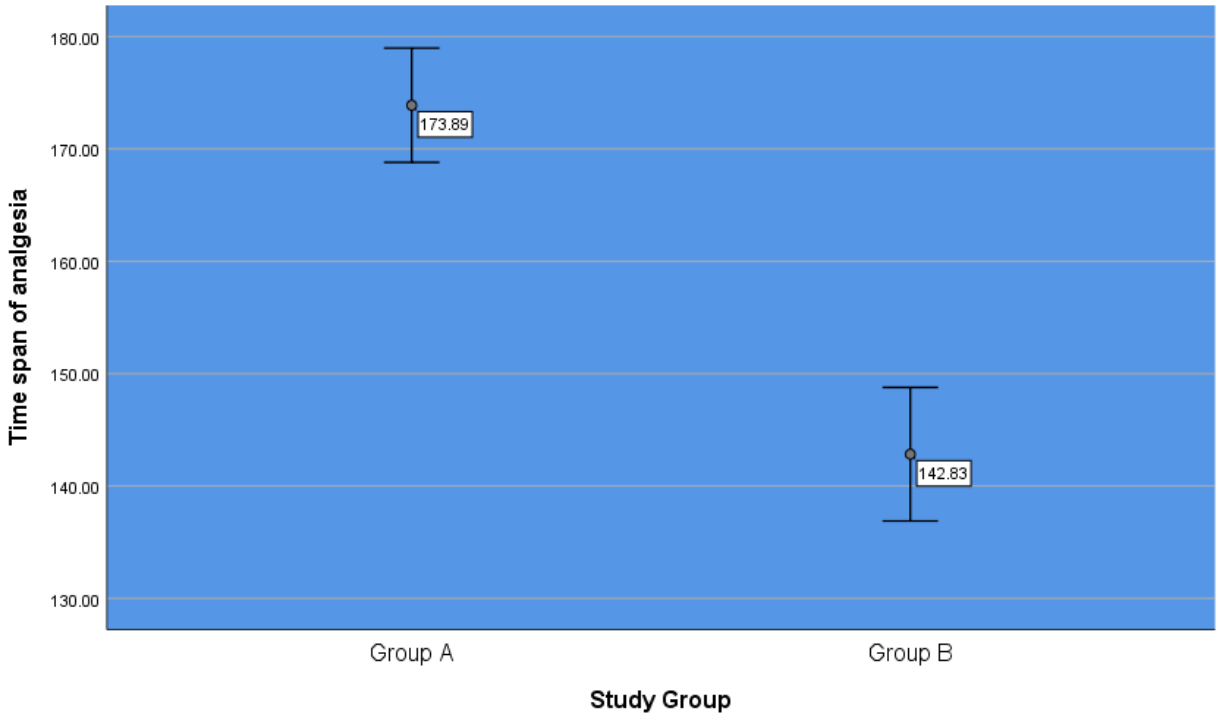
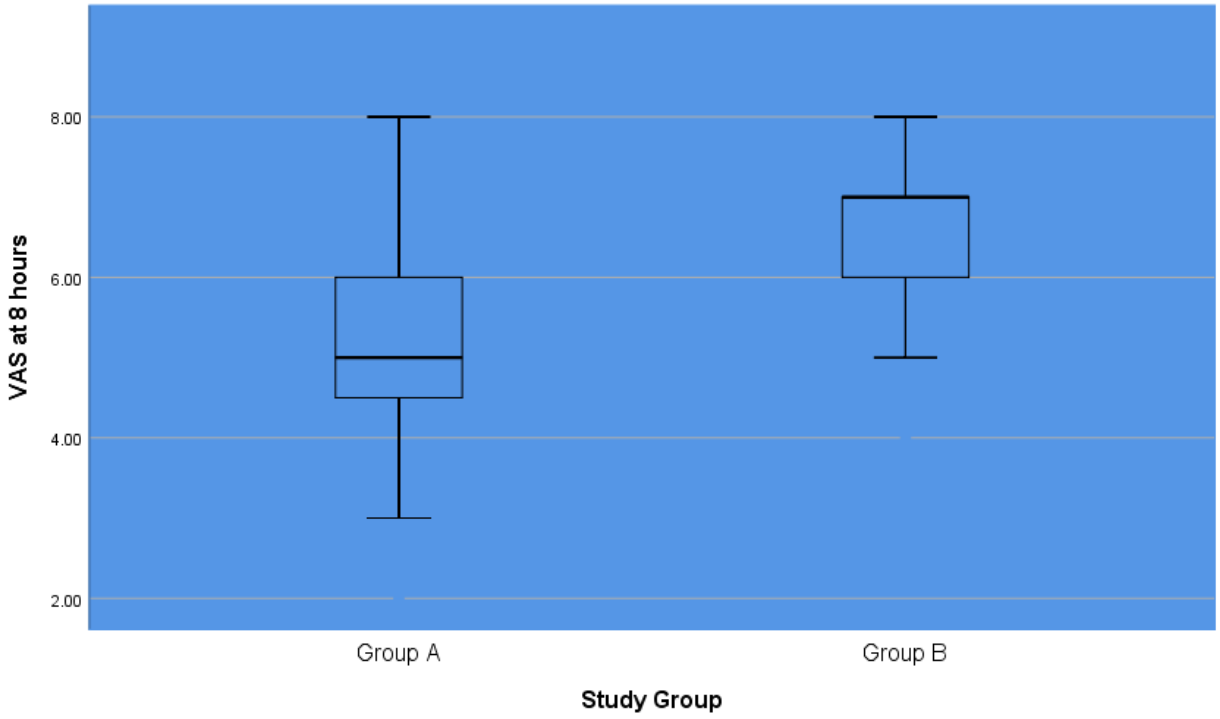


