

Low Dose Ketamine in Labour Analgesia

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ABSTRACT

Introduction: Ketamine is dissociative anaesthesia- a combination of profound analgesia with superficial sleep. This state is characterized by spontaneous ventilation, relative preservation of airway reflexes and hemodynamic stability. The present study was designed to evaluate the efficacy of programmed labour protocol in proving shorter, safer and relatively pain free deliveries.

Material and methods: This study was a randomised control trial done in The Department of Obstetrics and Gynaecology, Rohilkhand Medical College and Hospital for a span of one year (October 2016 to September 2017).

Result: In our study, the duration of labour, induction delivery interval was significantly reduced. Pain relief was excellent in study group.

Conclusion: Ketamine's site of action appears to be primarily in the thalamus and limbic systems, acting as N- methyl D- aspartate receptor non- competitive antagonist. It does not suppress respiratory drive unless high dosage are used, or small dosage given rapidly. Intravenous ketamine in low dose appears to be safe laternative to epidural analgesia.

Keywords: Ketamine; Low Dose; Pain Relief

INTRODUCTION

Ketamine was first synthesized in 1962 at the Park Devis Lab by Calvin Stevens. The original name of ketamine was CI 581.

According to Inger Findley and Geoffry Chamberlein an ideal method of pain relief in labour should not interfere with uterine contractions or the progress of labour and should not increase operative intervention¹, it should not depress the respiratory centre of newborn, should be easy to administer, it should not have unpleasant side effects to mother and fetus. Ketamine has least suppressive effects on fetus because of its ability to raise the maternal blood pressure and uterine blood flow, so babies delivered shortly after low dose ketamine might have benefited from an improvement in uterine perfusion.² Low dose ketamine of 2mg/kg given in labour analgesia does not have any deleterious effect on APGAR score.^{3,4}

Current research aimed to study maternal outcome, duration of labour, fetal outcome:- APGAR score at 1 and 5 minutes, side effects of ketamine on mother and to evaluate patients satisfaction

MATERIAL AND METHODS

This study was a prospective non- placebo randomised control trial done in The Department of Obstetrics and Gynaecology, Rohilkhand Medical College and Hospital for a span of one year (October 2016 to September 2017). Clearance was taken from institutional ethical committee,

informed and written consent obtained by patient, women admitted in labour room were screened. Detailed history taken, detailed general and obstetrics examination was done. 120 patients were enrolled in the study. They were divided in two different groups, control group (no drug given), study group (intravenous ketamine administered).

Inclusion criteria

1. Parturient in active phase of labour with 4cm cervical dilatation
2. Vertex presentation
3. Single term pregnancy
4. normotensive patient
5. no cephalopelvic disproportion
6. fetus in good condition

Exclusion criteria

1. Malpresentation
2. Multiple gestation
3. PROM
4. IUGR
5. Preeclampsia/ eclampsia/ hypertension
6. Previous uterine scar
7. Neuropsychiatric disorder
8. Preterm labour
9. Precious baby
10. Cardiac disease
11. Liver disease

The study started at active phase of labour (≥ 4 cm cervical dilatation) with good uterine contractions (3-4 contractions for 40-45seconds in 10 minutes).

Patients were divided into study and control groups. 60 patients were included in control groups, who fulfil the inclusion criteria. They were premedicated with glycopyrolate 0.0005mg/kg, then loading dose of ketamine 0.2mg/kg body weight given slowly over 30-60seconds. The maintenance

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dose was started at the rate of 1mg/minute body weight given in normal saline slowly after 30 min through infusion pump, Partograph maintained, fetal monitoring done with pulse, blood pressure, SPO₂, respiratory rate. After delivery, infusion was continued till episiotomy suturing done. In the control group 60 patient did not receive ketamine but all the parameters checked in same manner as control group. All same manner as control group.

All patients observed for one hour after delivery. The patients were asked to rate their overall quality of analgesia using visual analogue scale.

VAS follow:-

Excellent- VAS 0-2, no pain during labour

Satisfactory- VAS 2-8, minimal pain

Unsatisfactory- VAS 9-10, little or no pain relief^f

RESULTS

The mean age of study group was 35.3±10.1, while that of control group was 37.9±8.2. BMI of the women in study group was 25.1±5.2, in control group it was 26.5±3.6.

In the present study, 45 women in study group were primigravida and 15 were multigravida. In control group 42 were primigravida and 18 were multigravida.

Duration of first stage of labour in control group was 360 minutes, while in study group it was 240 minutes. Duration of first stage was significantly shorter in study group.

