Section: Anaesthesiology

Original Research Article

A COMPARATIVE STUDY BETWEEN THE EFFICACY OF INTRAVENOUS TRAMADOL VERSUS INTRAVENOUS DEXMEDETOMIDINE IN PREVENTING SHIVERING FOLLOWING SUB ARACHNOID BLOCK

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ABSTRACT

Background: Shivering is a frequent complication following anaesthesia, with an incidence of between 40 to 70% following spinal anaesthesia. There are many studies comparing the efficacy of tramadol & dexmedetomidine in prevention of post spinal anaesthesia shivering, even keeping in mind the associated side effects. **Aim & Objectives:** The aim was to study the efficacy of Intravenous tramadol versus Intravenous dexmedetomidine in prevention of shivering following spinal anaesthesia in elective lower abdominal & lower limb surgeries. 1. To compare the efficacy of IV tramadol & IV dexmedetomidine in prevention of post spinal anaesthesia shivering. 2. To compare haemodynamic status between IV tramadol versus IV dexmedetomidine following sub arachnoid block 3. To compare adverse effects between IV tramadol versus IV dexmedetomidine following sub arachnoid block 4. To compare sedation score of IV tramadol versus IV dexmedetomidine following sub arachnoid block.
Material and Methods: A randomised double blind study called "A comparative study between the efficacy of intravenous tramadol versus intravenous dexmedetomidine in preventing shivering following sub arachnoid block" was carried out to compare the effectiveness of tramadol & dexmedetomidine to prevent after giving spinal anaesthesia in lower limb surgeries. The study was conducted in the SURGERY & ORTHOPAEDIC OT, Government Medical College & General Hospital Nalgonda during a period from 1st April 2023 to 31st March 2024. Ninety patients who were taken up for lower limb surgeries, belonged to ASA class I & II, in the age group of 18 yrs to 60yrs and with no co-morbidities were included in the study. Patients with uncontrolled systemic disorders, coagulation abnormalities, neuromuscular junction disorders, spine abnormalities and failure of spinal anaesthesia, pregnant women were excluded from the study. GROUP D(N=45): Inj. Dexmedetomidine IV route at dose of 0.5µg/kg was infused in 100ml of NS 5mints before giving spinal anaesthesia. GROUP T (45): Inj. Tramadol IV route at dose of 0.5mg/kg was infused in 100ml of NS 5mints before giving spinal anaesthesia.
Results: Both the study drugs were similarly effective in preventing shivering. It was found that patients in Dexmedetomidine group were more comfortable, co-operative & sedated, but had no respiratory depression. Whereas, patients in tramadol group had more incidence of nausea & vomiting. Haemodynamic parameters were almost stable throughout the study in both the groups. Hence, no rescue drug was given. There was no significant variation in the haemodynamics of both the groups. Considering the side effect profile, patients in the dexmedetomidine group remained more sedated without respiratory depression having p value as 0.001 at all-time intervals. Whereas patients in the

tramadol group had more incidence of nausea and vomitting which was statistically significant with the p value of 0.001.
Conclusion: The present study conclude that both the study drugs i.e dexmedetomidine & tramadol were effective in preventing shivering after spinal anaesthesia as long as side effects & cost effectiveness and availability is kept in mind.
Key Words: Spinal Anesthesia, Dexmedetomidine, Tramadol, Hemodynamic Parameters, Sub arachnoid block.

INTRODUCTION

Spinal anaesthesia is widely used as a safe anaesthetic technique for both elective and emergency operations. Shivering is one of the most common complication of the central neuraxial blockade due to impairment of thermoregulatory control, reported in 19%-33% of the patients undergoing surgery under spinal anaesthesia.[1] Post anaesthetic shivering is defined as an involuntary, spontaneous, rhythmic oscillating tremor like muscle hyperactivity that increases metabolic heat production upto 600% after general or regional anaesthesia.[2]

Shivering during neuraxial anaesthesia is a common problem that could have potentially detrimental effects such as increase in oxygen consumption, carbondioxide production, lung ventilation and cardiac work as well as causing decreased mixed venous oxygen saturation.[3] Shivering is a physiological response to core hypothermia in an attempt to raise the metabolic heat production. The main cause of intra/post- operative shivering is temperature loss, increased sympathetic tone, pain and systemic release of pyrogens.[4]

