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Comparative Study of Dexmedetomidine and Clonidine as Adjuvants to Isobaric Ropivacaine 0.75% for Epidural Anesthesia in Infraumbilical Surgeries

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Abstract

Background: Epidural anesthesia is very popular for infraumbilical surgeries. Epidural form of central neuraxial blockade techniques avoid the disadvantages associated with general anesthesia like airway manipulations, polypharmacy and other untoward effects like postoperative nausea, vomiting and need for supplemental intravenous analgesics. Amongst different local anesthetic drugs used, Ropivacaine, being pure S-enantiomer of bupivacaine is the recently introduced long acting amide anesthetic agent is claimed to be better in its cardiovascular profile. Alpha 2 (α_2) adrenergic receptor agonists have both analgesic and sedative properties when used as an adjuvant to local anesthetic in regional anesthesia. *Methodology:* A double blind prospective randomized control study conducted at tertiary health care institute to evaluate and compare the efficacy, block characteristics and postoperative analgesia of 1.5 µg/kg Dexmedetomidine in comparison to 2 µg/kg Clonidine as adjuncts to 0.75% isobaric Ropivacaine in epidural anesthesia for infraumbilical surgeries. *Results:* Meantime for onset of sensory and motor blockade, meantime for maximum sensory blockade and meantime for complete motor blockade was earlier with dexmedetomidine than with Clonidine as epidural adjuvant. Total duration of sensory and motor blockade was considerably longer in group receiving dexmedetomidine. Higher dermatomal level of sensory blockade, longer postoperative analgesia with better sedation was achieved by group receiving dexmedetomidine with comparative stable hemodynamics as compared to group receiving Clonidine. *Conclusion:* Dexmedetomidine is a better alternative to Clonidine as an adjuvant to 0.75% isobaric Ropivacaine in epidural anesthesia for providing early onset of sensory and motor blockade, desirable sedation and prolonged postoperative analgesia.

Keywords: Clonidine; Dexmedetomidine; Epidural anesthesia; Infraumbilical surgeries; Isobaric ropivacaine.

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Introduction

Central neuraxial blockade in the form of epidural anesthesia is very popular for lower abdominal and lower limb surgeries. Central neuraxial blockade techniques avoid the disadvantages associated with general anesthesia like airway manipulations, polypharmacy and other untoward effects like postoperative nausea, vomiting and need for supplemental intravenous analgesics.[1] Epidural

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anesthesia provides anesthesia for prolonged surgery with better hemodynamic stability than spinal anesthesia. Advantage of epidural anesthesia over general anesthesia is that the intubation and extubation responses are avoided and there will be a choice to provide postoperative analgesia.

Amongst different local anesthetic drugs used for epidural anesthesia, most popular are lignocaine and bupivacaine. Though bupivacaine is used popularly in epidural space, the fear of accidental intravascular injection lead to cardiac arrest which is difficult to resuscitate is a major problem. Ropivacaine being pure S-enantiome is a recently introduced long acting amide local anesthetic agent derived from bupivacaine is claimed to have lesser cardiovascular side effects compared to the later. It is said to be better in its cardiovascular profile as Ropivacaine was found to be less cardiac depressant, less arrythmogenic and less cardiotoxic and neurotoxic than bupivacaine.[2–5]

To alleviate anxiety due to awake status, large doses of sedation or even general anesthesia may be needed in epidural anesthesia technique. This defeats the novel purpose of regional anesthesia of continuous verbal contact with the patient. Hence to overcome this problem an adjuvant can be used with epidural local anesthetics which will provide sedation, stable hemodynamic conditions and ability to provide smooth and prolonged postoperative analgesia in addition to the reduction in the dose of Ropivacaine.

