Intravenous dexmedetomidine vs intravenous tramadol for control of postspinal shivering in patients undergoing knee arthroscopy: a randomized double-blind placebo controlled trial

Thesis

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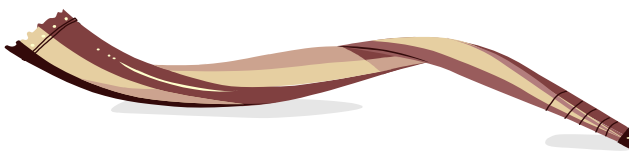

Ahmed Ashraf

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LIST OF ABBREVIATIONS

Abb.		Full Term
5HT	:	serotonin (5-hydroxytryptamin)
AVP	:	Antidiuretic action of vasopressin
BIS	:	The bispectral
BP	:	Blood pressure
Ca^{++}	:	Calcium Ion
cAMP	:	Cyclic adenosine monophosphate
CRPS	:	Complex regional pain syndrome
CYP	:	Cytochrome
ECG	:	Electrocardiography
EEG	:	Electroencephalography
EMG	:	Electromyography
GABA	:	Gamma-Aminobutyric acid
i.v	:	Intravenous
ICU	:	Intensive care unit
K^{+}	:	Potassium Ion
M	:	Menthol
MAP	:	Mean arterial pressure
N2O	:	Nitrous oxide
NMDA	:	N-methyl-D-aspartate
OTs	:	Operation theatres

LIST OF ABBREVIATIONS

Abb.		Full Term
PAS	:	Post anesthesia shivering
SAB	:	Sub-arachnoid block
SpO_2	:	Saturation of oxygen
SSRI	:	Selective serotonin reuptake inhibitors
TMN	:	Tuberomammillary nucleus
TRP	:	Transient Receptor Potential
V	:	Vanilloid
VLPO	:	Ventrolateral preoptic nucleus

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ABSTRACT

Background: shivering , the rate of which in regional anaesthesia is 39% is an undesired complication seen intra and postoperatively. **Aim:** this study aimed to compare the ability of preventing post spinal anesthesia shivering by i.v dexmeditomedine and tramadol. **Methods :** A total of 75 patients with ASA I – II, aged 18-60 years and undergoing elective knee arthoscopy surgery under spinal anesthesia were divided into three groups randomly, before spinal anesthesia by 20 mintues 0.5 mcq/kg dexmeditomedine i.v was applied to D group (n=25), 0.5 mg tramadol i.v was applied to T group (n=25) and 0.9% normal saline was applied to group C (n=25) in 10 minutes. The hemodynamics, oxygen saturation, axillary temperature, shivering, sedation score and side effects were evaluated and recorded intraoperatively every 5 minutes. **Results:** there was significant difference between group D and T in compare with C group as regard the incidence of shivering (p= 0.031) and there were significant differences between D group and other groups as regard grade of shivering (p=0.01) , there was significant difference between D group and others as regard sedation score it was higher in D group. Nausea and vomiting was significant higher in T group in compared to other groups. **Conclusion:** The current study revealed that prophylactic i.v dexmeditomedine 0.5 mcq/kg was effective as i.v tramadol 0.5mg/kg in prevention post spinal shivering in patients undergoing knee arthroscopy compared to the control group.

Key words: Arthoscopic surgery, dexmeditomedine, tramadol, shivering, spinal anesthesia.

INTRODUCTION

Shivering is known to be a frequent complication, reported in 40 to 70 % of patients undergoing surgery under regional anesthesia. Post-anesthetic shivering (PAS) is spontaneous involuntary, rhythmic, oscillating, thermo-like muscle hyperactivity that increases metabolic heat production up to 600 % after general or regional anesthesia ***(Bhattacharya et al., 2003).***

This unpleasant and undesirable complication occurring after sub-arachnoid block (SAB) secondary to vasodilatation due to sympathetic blockade ***(Buggy et al., 2000).***

Shivering occurs mainly in hypothermic patients but may also occur in normothermic. Shivering leads to feelings of discomfort in the patient as well as an increase in oxygen consumption, carbon dioxide production, catecholamine release, cardiac output, intraocular pressure and complications such as tachycardia and hypertension***(Alfonsi, 2001).***

In addition to this, shivering may affect accurate monitoring by causing artifacts in the monitor ***(Sessler, 2001).***

Shivering also increases intracranial pressure, and may contribute to increased wound pain, delayed wound healing ***(Katyal et al., 2002),*** and delayed discharge from post-anesthetic care ***(Kranke et al., 2002).***

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 ***(Usta et al., 2011).***

During the last decade, tramadol has become a favored and commonly used drug for post-spinal anesthesia shivering. However, it has many adverse effects like nausea, vomiting, dizziness etc., which cause further discomfort to the patient ***(Shukla et al., 2011).***

AIM OF THE WORK

The aim of the study was to compare the efficacy of Intravenous (i.v) Dexmedetomidine and i.v Tramadol in the treatment of postspinal anesthesia shivering.

