

Intermittent intravenous bolus Ketamine in labour Analgesia

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Summary: This study was undertaken to assess the effect of intermittent intravenous bolus ketamine for labour analgesia in 50 young full term patients. Ketamine, a phencyclidine derivative is an anaesthetic agent known to produce dissociative anaesthesia.

The study reveals excellent results, ketamine helps rapid progress of labour, 82% of patients required only 200mg of this drug, 84% of the patients delivered normally, Apgar score was more than 7 at the end of 5 min. 72% of the patients, had complete and satisfactory pain relief and only a few patients had mild degrees of hallucination which could be well controlled with diazepam. The authors conclude that intermittent I.V. ketamine as labour analgesia is safe, produces satisfactory analgesia with few side effects and deserves wider evaluation.

Introduction

From biblical times, it has been accepted that pain of childbirth is part of the meaning of womanhood. However, over the years, with the progress of civilization, education, eradication of poverty, evolution of modernisation and the assumption of a more positive role of women in today's society, women are standing upto their rights and demanding the benefits of technological advances involving modern analgesic methods to be made widely available during childbirth. It is true that the extent to which this is required is greatly influenced by cultural, social, religious and financial constraints and the medical facilities available.

Ketamine, a phencyclidine derivative as an anaesthetic is known to produce dissociative anaesthesia. Ketamine produces a so-called "dissociate" anaesthetic state, which has been described as a functional and electro physiological dissociation between the thalamo-neocortical and limbic system (Corrsen et al 1968). In small doses, it exerts powerful analgesic and amnesic effects. The drug does not depress the cardiovascular and respiratory system and is rapidly metabolised. The onset and duration of analgesia is rapid, intense and prolonged with no depression of the protective laryngeal and pharyngeal reflexes (Bovil & Dundee 1971). The unique clinical anaesthetic state produced by ketamine has been characterized as a state of catalepsy in which the eyes remain open, with a slow nystagmic gaze, in which corneal and light reflexes remain intact, varying degrees of hypertonus and occasional purposeful movements unrelated to painful stimuli are noted in the presence of adequate surgical anaesthesia. (Harris et al 1975).

The drawback of the drug is the emergent hallucinogenic reactions, which are produced when the patient emerges from the anaesthetic effect, small doses of drugs like diazepam can combat this effectively. Benzodiazepines appear to be the most effective in attenuating the psychic reactions of ketamine during the emergence period. Diazepam (0.15-0.30 mg per kg. I.V.). significantly reduces the incidence of dreams and eliminates post-analgesic illusions, when administered prior to administration of ketamine (Kothary & Pandit 1980).

The aim of the present study was to evaluate the efficacy of ketamine in providing obstetric analgesia by an intermittent regime, administering small repetitive bolus of the drug intravenously to provide adequate analgesia and to evaluate its effects on the mother, on the progress of labour, foetal outcome and finally to study the clinical effects produced by the drug when put to such use.

Materials and Methods

The present study was a prospective evaluation conducted at Nowrosjee Wadia Maternity Hospital between 1st June 1996 – 31st May 1997.

Fifty uncomplicated primigravidae at term (between 37 – 42 weeks) were included in the study. After obtaining an informed written consent, detailed history and clinical examination were performed to rule out any exclusion criteria like pregnancy induced hypertension, cardiovascular disease, or anaemia (Hb < 10 gms. %), any other medical or obstetric high risk problem was also carefully excluded. Further any patients with a history of psychiatric

Pain Relief Score: -

0: No relief

1: Mild relief : Some pain relief, but other drugs required to obtain adequate pain relief.

2: Moderate relief : pain perceived though only slight.

3: Complete relief : no pain perceived.

Any side-effects produced by ketamine were also recorded. Neonatal evaluation was done on the basis of Apgar score at 1 & 5 minutes. At the end of labour a summary was made to determine:

1. Total dose of drug used.
2. Duration of the stages of labour on partograms

Results and Conclusions

1. In the present study, 50 young primigravidae between the ages of 20-40 years, having no obstetric or medical complications were admitted for the study.
2. Eighty four per cent of the patients were under the age of 25 years, corresponding to the hospital averages.
3. All the patients had completed 37 weeks of gestation.
4. Labour was accelerated in most patients, so that 52% of women delivered within 2 hours of entering the active phase of labour, and 46% did not cross the nomographic curve. In only one case, did the active phase of labour last for more than 5 hours (Table I).

Table I.
Duration of labour from 3 - 4 cms. upto full Dilation

Time in hours	No. of cases	% age
upto 2 hours	26	52
2.1 - 5 hours	23	46
More than 5 hours	1	2

5. Maternal outcome in labour was satisfactory, so that in 84% of women a normal vaginal delivery was achieved. In 5 cases, vaginal instrumental assistance was needed. The incidence of caesarean section was only 6% which was lower than the hospital's overall incidence (Table II).

disorder, or drug allergy were also excluded from the study. On examination, patients in whom cephalopelvic disproportion was clinically suspected were also not included in the study.