Alpha 2 (α_2) adrenergic receptor agonists have both analgesic and sedative properties when used as an adjuvant to local anesthetic in regional anesthesia.[6–11] Dexmedetomidine is a relatively selective α_2 adrenergic agonist. Majority of patients receiving Dexmedetomidine were effectively sedated yet were easily arousable, a unique feature not observed with other sedatives.[12] Dexmedetomidine suppresses descending noradrenergic pathway activity, modulates nociceptive neurotransmission and terminates propagation of pain signals leading to analgesia. The hypnotic and supraspinal analgesic effects are mediated by the hyperpolarization of noradrenergic neurons, which suppresses neuronal firing in the locus ceruleus along with inhibition of norepinephrine release and activity in the descending medullospinal noradrenergic pathway, secondary to the activation of central α_2 adrenergic receptors. This suppression of inhibitory control triggers neurotransmitters that decrease histamine secretion producing hypnosis similar to normal sleep, without respiratory depression, making Dexmedetomidine a near ideal sedative.[13]

Clonidine is an established α_2 adrenoceptors agonist with antihypertensive properties. When administered epidurally it has an analgesic action that is largely mediated through α_2 adrenoceptors in dorsal horn of spinal cord. Clonidine is useful adjuvant to opioids and local anesthetic agent for postoperative analgesia after major abdominal surgeries and orthopedic surgeries.[14] Clonidine enhances both sensory and motor blockade from epidural injection of local anesthetic. Hence to come up with a better adjuvant for epidural 0.75% isobaric Ropivacaine the present study had been planned.

Objectives

To compare between dexmedetomidine and clonidine as adjuvants to epidural 0.75% isobaric Ropivacaine with respect to the following parameters:

1. Time for onset of sensory and motor blockade;
2. Level of sensory blockade achieved;
3. Time required for two segment regression of sensory blockade;
4. Duration of sensory and motor blockade;
5. Duration of postoperative analgesia;
6. Hemodynamic changes;
7. Intraoperative and postoperative complications if any.

Materials and Methods

Study design: Randomized double blinded clinically controlled study

Study setting: Tertiary health care center.

Study population: 60 patients with *inclusion criteria*:

1. Patient giving valid informed written consent;
2. Age group of 18–60 years of both sexes;
3. ASA grade I or II;
4. Patients undergoing elective infraumbilical surgeries.

Exclusion criteria

- Patient refusal.
- ASA Grade III and onwards.
- Patients on α_2 antagonist treatment, allergic to local anesthetics or α_2 adrenergic agonists.
- Patients with infection at the site of injection, congenital abnormalities of lower spine.

- Patients with coagulopathy, uncorrected hypovolemia, active disease of CNS.
- Patients with uncontrolled systemic illness like diabetes mellitus, hypertension, neuromuscular diseases, etc.

The study population was randomly divided into following two treatment groups in a double blinded fashion based on a computer generated code: RC and RD.

Group RC - Group of 30 patients received 17 ml of 0.75% Ropivacaine + 2 µg/kg Clonidine diluted up to 1 ml with normal saline.

Group RD - Group of 30 patients received 17 ml of 0.75% Ropivacaine + 1.5 µg/kg Dexmedetomidine diluted up to 1 ml with normal saline.

After ethical committee approval and preanesthetic evaluation with basic laboratory investigations like Hemoglobin, complete blood count, blood sugar level, blood urea, serum creatinine, liver function test, chest X-ray, Electrocardiography (ECG) and urine investigations and thorough clinical examination, patients belonging to study population were interviewed and explained in detail about the surgical procedure, procedure of giving anesthesia, the pin prick method for assessing anesthesia, VAS score and how it will be checked to the patient in their own language. All the patients were reviewed in the previous night of proposed day of surgery and received tab. diazepam 10 mg and tab. ranitidine 150 mg given at bed and kept nil orally for appropriate duration.

On the day of surgery, patient's basal hemodynamic parameters were recorded. Multi-parameter monitor was connected which records heart rate, noninvasive measurement of Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Arterial Pressure (MAP), continuous Electrocardiogram (ECG) monitoring and oxygen saturation (SpO_2).

Assessment of sensory and motor blockade was done using pin prick and modified Bromage scale respectively.

Modified Bromage Scale

0	No motor blockade
1	Inability to raise extended leg or able to move knees and feet.
2	Inability to raise extended leg and move knee or able to move feet
3	Inability to flex ankle and foot

Cardio-respiratory parameters were monitored continuously and recordings were made every 5 min for first 30 min, every 10 min for next 30 min and every 15 min thereafter, during intraoperative period.

Block characteristics observed were:

1. Time for onset of sensory blockade;
2. Time for onset of motor blockade;
3. Time of maximum sensory blockade;
4. Time for complete motor blockade;
5. Maximum level of sensory blockade;
6. Time required for two segment regression;
7. Total duration of sensory blockade;
8. Total duration of motor blockade;
9. Time required for rescue analgesia (VAS ≥ 4).