The processing of thermoregulatory response has three components: Afferent thermal sensing, Central regulation & efferent responses. Together they work to maintain normal core body temperature.[5] Though hypothalamic thermoregulation remains intact during regional anaesthesia, it is associated with greater heat loss than general anaesthesia which is attributed to various reasons like abnormal heat loss due to vasodilatation, impairment of shivering in the area of block & rapid intravenous infusion of cold fluids.[6]

Spinal anaesthesia impairs the thermoregulatory system by inhibiting tonic vasoconstriction, which plays important role in regulation of temperature.[7]

There are various methods available to control shivering during anaesthesia which includes the non - pharmacological methods & pharmacological methods using drugs which have anti-shivering properties. The non - pharmacological methods using equipments to maintain normal temperature of the body are effective but expensive and lack practicality8. Pharmacological agents remain the most popular mode of treatment of shivering. Many agents have been used to eliminate post – op shivering such as meperidine, doxapram, tramadol, ketanserine, clonidine, Propofol, physostigmine, nefopam, dexamethasone, magnesium sulfate, & fentanyl.[9]

Tramadol Hydrochloride, a μ -opioid receptor agonistic drug has a modulatory effect on central monoaminergic pathways & thus inhibit the neuronal uptake of noradrenaline/ serotonine& encourages 5HT3secretion which resets the body temperature regulating centre.[10] Dexmedetomidine, a potent α2 adrenergic receptor agonist, has been used as a sedative agent and is known to reduce the shivering threshold. It acts by decreasing the vasoconstriction and shivering thresholds.[11]

Hence the aim is to study the efficacy between dexmedetomidine and tramadol in preventing post anaesthetic shivering following sub arachnoid block.

Aim and Objectives

Primary Objective

"Compare the efficacy of Intravenous tramadol versus Intravenous dexmedetomidine in prevention of shivering following sub arachnoid block

Secondary Objectives

1. To compare hemodynamic status between IV tramadol versus IV dexmedetomidine
2. To compare adverse effects between IV tramadol versus IV dexmedetomidine.

MATERIALS AND METHODS

Ethical Considerations

The study protocol, informed consent form (Telugu) and case report form (CRF) were submitted to the ethical committee of Government Medical College & General Hospital, Nalgonda for approval. Written informed consent were taken from each participant of the study. Illiterate individuals have given their fingerprint (left thumb impression) instead of signature in the presence of an appropriate witness.

Study Area

Government Medical College, Nalgonda.

Study Population

The study was conducted on patients of ASA GRADE 1& 2 of either sex between the age group of 18-60yrs posted for elective lower limb surgeries requiring sub arachnoid block in Gvernment Medical college General Hospital, Nalgonda. There were divided 2 groups comprising of 45 patients in each group.

Study Design: A prospective , randomised, double-blind , comparative study

Sample Size & Sampling Technique

Primary Purpose: Intension to prevent

Sample Size: Minimum sample size was found to be 45 in each group making a total sample size of 90.

Study Period: Study will be done & data will be collected during the study period of 1year i.e from 1st April 2023 to 31st March 2024.

Inclusion Criteria

1. Patient aged between 18-60yrs
2. Patient with ASA grade 1 & 2
3. Patients whose height is in between 150cms to 175cms.
4. Patients who were operated for lower limb surgeries under spinal anesthesia

Exclusion Criteria

1. Patient refusal to participate in the study
2. Patient with h\o coagulation disorders
3. Patient with thyroid disease, Parkinson's disease, dysautonomia, Reynaud's syndrome, cardiopulmonary disease, h\o allergy to agents to be used, a need for blood transfusion during surgery, a known h\o alcohol use, use of sedative hypnotic agents, use of vasodilators, an initial core temperature >37.5degree (or)<36.5degree.
4. Sepsis.
5. Patient having sub arachnoid block failure shall be excluded from the study.

Statistical Methods

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. The following assumptions on data is made, (1) Dependent variables should be normally distributed, (2) Samples drawn from the population should be random, Cases of the samples should be independent

Methodology

This study is a Randomised & double blind study conducted in, in the department of anaesthesiology.

Patients of ASA grade 1 and 2 undergoing elective lower abdominal surgeries &lower limb orthopaedic surgery which are over duration of 2hrs are accepted for this study. A written and informed consent for the sub arachnoid block have been taken and the patients have been explained that she/he is a part of the study. Patients are randomly allocated into two groups. Patients of the group T received intravenous tramadol 0.5mg/kg in 100ml saline & patients of group D received intravenous dexmedetomidine 0.5µg/kg in 100 ml saline 5mint prior to sub arachnoid block.

