European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 07, 2022

ORIGINAL RESEARCH

Dexmedetomidine and Clonidine as Adjuvants in Epidural Anaesthesia: A Comparative Evaluation

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ABSTRACT

Background: To compare the efficacy standards and clinical status of two α-2 agonists dexmedetomidine and clonidine as adjuvant to bupivacaine in undergoing surgical procedures of lower limb and infraumbilical region. To estimate adjuvants analgesic property that provides superior anaesthetizing properties with sedation, haemodynamic stability in neuraxial anaesthesia.

Martial and Methods: A double blind randomized controlled study was planned with 50 patients of ASA I & II physical aged between 18-60 yrs who underwent elective infraumbilical and lower limb surgical surgery from 1st of January 2021 to 31st of December 2021 and satisfying all the inclusion criteria were enrolled in the study and they were randomly allocated into two groups. Group A (n=25) patients received 0.5% isobaric bupivacaine 15 ml with dexmedetomidine 1µg/kg of dose. Group B (n=25) patients received 0.5% isobaric bupivacaine 15ml with clonidine 2µg/kg of dose. A comparative study was performed between two groups for their effective analgesic actions. Group allotted to the patient was disclosed at the end of study.

Results: An earlier onset of sensory analgesia at T10 was reported with addition of dexmedetomidine to bupivacaine when compared to the addition of clonidine. Dexmedetomidine not only provided a higher dermatomal spread but also helped in achieving the maximum sensory anaesthetic level in a shorter period compared to clonidine. All these initial block characteristics turned out to be statistically significant values on comparison. Mean sedation scores were significantly higher in Dexmedetomidine group compared to Clonidine group. Dexmedetomidine provided a potential analgesic effect as compared to clonidine. As a result, patients in clonidine group required rescue analgesia earlier than dexmedetomidine group.

Conclusion: To conclude dexmedetomidine is observed to be better adjuvant than clonidine in epidural anaesthesia due to its better sedation, anxiolysis, superior intraoperative and postoperative analgesia and stable cardio- respiratory parameters.

Keywords: Bupivacaine, Dexmedetomidine, Clonidine, sedation, epidural.

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INTRODUCTION

Pain is a major concern of humankind since beginning and it has been the object of ubiquitous efforts to understand and to control it. Providing comfort to the patient by

prevention and relief of pain and monitoring and maintenance of normal physiology during the perioperative period is the primary goal of an anaesthetist. 1. Regional anaesthesia and analgesia has the potential to provide excellent operating conditions and prolonged post-operative pain relief. 2. Epidural blockade is becoming one of the most useful and versatile procedures in modern anesthesiology. The impressive point is that it can be placed virtually at any spine levels which makes it unique and provides flexion property when implemented into practise.[1,2,3] It is more versatile than spinal anaesthesia, giving the clinician the opportunity to provide anaesthesia and analgesia, as well as enabling chronic pain management. It provides better postoperative pain control and more rapid recovery from surgery. For orthopedic surgery, the provision of pain relief enables early post-operative mobilization, accelerates rehabilitation and return to normal function.[2,3,4] Many techniques and drug regimens, with partial or greater success, have been tried from time to time to calm the patients and to eliminate the anxiety component during regional anaesthesia.[4,5] The intense sensory and motor block, continuous supine position for a prolonged duration and the inability to move the body during regional anaesthesia brings a feeling of discomfort and phobia in many of the patients.[5,6] The high cephalic spread of analgesia with local anaesthetics may be significant but still its quality sometimes may not correlate with the level of sensory analgesia.[6,7,8] At this stage, the impulsive use of large doses of sedation or even general anaesthesia with mask defeats the novel purpose of regional anaesthesia whereby a continuous verbal contact with the patient is lost. Sedation, stable haemodynamic and an ability to provide smooth and prolonged post-operative analgesia are the main desirable qualities of an adjuvant in neuraxial anaesthesia. Bupivacaine is a long-acting amide local anaesthetic which has been in use for more than 40 years. Its introduction in 1957 is a very important step in the evolution of regional anaesthesia. Dexmedetomidine is a highly selective α-2 Adrenergic agonist with an affinity of eight times greater than clonidine.[8,9,10] There is no such study which has compared the dose equivalence of these drugs but the observations of various studies have stated that the dose of clonidine is 1.5–2 times higher than dexmedetomidine when used in epidural route.[10,11,12] The anaesthetic and the analgesic requirement get reduced to a huge extent by the use of these two adjuvants because of their analgesic properties and augmentation of local anaesthetic effects as they cause hyperpolarisation of nerve tissues by altering transmembrane potential and ion conductance at locus coeruleus in the brainstem. With an aim to compare the analgesic and sedative effects of both these drugs were used epidurally as an adjuvant to Bupivacaine in patients undergoing lower abdominal and lower limb surgeries by keeping their pharmacologic interactions and other properties, we planned a double blind prospective randomized clinically controlled study at our institute. This study appears to be the first comparing these drugs in epidural analgesia.

