Original Research Article

A comparative study of the efficacy of dexmedetomidine versus tramadol on post-spinal anesthesia shivering at tertiary health care center

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Abstract

Background: Postoperative shivering is a frequent complication of anaesthesia; it has been reported to range from 20 to 70% in general anaesthesia **Aims and Objectives:** A study of the efficacy of dexmedetomidine versus tramadol on post-spinal anesthesia shivering at tertiary health care center. **Methodology:** This was a cross-sectional study carried out in the patients undergoing various surgeries under spinal anesthesia during the one year period i.e. June 2018 to June 2019 in the one year period with written and explained consent there were 50 patients were enrolled for the study. Out of these 50 patients 25 given Tramadol (Group A) and remaining 25 given dexmedetomidine (Group B) for the management of Shivering .Statistical analysis done by unpaired t-test and Chi –square test and calculated by SPSS 19 version software. **Result:** mean age in both the groups was comparable i.e. 38 ± 3.12 and 39± 2.97 (t=0.76,df=48,P>0.05) and the Male to Female ratio was comparable i.e. 1.5 :1 and 1:33(X2=0.35,df=1,p>0.05) .Time of onset of shivering (min) was comparable i.e. 69 .45±20.13 and 71.38±25.76 (t=1.23,df=48,p>0.05); Severity of shivering was significantly lower i.e. 4.56±0.12 and 2.93±1.02 (t=4.53,df=48,p<0.05) ; Time to disappearance of shivering (s) was significantly lesser i.e. 179.34±8.93 and 263.35±25.76 (t=5.67,df=48,p<0.01) ; Time of recurrence (min) was significantly higher i.e. 68.13±13.45 and 75.98±29.13 (t=7.84,df=48,p<0.001) respectively in Group B as Comparable Group A .
Conclusion: It can be concluded from our study that dexmedetomidine was superior to tramadol with respect less severity, less time of disappearance of shivering significantly higher time for recurrence
Key Words: dexmedetomidine, tramadol, post-spinal anesthesia shivering

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INTRODUCTION

Postoperative shivering is a frequent complication of anaesthesia; it has been reported to range from 20 to 70% in general anaesthesia.[1] Shivering is believed to increase oxygen consumption and increase the risk of hypoxemia; it might also increase postoperative complications. Shivering is usually triggered by hypothermia. However, it occurs even in normothermic patients during the perioperative period. The aetiology of shivering is not understood sufficiently.[2] In addition to the fact that shivering is poorly understood, the gold standard for the treatment and prevention has not been defined yet. Because of its importance as a postoperative complication and the lack of evidence about aetiology and treatment, this narrative review of the published literature on this topic is necessary. Shivering, a syndrome involving involuntary oscillatory contractions of skeletal muscles, is a common and challenging side effect of anaesthesia and targeted temperature modulation.[3] Shivering is a physiologic response to cold exposure and the body's

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next step in heat preservation after peripheral vasoconstriction [4]. Postoperative shivering (PS) is an involuntary, oscillatory muscular activity during early recovery after anaesthesia. Shivering is defined as the fasciculation of the face, jaw, or head or muscle hyperactivity lasting longer than 15 seconds [5]. Regional anesthesia is a popular and safe anesthetic technique for various surgeries when executed properly. It produces certain side effects such as hypotension, bradycardia, and shivering. Around 40-60% of patients under regional anesthesia develop shivering[6], so being so common problem in Spinal anesthesia we have studied the efficacy of two drugs treated i.e. efficacy of dexmedetomidine versus tramadol on post-spinal anesthesia shivering at tertiary health care center**.**

METHODOLOGY

This was a cross-sectional study carried out in the patients undergoing various surgeries under spinal anesthesia during the one year period i.e. June 2018 to June 2019 in the one year period with written and explained consent there were 50 patients were enrolled for the study. Out of these 50 patients 25 given Tramadol (Group A) and remaining 25 given dexmedetomidine (Group B) for the management of Shivering. Grading of shivering was done as described [16]: Grade 0: No shivering ,Grade 1: One or more of the following: Piloerection, peripheral vasoconstriction, peripheral cyanosis without other cause, but without visible muscle activity Grade 2: Visible muscle activity confined to one muscle group Grade 3: Visible muscle activity in more than one muscle group Grade 4: Gross muscle activity involving the whole body. Patients who developed either Grade 3 or Grade 4 of shivering were included in the study. Same criteria were used for grading shivering during recurrence and patients with Grade 3 or 4 shivering were included. The necessary data like age, sex and Shivering related parameters etc. was entered to excel sheet and analyzed by unpaired t-test and Chi –square test and calculated by SPSS 19 version software.