Hypotension (i.e. systolic arterial blood pressure falling more than 20% mm Hg of baseline value) was treated with inj. mephenteramine 6 mg in bolus doses intravenous and bradycardia (heart rate < 60 beats/min) was treated with 0.6 mg of inj. atropine intravenously. Intravenous fluids were given as per body weight and operative loss requirements. During the surgical procedure, adverse event like anxiety, nausea, vomiting, shivering, dry mouth etc. were recorded. Nausea and vomiting were treated with 4 mg of intravenous inj. ondensetron.

Sedation Grading was done by 5 points scale:

I	Alert and wide awake
II	Arousable to verbal command
III	Arousable with gentle tactile stimulation
IV	Arousable with vigorous shaking
V	Not arousable

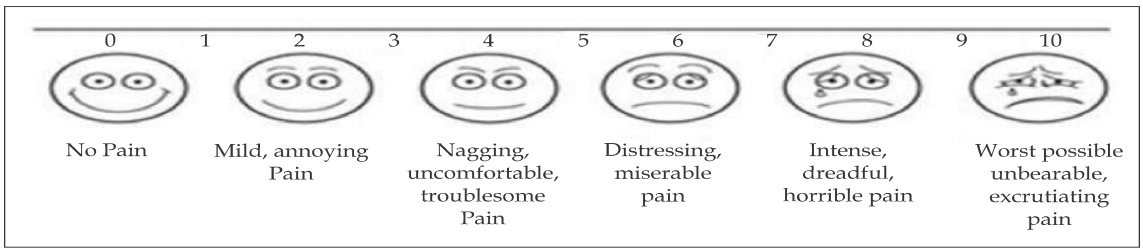

Fig. 1: Visual analog scale for assessment of pain

Sedation up to Grade III of this scale was desirable for surgical procedures.

Pain scoring was done using VAS score. Rescue analgesia given to the patient experiencing pain of VAS ≥ 4 with inj. Diclofenac sodium 75 mg by intramuscular or intravenous route.

After completion of surgery, the epidural catheter was removed. Patients were observed postoperatively as well.

Statistical Analysis

The findings were recorded in the case record forms. Data entries were done in Microsoft excel 2013. Statistical analyses were performed in SPSS software (version 20.0). for quantitative data unpaired t-test was applied and for qualitative data Chi-square test was applied. p - value less than 0.05 is taken as significant and p - value < 0.001 as highly significant.

Results

The demographic profile of the patients in terms of their age, sex, weight, duration of surgery and type of infraumbilical surgeries were comparable. The block characteristics and hemodynamic changes were as shown in Tables 1,2 and Figs. 1–5.

Discussion

Among local anesthetic agents, ropivacaine is a newer local anesthetic agent which is popular in the conduct of epidural anesthesia. Though ropivacaine is slightly less potent as compared to bupivacaine, its pharmacological profile is almost comparable to later. Various studies and literary evidence had concluded that cardiac toxicity of ropivacaine is far less than bupivacaine. In this study, 60 patients were randomly divided into two groups, each group had 30 patients, (n = 30).

Table 1: Comparison of block characteristics between Group RC and Group RD

Block Characteristics	Group RC	Group RD	*p* - value
Time for onset of sensory blockade at T 10 dermatome (min.)	12.53 ± 1.85	7.28 ± 0.97	0.000013
Time for onset of motor blockade (min.)	17.26 ± 3.42	14.02 ± 4.18	0.0017
Time for maximum sensory blockade (min.)	18.52 ± 2.33	12.05 ± 3.71	0.00007
Time for complete motor blockade (min.)	22.31 ± 2.67	18.25 ± 4.12	0.000089
Max. sensory level			
T4	3 (10%)	4 (13%)	
T6	21 (70%)	26 (86.67%)	0.01904
T8	6 (20%)	0 (0%)	
T10	0 (0%)	0 (0%)	
Total duration of sensory blockade Study (min.)	303.3 ± 27.7	324.7 ± 32.3	0.0078
Duration of motor blockade (min.)	206.3 ± 21.78	226.7 ± 23.96	0.0015
Time required for 2 segment regression (min.)	123.7 ± 13.4	146.3 ± 14.3	0.000034
Time required for rescue analgesia (minutes)	387.00 ± 41.14	423.3 ± 42.67	0.0014