MATERIALS & METHODS

Adult patients (18- 60yrs) of physical status ASA I & II who underwent elective lower limb surgical procedures under epidural anaesthesia from 1st of January 2021 to 31st of December 2021 at SVS Medical College, Mahaboobnagar. Telangana, India. Group A (n=25) patients received 0.5% isobaric bupivacaine 15 ml with dexmedetomidine 1µg/kg of dose. Group B (n=25) patients received 0.5% isobaric bupivacaine 15ml with clonidine 2µg/kg of dose.

Methods of collection of data: A prospective randomized double blind controlled study was planned with inclusion of 50 patients of ASA I & II physical status aged between 18-60 yrs who underwent infraumbilical and lower limb elective surgery and satisfying all the inclusion criteria were enrolled in the study and were randomly allocated into two Group A and Group B.

Inclusion criteria:

1. ASA grade I & II status.
2. 18-60 years of age.
3. Patients giving informed written consent.
4. Patients scheduled to undergo elective below umbilical and lower limb surgical procedures under epidural anaesthesia.

Exclusion criteria:

1. ASA III or greater.
2. Age more than 60 years and less than 18 years.
3. Pregnant and lactating women.
4. Any contraindication to epidural anaesthesia –uncooperative patients, hypotension, previous spinal surgeries, spine abnormalities, local site infection and coagulation abnormalities.
5. Poorly controlled hypertension, angina, and cardiopulmonary disease.
6. Patients with hematological disease, neurologic, psychiatric disease, severe renal or hepatic derangement.
7. Patients taking Tricyclic antidepressants, any anti-psychotic drugs, alpha-2 adrenergic agonists, opiods, anti-arrythmics, beta blockers, anticoagulants.

Method of study: A prospective randomized double-blind study was planned. Patient and anaesthesiologist who deliver the epidural anaesthesia were blinded by the study solutions. All pre-anaesthetic evaluation of the patients was performed by an anaesthesiologist a day before the surgery. All patients who belonged in the inclusion criteria, after being taken a written informed valid consent were randomly allocated into group A and B.

Baseline non-invasive blood pressure, pulse rate, electrocardiograph, pulse oximetry was recorded. All patients received Ringer's lactate solution 20ml/kg as preloading solution before the block. Patients were put in sitting position and skin over the desired site was infiltrated with 2% lignocaine 2ml. After 5minutes of administering test dose, patients in group A and B received the dose decided for study.

Parameters observed:

Baseline pulse rate, respiratory rate, noninvasive blood pressure, Cardio respiratory parameters were monitored and recordings were made every 5 minute until 30 min and at 10 min interval, thereafter up to 60 minute and then at 15 minute interval for the next hour and finally at 30 minute in the 3rd hour. Intraoperatively and postoperatively, incidence of bradycardia was treated with 0.3mg of injection atropine and hypotension was treated with injection Mephenteramine 3-6 mg in bolus. Time to analgesic block that is administration of anaesthetic to the onset of action was evaluated as well as minimum and maximum analgesic block dermatome recorded with degree of motor block was assessed. Therefore, T10 measured using modified Bromage scale. Sedation scores were recorded just before the initiation of surgery and every 20 minutes. Level of sedation was assessed using a 5-point scale. Duration of analgesia was recorded as time interval from the completion of anaesthesia to the time when the patient complains of pain. During surgical procedure adverse effects like anxiety, nausea, vomiting, dry mouth, dizziness, headache, respiratory depression, pruritis and shivering were recorded. Post operatively patients were assessed at 30 min, 2 hours,6 hours 24 hours. Intensity of post-operative pain and quality of relief of pain was assessed. The group allocation of the patient was revealed after the end of the study

Statistical analysis: The obtained observations of the randomised double-blind study was statistically analysed by the student t test, chi- square for deriving results and conclusion of study.