Table 9: Comparison of VAS Score at different time periods between study group (N=70)

VAS Score	Study Group [Median (IQR)]		P value
	A (N=35)	B (N=35)	
At 2 hours	2 (2 to 2)	3 (3 to 4)	<0.001
At 4 hours	2 (2 to 3)	5 (4 to 5)	<0.001
At 8 hours	5 (4 to 6)	7 (6 to 7)	<0.001

Among the study population, the median VAS score at 2 hours was 2 (2 to 2) in group A and 3 (3 to 4) in group B, the median VAS score at 4 hours was 2 (2 to 3) in group A and 5 (4 to 5) in group B and the median VAS score at 8 hours was 5 (4 to 6) in group A and 3 (3 to 4) in group B. There was a statistically significant difference in median VAS Scores (at 2 hours, at 4 hours and at 8 hours) between study group (P Value<0.05). (Table 9)

Figure 13: Error bar chart for comparison of VAS at 8 hours between study group



Discussion:

Various intravenous adjuvants are used along with the spinal anesthesia in order to delay the onset of postoperative pain and also to reduce the analgesic requirement.Midazolam is one of the most often used sedatives for conscious sedation during a subarachnoid block..Dexmedetomidine is considered as a highly selective alpha agonist with a sedative, analgesic and anxiolytic properties. It is not related with respiratory depression which makes it as a safer drug for the purpose of conscious sedation. Intravenous dexmedetomidine and midazolam areidentified to lengthen the sensory and motor blockade of the subarachnoid block. The goal of this study was to examine the effects of intravenous midazolam with dexmedetomidine on sensory and motor block duration, as well as analgesia, in patients undergoing lower limb and lower abdomen procedures under intra the calropivacaine anaesthesia.

A total of 70 participants were enrolled in the study with 35 participants in dexmedetomidine group and 35 participants in midazolam group.

In the current study, 45.17 ± 15.23 and 45.86 ± 15.9 were identified as the mean age (years)in the dexmedetomidine and midazolam group. Similarly, 60.8 ± 5.47 and 61 ± 6.08 were identified as the mean weight (kgs) in the dexmedetomidine and midazolam group respectively.

BalwinderKaurRekhi , et al.[9], conducted a single blind placebo controlled trial on 60 patients in which the mean of age (years) was higher in the midazolam Group with 36.35±12.97 years as compared to dexmedetomidine group with 33.40±9.98. While, the mean of weight (kgs) was higher in the dexmedetomidine group with 68.80±8.33 as compared to the midazolam Group with 65.60±9.57.

In our study and Sanjay Kumar, et al., [10]study, the mean age and weight does not show any statistically significant difference

Table10: Comparison of mean age between various studies

Study	population	Mean of age
Present study	70	**Dexmedetomidine (**45.17 ± 15.23) **Midazolam (**45.86 ± 15.9)
Sanjay Kumar, et al., [10]	100	**Dexmedetomidine** (39.86±13.51) **Midazolam (**39.8±13.75)
FatmaNur Kaya, et al., [11]	75	**Dexmedetomidine (**56.6 ± 8.5) **Midazolam (**54.8 ± 6.4)

Table11: Comparison of mean weight between various studies

Study	population	Mean of weight
Present study	70	**Dexmedetomidine (**60.8 ± 5.47) **Midazolam (**61 ± 6.08)
Sanjay Kumar, et al., [10]	100	**Dexmedetomidine (**52.22±6.02) **Midazolam (**52.18±6.08)
FatmaNur Kaya, et al., [11]	75	**Dexmedetomidine (**81.1 ± 12.4) **Midazolam (**78.5 ± 8.9)

In the current study, majority of the participants were identified as males in the dexmedetomidine and midazolam group with 65.71% and 57.14% respectively. Şenses., et al., [12]conducted a study on 80 participants

in which majority of the participants were females with 61% followed by males with 39% which was contradictory to our study results.