Review of Literature
Pathophysiology of Shivering

Definition:

Shivering is an involuntar, spontaneous, oscillatory mechanical activity of skeletal muscle associated with increased oxygen consumption, this can be as much as 600% ***(Honarmand et al., 2008).***

Amoung the various causes, shivering can be divided into thermoregulatory and non-thermoregulatory in nature ***(Witte et al., 2002).***

Grads of Shivering:

Crossley and Mahajan have graded the intensity of (PAS) using the following scale:

0 = No shivering.

1 = No visible muscle activity but piloerection, peripheral vasoconstriction, or both are present (other causes excluded);

2 = Muscular activity in only one muscle group;

3 = Moderate muscular activity in more than one muscle group but no generalized shaking;

4 = Violent muscular activity that involves the whole body **(*Crossley et al., 1994*).**

A scale more specific to neuraxial anaesthesia would be:

0 = No shivering.

1 = Shivering not interfering with monitoring or causing patient distress.

2 = Shivering interfering with monitoring or causing patient distress ***(Crowley et al., 2008).***

Also a scale that we used in the current study was Tsai and Chu Scale:

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 but not generalized;

4= Shivering involving the whole body **(*Tsai* et al., *2001).***

Shivering Patterns:

There is two types of shivering patterns have been observed following general anaesthesia and also confirmed by Electromyography (EMG) assessment.

The first is a synchronous ”waxing and waning” at a frequency of 4 -8 cycles/min and is of a tonic nature associated with true thermoregulation shivering as seen in unanaesthetised volunteers exposed to cold enviroments

The second is a clonic pattern of shivering occurring 5-7hz associated with uninhibited spinal reflexes as seen in spinal cord transection, as seen in a study with 0.2-0.4 end-tidal isoflurane concentration ***(sessler et al.,1991).***

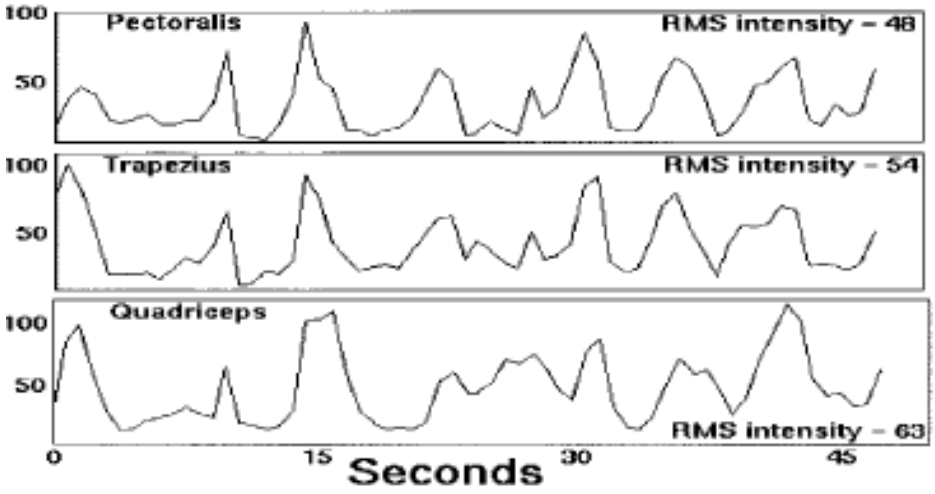

Fig.(1): EMG - tonic - pattern of shivering ***(Witte et al., 2002).***

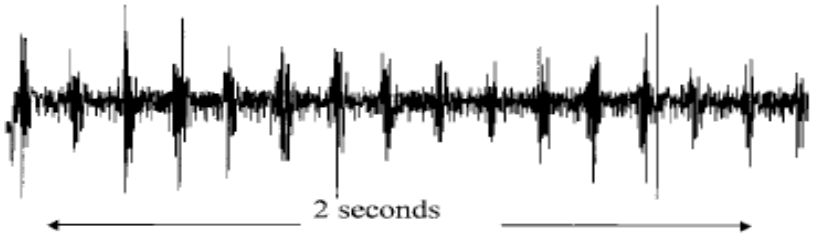

Fig.(2): EMG - clonic - pattern of shivering ***(Witte et al., 2002).***