RESULTS

Table 1: Distribution of patients according to age groups in group a and group b

Age groups	Group A	%	Group B	%	Total	%
20-29yrs	10	40.00	10	40.00	20	40.00
30-39yrs	5	20.00	7	28.00	12	24.00
40-49yrs	7	28.00	5	20.00	12	24.00
50+yrs	3	10	3	10	6	22.00
Total	25	100	25	100	50	100.00

Mean age	35.17	33.87	34.52
SD age	11.15	9.38	10.24
	Chi-square= 3.40	73 df=3 p=0.3330	

Table 2: Distribution of male and female patients in group a and group b

Sex	Group A	%	Group B	%	Total	%
Male	15	60.00	14	56.67	29	58.33
Female	10	40.00	11	43.33	21	41.67
Total	25	100.00	25	100.00	50	100.00

Chi-square= 0.0699, df=1 p=0.7934

Table 3: Comparison of group a and group b with respect to weight, height and bmi by t test

Variable	Group	Mean	SD	t-value	P-value
Height	Group A	164.33	3.58	-1.0708	0.2887
	Group B	165.30	3.41		
Weight	Group A	56.73	7.52	-1.0813	0.2841
	Group B	58.93	8.22		
BMI	Group A	21.02	2.77	0.1995	0.8426

Table 4: Distribution of patients according to asa grades in group a and group b

ASA grade	Group A	%	Group B	%	Total	%
Grade I	22	88.00	23	92.00	45	90.00
Grade II	3	12.00	2	08.00	5	10.00
Total	25	100.00	25	100.00	50	100.00

Chi-square= 0.1623, df=1, p=0.6875

Table 5: Comparison of group a and group b with respect to total duration of surgery (in min) by t test.

Group	Mean	SD	t-value	P-value
Group A	111.83	23.58	-0.1595	0.8739
Group B	112.67	16.23		

Table 6: Comparison of group a and group b with respect to onset time of sensory block at t 10 (in min) by t test

Group	Mean	SD	t-value	P-value
Group A	8.70	1.12	-7.8045	0.00001*
Group B	11.23	1.38		

*p<0.05

Table 7: Comparison of group a and group b with respect to time to maximum sensory block by t test

Group	Mean	SD	t-value	P-value
Group A	12.87	1.04	-12.5265	0.00001*
Group B	17.13	1.55		

*p<0.05

Table 8: Comparison of group a and group b with respect to time in min for complete motor block / bromage 3 by t test

Group	Mean	SD	t-value	P-value
Group A	19.30	1.62	-13.5996	0.00001*
Group B	24.87	1.55		

*p<0.05

Table 9: Distribution of patients according to maximum sensory block levels in group a group b

Maximum sensory block level	Group A	%	GroupB	%	Total	%
T5	0	0.00	1	4.00	1	02.00
T6	11	44.00		36.00	20	40.00
T7	8	32.00	5	20.00	13	26.00
T8	6	24.00	10	40.00	16	32.00
Total	25	100.00	25	100.00	50	100.00

Chi-square=1.8812, df=3, p=0.5974

Table 10: Comparison of group a and group b with respect to mephenteramine requirement (in mg) by t test

Group	Mean	SD	t-value	P-value
Group A	0.80	1.75	0.0000	1.0000
Group B	0.80	1.92		

Table 11: Comparison of group a and group b with respect to sedation scores during surgery

Duration	Group A		Group B		t-value	P-value	P value
Basal	Mean	Std. Dev.	Mean	Std. Dev.			
	1.00	0.00	1.00	0.00	--	--	NS
20 minutes	2.87	0.68	1.30	0.47	10.3937	0.00001*	S
40 minutes	2.27	0.45	1.00	0.00	15.4250	0.00001*	S
60 minutes	1.20	0.41	1.00	0.00	2.6926	0.0093*	S
80 minutes	1.00	0.00	1.00	0.00	--	--	NS
100 minutes	1.00	0.00	1.00	0.00	--	--	NS
120 minutes	1.00	0.00	1.00	0.00	--	--	NS
140 minutes	1.00	0.00	1.00	0.00	--	--	NS
160 minutes	1.00	0.00	1.00	0.00	--	--	NS
180 minutes	1.00	0.00	1.00	0.00	--	--	NS

Table 12: Comparison of group a and group b with respect to systolic bp (mm of hg) by t test

