TRAMADOL AS A PRE-INDUCTION AGENT FOR CAESAREAN SECTION UNDER GENERAL ANAESTHESIA

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ABSTRACT

AIM

To evaluate the efficacy and safety of Tramadol for the mother and the foetus when used as part of balanced anaesthesia without the possibility of using potent anaesthetics.

METHODS

Forty parturients undergoing caesarean section irrespective of their American Society of Anaesthesiologists physical status classification or associated medical conditions were included in randomised single blind study. The patients were randomly allocated to receive Tramadol 1 mg/kg (n=20) and Tramadol 2 mg/kg (n=20) intravenously 15 minutes before induction with Thiopentone. Anaesthesia was maintained only on nitrous-oxide and oxygen mixture with controlled ventilation.

RESULTS

A total of 70% of patients in group I and 90% in group II showed acceptable haemodynamic changes. There was no significant difference in the uterine tone between the two groups. The Apgar scores at one and five minutes were not significantly different between the two groups.

CONCLUSION

It was found that the Tramadol at 2 mg/kg intravenous dose could avoid use of inhalation agents in 90% of patients and the dose was safe for even compromised babies.

KEYWORDS

Anaesthesia, Caesarean Section, Tramadol, Single Blind Study, Apgar Score.

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INTRODUCTION: The ideal obstetric anaesthesia technique recommended by Moir poses certain limitations on the conventional methods of general anaesthesia (GA).

i) To avoid uterine atony.[1] and consequent postpartum haemorrhage, volatile agents like Halothane have to be used very carefully.
ii) To avoid foetal respiratory depression, the administration of narcotics like Pethidine.[2,3] and Morphine.[3,4] has to be restricted till the delivery of the baby.
iii) To provide foetal oxygenation, the nitrous oxide percentage in respiratory gases has to be limited to about 50%. Such conditions may lead to incidence of maternal awareness during intraoperative period and a majority of patients show undesirable haemodynamic responses.

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Tramadol is a synthetic analogue of Codeine.[5] which causes activation of both opioid as well as descending monoaminergic pain inhibitory mechanisms. Its advantage lies in its low risk of neonatal respiratory depression.[6,7,8,9,10] and minimal effects on cardiovascular system. These properties of Tramadol are advantageous, hence selected for trial in patients undergoing Caesarean section under general anaesthesia. The aim was to explore the possibility of avoiding use of potent anaesthetics which have untoward effects on maternal uterine tone and neonatal Apgar and Sarnat scores, yet able to ensure absence of intraoperative awareness.

MATERIALS AND METHODS: This prospective, randomised, single-blind study included 40 parturients undergoing Caesarean section under GA. Patients were selected irrespective of their American Society of Anaesthesiologists physical status (ASA PS) classification and irrespective of their associated medical conditions. During the period of study, patients brought for emergency were also included in the study. The patient series included 3 Ante Partum haemorrhage (APH), 5 Preeclamptic Toxaemia, 12 emergencies and 1 case of Rheumatic Heart Disease in atrial fibrillation.

Along with this 4 patients had bronchial asthma, 1 had diabetes and 2 of them had gross obesity. The patients were divided into two groups on the basis of randomisation.

Group- I: Those given injection Tramadol 1 mg/kg, 15 minutes prior to induction of anaesthesia.

Group- II: Those given Tramadol 2 mg/kg intravenously, 15 minutes prior to induction of anaesthesia.

The technique of GA was standardised to induction with Thiopentone 4 mg/kg intravenously and Succinylcholine 2 mg/kg intravenously. Maintenance was done with 50% mixture of Oxygen and Nitrous oxide. Ventilation was controlled with Atracurium 0.5 mg/kg intravenously.

Patients were monitored with continuous ECG for heart rate changes, systolic blood pressure every 5 minutes to ascertain depth of anaesthesia, blood loss, requirement of uterine tonics, condition of baby using Apgar score after 1 min, after 5 minutes and after 24 hours. Patients were interviewed for awareness and recall of intraoperative events, first dose of analgesic requirement felt in post-operative ward and for any other undesirable sequelae.