Groups	Study	Control	t- value	P- value
Age	35.3±10.1	37.9±8.2	1.5480	0.1243
Weight	68.2±12.7	70.6±10.6	1.1238	0.2634
Height	1.65±0.7	1.63±0.06	0.1397	0.8891
BMI	25.1±5.2	26.5±3.6	1.7146	0.0890

Table-1: Demographic distribution

	Study group	Control	χ ²	P
Primigravida	45	42	0.17	0.6801(NS)*
Multigravida	15	18		

* NS = not significant

Table-2: Distribution according to parity

Groups	N	Mean	SD	t- value	P value
Control	60	360	40.6	14.695	<0.001(HS)*
Study	60	240	48.5		

*highly significant

Table-3: Duration of first stage of labour

Group	Number	Mean	SD	t- value	P-value
Study	60	32.04	5.37	3.454	<0.001(HS)*
Control	60	35.80	6.50		

*HS = highly significant

Table-4: Duration of second stage of labour

Time (in minutes)	Study group		Control group		χ ²	P
	Number	Percentage (%)	Number	Percentage (%)		
180- 240	30	50	10	16.6	16.98	<0.001(HS)*
241-300	20	33.3	25	41.6		
301-360	10	16.6	25	41.6		
>360	0	0	0	0		
Total	60	100	60	100		

*HS = highly significant

Table-5: Induction- Delivery Interval

APGAR score	At one minute		At 5 minutes	
	Study	Control	Study	Control
9-10	4	0	100	95
7-8	96	98	0	5
<7	0	2	0	0
Total	100	100	100	100

Table-6: Effect on fetus

Side effects	Number	Percentage (%)	$\chi^2 = 31.2$	P= 0.496
Tachycardia	15	25		
Rise in B.P	10	16.6		
Hallucination	0	0		
Apnoea	0	0		
Nausea and vomiting	10	16.6		
Emergency reaction	0	0		

Table-7: Side effects on mother

Degree of analysis	Number	Percentage (%)	$\chi^2 = 31.2$	P= <0.001
Unsatisfactory	0	0		
Satisfactory	12	20		
Excellent	48	80		
Total	60	100		

Table-8: Degree of pain relief

In study group maximum number of women (i.e, 50%) had induction to delivery interval was between 180-240 minutes compared to 16.6% in control group.

In the study group, 4% of neonate had APGAR score of 9-10 at one minute, 100% at 5 minutes. None of the neonate had APGAR score of <7. There was no significant adverse effect of ketamine in study group.

In the present study, 25% of the women experienced tachycardia, 16.6% had rise in B.P, 16.6% had nausea and vomiting.

The degree of pain relief in the study group was excellent in 80% of the patient, was satisfactory in 20%. This was statistically significant.

DISCUSSION

In the present study, induction dose of ketamine was 0.2mg/kg and maintenance dose was 1mg/min with continuous infusion pump. In present study, mean duration of first stage of labour was 140.6 minutes Z value was 8.10 i.e, significant, compared to Ayangude, in which duration of labour was shortened from 360 minutes to 196minutes.⁶

In Sharma et al, duration of first stage was 192 minutes in primigravida, 98 minutes in multigravida.⁷

Ketamine reduces pain thereby reduces maternal exhaustion; so the patients were very cooperative during labour. It has oxytocic effect also, so it has increased uterine contractions and cervical dilatation. So first stage was shortened significantly.

In present study, mean duration of second stage was 32 minutes in study group and 35.8 minute in control group with Z value of 3.15 i.e. significant. Bearing down effort was not inhibited by ketamine in second stage of labour. Mean duration of third stage of labour was similar in both groups. In the present study, ketamine had no effect on APGAR score at 1 minute and 5 minute.

In the present study 15% had tachycardia, 10% had rise in blood pressure and 10% had nausea and vomiting. Degree of pain relief was excellent in 80% as compared to Desai and Dftary, where it was 70%.⁸

The low dose ketamine for painless labour is simple, safe, effective and economical method for pain relief in labour

in India where everyone is not capable enough to afford epidural analgesia for labour pain.^{9,10}

CONCLUSION

The low dose intravenous ketamine suits best for painless labour since

1. It provides effective analgesia in low doses
2. Safe without significant maternal and fetal complications
3. It does not prolong duration of labour and there is no increase in rate of instrumental delivery or caesarean section rates.
4. It is easy to administer and monitor
5. It is cost effective and economical

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