Time point	Group A		Group B		t-value	P value	Significance.
	Mean	Std.dev.	Mean	Std.dev.			
Basal	125.20	13.39	125.40	12.74	-0.0593	0.9529	NS
1 minute	125.33	13.47	125.80	12.92	-0.1370	0.8915	NS
3 minutes	124.93	13.99	125.13	12.79	-0.0578	0.9541	NS
5 minutes	124.60	13.35	124.13	12.55	0.1395	0.8895	NS
10 minutes	122.00	12.81	121.87	12.41	0.0410	0.9675	NS
15 minutes	118.07	12.56	118.27	12.27	-0.0624	0.9505	NS
20 minutes	113.67	12.15	114.93	13.05	-0.3890	0.6987	NS
35 minutes	110.87	12.30	114.13	12.81	-1.0074	0.3180	NS
50 minutes	110.33	10.96	113.60	12.61	-1.0711	0.2886	NS
65 minutes	110.60	11.22	113.87	12.10	-1.0843	0.2827	NS
80 minutes	111.33	10.77	114.73	11.69	-1.1716	0.2461	NS
95 minutes	112.53	9.55	115.00	11.82	-0.8888	0.3778	NS
110 minutes	113.40	9.05	115.20	11.96	-0.6572	0.5136	NS
125 minutes	114.13	9.32	116.07	11.60	-0.7117	0.4795	NS
140 minutes	115.40	8.82	116.60	12.30	-0.4343	0.6657	NS
155 minutes	115.73	8.94	117.47	11.77	-0.6424	0.5231	NS
170 minutes	117.67	9.20	118.13	11.70	-0.1717	0.8642	NS
185 minutes	118.60	8.63	119.00	11.44	-0.1528	0.8791	NS
200 minutes	119.20	8.75	119.73	11.61	-0.2009	0.8415	NS
215 minutes	118.93	9.30	119.60	11.83	-0.2426	0.8092	NS
230 minutes	120.53	9.98	122.00	11.23	-0.5348	0.5948	NS
245 minutes	121.73	9.39	122.53	11.57	-0.2941	0.7697	NS
260 minutes	122.93	9.95	122.73	11.68	0.0714	0.9433	NS
275 minutes	123.07	10.28	123.27	11.16	-0.0722	0.9427	NS

Table 13: Comparison of group a and group b with respect to diastolic bp (mm hg) by t test

Time point	Group A		Group B		t-value	P-value	Significance.
	Mean	Std.dev.	Mean	Std.dev.			
Basal	80.73	8.40	79.87	7.10	0.4316	0.6676	NS
1 minute	81.13	8.56	79.93	7.34	0.5827	0.5623	NS
3 minutes	80.40	8.14	79.67	7.26	0.3682	0.7141	NS
5 minutes	79.80	8.54	79.67	7.79	0.0632	0.9498	NS
10 minutes	79.60	7.69	77.93	7.27	0.8627	0.3919	NS
15 minutes	77.33	7.83	76.13	6.58	0.6426	0.5230	NS

20 minutes	75.27	7.73	74.60	6.22	0.3681	0.7141	NS
35 minutes	73.73	7.93	73.33	6.13	0.2186	0.8277	NS
50 minutes	73.20	7.57	73.07	5.55	0.0778	0.9382	NS
65 minutes	74.00	6.95	73.20	5.37	0.4989	0.6197	NS
80 minutes	74.13	6.72	73.47	6.06	0.4035	0.6881	NS
95 minutes	75.67	6.89	74.13	6.56	0.8829	0.3809	NS
110 minutes	75.87	7.61	74.53	7.18	0.6980	0.4880	NS
125 minutes	76.73	7.00	74.60	7.05	1.1764	0.2442	NS
140 minutes	77.73	6.90	74.93	6.49	1.6185	0.1110	NS
155 minutes	78.40	7.53	75.33	6.50	1.6885	0.0967	NS
170 minutes	78.47	7.57	76.07	6.36	1.3299	0.1888	NS
185 minutes	78.33	7.26	76.13	6.41	1.2442	0.2184	NS
200 minutes	78.53	7.46	76.27	6.03	1.2940	0.2008	NS
215 minutes	79.00	7.50	76.87	6.70	1.1622	0.2499	NS
230 minutes	79.33	6.63	77.27	6.18	0.2167	1.2489	NS
245 minutes	80.07	7.15	78.27	6.12	0.2993	1.0473	NS
260 minutes	80.13	7.57	78.40	6.96	0.3597	0.9232	NS
275 minutes	80.07	7.69	78.33	6.43	0.3477	0.9467	NS