Table 2: Comparison of sedation score & incidence of side effects between group RC & group RD

	Group RC	Group RD	*p*- value
Sedation score			
I	19 (61.33%)	4 (13.33%)	
II	9 (30%)	12 (40%)	
III	2 (6.67%)	14 (46.67%)	0.00067
IV and V	0 (0%)	0 (0%)	
Side effect			
Dry Mouth	3(10%)	3(10%)	
Nausea	2(6.67%)	5(16.67%)	>0.05
Vomiting	2(6.67%)	1(3.33%)	>0.05
Shivering	5(16.67%)	4(13.33%)	>0.05
Bradycardia	6(20%)	13(43.33%)	< 0.05
Hypotension	16(53.33%)	2(6.67%)	<0.001

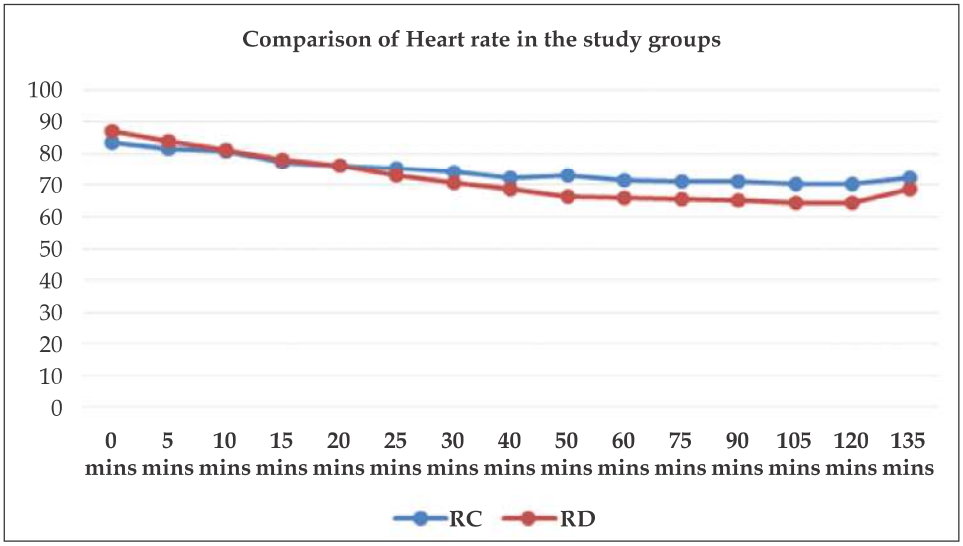

Fig. 2: Comparative changes in heart rate in study groups

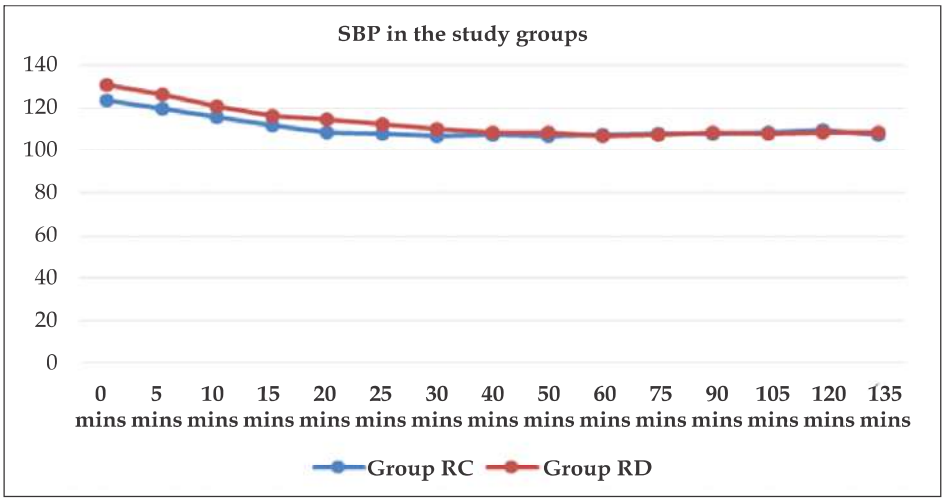

Fig. 3: Comparative changes in systolic blood pressure in study groups

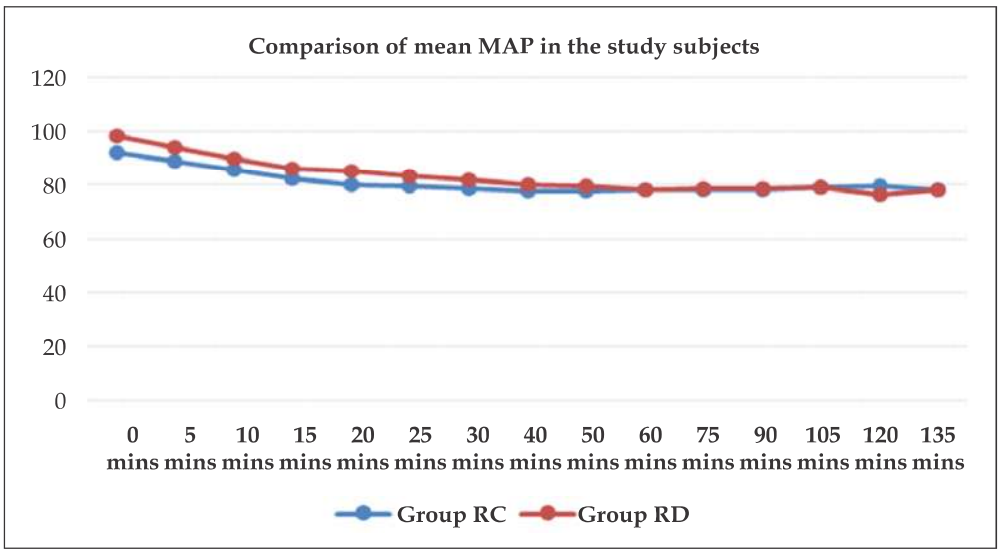

Fig. 4: Comparative changes in mean arterial pressure in study groups

Group RC: Received epidurally 17 ml of 0.75% isobaric ropivacaine with 2 µg/kg of Clonidine.

Group RD: Received epidurally 17 ml of 0.75% isobaric ropivacaine with 1.5 µg/kg of dexmedetomidine.

The demographic parameters like age, sex, weight, ASA Grading and duration of surgery were comparable.

The findings of our study were as follows:

The meantime for onset of sensory blockade in Group RC (12.53 ± 1.85 min.) was late than in Group RD (7.28 ± 0.97 min.). Bajwa, et al.[11] in their study observed onset time of sensory blockade to be 9.72 ± 3.44 min in Group RC and 8.52 ± 2.36 min in Group RD. Shivakumar M. Channabasappa et al.[15] 63 found onset of sensory blockade in group of patients receiving dexmedetomidine (14.53 ± 2.96 min.) earlier than group of patients receiving clonidine (16.72 ± 4.43 min.).

