Original article:

Study of Hemodynamic and Respiratory changes during use of Tramadol in Anesthesia practices

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Abstract:

Introduction: Tramadol interferes with monitoring of electrocardiogram, blood pressure and pulse oximetry. With post anesthesia shivering, left ventricular systolic work index is increased and oxygen consumption may be increased by 200% to 500% in patients under neuraxial anesthesia.

Material and Methods: It was prospective observational Longitudinal study for two years duration in the Department of Anesthesiology & Critical Care, Pravara Rural Hospital, Loni with sample size 384. Sample size was calculated using open epi software.

Results: We found higher mean HR at the time of shivering which was gradually decreased after giving tramadol . Maximum HR found was 98.93 at base line and minimum at 15 and 30 min. We had applied Students' paired t test to compare T0 with T5, T10, T15, T30.(P value <0.0001)

Conclusion: Tramadol causes no significant difference in other vital parameters like Respiratory Rate & SpO_2..

Keywords: Tramodol , Haemodynamic changes

Introduction:

Tramadol interferes with monitoring of electrocardiogram, blood pressure and pulse oximetry.[1]With post anesthesia shivering, left ventricular systolic work index is increased and oxygen consumption may be increased by 200% to 500% in patients under neuraxial anesthesia. Thus, in patients with decreased myocardial reserve, shivering may further compromise myocardial function. Shivering may also increase intraocular and intracranial pressures and may also contribute to increased wound pain. [2]The possible mechanisms of shivering after spinal anesthesia in parturients result from central thermoregulation disturbance[3]Shivering may be justified as a thermoregulatory response to hypothermia that occurs during operation and presents with tonic or clonic patterns[4]This increased muscular activity leads to increased oxygen consumption and carbon dioxide production that results in hypoxemia, hypercarbia and lactic acidosis which are not only discomforting but also worsens pain sensation.[2]Shivering can be prevented by maintaining intraoperative normothermia, giving warm fluids, using warm clothing covers sites or by administering pharmacologic treatments like tramadol, clonidine, pethidine, Ondansetron and butorphanol [5]Equipment to maintain normothermia is effective in preventing shivering but may be expensive and its not practical in all settings.

Material and methods:

It was prospective observational Longitudinal study for two years duration in the Department of Anesthesiology & Critical Care, Pravara Rural Hospital, Loni with sample size 384. Sample size was calculated using open epi software.

INCLUSION CRITERIA

- Patients aged between 20-60 years.
- Patients of both sex.
- Patients with ASA Grade I & II.
- All Patients who underwent for elective lower abdominal and lower limb surgeries under spinal anesthesia.
- Patients who developed grade III and IV shivering and who received IV Inj. Tramadol for cessation of shivering.
- All patients with spinal anesthesia level achieved up to T8-T10.
- Patients who were willing to give consent which was taken postoperatively when he/she was fully conscious and in a cognitive position of giving consent for his/her inclusion in the study.

EXCLUSION CRITERIA

- Patients with H/o Cardio-Respiratory disorders.
- Patients with Hepatic and Renal diseases.
- Patients who were allergic to tramadol or opioid drugs.
- Patients who were not willing to give consent.
- It was a prospective study which was carried out in tertiary care teaching hospital, over 2 years of time after obtaining the necessary approval from the institutional ethical committee .
- Total390 Patients with 20 to 60 years of age , of either sex belonging to ASA I and II posted at P.R.H. LONI ,who developed grade III and IV shivering according to Wrench criteria after spinal anesthesia who were given Tramadol , without any exclusion criteria were included in our study.

Results:

Table 9(A): Heart Rate

Time (Min)	Base line	5	10	15	30
Mean Heart Rate (/Min)	98.93	94.74	93.93	94.27	94.26
S.D.	15.31	15.40	15.29	15.49	15.47
P Value		<0.0001	<0.0001	<0.0001	<0.0001

T0: Heart rate before Inj.Tramadol administration.

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T5: Heart rate after 5 mins of Inj.Tramadol administration.

T10: Heart rate after 10 mins of Inj.Tramadol administration.

T15: Heart rate after 15 mins of Inj.Tramadol administration.

T30: Heart rate after 30 mins of Inj.Tramadol administration.