To 500 ml. dextrose drip 2.5 units of pitocin were added. The drip was titrated, so that the patient achieved a minimum of 3 contractions per 10 minutes of satisfactory intensity, lasting for 30 - 40 seconds. When the cervix was atleast 3 cm. dilated and more than 50% effaced, with a uterine activity of 3 contractions every 10 mins. lasting for atleast 30 seconds duration and of moderate intensity, diazepam (0.15mg. - 0.30mg. per kg. I.V.) was administered prior to administration of ketamine. The calculated initial loading dose of ketamine calculated was 0.5 mg/kg. body weight and was administered as a bolus through the I.V. line. All subsequent doses of 0.25mg/kg. body weight were administered repetitively in bolus form through the I.V. line at 20-30 minutes interval, depending on the individual response.

When the cervix reached full dilation, all further top-up doses were omitted. This enabled the patient to enter a lighter plane of analgesia, when she could just about perceive a much attenuated uterine contraction. The patient was made to bear down whenever she experienced pain. In a very small percentage of patients, rowdy behaviour was observed, such patients were readily calmed down with an injection of 2 mg. diazepam given diluted in 10 cc. of 5% dextrose before the next top up dose of ketamine. A 0.5mg./kg. top up dose was administered prior to episiotomy suturing.

The patients were observed for 2 hours in the delivery room and were administered 5mg. diazepam slow I.V. to prevent emergent hallucination reactions.

Patients were actively monitored every 15 mins. and maternal pulse, blood pressure, respiratory rate is noted. Intermittent post-contraction foetal heart rate and intrapartum monitoring, was carried out whenever required. Progress of labour was recorded graphically on a partogram. The level of maternal analgesia was monitored on the basis of a pain relief score as follows:

Table II.
Labour Outcome

Labour outcome	No. of cases	% age	Hospital Incidence (%)
1. Unassisted vaginal delivery with episiotomy	42	84	75.4
2. Low forceps assistance (from station+3)	3	6	7.2
3. Vacuum assistance (from station +2)	2	4	6.1
L.S.C.S.	3	6	11.3

6. The Apgar scores at 5 minutes were satisfactory in all cases. There was no perinatal death in this series (Table III).

Table - III
Apgar scores

	Apgar scores					
	1 min.			5 min.		
	<5	5-8	>8	<5	5-8	>8
Distribution of cases (No.)	2	12	36	-	-	50
Distribution of cases (%)	4	24	72	-	-	100

7. Total dose of ketamine required during labour for securing pain relief was upto 200mg. in 82% of patients and in another 18% total dose required was upto 300 mg (Table IV).

Table IV.

Dose of ketamine used for Analgesia.

Dose of ketamine used	No. of cases	% Distribution
- Upto 50 mgs.	4	8
51 upto 100 mgs.	22	44
100 upto 150 mgs.	10	20
151 upto 200 mgs.	5	10
201 upto 250 mgs.	6	12
251 upto 300 mgs.	3	6

8. Fifty-four percent of the patients experienced some degree of hallucinations which could generally be well controlled with additional medication of diazepam and pethidine, 36% of these patients experienced mild nausea and occasional vomiting (Table V)

9. In 72% of patients, complete and satisfactory pain relief was achieved and in 16% additional medication was required. In 12% of cases, the pain relief was unsatisfactory (Table VI).

Table V

Analysis of side-effects of ketamine

Side effects	No. of cases.	% Distribution
Hallucinations (mild)	27	54
Nausea & Vomiting	18	36
Other symptoms	3	6
Rise of B.P.	Nil	Nil
Tachycardia	13	26
Foetal Distress	Nil	Nil

Table VI

Pain Relief Scores with Ketamine

Pain relief scores	No. of cases	% Distribution
0 No. relief	Nil	-
1 Mild Relief	6	12
Additional drugs required repeatedly		
2 Moderate relief of pain.	8	16
Patient aware of some discomfort which was Relieved with analgesics.		
3 Complete relief,	36	72
No awareness of pain.		

Discussion

Low dose ketamine (0.25mg/kg. -0.5mg/kg.) has been used, in intermittent intravenous doses to provide rapid and effective analgesia, it is especially useful for vaginal or assisted instrumental vaginal deliveries like forceps or vacuum extraction (White et al 1982).

Authors conclude that 72% of patients had complete and satisfactory pain relief. It was also found to be safe, as all the babies had Apgar score more than 8 at the end of 5min. Only 54% of the patients experienced some degree of hallucinations which were easily well controlled with diazepam, 98% of the patients delivered within 5hours.

We conclude that intermittent intravenous bolus ketamine can be safely and effectively used as labour analgesia.

References

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