

OBSTETRIC ANALGESIA WITH INTRAVENOUS LOW DOSE KETAMINE

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SUMMARY

Study of intravenous low dose infusion of Ketamine Hydrochloride in normal vertex labour aimed at studying its effect on labour pain, progress of labour, foetus and mother.

This study reveals excellent results with reduction of pain to tolerable limits, with positive response on progress of labour and with no notable adverse effect on the mother or the foetus. Ketamine does show an uplift on the neonatal foetal status rather than producing foetal complications. There was no need of assisted delivery due to poor maternal co-operation or poor progress in any of the patients. No caesarian section was conducted in any case. Patient remained fully conscious through out the procedure.

Average dose of Ketamine in the study group was 0.25 mg/50 Kg/min

INTRODUCTION

Well known to the obstetric is the fact that fear anxiety and apprehension are the etiologies of prolongation of labour. Usually used analgesics for non-obstetric purposes are known to cause foetal and maternal side effects. Ketamine-a phencyclidine derivative, already proved

as an anaesthetic and analgesic for manual removal of placenta and caesarian section and failed due to foetal side effects with high doses during labour is now being tested in extremely low doses in this study which is coming only to 1/1000 of the dose normally given in induction of anaesthesia. (0.11 mg/mt versus 1-2 mg/kg bolus dose).

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MATERIAL AND METHOD

Study included 70 cases in normal labour.

16 were primigravidas and 54 were multigravidas, of age group 19 to 30 years. 70% were between 20.23 years of age, 95% of patients were of low socio economic status. 80% of patients were anaemic, mainly of iron deficiency and having haemoglobin between 8/9 gm%. 80% of patients were illiterate with no knowledge of painless labour.

To emphasis on uniformity of study only patients with vertex presentation having good fetal status and without any obstetric complications were selected. Malpresentation is not contraindication for Ketamine.(Table1)

was done, written consent was obtained.

Once the patient was in active phase of labour i.e. 3 to 4 cms. dilatation and 75% effacement of cervix, artificial rupture of membrane was done.

Ketamine was started in active phase of labour when patient complained of discomfort. For one hour of starting the infusion patients were closely monitored for side effects of ketamine. All basal parameters of mother and fetus were noted at 20 minutes interval.

Ketamine which is available as 10 mg/ml. was dissolved in 5% 500 ml dextrose

Table I
Contraindications for Ketamine

1. Prematurity	-	Crosses placenta.
2. Hypertensive diseases	-	Increases BP & Pulse.
3. Cardiovascular diseases	-	Myocardial ischemia.
4. CNS & Psychiatric illness	-	Aggravates symptoms.
5. Previous C.S.	-	Monitoring difficulty.
6. Thyrotoxicosis	-	Increases BP + Pulse.
7. Open Global Defects	-	Intraocular pressure.
8. Sensitivity to ketamine.		

Patients having contraindications for ketamine e.g. prematurity, previous caesarean section, maternal sensitivity to ketamine and mothers having hypertension, cardiovascular, central nervous system diseases, thyrotoxicosis and psychiatric illness were excluded.

Patients with acute respiratory infection are not contraindicated for ketamine. In fact in study group 2 patients had pulmonary tuberculosis. Thorough check up comprising clinical and relevant investigations

at dose of 0.5 mg per kilogram of body weight. Induction was done by giving 90 to 100 drops per minute (0.3125 mg. per minute) till four minutes or till the effect of ketamine manifests like reduction of pain or when patients feels sleepy. After that infusion is adjusted according to the patients response, which is aimed at reducing the pain to a tolerable level which is subjective. Usually 30 to 40 drops per minute (0.125 mg/min) was needed for maintenance. Infusion of ketamine is

continued in the 1st 2nd and 3rd stages and withdrawal was affected only after the whole process of delivery was complete including suturing of episiotomy. If the patient had hallucination or delirium during withdrawal 10 mg diazepam was given intramuscularly. Baby is monitored for 3 days, patient was shifted three hours after completion of procedure.(Table II)

of patient. Patients were usually conscious and co-operative. There was a significant degree of amnesia with doubtful recall of labour in 28.5% cases. Ketamine gave fairly good analgesia for suturing of episiotomy, but in some cases local anaesthesia was supplemented. 28.5% of cases complaint of increased after pains in the ward which responded to mild

Table II
Dose of I. V. Ketamine

Average Dose	-	15.4 mg/hr (0.2575 mg/mt)
Multi	-	17.53 mg/hr (0.29 mg/min.)
Lowest Dose/Hr.	-	6.6 mg/hr (0.11 mg/min)
Maximum Dose/Hr.	-	29.4 mg/hr (0.49 mg/min)
Maximum Total Dose	-	85 mg in 10 hrs.

OBSERVATION AND ANALYSIS

(1) Pain during Labour:

Even though it is not possible to give an absolute relief of pain during the first and second stage, pain was reduced to a tolerable level which is aimed at. Second stage pains were well taken with no difficulty in positioning and co-operation

doses of analgesics.(TableIII)

In one patient no effect was produced even after increasing the dose upto 150 drops/minute (0.496 mg/min.50 kilogram which was much higher than the average dose). This may be due to tolerant effect seen in some patients especially alcoholic.