Thimmappa et al.[1] found onset of sensory blockade earlier in dexmedetomidine Group (8.90 ± 0.99 min.) than clonidine Group (9.17 ± 1.21 min.), similar to our study. Muhammad Rashid O, et al.[19] observed earlier onset of sensory blockade with dexmedetomidine (9.42 ± 1.41 min.) than clonidine. (10.80 ± 2.49 min.) Arunkumar S et al.[16] in their study found earlier onset of sensory blockade in patients receiving dexmedetomidine (8.53 ± 1.81 min.) as compared to patients receiving clonidine. (11.93 ± 1.96 min.) Harinath G et al.[13] in their study found earlier onset of sensory blockade in patients receiving dexmedetomidine (8.6 ± 12.38 min.) as compared to patients receiving clonidine. (9.84 ± 1.77 min.) These results support our study.

Meantime for onset of motor blockade in Group RC and Group RD were 17.26 ± 3.42 min. and 14.02 ± 4.18 min. respectively. The onset time of sensory and motor blockade, was significantly earlier in Group RD than in Group RC. The onset is faster in patients receiving dexmedetomidine than the patients receiving clonidine. The difference was found to be statistically significant.

Bajwa et al.[11] in their study found rapid onset of motor blockade in Group RD (17.24 ± 5.16 min.) than in the Group RC. (19.52 ± 4.06 min.) Thimmappa et al.[1] in their comparative study found that time required to attain motor blockade with Group RD was 15.77 ± 1.25 min. and with Group RC was 16.47 ± 1.38 min. Bajwa et al.[11] also found that addition of dexmedetomidine to epidural ropivacaine hastens the onset of motor blockade.