We found higher mean HR at the time of shivering which was gradually decreased after giving tramadol . Maximum HR found was 98.93 at base line and minimum at 15 and 30 min.

We had applied Students' paired t test to compare T0 with T5, T10, T15, T30.(P value <0.0001)

Table 10(A): Mean Arterial Pressure (MAP)

Time (Min)	0	5	10	15	30
MAP (mmHg)	87.82	83.63	82.93	83.10	83.87
S.D.	11.78	11.71	11.08	11.79	11.77
P Value		<0.0001	<0.0001	<0.0001	<0.0001

T0: Mean Arterial Pressure before Inj.Tramadol administration.

T5: Mean Arterial Pressure after 5 mins of Inj.Tramadol administration.

T10: Mean Arterial Pressure after 10 mins of Inj.Tramadol administration.

T15: Mean Arterial Pressure after 15 mins of Inj.Tramadol administration.

T30: Mean Arterial Pressure after 30 mins of Inj.Tramadol administration.

We found higher mean MAP at the time of shivering which was gradually decreased after giving tramadol . Maximum MAP found was 87.82 mmHg at base line and minimum MAP was 83.10 mmHg .

We had applied Students' paired t test to compare T0 with T5, T10, T15, T30. (P value <0.0001)

Table 11(A): Respiratory Rate (RR)

Time (Min)	0	5	10	15	30
RR (mmHg)	16.02	15.99	16.04	16.07	16.03
S.D.	1.54	1.81	1.94	2.09	2.25
P Value		0.56	0.88	0.7	0.94

T0: Respiratory Rate before Inj.Tramadol administration.

T5: Respiratory Rate after 5 mins of Inj.Tramadol administration.

T10: Respiratory Rate after 10 mins of Inj.Tramadol administration.

T15: Respiratory Rate after 15 mins of Inj.Tramadol administration.

T30: Respiratory Rate after 30 mins of Inj.Tramadol administration.

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In our study we didn't find any change in Respiratory Rate. Comparison of Mean RR at T0 with T5, T10, T15, T30 were done by using student's paired t test , (P value >0.05) which was not significant.

Discussion:

Hemodynamic parameters were measured at 5, 10, 15, 30 mins after tramadol administration and compared with baseline data by using Student's paired t test. We found that there was significant decrease in Heart Rate and Mean Arterial Pressure as compared to baseline data.(P Value <0.0001) This indicates that tramadol effectively controls shivering that helps in stabilizing disturbed hemodynamics due to shivering. We found Bradycardia in only 1.28% and hypotension in 3.08% of patients which was easily manageable. This might be due to other reasons like the effects of spinal anesthesia as none of other studies found bradycardia and hypotension in their study after giving tramadol. There was no statistical difference in Respiratory Rate and Oxygen saturation level. (P Value >0.05) Respiratory depression wasn't seen in any case. *Attal P et al* [6] also found the same findings in their study. Patients were heamodynemically stable intraoperatively barring the exception of the period of shivering. *Maheshwari B* [7], Joshi S [8] and *Bansal P* [9] also found their patients were heamodynemically stable throughout after giving tramadol for shivering after spinal anesthesia.

In our study we observed lower incidence of nausea and vomiting while earlier studies found higher incidence of Nausea & Vomiting after tramadol mentioned in their study that slower injection of injection tramadol reduces incidence of nausea and vomiting and they found the incidence of nausea and vomiting only in 6.66% and 11.4% respectively. In our study we gave Inj.Tramadol very slowly and diluted up to 10 ml, with the incidence of nausea and vomiting in only 9.49 % patients.

We observed recurrence of shivering in 11.04 % patients. Rescue dose of Tramadol 1 mg//kg was given in patients in whom shivering reappeared. Dhimar A et al [7] observed recurrence in 10% patients in Tramadol group and 50% in Pethidine group. Attal P et al [10] found recurrence in 6.6% patients of Tramadol group and 13.3% patients in Clonidine group. *Joshi S et al* [11] found recurrence in 15.38% in Tramadol group and 26.67% in Butorphanol group. *Maheshwari BK* [12] found recurrence in 8% in Tramadol group and 20% in Butorphanol group.

Conclusion:

Tramadol causes no significant difference in other vital parameters like Respiratory Rate & SpO_2..

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