Table 14: Comparison of group a and group b with respect to pulse rate by t test

Time point	**Group A**		**Group B**		**t-value**	**P-value**	**Significance.**
	Mean	Std.dev.	Mean	Std.dev.			
Basal	82.33	8.41	82.20	7.29	0.0656	0.9479	NS
1 minute	81.77	8.37	81.93	7.29	-0.0822	0.9348	NS
3 minutes	80.90	8.14	80.93	7.10	-0.0169	0.9866	NS
5 minutes	79.70	7.85	79.80	6.62	-0.0533	0.9576	NS
10 minutes	77.57	7.56	78.43	6.67	-0.4709	0.6395	NS
15 minutes	76.63	8.31	77.13	6.75	-0.2559	0.7990	NS
20 minutes	75.33	8.24	76.17	7.15	-0.4183	0.6773	NS
35 minutes	73.97	8.53	75.33	6.98	-0.6791	0.4998	NS
50 minutes	73.23	8.61	75.20	6.72	-0.9867	0.3279	NS

65 minutes	73.37	8.07	75.37	6.99	-1.0266	0.3089	NS
80 minutes	73.57	8.23	75.13	7.21	-0.7844	0.4360	NS
95 minutes	74.00	8.18	74.87	7.75	-0.4212	0.6752	NS
110 minutes	73.90	7.96	75.23	8.11	-0.6424	0.5232	NS
125 minutes	75.20	8.05	75.27	8.12	-0.0319	0.9746	NS
140 minutes	75.33	8.66	75.37	7.80	-0.0157	0.9876	NS
155 minutes	76.20	8.62	75.57	7.50	0.3036	0.7625	NS
170 minutes	75.90	8.73	75.33	7.25	0.2735	0.7855	NS
185 minutes	76.60	9.02	75.57	6.97	0.4965	0.6214	NS
200 minutes	76.43	9.29	75.90	6.89	0.2526	0.8015	NS
215 minutes	76.57	9.06	76.10	6.92	0.2243	0.8233	NS
230 minutes	76.50	8.75	74.00	14.69	0.8009	0.4265	NS
245 minutes	76.10	9.11	75.90	7.64	0.0922	0.9269	NS
260 minutes	76.37	8.91	76.23	7.46	0.0628	0.9501	NS
275 minutes	76.07	8.64	76.37	7.52	-0.1434	0.8865	NS
300 minutes	75.67	8.18	75.93	7.04	-0.1354	0.8928	NS

Table 15: Comparison of group a and group b with respect to respiratory rate (min) by t test

Time point	**Group A**		**Group B**		**t-value**	**P-value**	**Significance.**
	Mean	Std.dev.	Mean	Std.dev.			
Basal	14.23	1.50	14.00	0.87	0.7363	0.4645	NS
1 minute	14.27	1.64	14.00	0.87	0.7871	0.4344	NS
3 minutes	14.17	1.44	13.97	0.93	0.6394	0.5251	NS
5 minutes	14.23	1.22	14.03	0.89	0.7243	0.4718	NS
10 minutes	14.20	1.13	14.17	0.87	0.1280	0.8986	NS
15 minutes	14.23	1.43	14.20	0.89	0.1085	0.9140	NS
20 minutes	14.33	1.21	14.23	0.86	0.3686	0.7138	NS
35 minutes	14.20	1.19	14.23	0.90	-0.1227	0.9027	NS
50 minutes	14.30	1.26	14.17	0.95	0.4620	0.6458	NS
65 minutes	14.50	1.25	14.10	0.84	1.4501	0.1524	NS
80 minutes	14.33	1.49	14.10	0.96	0.7200	0.4744	NS
95 minutes	14.23	1.10	14.23	0.82	0.0000	1.0000	NS
110	14.23	0.97	14.20	0.85	0.1417	0.8878	NS

minutes							
125 minutes	14.27	1.23	14.20	0.89	0.2408	0.8105	NS
140 minutes	14.13	1.17	14.20	0.89	-0.2492	0.8041	NS
155 minutes	14.40	1.22	14.17	0.91	0.8385	0.4052	NS
170 minutes	14.57	1.19	14.17	0.79	1.5291	0.1317	NS
185 minutes	14.43	1.17	14.07	0.94	1.3390	0.1858	NS
200 minutes	14.47	1.41	14.20	0.81	0.9007	0.3715	NS
215 minutes	14.37	1.30	14.27	0.83	0.3555	0.7235	NS
230 minutes	14.20	1.16	14.17	0.91	0.1239	0.9018	NS
245 minutes	14.37	1.10	14.30	0.92	0.2554	0.7993	NS
260 minutes	14.17	1.18	14.07	0.94	0.3630	0.7179	NS
275 minutes	14.30	1.15	14.17	0.83	0.5143	0.6090	NS

Table 16: Comparison of group a and group b with respect to time to two segment regression (in min) by t test