In the current study, the median onset of sensory block was identified as 3 (2 to 4) and 4 (3 to 4) in the dexmedetomidine and midazolam group. Whereas, the median onset of motor block was identified as 9 (8 to 9) and 8 (8 to 9) in the dexmedetomidine and midazolam group.

In Sanjay Kumar, et al., [10]study the mean time of onset of sensory block (min) was identified as 2.52±0.32 in the dexmedetomidine group and 2.97±0.64 in the midazolam Group. Similarly, the mean time of onset of motor block (min) was 3.21±0.79 in the dexmedetomidine group and 3.64±0.84 in the midazolam Group.

In the current study, the median duration of sensory block was identified as 180 (175 to 186) and 150 (140 to 170) in the dexmedetomidine and midazolam group.. While, the median duration of motor block was identified as 150 (145 to 155) and 130 (110 to 148) in the dexmedetomidine and midazolam group respectively.

In BalwinderKaurRekhi , et al., [9]study the mean duration of sensory block was higher in the dexmedetomidine group with 208±19.36 min as compared to the midazolam Group with 177±15.25 min. Similarly, the mean duration of motor block was more in the dexmedetomidine group with 190.25±13.81min as compared to the midazolam Group with 136.50±17.54 min.

In our study, BalwinderKaurRekhi , et al., [9]and Nirmala B. et al., [13]study the duration of sensory and motor block were identified as higher in the dexmedetomidine group.

Table 12: Comparison of mean duration of sensory and motor block between various studies

Study	Population	Duration of sensory and motor block
Present study	70	Sensory block Dexmedetomidine (180 (175 to 186)) Midazolam Group 150 (140 to 170) Motor block Dexmedetomidine150 (145 to 155) Midazolam Group 130 (110 to 148)
Nirmala B. et al.,[13]	120	Sensory block Dexmedetomidine (265.32 ± 15) Midazolam (185.2 ± 15) Motor block Dexmedetomidine (198.8 ± 15) Midazolam (135.60)

In the present study, the pre-operative median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg)were identified as 90 (83 to 98), 127 (118 to 134) and 80 (76 to 89) in the dexmedetomidine group. While, it was 90 (82 to 98), 127 (121 to 134) and 82 (76 to 89) in the midazolam Group. Similarly, 96.46 ± 8.49 and 97.97 ± 8.19 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In BalwinderKaurRekhi , et al., [9]study the mean of pulse rate (bpm), systolic blood pressure (mm Hg), diastolic blood pressure (mm Hg) and arterial pressure (mm Hg) were identified as 83.15±6.77, 126.40±6.54, 79.40±6.68 and 95.05±6.45 in dexmedetomidine group. While, it was identified as 83.85±5.99, 124.3±6.46, 80.30±8.11 and 94.95±7.13 in the midazolam Group.

In our study andBalwinderKaurRekhi , et al., [9]study the vital parameters (PR, SBP, DBP, MAP) at pre-operative stage does not show any statistically significant difference between the two groups.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 1 minute were identified as 81 (74 to 94), 120 (114 to 124) and 78 (71 to 85) in the dexmedetomidine group. While, it was 86 (76 to 93), 121 (114 to 126) and 79 (74 to 84) in the midazolam Group. Similarly, 90.23 ± 8.13 and 92.37 ± 8.89 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 5 minutes were identified as 75 (70 to 80), 116 (109 to 118) and 75 (71 to 78) in the dexmedetomidine group. While, it was 78 (75 to 86), 112 (108 to 120) and 77 (70 to 79) in the midazolam Group. Similarly, 87.71 ± 5.5 and 87.29 ± 8.62 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 10 minutes were identified as 72 (68 to 75), 108 (104 to 115) and 72 (64 to 76)in the dexmedetomidine group. While, it was 78 (70 to 85), 107 (103 to 113) and 71 (66 to 77) in the midazolam Group. Similarly, 81.6 ± 8.14 and 82.43 ± 7.03 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 15 minutes were identified as 70 (68 to 75), 107 (104 to 113) and 69 (63 to 72) in the dexmedetomidine group. While, it was 74 (68 to 80), 106 (103 to 110) and 72 (65 to 74) in the midazolam Group. Similarly, 79.83 ± 9.6 and 82.31 ± 5.85 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 30 minutes were identified as 70 (68 to 75), 110 (105 to 115) and 73 (64 to 75) in the dexmedetomidine group. While, it was 76 (70 to 78), 108 (105 to 110) and 69 (64 to 72) in the midazolam Group. Similarly, 83.6 ± 9.51 and 81.37 ± 4.17 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 60 minutes were identified as 72 (66 to 77), 116 (113 to 119) and 71 (67 to 76) in the dexmedetomidine group. While, it was 78 (74 to 80), 116 (111 to 118) and 75 (69 to 81)in the midazolam Group. Similarly, 84.91 ± 8.39 and 88.09 ± 5.54 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In the current study, the median of pulse rate (bpm), systolic blood pressure (mm/hg) and diastolic blood pressure (mm/hg) at 120 minutes were 74 (68 to 78), 122 (120 to 123) and 80 (77 to 80)identified as in the dexmedetomidine group. While, it was 80 (74 to 85), 123 (120 to 126) and 80 (74 to 82) in themidazolam