The operating room temperature was kept at 22-24°C. IV fluids are being administered at the room temperature & anaesthetic equipments and emergency drugs are kept ready at hand. Then the study drugs are injected 5mints prior to giving spinal anaesthesia.

Before starting the case, routine check of the anaesthesia machine have been done. All patients are covered with 1 layer of surgical drapes over chest, thighs & calves during the operation, and then one cotton blanket over entire body post operatively. No other warming devices are used. After taking a short history from the patient, an intravenous cannula of size 18G was placed on the vein of left or right forearm. Non invasive blood pressure, ECG leads, spo2 monitor were placed and preoperative vitals (BP, HR, and SPO2) were noted. Injection ranitidine 50mg intravenous and Injection metaclopramide was given intravenously to the patients as premedication. Patient were positioned in sitting posture and after antiseptic dressing and draping, a 25G Quinkes needle was inserted in L3-L4 inter-vertebral space and hyperbaric bupivacaine 0.5% 2.5ml have been administered intrathecally. Thereafter patient was been placed in supine position. Blood pressure monitoring was done every 3mints by NIBP monitor. The MAP (NIBP), HR, SPO2, Shivering, sedation score were recorded at each intervals of 0, 15, 30, 45, 60,75,90,105,120 mints.

Parameters Evaluated

Scoring for shivering graded with 5point scale validated by crossly and mahajan were;

0= No shivering

1= piloerection or peripheral vasoconstriction but no visible shivering

2= muscular activity in only one muscle group

3= muscular activity in more than one muscle group

4= whole body shivering

Level of sedation was assessed by means of Ramsay sedation scale;

1 point= worried, agitated or unpeaceful

2point = co -operative, oriented and calm

3= responds to oral warnings

4= snoozing, gives lively response to hitting between the eye brows or loud noise

5point= snoozing, slowly responds to hitting between eyebrows or loud noise

6point= snoozing, no response.

Hypotension episodes were defined as SBP<80% of Baseline SBP or SBP<100mmHg

Bradycardia defined as HR <60beats/mint.

Decrease of SPO2 below 90% at room temperature to be considered as hypoxemia.

Nausea and vomiting; the presence of nausea or vomiting will be measured on a 3 point scale with 1 indicating – no nausea, 2- only nausea no vomiting, 3- vomiting.

RESULTS

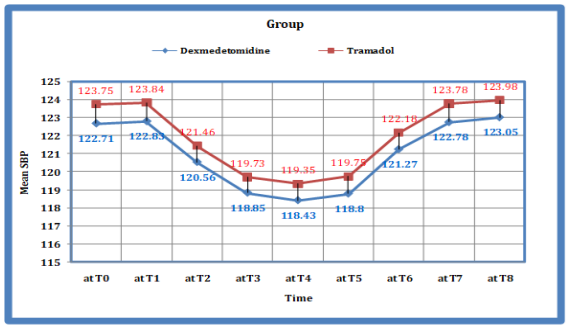

Figure 1: Showing Distribution of systolic blood pressure(mmHg)

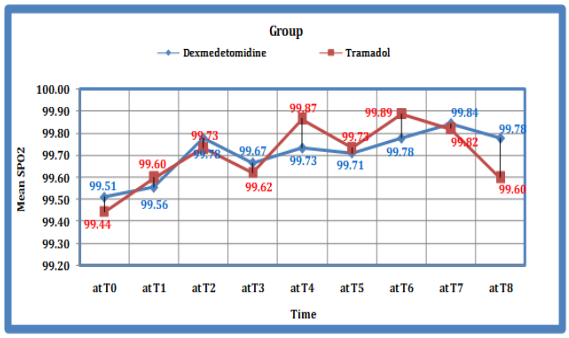

Figure 2: Distribution of spo2 measurements between tramadol & dexmedetomidine

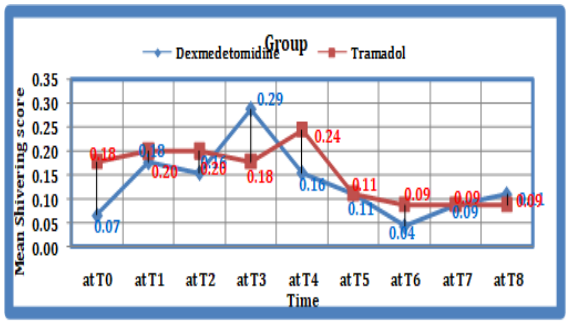

Figure 3: Distribution of shivering score at various time intervals in both the groups