Variable	Group	Mean	SD	t-value	P-value
Mean time to two segment regression	Group A	136.00	6.86	6.3279	0.00001*
	Group B	124.97	6.65		

Table 17: Comparison of group a and group b with respect to time to regression to s1 in min by t test

Variable	Group	Mean	SD	t-value	P-value
Mean time to sensory regression to s1	Group A	314.17	18.87	3.0195	0.0038*
	Group B	298.73	20.68		

*p<0.05

Table 18: Comparison of group a and group b with respect to time to regression to bromage 1 (in min) by t test

Variable	Group	Mean	SD	t-value	P-value
Mean time to regression to bromage 1	Group A	240.93	16.54	13.7541	0.00001*
	Group B	160.17	27.58		

*p<0.05

Table 19: Verbal analog score group a

	VAS 1	VAS 2	VAS 3	VAS 4
0min	0	0	0	0
30min	0	0	0	0

60min	0	0	0	0
90min	0	0	0	0
120min	0	0	0	0
150min	0	0	0	0
180min	0	0	0	0
220 min	4	0	0	0
250 min	12	4	0	0
280 min	14	12	4	0
310 min	0	14	12	4
340min	0	0	14	12
370 min	0	0	0	14

Table 20: Verbal analog score group b

	VAS 1	**VAS 2**	**VAS 3**	**VAS 4**
0min	0	0	0	0
30min	0	0	0	0
60min	0	0	0	0
90min	0	0	0	0
120min	2	0	0	0
150min	0	2	0	0
180min	0	0	2	0
220 min	20	0	0	2
250 min	8	20	0	0
280 min	0	8	20	0
310 min	0	0	8	20
340min	0	0	0	8
370 min	0	0	0	0

Table 21: Comparison of group a and group b with verbal analog scores at different time intervals

Time point	**Group A**		**Group B**		**t-value**	**P-value**
	Mean	Std.Dev.	Mean	Std.Dev.		
0min	0.0000	0.0000	0.0000	0.0000	--	--
30min	0.0000	0.0000	0.0000	0.0000	--	--
60min	0.0000	0.0000	0.0000	0.0000	--	--
90min	0.0000	0.0000	0.0000	0.0000	--	--
120min	0.0000	0.0000	0.0667	0.2537	-1.4392	0.1555
150min	0.0000	0.0000	0.1333	0.5074	-1.4392	0.1555
180min	0.0000	0.0000	0.2000	0.7611	-1.4392	0.1555
220 min	0.1379	0.3509	0.9333	0.9444	-4.2591	0.0001*
250 min	0.6667	0.7112	1.7143	0.4600	-6.6086	0.0000*
280 min	1.6667	0.7112	2.7143	0.4600	-6.6086	0.0000*
310 min	2.6667	0.7112	3.7143	0.4600	-6.6086	0.0000*
340min	3.4615	0.5084	4.0000	0.0000	-2.9638	0.0057*
370 min	4.0000	0.0000	--	--	--	--

 *$p<0.05$

Table 22: Comparison of group a and group b with respect to time to rescue analgesia (in min) by t test.

Variable	Group	Mean	SD	t-value	P-value
Time to first rescue analgesia	Group A	342.97	18.03	6.6425	0.00001*
	Group B	307.97	22.54		

*p<0.05

Table 23: Distribution of patients according to side effects in group a and group b

Side effects	Group A	%	Group B	%	Total	%
Dizziness	2	6.67	2	6.67	4	6.67
Headache	1	3.33	1	3.33	2	3.33
Nausea	4	13.33	3	10.00	7	11.67
Shivering	2	6.67	1	3.33	3	5.00
Vomiting	1	3.33	1	3.33	2	3.33
Dry mouth	6	20.00	7	23.33	13	21.67
Respiratory Depression	o	-	0	-	-	-

Table 24: Demographic profile

Demogrphic Variables	Group A	Group B	P Value
Female /male	12/18	13/17	0.7934
Age in years	35.17	33.87	0.3330
Weight in kg	56.73	58.93	0.2841
Height in cm	164.33	165.30	0.2887
BMI	21.02	20.83	0.8426
ASA I/II	26/4	27/3	0.6875
Mean duration of surgery in min	**111.83**	**112.67**	**0.8739**