RESULT

Table 1: Distribution of the patients as per the age and sex

	Group A (n=25)	Group B (n=25)	p-value
Age (Yrs.) (Mean ±SD)	38 ± 3.12	39± 2.97	t=0.76,df=48,P>0.05
Sex			
Male	15	14	X^2=0.35,df=1,p>0.05
Female	10	11	

In our study we have seen that mean age in both the groups was comparable i.e. 38 ± 3.12 39± 2.97 (t=0.76,df=48,P>0.05) and the Male to Female ratio was comparable i.e. 1.5 :1 and 1:33(X^2=0.35,df=1,p>0.05)

Table 2: Distribution of the patients as per the various shivering related characteristics

Shivering Characteristics	Group A (n=25)	Group B (n=25)	p-value
Time of onset of shivering (min)	69.45±20.13	71.38±25.76	t=1.23,df=48,p>0.05
Severity of shivering	4.56±0.12	2.93±1.02	t=4.53,df=48,p<0.05
Time to disappearance of shivering (s)	263.35±25.76	179.34±8.93	t=5.67,df=48,p<0.01
Time of recurrence (min)	68.13±13.45	75.98±29.13	t=7.84,df=48,p<0.001

Time of onset of shivering (min) was comparable i.e. 69 .45±20.13 and 71.38±25.76 (t=1.23,df=48,p>0.05); Severity of shivering was significantly lower i.e. 4.56±0.12 and 2.93±1.02 (t=4.53,df=48,p<0.05) ; Time to disappearance of shivering (s) was significantly lesser i.e. 263.35±25.76 and 179.34±8.93 (t=5.67,df=48,p<0.01) ; Time of recurrence (min) was significantly higher i.e. 68.13±13.45 and 75.98±29.13 (t=7.84,df=48,p<0.001) respectively in Group B as Comparable Group A .

DISCUSSION

Shivering is defined as an involuntary, repetitive activity of skeletal muscles occurring as an attempt to generate heat in response to core hypothermia. Spinal anesthesia inhibits tonic vasoconstriction, causes a redistribution of core heat from trunk to the peripheral tissues. These factors predispose patients to hypothermia and shivering.[7] It increases the metabolic rate, oxygen consumption, and carbon dioxide production.[8] It may induce arterial hypoxemia and acidosis. Shivering leads to increases in intraocular and intracranial pressure, and may contribute to increased wound pain, stretch on suture lines, delayed wound healing and delay in discharge from post-anesthesia care unit.[9,10] It can be detrimental to patients with low cardiorespiratory reserve [11].Various mechanisms have been suggested for postanesthesia shivering. These include intraoperative heat loss, postoperative increased sympathetic tone, pain and systemic release of pyrogens.[12] Though hypothalamic thermoregulation remains intact during regional anesthesia, it is associated with greater heat loss than general anesthesia which is

attributed to various reasons like abnormal heat loss due to vasodilatation, impairment of shivering in the area of block and rapid intravenous (IV) infusion of cold fluids.13. Shivering is not only physically distressing for the patient, but can have various other detrimental effects. It may lead to pain, patient discomfort, impede monitoring techniques, increase intraocular and intracranial pressures, double or even triple oxygen consumption and carbon dioxide production,[14] which might pose difficulties in patients with existing intrapulmonary shunts, fixed cardiac output or limited respiratory reserve. Various modalities have been used for the prevention and treatment of postanesthesia shivering. Tramadol, an opioid receptor agonist, is an inhibitor of the re-uptake of serotonin (5-hydroxytryptamine) and norepinephrine in the spinal cord. This facilitates 5-hydroxytryptamine release, which influences thermoregulatory control. Presently it is a widely used drug for the control of shivering. But tramadol may cause nausea and vomiting which is very distressing for the patient. Dexmedetomidine, a centrally acting alpha 2-adrenergic agonist, has been used as a sedative agent and is known to reduce the shivering threshold. Various studies have been performed using dexmedetomidine in the prophylaxis of postoperative shivering.15 In our study we have seen that mean age in both the groups was comparable i.e. 38 ± 3.12 and 39± 2.97 (t=0.76,df=48,P>0.05) and the Male to Female ratio was comparable i.e. 1.5 :1 and 1:33(X^2=0.35,df=1,p>0.05) Time of onset of shivering (min) was comparable i.e. 69 .45±20.13 and 71.38±25.76 (t=1.23,df=48,p>0.05); Severity of shivering was significantly lower i.e. 4.56±0.12 and 2.93±1.02 (t=4.53,df=48,p<0.05); Time to disappearance of shivering (s) was significantly higher i.e. 179.34±8.93 and 263.35±25.76 (t=5.67,df=48,p<0.01) ; Time of recurrence (min) was significantly higher i.e. 68.13±13.45 and 75.98±29.13 (t=7.84,df=48,p<0.001) respectively in Group B as Comparable Group A . These findings are similar to Kundra, *et al* they found that All patients who received dexmedetomidine as well as tramadol had cessation of shivering. The time to cessation of shivering was significantly less with dexmedetomidine (174.12 ± 14.366SD) than with tramadol (277.06 ± 23.374SD) (P < 0.001). The recurrence rate of shivering with dexmedetomidine was less (6%) as compared to tramadol (16%). Nausea and vomiting was found to be higher in the case of tramadol.

CONCLUSION

It can be concluded from our study that dexmedetomidine was superior to tramadol with respect less severity, less time of disappearance of shivering significantly higher time for recurrence

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