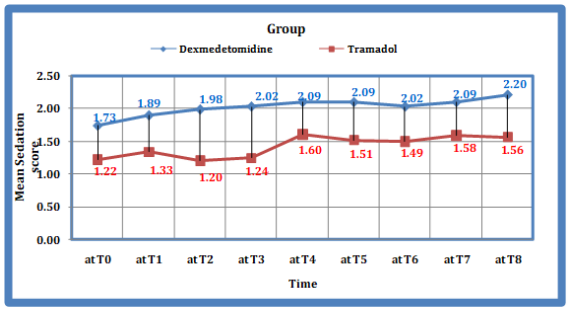

Figure 4: Distribution of sedation score of both the study groups at various time intervals

This present study was done on 90 patients who underwent elective lower limb surgeries under spinal anaesthesia. They were divided into two groups, each group comprising of 45 patients.

Group T patients received inj. Tramadol 0.5mg/kg diluted in 100ml normal saline & Group D received inj. Dexmedetomidine 0.5µg/kg diluted in 100ml normal saline, both drugs were infused over a time period of 5mins before giving spinal anaesthesia.

DBP showed insignificant change between two groups. Group D, mean DBP at T0 was 68.94±9.65, which reduced 15 mins after spinal anaesthesia i.e. T1, by less than 1mm Hg. Whereas in group T mean DBP at T0 was 69.89±9.15, which remained almost same in T1 i.e 69.97±9.15. Fall of mean DBP among two groups was statistically insignificant (p>0.05). [Table 3]

Mean arterial pressure at the time of infusion was 88.90 ± 6.93 and 87.18±6.46 in group D and group T respectively. As it was seen in SBP and DBP, there was a clinically and statistically Insignificant (p>0.05) change in MAP in group D i.e 86.71±5.17mm Hg at T1 when compared to group T which was found to be 87.73±5.24mm Hg

At all time intervals mean MAP was normal and statistically insignificant. [Table 4]

At T0 mean heart rate in-group D was found to be 89.98±8.80 and in group T 90.76 ±8.85. After giving SAB there was insignificant reduction in mean heart rates at almost all time intervals in both groups. [Table 5]

The mean oxygen saturation in group D at T1 was recorded as 99.51±0.66 & in the Group T at T0 was recorded as 99.44±0.72. After giving spinal anesthesia the changes in oxygen saturation remained insignificant at all the time intervals among both the groups. (P>0.05). [Table 7]

The mean shivering score in Group D was 0.07±.25 at T0 interval. Whereas the mean shivering score in Group T was 0.18± 0.39 at T0 interval. At the end of time of observation i.e after 2hrs the shivering score was0.11±0.32 in Group D & 0.09±0.29 in Group T. The variations in shivering score was insignificant inbetween the groups of Tramadol & Dexmedetomidine i.e at T8, P= 0.73. [Table 8]

The mean sedation score at time interval T1 was recorded as 1.73±0.45 in Group D & the mean in Group T was recorded as 1.22±0.42. There was significant variation in sedation score in between the groups (p<0.05). [Table 9]

The mean nausea & vomiting score of Group D at T1 was measured as 1± 0.00 & nausea & vomiting score of Group T was recorded as 1.20±.40. Nausea & vomiting score was statistically significant in between the study groups. (<0.05). [Table 10]

Independent t-test

Table 1: Comparing Age, Height, Weight among two study groups

Variable	Tramadol					Dexmedetomidine					t-value	P-value
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
Age (years)	45	30	60	45.1	8.3	45	28	59	41.7	7.9	1.9	0.05
Height (cms)	45	150	170	159.2	4.8	45	149	170	157.8	4.8	1.4	0.17
Weight (kg)	45	50	75	60.6	6.7	45	49	77	60.5	6.2	0.08	0.93