Table 25: Initial block characteristics

Variables	Group	Mean	SD	t-value	P-value
onset time of sensory block at T10	Group A	8.70	1.12	-7.8045	0.00001*
	Group B	11.23	1.38		
Time to maximum sensory block	Group A	12.87	1.04	-12.5265	0.00001*
	Group B	17.13	1.55		
Time in min for bromage 3	Group A	19.30	1.62	-13.5996	0.00001*
	Group B	24.87	1.55		
Mephenteramine requirement (in mg)	Group A	0.80	1.75	0.0000	1.0000
	Group B	0.80	1.92		

Table 26: Post op block characteristics

Variable	Group	Mean	SD	t-value	P-value
Mean time to two segment regression	Group A	136.00	6.86	6.3279	0.00001*
	Group B	124.97	6.65		
Mean time to regression to bromage 1	Group A	240.93	16.54	13.7541	0.00001*
	Group B	160.17	27.58		
Mean time to sensory regression to s1	Group A	314.17	18.87	3.0195	0.0038*

	Group B	298.73	20.68		
Time to first rescue analgesia	Group A	342.97	18.03	6.6425	0.00001*
	Group B	307.97	22.54		

DISCUSSION

Epidural anaesthesia and analgesia is considered by many as the gold standard technique for major surgery. It provides a complete analgesia for as long as the epidural is continued.[12,13,14] It also improves the postoperative outcome and attenuates the physiologic response to surgery, in particular, significant reduction in pulmonary infections, pulmonary embolism, ileus, acute renal failure and blood loss. Bupivacaine is a well-established, long acting amide local anaesthetic which has been in use since 1957.[14,15] It has been the most popular and widely used local anaesthetic agent suitable for long surgical procedures. It is used to provide intraoperative anaesthesia by intrathecal, epidural and caudal routes, nerve blocks, field blocks, labour analgesia, post-operative analgesia by continuous thoracic or lumbar epidural infusion and continuous nerve blocks, chronic pain management and others. It provides excellent operating conditions with good muscle relaxation.[15,16,17]

The present study was undertaken to compare the peri-operative and postoperative analgesic efficacy, as well as sedation effects of α-2 agonists in the Department of Anesthesia, at SVS Medical College, Mahaboobnagar. Telangana, India., during the period of Jan 2021 to Dec 2021. The evaluation stated for comparable distribution of the data for parameters like age, sex, mean BMI. According to statistical data, there is no significant difference between duration of surgery. The results of our study have shown that the addition of either 1μg/kg dexmedetomidine or 2 μg/kg clonidine as adjuvant to epidural bupivacaine not only prolongs the duration of analgesia but also provides a good sedation level during the surgical procedure. Dexmedetomidine has a visible edge over clonidine as it enables an earlier onset and establishment of sensory and motor block.[17] Further, addition of these two adjuvants promotes faster onset compared to established time of onset of sensory analgesia with bupivacaine alone. Hence, dexmedetomidine showed efficient analgesic property as compared to clonidine according to the parametric analysis. Time taken for rescue of analgesic behaviour in patient administered with clonidine was shorter when compared to dexmedetomidine which proves prolonged analgesic action of dexmedetomidine when compared to clonidine.[17,18] So, student t test shows significant difference between two adjuvants. Time for mean regression to bromage 1 was higher for dexmedetomidine than clonidine.

Cardio respiratory evaluation was done by monitoring and managing pulse rate, blood pressure and respiratory rate. By the end of study, no depression in the respiratory rate or cardiac function was observed in patients of both groups. Side effects that prevailed in both group during the study were nausea, dry mouth, vomiting, shivering, headache, dizziness showed statistical non-significant values.

CONCLUSION

Our results allow us to conclude that addition of dexmedetomidine or clonidine to epidural bupivacaine significantly promoted analgesia in patients undergoing lower limb surgeries without increasing the incidence of side-effects. Dexmedetomidine is a better neuraxial adjuvant to bupivacaine when compared to clonidine for early onset of analgesia, superior intraoperative analgesia, stable cardio respiratory parameters, prolonged post-operative analgesia and providing patient comfort. Overall acquired experience with dexmedetomidine was quite satisfactory as compared to clonidine because of its superior sedative and anxiolytic properties during the surgical procedure under epidural anaesthesia.