RESULTS: The observations of the parameters during the study are given in Table 1.

Sl. No.	Results Parameters	Group I (n=20)	Group II (n=20)
1.	**Hemodynamic responses**		
	Peak Systolic BP up to 140 mmHg	11	17
	Rise in SBP <20 mmHg from Baseline	16	19
	Peak Heart Rates up to 120/min.	16	19
	Rise in Heart Rates <20 from Baseline	12	15
2.	**Requirement of Uterine tonics**		
	Not more than 2 Units*	17	16
3.	**APGAR Scores**		
	After 1 minute 5-7	3	2
	After 1 minute 8-10	17	18
	After 5 minutes: 5-7	0	0
	After 5 minutes: 8-10	20	20
	After 24 Hours: Neurobehavioral response	No depression	No depression
4.	**1st Postoperative analgesic demand**	3.5 Hrs.	4.5 Hrs.
5.	**Incidence of awareness**	5	2
6.	**Blood loss requiring transfusion**	1	1

Table 1

*1 Unit = 0.2 Methergine or 5 IU Pitocin.

The first dose of analgesic requirement felt in postoperative ward was observed to be at 3.5 hours in Group I and at 4.5 hours in Group II.

5 patients in Group- I and 2 patients in Group- II reported awareness in form of recall of music played during intraoperative period.

DISCUSSION: Tramadol achieves good analgesic effect within 15-20 minutes of intravenous injection and its efficacy has been comparable to that of Morphine and Pethidine in equipotent doses.[11] At clinically relevant doses it is devoid of significant sedative and respiratory depressant.[4] effect. It also has very low dependency potential.[11] Tramadol crosses the placental barrier and the peak serum concentrations of Tramadol are in the ratio of 0.83 in umbilical vein to the maternal vein.[12] it has been observed that the average drug injection to delivery interval is around 25 minutes. It was also found that at the time of peak effect of Tramadol in mother, there were no untoward effects on neonate. All babies were vigorous after 15 minutes of delivery when they were sent to neonatal intensive care unit (NICU). This advantage of the drug has been used and thereby the drug was administered 15 minutes before induction of anaesthesia. In case of emergencies the drug was given in the preoperative room before shifting the patient to the surgery.

The hemodynamic responses in the intraoperative period reflect the depth of anaesthesia. A rise in heart rate and systolic blood pressure up to 20 from the baseline preoperative values was considered acceptable. Peak values of heart rate 120/min. and systolic blood pressure of 140 mmHg were considered acceptable. A total of 70% of patients in Group I and 90% in Group II showed acceptable hemodynamic changes in whom the need for volatile inhalation agent was not felt. One patient in Group II had atrial fibrillation and presented with a heart rate of >160/minute preoperatively. A total of 30% patients in Group I and 10% in Group II showed undesirable levels of changes in heart rate and systolic blood pressure necessitating minimal concentrations (0.2-0.5%) of Sevoflurane to be used.

The uterine tone was not affected in any patient because volatile inhalation agent was either totally avoided or was used in very low concentrations (0.2-0.5%) in a few cases. Seven patients in the study were given more than 2 units of uterine tonic (1 Unit = 0.2 mg Methergine or 5 IU of Pitocin), of which 3 were cases of APH. Blood loss was significant (>1 litre) in only 2 patients who required blood transfusion. 5 patients in Group- I and 2 patients in Group- II reported awareness in form of recall of music played during intraoperative period.

CONCLUSION: Tramadol in doses of 2 mg/kg administered intravenously to caesarean patients, 15 minutes prior to induction of anaesthesia is considered safe with respect to the foetal outcome. It is also a valuable adjunct in analgesic supplemented balanced anaesthesia for Caesarean sections–elective or emergency alike. Such use of the drug could eliminate the requirement of volatile agents in 90% of patients.

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