SYSTOLIC BLOOD PRESSURE

Table 2: Comparision of SBP (mm Hg) between two study groups

SBP (mmHg)	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
T0(0min)	45	108	138	122.71	6.27	45	108	140	123.75	7.97	0.69	0.49
T1(15min)	45	109	139	122.83	7.31	45	108	142	123.84	8.11	0.62	0.53
T2(30min)	45	103	140	120.56	7.24	45	106	140	121.46	8.25	0.55	0.58
T3(45min)	45	95	138	118.85	7.81	45	100	140	119.73	8.72	0.5	0.61
T4(60min)	45	97	142	118.43	8.32	45	102	142	119.35	8.55	0.52	0.6
T5(75min)	45	89	138	118.8	8.15	45	94	140	119.75	8.51	0.54	0.59
T6(90min)	45	97	140	121.27	8.39	45	102	146	122.18	9.75	0.47	0.63
T7(105min)	45	93	147	122.78	9.62	45	98	141	123.78	10.07	0.48	0.63
T8(120min)	45	97	150	123.05	11.65	45	102	144	123.98	9.71	0.41	0.68

DIASTOLIC BLOOD PRESSURE

Table 3: Comparision of DBP(mmHg) in between two groups studied

DBP	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
at T0	45	53	88	68.94	9.65	45	53	88	69.89	9.15	-0.48	0.63
at T1	45	51	78	68.5	7.01	45	52	82	69.97	6.39	-1.04	0.3
at T2	45	52	88	70.3	8.04	45	56	94	71.86	7.61	-0.95	0.35
at T3	45	49	88	69.54	7.9	45	58	94	71.04	7.98	-0.89	0.37
at T4	45	47	86	69.07	7.6	45	56	93	70.51	7.65	-0.89	0.38
at T5	45	47	88	70.14	8.15	45	55	94	71.62	8.51	-0.84	0.4
at T6	45	48	84	70.21	8.02	45	51	100	71.97	8.76	-1	0.32
at T7	45	43	83	69.03	7.99	45	52	92	70.48	8.6	-0.83	0.41
at T8	45	56	83	70.2	5.12	45	50	93	70.28	8.57	-0.06	0.96

MEAN BLOOD PRESSURE

Table 4: comparing MAP (mm Hg) in between two groups of the patients

MAP	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
at T0	45	76	104	88.9	6.9	45	74	102	87.18	6.46	-1.22	0.23
at T1	45	72	98	86.71	5.3	45	77	101	87.73	5.17	0.92	0.36
at T2	45	73	99	85.75	5.1	45	78	106	87.88	5.84	1.84	0.07
at T3	45	69	97	85.2	5.8	45	77	108	86.91	6.53	1.31	0.19
at T4	45	67	96	85.96	6	45	75	105	86.54	6.64	0.43	0.66
at T5	45	68	98	87	6.4	45	73	108	87.42	6.81	0.3	0.76
at T6	45	69	96	85.7	7.9	45	72	112	88.34	6.84	1.69	0.09
at T7	45	65	98	86.99	6.11	45	76	108	88.27	6.29	0.98	0.33
at T8	45	76	104	87.59	5.18	45	74	110	87.96	6.55	0.3	0.77

HEART RATE

Table 5: Comparision of HR(bpm) in between two study groups

	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max	Mean	SD	N	Min	Max	Mean	SD		
at T0	45	74	114	89.98	8.8	45	72	108	90.76	8.85	0.42	0.676
at T1	45	66	116	90.27	10.19	45	68	116	91.05	10.03	0.37	0.715
at T2	45	57	118	89.92	12.25	45	64	120	90.61	10.88	0.28	0.778
at T3	45	54	130	89.1	14.24	45	56	120	89.83	12.61	0.26	0.796
at T4	45	48	132	88.67	15.81	45	52	122	89.43	14.37	0.24	0.813
at T5	45	63	120	89.33	14.46	45	57	116	89.5	15.23	0.05	0.957
at T6	45	47	114	88.36	15.71	45	54	112	89.03	15.45	0.2	0.839
at T7	45	59	138	90.29	18.87	45	45	128	90.21	19.92	-0.02	0.983
at T8	45	60	139	90.38	18.88	45	46	129	90.19	19.48	-0.05	0.961

OXYGEN SATURATION(Spo_2)

Table 7: Comparision of Spo2 Values inbetween two study groups

SPO2	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
at T0	45	98	100	99.51	0.66	45	98	100	99.44	0.72	-0.46	0.65
at T1	45	98	100	99.56	0.62	45	97	100	99.6	0.72	0.31	0.755
at T2	45	98	100	99.78	0.47	45	98	100	99.73	0.54	-0.42	0.678
at T3	45	98	100	99.67	0.56	45	97	100	99.62	0.68	-0.34	0.737

at T4	45	98	100	99.73	0.5	45	99	100	99.87	0.34	1.48	0.142
at T5	45	98	100	99.71	0.51	45	97	100	99.73	0.58	0.19	0.847
at T6	45	98	100	99.78	0.47	45	99	100	99.89	0.32	1.31	0.193
at T7	45	99	100	99.84	0.37	45	98	100	99.82	0.44	-0.26	0.796
at T8	45	98	100	99.78	0.52	45	98	100	99.6	0.58	-1.53	0.129