REFERENCES

1. Morgan, G. E., Mikhail, M. S., & Murray, M. J. (1996). The practice of anesthesiology. Clinical anesthesiology.
2. Davies, N. J. H., & Cashman, J. N. (2006). Techniques in regional anaesthesia. Lee's synopsis of anaesthesia.
3. Rao, M. K. (2020). Dexmedetomidine and clonidine as adjuvants in epidural anaesthesia: A comparative evaluation. Methods.
4. Höhener, D., Blumenthal, S., & Borgeat, A. (2008). Sedation and regional anaesthesia in the adult patient. British journal of anaesthesia, 100(1), 8-16.
5. Helgeson, L. E. (2005). Sedation during regional anesthesia: inhalation versus intravenous. Current Opinion in Anesthesiology, 18(5), 534-539.
6. Némethy, M., Paroli, L., Williams-Russo, P. G., & Blanck, T. J. (2002). Assessing sedation with regional anesthesia: inter-rater agreement on a modified Wilson sedation scale. Anesthesia & Analgesia, 94(3), 723-728.
7. Asehnoune, K., Albaladejo, P., Smail, N., Heriche, C., Sitbon, P., Gueneron, J. P., ... & Benhamou, D. (2000, October). Information and anesthesia: what does the patient desire?. In Annales francaises d'anesthesie et de reanimation (Vol. 19, No. 8, pp. 577-581).
8. Badner, N. H., Nielson, W. R., Munk, S., Kwiatkowska, C., & Gelb, A. W. (1990). Preoperative anxiety: detection and contributing factors. Canadian Journal of Anaesthesia, 37(4), 444-447.
9. Schnider, T. W., & Minto, C. F. (2001). Predictors of onset and offset of drug effect. European Journal of Anaesthesiology, 18(S23), 26-31.
10. McNamee, D. A., Parks, L., McClelland, A. M., Scott, S., Milligan, K. R., Ahlén, K., & Gustafsson, U. (2001). Intrathecal ropivacaine for total hip arthroplasty: double-blind comparative study with isobaric 7.5 mg ml–1 and 10 mg ml–1 solutions. British journal of anaesthesia, 87(5), 743-747.
11. Kamibayashi, T., Maze, M., Weiskopf, R. B., Weiskopf, R. B., & Todd, M. M. (2000). Clinical uses of α2-adrenergic agonists. The Journal of the American Society of Anesthesiologists, 93(5), 1345-1349.
12. De Beer, D. A. H., & Thomas, M. L. (2003). Caudal additives in children—solutions or problems?. British Journal of anaesthesia, 90(4), 487-498.
13. Pratiwi, D. A. N. I., Sucandra, I. M. A. K., & Senapathi, T. G. A. (2021). Dexmedetomidine versus clonidine as adjuvants in epidural analgesia in gynecological laparotomy: Case series. Bali Journal of Anesthesiology, 5(1), 33.
14. Arunkumar, S., Kumar, V. H., Krishnaveni, N., Ravishankar, M., Jaya, V., & Aruloli, M. (2015). Comparison of dexmedetomidine and clonidine as an adjuvant to ropivacaine for epidural anesthesia in lower abdominal and lower limb surgeries. Saudi journal of anaesthesia, 9(4), 404.
15. Babu, M. S., Verma, A. K., Agarwal, A., Tyagi, C. M., Upadhyay, M., & Tripathi, S. (2013). A comparative study in the post-operative spine surgeries: Epidural ropivacaine with dexmedetomidine and ropivacaine with clonidine for post-operative analgesia. Indian Journal of Anaesthesia, 57(4), 371-376.
16. Shaikh, S. I., & Mahesh, S. B. (2016). The efficacy and safety of epidural dexmedetomidine and clonidine with bupivacaine in patients undergoing lower limb orthopedic surgeries. Journal of anaesthesiology, clinical pharmacology, 32(2), 203.
17. Kamal, M., Mohammed, S., Meena, S., Singariya, G., Kumar, R., & Chauhan, D. S. (2016). Efficacy of dexmedetomidine as an adjuvant to ropivacaine in pediatric caudal epidural block. Saudi journal of anaesthesia, 10(4), 384.

18. Mahendru, V., Tewari, A., Katyal, S., Grewal, A., Singh, M. R., & Katyal, R. (2013). A comparison of intrathecal dexmedetomidine, clonidine, and fentanyl as adjuvants to hyperbaric bupivacaine for lower limb surgery: A double blind controlled study. Journal of anaesthesiology, clinical pharmacology, 29(4), 496.
19. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
20. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
21. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
22. A comparative evaluation. Indian J Anaesth 2011;55:116-21
23. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
24. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
25. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
26. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
27. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
28. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
29. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
30. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
31. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
32. A comparative evaluation. Indian J Anaesth 2011;55:116-21.
33. Bajwa SJ, Bajwa SK, Kaur J, Singh G, Arora V, Gupta S, et al. Dexmedetomidine and clonidine in epidural anaesthesia:
34. A comparative evaluation. Indian J Anaesth 2011;55:116-21.