The meantime for maximum sensory blockade was 18.52 ± 2.33 min. in Group RC and 12.05 ± 3.71 min. in Group RD. Thus, time for maximum sensory blockade in Group RD was earlier than in Group RC which was statistically significant. Harinath G et al.[13] found time for maximum sensory blockade earlier (13.36 ± 2.62 min.) in patients receiving dexmedetomidine than in patients receiving clonidine. (15.56 ± 2.53 min.) Bajwa et al.[11] noticed time for maximum sensory blockade to be earlier in Group RD (13.14 ± 3.96 min.) as compared to Group RC (15.80 ± 4.56 min.) which was similar to our study.

Thimmappa et al.[1] unlike our study, found no any significant difference in attaining maximum

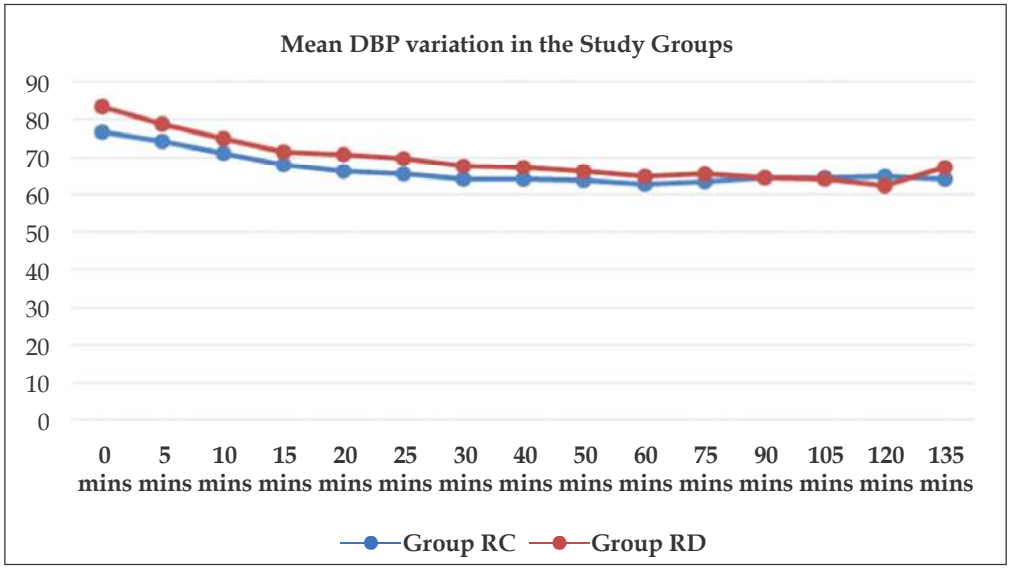

Fig. 5: Comparative changes in mean diastolic blood pressure in study groups

sensory blockade in patients receiving Clonidine (13.36 ± 1.46 min.) and dexmedetomidine (13.03 ± 1.33 min.).

In present study, meantime for complete motor blockade in Group RC was 22.3 ± 2.67 min and in Group RD was 18.25 ± 4.12 min. Tis finding suggest motor blockade to be earlier in Group RD as compared to Group RC which was statistically significant.

Bajwa et al.[11] in their study found that the meantime for complete motor blockade in Group RD (17.24 ± 5.16 min.) was earlier than in Group RC (19.52 ± 4.06 min.).

Muhammad Rashid O et al.[19] found time for complete motor blockade to be earlier in patients receiving dexmedetomidine (21.20 ± 3.36 min.) as compared to patients receiving Clonidine (28.40 ± 4.06 min.) Harinath G et al.[13] found time for complete motor blockade to be earlier in patients receiving dexmedetomidine (17.32 ± 2.71 min.) as compared to patients receiving Clonidine (19.6 ± 3.09 min.) which was similar to our study.

Thimmappa et al.[1] found no any significant difference in attaining complete motor blockade in patients receiving Clonidine (16.47 ± 1.38 min.) and dexmedetomidine. (15.77 ± 1.25 min.)

Arunkumar S et al.[16] also found no statistically significant difference in time required for complete motor blockade between two groups of patients i.e. patients receiving Clonidine (23.07 ± 4.63 min.) and dexmedetomidine. (23.00 ± 4.27 min.) Higher dermatomal level of sensory blockade was achieved by (T 4–5) than with Clonidine T 5–6). Harinath G et al.[13] found higher dermatomal level of sensory blockade in patients receiving dexmedetomidine (T 5–6) than those receiving Clonidine (T 6–7).