SHIVERING SCORE

Table 8: Comparision of shivering score in between two study drugs

Shivering score	Group										t-score	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
at T0	45	0	1	0.07	0.25	45	0	1	0.18	0.39	1.61	0.11
at T1	45	0	1	0.18	0.39	45	0	1	0.2	0.4	0.27	0.79
at T2	45	0	1	0.16	0.37	45	0	1	0.2	0.4	0.55	0.59
at T3	45	0	3	0.29	0.76	45	0	3	0.18	0.53	-0.8	0.42
at T4	45	0	2	0.16	0.47	45	0	2	0.24	0.48	0.88	0.38
at T5	45	0	1	0.11	0.32	45	0	1	0.11	0.32	0	1
at T6	45	0	1	0.04	0.21	45	0	1	0.09	0.29	0.84	0.4
at T7	45	0	1	0.09	0.29	45	0	1	0.09	0.29	0	1
at T8	45	0	1	0.11	0.32	45	0	1	0.09	0.29	-0.35	0.73

Independent t-test

Table 9: Comparision of shivering score among both the groups studied

At	Shivering score	Group				P-value
		Dex		Tram		
		count	%	count	%	
T0	0	42	93.33%	37	82.22%	0.11
	1	3	6.67%	8	17.78%	
T1	0	37	82.22%	36	80.00%	0.78
	1	8	17.78%	9	20.00%	
T2	0	38	84.44%	38	84.44%	1
	1	7	15.56%	7	15.56%	
T3	0	38	84.44%	39	86.67%	0.41
	1	3	6.67%	5	11.11%	
	2	2	4.44%	0	0.00%	
	3	2	4.44%	1	2.22%	
T4	0	40	88.89%	35	77.78%	0.15
	1	3	6.67%	9	20.00%	
	2	2	4.44%	1	2.22%	
T5	0	40	88.89%	40	88.89%	1
	1	5	11.11%	5	11.11%	
T6	0	43	95.56%	41	91.11%	0.39
	1	2	4.44%	4	8.89%	
T7	0	42	93.33%	41	91.11%	0.69
	1	3	6.67%	4	8.89%	
T8	0	40	88.89%	41	91.11%	0.23
	1	5	11.11%	4	8.89%	

SEDATION SCORE

Table 9: Comparision of Sedation score in between two study groups

Sedation Score	Group										Z-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		
at T0	45	1	2	1.73	0.45	45	1	2	1.22	0.42	-5.59	**<0.001**
at T1	45	1	3	1.89	0.68	45	1	3	1.33	0.52	-4.34	**<0.001**
at T2	45	1	3	1.98	0.58	45	1	2	1.2	0.4	-7.35	**<0.001**
at T3	45	1	3	2.02	0.4	45	1	3	1.24	0.61	-7.17	**<0.001**
at T4	45	1	3	2.09	0.42	45	1	3	1.6	0.58	-4.59	**<0.001**
at T5	45	1	3	2.09	0.42	45	1	3	1.51	0.55	-5.63	**<0.001**
at T6	45	1	3	2.02	0.5	45	1	3	1.49	0.55	-4.82	**<0.001**
at T7	45	1	3	2.09	0.42	45	1	3	1.58	0.62	-4.58	**<0.001**
at T8	45	2	3	2.2	0.4	45	1	2	1.56	0.5	-6.7	**<0.001**