(2) Effect on Labour :

Table III
Effect of Ketamine on Pain

No Pain	-	2 Cases	-	2.85%
Tolerance	-	66 cases	-	94.28%
No effect	-	1 case	-	1.43%
Doubtful recall	-	20 cases	-	28.5% - Amnesia
Late after pains	-	29 cases	-	28.5%
Increased	-	1 case	-	1.43%

(Table IV)

Table IV
Effect of progress of Labour

				Normal (Williams)
Primi	-	1st stage	- 246.5 min (1.7 cm/hr)	1.2 cm/hr
		2nd stage	- 17.5 min.	45 mts
		3rd stage	- 4.4 min.	5 mts
Multi	-	1st stage	- 110.7 min	1.5 cm/hr
		2nd stage	- 12.5 min	20 mts
		3rd stage	- 3 min.	4 mts.
Causes		Pitocin like action		
		Smooth 2nd stage movements due to pelvic Muscle tone		
		Reduced dysfunction and anxiety.		

(3) Ketamine as an Analgesic and Anaesthetic

Induction which is attained in four minutes was smooth with complete maintenance of reflexes and quite rapid. Maintenance was smooth and easy with full patient consciousness. Withdrawal was

rapid and smooth, with isolated cases of hallucination which responded to Diazepam 10 mg. (Table V & VI)

Minor side effects like dizziness, slurring of speech, muscle twitching, staring look, nystagmus etc. were seen. But the only complication noted was vomiting in

Table V
Duration of actions of Ketamine

Induction	4 min.	66 cases	Rapid Smooth
Shortest	90 Sec.	2 cases	Maintain Reflexes
Longest	15 min.	1 case	
Maintenance	- Easy, smooth, no complication, patient conscious.		
Withdrawal average	15-20 min	60 cases	
	20 min	2 cases	Rapid smooth
	15 min	7 cases	analgesic effecte prolonged.

2.85% cases and hallucinations and emotional upset in 11% cases.(Table VII)

Table VI
Complications of Ketamine as Analgthetic
At induction Maintenance

Dizziness	28.5%	Sleepiness	97.14%
Nystagmus	11.43%	Involuntary	
Slurring of Speech	11.43%	Movement	2.85%
Involuntary		Murmuring	2.85%
Movement	2.85%	Nystagmus	2.85%
Staring look	2.85%	Muscle twitching	2.85%
Vomiting	2.85%		
Withdrawal		Emotional Upset	2.85%
		Hallucination	8.57%

Table VII
Minor effect of Ketamine

Blood Pressure Sys/Diast	-	↑ 10-20/16-18 mm
Pulse rate	-	↑ By 10 BPM
Respiration	-	Rate ↑ by 5-6/mt Increased Depth.
No effect on Bladder, G.I. function etc.		

Table VIII
Apgar of babies of Ketamine analgesia

Time	Apgar Score					
	4	6	8	9	10	
1 min	1	1	20	3	44	(62.9%)
5 min	0	0	2	0	68	(97.14%)
10 min	0	0	0	0	70	(100%)

Causes of excellent foetal outcome

1. Better Respiratory Capacity of Mother.
2. Increased B.P. and Pulse improve U.P.C.
3. Reduced duration of Labour.

OTHER EFFECTS

Ketamine showed a mild increase in pulse rate, respiration and blood pressure which were not much significant with proper patient selection and monitoring. There was no effect on bladder and GIT function.

All the babies except two had a good apgar score at 1 minute. Two babies who had somewhat low apgar scores at 1 mt. improved at 5 mts. & 10 mts. apgar. (Table VIII)

We did not have any case of assisted delivery with forceps or vacuum or none of the cases progressed to cesarean section due to dysfunctional labour. Of course good patient selection is a reason for this good obstetric outcome. (Table IX & X)

Theoretical Basis :

Ketamine positively acts on the progress of labour by producing a pitocin like action on uterus and by reducing anxiety and pain. It smoothens the second stage of labour producing good pelvic tone and producing good uterine contraction. Ketamine at this dose acts to increase the respiratory capacity of mother rather than producing respiratory depression. Increased blood pressure & pulse rate (still maintained within physiological limits) has produced an increase in the uteroplacental circulation which has produced a good foetal outcome. Reduced duration of labour has also contributed to the same.

Table IX
Advantages of Ketamine in labour

1. Safe	7. Reduce blood loss
2. Rapid & smooth anaesthesia	8. Good foetal outcome
3. Effective analgesia	9. Effective Respiration
4. No Resp. Depression	10. No Premedication
5. Shortens Labour	11. Maintain Conscious
6. Reduce Dysfunction	12. High acceptability

Table X
Disadvantages of Ketamine anaesthesia

1. Complications in high dose.
2. Resistance in some patients.
3. Increased after pains.
4. Hallucinations. At withdrawal - correct by IM Diazepam.

CONCLUSION

After close analysis of observation, we conclude that Ketamine Hydrochloride is a very effective, satisfactory and acceptable analgesic in normal labour if given in low

dose as an intravenous infusion without any supplementation or premedication, provided proper criteria for selection of patients are maintained.

Table IX
Advantages of Ketamine in labour

1. No	7. No fetal loss
2. Rapid & simple technique	8. Good fetal outcome
3. Effective analgesia	9. Effective Respiration
4. No hypotension	10. No emesis
5. Normal labour	11. No side effects
6. No uterine relaxation	12. High success rate

Table X
Disadvantages of Ketamine in labour

1. Hypotension at high dose
2. Resistant to some analgesics
3. Increased vital signs
4. Hypertension on withdrawal - caused by IM injection