Bajwa et al.[11] found higher dermatomal level of sensory blockade in patients receiving dexmedetomidine (T 5–6) than those receiving Clonidine (T6–7).

uhammad Rashid O et al.[19] also found higher dermatomal level of sensory blockade in patients receiving dexmedetomidine (T 3–4) than those receiving Clonidine (T4–5). The findings of these studies were similar to our study. Bamne et al.[17] found highest dermatomal blockade T4 in both groups of patients receiving dexmedetomidine and Clonidine with no statistically significant difference.

Time taken for two segment regression in Group RC and RD were 123.7 ± 13.4 min. and 146.3 ± 14.3 min. respectively in present study i.e. significantly earlier in Group RC than in Group RD. Study by Bajwa et al.[11] found meantime to two segment regression to be statistically significantly earlier in Group RC (128.08 ± 7.54 min.), than Group RD (136.46 ± 8.12 min.) similar to our study. Harinath G et al.[13] found meantime to two segment regression to be statistically highly significant between Group RD (135.76 ± 7.63 min.) and Group RC (127.96 ± 6.79 min.) comparable to our study. Channabasappa S et al.[15] also found meantime for two segment regression to be statistically significant between group of patients receiving dexmedetomidine (123.2 ± 8.63 min.) and clonidine.(111.52 ± 7.21 min.)

Thimmappa et al.[1] also found time taken for two segment regression to be statistically significant between Group RC (120.63 ± 17.59 min.) and Group RD (163.67 ± 15.20 min.) patients.

Muhammad Rashid O et al.[19] also found statistically significant difference in Group RC (108 ± 7.21 min.) and Group RD (132.60 ± 9.25 min.) patients. These findings supports our study. Total duration of sensory blockade in present study was more in group RD (324.7 ± 32.3 min) as compared to Group RC (303.3 ± 27.7 min) which was statistically significant. Bajwa et al.[11] found total duration of sensory blockade to be more in patients receiving dexmedetomidine (316.64 ± 40.36 min.) as compared to clonidine (296.72 ± 35.52 min) which was statistically significant.

Saravana Babu et al.[12] found total duration of sensory blockade significantly more in patients receiving dexmedetomidine (407.00 ± 47.06 min.) than patients receiving clonidine (345.01 ± 35.02 min).

Arunkumar S et al.[16] also found total duration of sensory blockade significantly more in patients receiving dexmedetomidine (316.00 ± 31.15 min.) than patients receiving Clonidine (281 ± 37 min).

Salgado PF et al.[18] also found prolonged sensory blockade in group of patients receiving dexmedetomidine than in those receiving Clonidine.

Thimmappa et al.[1] unlike our study, found no statistical significant difference in total duration of sensory blockade in patients receiving Clonidine (261.00 ± 17.68 min.) and dexmedetomidine (291.33 ± 27.79 min.). Total duration of motor blockade in present study in Group RC was 206.3 ± 21.7 min and in Group RD it was 226.7 ± 23.96 min. Thus, the duration of motor blockade in Group RD was more than Group RC which was statistically significant.

Bajwa et al.[11] found duration of motor blockade to be more in Group RD (246.72 ± 30.46 min.) than in Group RC (228.84 ± 27.18 min.) Muhammad Rashid O et al.[19] found duration of motor blockade in patients receiving dexmedetomidine (180.4 ± 11.6 min.) to be significantly more than those receiving Clonidine (143.00 ± 5.16 min.) which was similar to our study. Salgado PF et al.[18] found duration of motor blockade in group of patients receiving dexmedetomidine to be about 390 min. Bajwa et al.[11] found in their study that duration of motor blockade was prolonged in patients receiving dexmedetomidine along with ropivacaine i.e. 259.62 ± 21.38 min. Their finding was similar to our study. Thimmappa et al.[1] found time for complete recovery of motor blockade to be nonsignificant between patients of Group RC and Group RD.

