Original Article

SHIVERING CONTROL IN SUBARACHNOID BLOCK BY NALBUPHINE- A COMPARATIVE STUDY WITH PETHIDINE

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SUMMARY:

Complication during anaesthesia is inevitable but judicious start, vigilant monitoring, application of pharmacology can prevent or lessen it. Shivering is one of the complications of Subarachnoid block (SAB). To prevent shivering during SAB many techniques had so long been applied. Among them during shivering giving low dose intravenous Pethidine is so far popular in our country. As the drug is not available all the times due to legal restriction & our socioeconomic circumstances, so we studied with another opioid, Nalbuphine and has got an acceptable result which is equipotent and some where better than that of Pethidine. This randomized prospective study conducted in 60 ASA I, II patients, was designed to explore the efficacy and potency of Nalbuphine in comparison to Pethidine for shivering under subaracnoid block. Patient received Nalbuphine 5mg LV or Pethidine25mg after appearance of shivering. Disappearance and recurrence of shivering, as well as haemodynamics were observed at scheduled intervals. Onset of disappearance of shivering was found at 1 minute in Nalbuphine group (N) ($p<0.05$) and at 3 minutes in Pethidine group (P) ($p <0.05$). The complete disappearance of shivering took 5 minutes in N group and 20 minutes in P group. Thus Nalbuphine and Pethidine were equally efficacious, but Nalbuphine was more potent with respect to control of shivering and its recurrence. It was concluded that I.V Nalbuphine is qualitatively superior to Pethidine for control shivering.

Key words: Shivering in SAB, Nalbuphine, Pethediite

INTRODUCTION:

Regional anaesthesia is a safe and popular technique for various surgeries. A 40 – 60% of the patients under Subarachnoid block (SAB), one of the types of regional anaesthesia develops shivering[1,2]. Shivering is distressing for the patients and may exacerbate postoperative pain, increase intracranial pressure, and induce cardiopulmonary complications[3]. Many drugs have been used to treat shivering, including pethidine, doxapram, tramadol, ketanserin, clonidine, propofol, physostigmine, and nalbuphane[4]. Among these drugs, pethidine is often recommended. Although its mechanism of action is not fully elucidated, much evidence suggests the drug's special anti-shivering activity is mediated by its -opioid receptor activity[5]. Nalbuphine, a mixed agonist-antagonist opioid, has a high affinity for - opioid receptors. Theoretically, nalbuphine may have significant anti-shivering effects on perioerative shivering in regional anaesthesia. Shivering can be very unpleasant and physiologically stressful for the patient after enjoying the comforts of modern anaesthetics. Mild shivering increases oxygen consumptions to a level that is produced by light exercise, whereas severe shivering increases metabolic rate and oxygen consumption up to 100-600%. It may induce arterial hypoxaemia, lactic acidosis, increases IOP and ICP and interferes with ECG monitoring, pulse rate, BY etc. [3,4,5] Shivering may be detrimental to the patients with low cardio respiratory reserves[6] It is uncomfortable to the parturient as well as to the operating room personnel, especially during regional anaesthesia. Various methods are available for the control of shivering during anaesthesia. Non-pharmacological methods using equipments to maintain normothermia are effective but may be expensive and are not practical in all the settings. Pharmacological methods using various drugs like Pethidine, Clonidine, Doxapram, Ketanserine, Tramadol, Nefopam etc. have been tried which are simple, cost effective and easily available. Here we have compared Nalbuphine, a newer synthetic opioid with Pethidine, the gold standard drug for the treatment of shivering, in the quest for more safer and efficacious drug. We conducted this study to compare the efficacy, potency, haemodynamics

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effects and complications or side effects of Nalbuphine with that of Pethidine for the control of shivering.

METHOD AND MATERIAL:

Sixty adult women ages ranging from 20-25 years with full term pregnancy Scheduled for LUCS for 1) Prolong labour 20 patients, 2) Obstructed labour 20 patients 3) Foetal distress 20 patients. Study was done in a randomized way by card sampling in Sylhet M A G Osmani Medical College Hospital period June 2007-December 2007. 007. Anaesthesia of all patients was done by SAB. Preload was done by Hartman solution 20ml/Kg within 30 mins. SAB was done by 12.5 mg of 0.5% bupivacaine heavy to all patients. Then grading of shivering, mean BP, Pulse, sedation, Spo2 were monitored.

Shivering grades

Grade 0	No Shivering.
Grade I	Mild fasciculations of face or neck, ECG disturbances in absence of voluntary activity of arms.
Grade 2	Visible tremors involving more than one group of muscle.
Grade 3	Gross muscular activity involving the entire body, bed shaking

All the patients who experienced shivering were randomly divided into Group N and Group P. Group N received 5mg Nalbuphine and Group P received 25mg Pethidine after initiation of shivering. All the patients were assessed for shivering grades, its disappearance, haemodynamics status, and complications if any. Patients were observed at intervals of 1 min till 5 mins, and thereafter at 10, 20, 30, 45, and 60mins.Pulse rate, BY, SP02, Respiratory rate, and temperature were noted immediately after regional anaesthesia, and also during shivering, and thereafter the drug administration at regular intervals. Recurrence of shivering was also noted and an additional dose of either Nalbuphine 5mg or Pethidine in a dose of 25mg LV was given in respective groups. Statistical analysis was done by EPI infoversion 6.04 January 2001 software package using unpaired student 't' test and chi square test.