Independent t-test

NAUSEA & VOMITTING SCORE

Table 10: Comparision of Nausea & Vomitting Score inbetween two groups studied

Nausea Vomiting score	Group										t-value	P-value
	Dexmedetomidine					Tramadol						
	N	Min.	Max.	Mean	SD	N	Min.	Max.	Mean	SD		

at T0	45	1	2	1.02	0.15	45	1	3	1.27	0.5	3.17	0.002
at T1	45	1	1	1	0	45	1	2	1.2	0.4	3.32	0.001
at T2	45	1	2	1.02	0.15	45	1	3	1.29	0.63	2.78	0.007
at T3	45	1	2	1.04	0.21	45	1	3	1.24	0.57	2.21	0.03
at T4	45	1	1	1	0	45	1	3	1.18	0.49	2.43	0.017
at T5	45	1	2	1.02	0.15	45	1	3	1.16	0.42	1.99	0.05
at T6	45	1	2	1.07	0.25	45	1	2	1.2	0.4	1.88	0.064
at T7	45	1	1	1	0	45	1	3	1.22	0.52	2.88	0.005
at T8	45	1	2	1.04	0.21	45	1	2	1.22	0.42	2.54	0.013

DISCUSSION

Shivering is known to be a frequent complication in patients undergoing surgery under neuraxial anesthesia.

The possible mechanisms of shivering during spinal anaesthesia include impairment of central thermoregulation, heat loss to the environment & internal redistribution of body heat. Potential risk factors for hypothermia in spinal anaesthesia include level of sensory block, Ageing, IV solutions and temperature of the operation theatre.[12]

In this study it was found that the efficacy of dexmedetomidine in the treatment of post-SA shivering in adults and compared its efficacy with tramadol for the treatment of shivering after SA in patients undergoing various elective surgeries.

Although tramadol is an established drug in the treatment of shivering, in this study. we found that dexmedetomidine is equally effective as tramadol in treating post-SA shivering. In our study incidence of shivering was maximum at T1 & T2 Iin Group D whereas the incidence of shivering was maximum at T4 in Group T with no significance difference between the two group at any point of time(P>0.05).Similar findings was seen in the study by Neeharika Arora,[13] Bozgeyik et al.[14]

Kundra et al,[15] concluded that there was no statistically significant variation with respect to HR, Oxygen saturation,SBP/DBP among groups of tramadol and dexmedetomidine which was similar to this study.

In the contrary, Lim fern,[16] have found there was significant incidence of bradycardia and hypotension in dexmedetomidine group. Which was not found in my study and this variation could be explained by small sample size.

Only the patients who were in Group D remained cooperative, orientated, tranquil and could respond to commands, in contrast to Group T where the patents were not significantly sedated and these findings were similar to the results obtained in the study conducted by Lim Fern etal.[16] The highest incidence of sedation was found to be 88% in this study which is almost similar to the finding of study done by Maheshwari et al.[17] In contrary Geeta Mittal,[18] had only 4% as highest sedation incidence. This variation may be because of patient characteristics.

The study done by Mahesh sharma, Kalpana Kharbuja, Bikash Khadka,[19] regarding the side effects of tramadol concluded that tramadol group had significant number of nausea or vomiting episodes(P=0.001) which was Similar in this study where P=0.001.

The study by Kundra et al,[15] had found that tramadol had more nausea or vomitting when compared to dexmedetomidine, which was similar finding in this study.

The limitations of this study were small sample size, and selection of medium duration surgeries as the chance of developing core hypothermia are more in long duration surgeries. Tymphanic membrane temperature probe and mid esophagus temperature probe could not be used to measure core body temperature because it causes patient discomfort who is awake under spinal anaesthesia. Axillary temperature couldn't be monitored because of unavailability at the study site. Recurrence rate of shivering was not calculated.

This study can be useful to know drugs that can sufficiently improve the tolerance to thermoregulation without simultaneously producing respiratory depression or haemodynamic instability. Dexmedetomidine might prove to be a valuable addition in this current requirements.

CONCLUSION

Spinal anaesthesia or sub arachnoid block is the anaesthesia of choice worldwide in emergent or non-emergent surgeries, owing to its ease of administration and the avoidance of several side effects of giving general anaesthesia to a patient. Shivering is one of the concerned side effect of spinal anaesthesia which could be prevented by using many non-pharmacological & pharmacological measures. Among the various pharmacological drugs.In this study we compared the efficacy of tramadol & dexmedetomidine to prevent shivering in patients after giving spinal anaesthesia. Even though the maximum incidence of shivering was less in Group D at a particular time interval, the difference between the two groups were statistically insignificant. There was no significant variation in the haemodynamics of both the groups. Considering the side effect profile, patients in the dexmedetomidine group remained more sedated without respiratory depression having p value as 0.001 at all time intervals. Therefore we can conclude that both the study drugs i.e dexmedetomidine & tramadol were effective in preventing shivering after spinal anaesthesia as long as side effects & cost effectiveness and availability is kept in mind.

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