Group. Similarly, 93.49 ± 3.44 and 93.4 ± 5.63 were identified as the mean atrial pressure in the dexmedetomidine and midazolam group.

In our study the reduction of pulse rate was higher in the dexmedetomidine group as compared to the midazolam group for the first 30 minutes. Similar pattern of reduction was showed by BalwinderKaurRekhi , et al.,[9] study also.

In the present study, 63.57 ± 15.37 and 63.29 ± 15.24 were identified as the mean duration of surgery (mins) in the dexmedetomidine group and in the midazolam Group. In BalwinderKaurRekhi , et al., [9]study the duration of surgery (Minutes) was higher in the dexmedetomidine group with 82.5±13.72 as compared to the with midazolam Group 72.5±19.70.

Sanjay Kumar, et al.,[10]conducted a prospective, randomized, comparative, and double-blinded study in which 51.23±2.02 and 55.35±3.74 were identified as the duration of surgery (mins) in the dexmedetomidine and midazolam group respectively.

Table 13: Comparison of duration of surgery between various studies

Study	Population	Duration of surgery
Present study	70	**Dexmedetomidine (**63.57 ± 15.37) **Midazolam (**63.29 ± 15.24)
FatmaNur Kaya, et al., [11]	**75**	**Dexmedetomidine (**38.7 ± 5.6) **Midazolam (**39.2 ± 6.1)
Nirmala B. et al., [13]	**120**	**Dexmedetomidine (**112.07 ± 21.51) **Midazolam(**115.8 ± 22.56)
Yongxin Liang, et al., [14]	**120**	**Dexmedetomidine (**102 ± 41) **Midazolam(**101 ± 30**)**

In the current study, duration of analgesia (mins) was high in the dexmedetomidine group with 173.89 ± 14.81 as compared to the midazolam group with 142.83 ± 17.31. Mariko Watanabe, et al., [15]conducted a study in which mean duration of anaesthesia was higher in the dexmedetomidine group with79.3 ± 22.8 as compared to the midazolam group with 76.3 ± 30.5.

In our study and Mariko Watanabe, et al., [15]study the duration of analgesia was higher in the dexmedetomidine group.

In the present study, the median VAS score at 2, 4 and 8 hours were higher in the midazolam group with 3 (3 to 4), 5 (4 to 5) and 7 (6 to 7) as compared to the dexmedetomidinegroup with 2 (2 to 2), 2 (2 to 3) and 5 (4 to 6) respectively.

In Sanjay Kumar, et al.,[10] study the mean VAS score at 4 h, 8 h, 12 h and 24 h were identified as 2.23, 4.5, 5.8 and 4.3 in the dexmedetomidine group while, it was 4.9, 5.1, 5.2, and 5.12 in the midazolam group.

In our study andSanjay Kumar, et al.,[10] study the VAS scores were identified as higher in the midazolam group.

Conclusions:

Our findings showed that intravenously administered dexmedetomidine and midazolam may both prolong the duration of sensory and motor blockade, but dexmedetomidine has a longer duration of analgesia than midazolam. As a result, we recommended it for use under spinal anaesthesia, although heart rate should be closely monitored.

Limitation:

The sample size of the study was small. It could have been better with larger population size. Participants above the age of 60 years have been excluded from the study so effect of drug on older age group and associated cardiovascular status were not identified. A physiological saline group was not enrolled in the present study. The addition of a saline group as a placebo can be helpful for identifying the effects of dexmedetomidine itself on duration of the spinal anesthesia.

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