The time required for first rescue analgesia in Group RC was 387.00 ± 41.14 min. and in Group RD was 423.3 ± 42.67 min., suggesting duration of postoperative analgesia to be more in Group RD than in Group RC which was statistically significant. Bajwa et al.[11] found time for first rescue top up to be more in Group RD (342.88 ± 29.16 min.) than in Group RC (310.76 ± 33.76 min.). Harinath G et al.[13] found time for first rescue top up to be earlier in Group RC (200.56 ± 17.74 min.) than in RD (220.48 ± 21.43 min.) which was statistically highly significant.

Channabasappa S et al.[15] found time for first rescue top up to be earlier in Group RC (234.65 ± 23.76 min.) than in RD (286.76 ± 34.65 min.) which was statistically highly significant. Thimmappa et al.[1] found no statistical difference in the duration of postoperative analgesia between Group RC (261.00 ± 17.68 min.) and Group RD (291.33 ± 27.79 min.) Muhammad Rashid O et al.[19] also found time to first rescue top up to be prolonged in Group RD (306 ± 12.3 min.) than Group RC (224 ± 17.2 min.) patients.

Soni P et al.[14], Arunkumar S et al.[16] also found duration of analgesia to be more in Group RD patients than Group RC patients. The incidence of sedation score of Grade II and III was more in Group RD as compared to Group RC. While the incidences of sedation score of Grade I was found more in Group RC than in Group RD.

Studies by Bajwa et al.[11], Thimmappa et al.[1] also found sedation score to be significantly more in Group RD than Group RC patients. Harinath G et al.[13] observed sedation score during surgery between the two groups to be statistically significant in Grade I and III sedation score.

Arunkumar S et al.[16] and Muhammad Rashid O et al.[19] found higher sedation scores in group of patients receiving dexmedetomidine than those who received clonidine. The results were similar to our study. Hemodynamic parameters were preserved both in intraoperative and postoperative period in both groups. There was overall statistically significant difference in mean heart rate at various time intervals between patients of Group RD and RC. 13 patients (43.33%) who received dexmedetomidine and 6 patients who received clonidine (20%) had bradycardia, which was statistically significant. Bradycardia was easily reversed with 0.6 mg of inj. atropine IV in all the patients experiencing bradycardia. Thimmappa et al.[1] found bradycardia in 13.3% of patients in Group RC and 33.3% of patients of Group RD which was similar to our study.

Studies by Harinath G et al.[13] and Muhammad Rashid O et al.[19] found no statistically significant difference in heart rate between patients of Group RD and Group RC. Saravana Babu et al.[12] found stable heart rate in Group RC and RD patients. Arunkumar S et al.[13] found significant fall in heart rate in both the study groups by 20% in 30–50 min. following epidural injection.

Channabasappa S et al.[15] found slight decrease in heart rate in both groups which was statistically insignificant. In this study, statistically significant difference in mean arterial pressure at various time intervals observed. 16 patients in Group RC and 2 patients in Group RD developed hypotension requiring treatment. Fall in MAP was significantly more in patients of Group RC than in Group RD, which was managed by intravenous fluids and inj. mephenteramine 6 mg IV.

Harinath G et al.[13] found statistically significant difference in MAP between Group RC and Group RD patients with incidence of hyptension more in Group RC than Group RD. This finding was similar to our study.

Bajwa et al.[11], Saravana Babu et al.[12] 55 found stable cardiorespiratory parameters in both RD and Group RC of patients. Muhammad Rashid O et al. 70 and Arunkumar S et al.[13] did not find any statistically significant difference in deviation in Blood Pressure (BP) in both study groups.

Channabasappa S et al.[15] found a slight decrease in MAP in both the study groups which was statistically not significant. Incidence of side effects like nausea, vomiting, dry mouth, shivering and headache were observed in very few patients. The difference between the two study groups was statistically nonsignificant. No patients in either

group had any respiratory depression. Bajwa et al.[11] found incidence of dry mouth to be significantly higher in both the groups but it was statistically not significant on comparison. Incidences of other side effects were comparable were statistically not significant in both the groups. Studies by Muhammad Rashid O et al.[19] and Thimmappa et al.[1] did not find statistically significant difference in incidence of side effects in both the study groups.

Harinath G et al.[13] found incidence of dry mouth to be higher in both the study groups but it was statistically not significant on comparison.

Conclusion

The present study, concludes that dexmedetomidine is a better alternative to clonidine as an adjuvant in epidural anesthesia for providing early onset and prolonged duration of sensory and motor blockade, desirable sedation and prolonged postoperative analgesia.

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