RESULTS

In our study, both the groups were comparable with regards to age, weight, and ASA physical status (PS).

There was no significant difference found in duration of surgery, as well as shivering grades at the start of study between the two groups (Table- III). NS*= Statistically Significant.

The onset of disappearance of shivering was found at around 1 minute and 3 minutes in Group N and Group P respectively. Regarding the disappearance of shivering in both groups, we found a statistically significance difference as shown in the table-3. Stoppage of shivering occurred earlier in Group N in comparison to Group P ($p < 0.001$) as shown in table-III.

Table-I

Demographic data

	Nalbuphine (N=30)	Pethidine (N=30)	Z	P	
Age (Yrs)	25±13	23±15	0.04	>0.05	NS*
Weight (kgs)	58±0.36	57±0.56	1.20	>0.05	NS*
ASA PS	13:17	12:18	-	>0.05	NS*

Table-II

Grading & Duration of Shivering

	Nalbuphine (N=30)	Pethidine (N=30)	Z	P	
Shivering grade	2.17±0.449	2.4±0.466	0.914	>0.05	NS*
Duration of surgery (Min)	58.22±0.81	57.08±0.82	0.316	>0.05	NS*

Table-III

Control of Shivering

TIME(Minutes)	Nalbuphine (N=30)	Pethidine (N=30)	Z	P	
1	21(70%)	1(3.33%)	5.15	<0.05	*S
3	27(90%)	7(23%)	7.05	<0.05	*S
5	30(100%)	16(23.33%)			
10	30(100%)	2S(83.33%)			
20	30(100%)	30(100%)			
30	30(100%)	30(100%)			
40	30(100%)	30(100%)			
50	16(53.33%)	21(70%)			
60	27(90%)	20(66%)			

*S= Statistically Significant.

Haemodynamically there was no significant difference found in two groups as shown the Table-4.

Table-IV

Haemodynamics.

		Nalbuphine (N=30)	Pethidine (N=30)	Z	P	
Pre	Mean BP	116.6±10.94	117.0±13.0	0.660	e" 0.05	*NS
Shivering	Mean PR	81.93±7.05	83.0±7.0	0.019	e" 0.05	*NS
During	Mean BP	117.81±0.42	117.0±10.0	0.159	e" 0.05	*NS
Shivering	Mean PR	88.23±7.67	90.0±6.4	1.696	e" 0.05	*NS
Post	Mean BP	116.93±11.37	117.0±9.7	0.610	e" 0.05	*NS
Shivering	Mean PR	82.07±.01	82.0±7.01	0.209	e" 0.05	*NS

*NS= Statistically not significant. BP= Blood Pressure. PR= Pulse rate

DISCUSSION

Regional anaesthesia, central neural blockade e.g. SAB is popular technique for various surgeries. Around 40-60% of the patients under regional anaesthesia develop shivering, though it is found commonly after general anaesthesia.[8] The probable mechanism under regional anaesthesia could either be a result of decrease in core body temperature or misinformation from receptors.[9] The factors causing decrease in core body temperature include, sympathetic block causing peripheral vasodilatation, increased cutaneous blood flow resulting in increased heat loss through skin, cold operating room, rapid IV infusion for preload. Earlier studies have showed better results with Nalbuphine group.[6] The findings were in condolence with other studies which noted 8% with Nalbuphine group and 13-50% in Pethidine group' [1,13] Thus various studies including ours there was higher rate of recurrence with Pethidine in comparison to Nalbuphine . The second dose of the drug controlled the shivering completely but the possibility of respiratory depression with Pethidine should be borne in mind. The probable reason for recurrence of shivering could be result of low plasma concentration of the active drug, when hypothermia is still persisting and individual variations in the

core temperatures. Nalbuphine produced a rapid and potent anti-shivering effect similar to that observed with pethidine. After each treatment, there were no significant differences among groups in blood pressure, heart rate, respiratory rate, and arterial oxygen saturation. Because these variables were similar, only data obtained 0, 5, and 30 min after the treatments are shown (Table-III).

Till date it is not clear whether higher shivering grades requires a higher doses of the drug. In our study both the drugs gave good and better haemodynamic stability throughout the course of the study in all the patients. Nalbuphine is effective in treating shivering under regional anaesthesia due to its rapid onset, effective control, less recurrence rate and minimum side effects in a dose of 5mg. when compared to Pethidine 25mg. Similarly Nalbuphine was effective and safe in comparison to Pethidine for control of shivering as noted earlier[3]even recommend for Nalbuphine on prophylactic basis also.

CONCLUSION:

IV administration of nalbuphine, a σ-receptor agonist, provides a rapid and potent anti-shivering effect and the effect of nalbuphine is similar to that of pethidine in an equianalgesic dose. Nalbuphine may be an alternative to pethedine for treating peri-operative shivering.

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