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A CROSS SECTIONAL STUDY OF KETAMINE AS A SOLE ANAESTHETIC AGENT IN SHORT SURGICAL PROCEDURES

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Abstract

Introduction: Ketamine, an anaesthetic drug, is commonly used intravenously or intramuscularly for general anaesthesia induction and maintenance. It is frequently used as a first-line agent in the emergency department or outside of the operating room for short, unpleasant operations. Ketamine is well-known for its unique qualities, which make it effective in circumstances when hypotension is a problem, such as emergency surgery, when the patient's fluid content is unknown, and in those with co-existing bronchospasm, such as some paediatric procedures.

Materials and Methods: The present study was done on hundred patients, at Department of Anaesthesia, Balaji Medical College, Chennai from June 2013 to November 2013. 200 patients of either sex and various age groups ranging from 10 to 40 years were selected for the study.Patients of ASA grade I and grade II, either sex between 10-40years were included. Patients with history or clinical evidence of Ischemic heart disease, Hypertension, Diabetes mellitus, Raised intraocular pressure, Epilepsy, Cerebrovascular disorders, Personality disorders, Old age, Surgery on head and neck, Psychiatric disorders were excluded from the study.

Results: Of the 200 selected patients of either sex, 84 patients were male and 116 were female. The age range was 10-40 yrs and the mean age was 24 ± 8.7. The majority of the patients belonged to the age group 21-30. The distribution of weight of the patients ranged from 20-75kgs with the mean weight of 46 ± 12kgs.

Conclusion: It can be concluded by evaluation and clinical trail that Ketamine can be used as a sole anaesthetic agent with minimum adverse effects and maximum safety. It has the advantage of rapid and smooth onset of action, minimal depression of respiratory system and intense analgesia during intra-operative and post-operative period. However the undesirable side effect of Ketamine can be effectively countered by the use of benzodiazepines. Hence Ketamine can be used as a sole anaesthetic agent with considerable amount of success in most of the short surgical procedures.

Key Words: Ketamine, benzodiazepines, hypotension, depression.

INTRODUCTION

Ketamine, an anaesthetic drug, is commonly used intravenously or intramuscularly for general anaesthesia induction and maintenance. It is frequently used as a first-line agent in the emergency

department or outside of the operating room for short, unpleasant operations.[1] Ketamine is well-known for its unique qualities, which make it effective in circumstances when hypotension is a problem, such as emergency surgery, when the patient's fluid content is unknown, and in those with co-existing bronchospasm, such as some paediatric procedures.[2]

Patients on ketamine have been reported to have electrophysiological dissociation characterised by profound analgesia, unresponsiveness to commands, and amnesia, while maintaining cardiovascular stability, spontaneous respirations, and protective airway reflexes even when the drug is fully effective.[3] Side effects of this cataleptic state include nystagmus with pupillary dilatation, ataxia, salivation, lacrimation, spontaneous limb movements, and increased total muscular tone. Emergence delirium, a common Ketamine consequence, is characterized by hallucinations, vivid dreams, and illusions that can cause considerable patient unhappiness and impede postoperative care and recovery.[4]

The most serious consequence of this medication is emerging delirium. Patients may have vivid dreaming with or without psychomotor activity evidenced by perplexity or irrational behaviours. This is more common among young adults, particularly girls. They are less common among children and the elderly.[5]

The present study is to assess the suitability of Ketamine as a sole anaesthetic agent for short surgical procedures with Diazepam to attenuate the emergence phenomenon.

MATERIALS AND METHODS

Study design: A prospective study.

Study location: Department of Anaesthesia, Balaji Medical College, Chennai.

Study Duration: June 2013 to November 2013.

Sample size: 200 patients

The present study was done on hundred patients, at Department of Anaesthesia, Balaji Medical College, Chennai from June 2013 to November 2013. 200 patients of either sex and various age groups ranging from 10 to 40 years were selected for the study.

Inclusion criteria: Patients of ASA grade I and grade II, either sex between 10-40years.

Exclusion criteria: Patients with history or clinical evidence of Ischemic heart disease, Hypertension, Diabetes mellitus, Raised intraocular pressure, Epilepsy, Cerebrovascular disorders, Personality disorders, Old age, Surgery on head and neck, Psychiatric disorders.

All patients were screened thoroughly and investigations like Hb%, urine for sugar and albumin, fasting blood sugar and ECG were done. Physical examinations were carried out and body weight was recorded in each case. Basal preoperative pulse rate, blood pressure and respiratory rate were

recorded. All patients were premedicated with Atropine 0.02mg/kg body weight and Diazepam 0.2mg/kg body weight intravenously 2-3minutes before the injection of Ketamine.

Initial dose of Ketamine 2mg/kg body weight was given intravenously. Subsequent doses of Ketamine were given after the signs of waring off of anaesthesia like phonation, return of nystagmus and movements on surgical stimulation were seen. The dose repeated was half the initial dose.

All patients were premedicated and Ketamine 2mg/kg body weight was given intravenously slowly over a period of 30-40 seconds. After injecting Ketamine, time taken to obtain the surgical anaesthesia was noted. Patient was closely monitored for vital signs at 2, 5 and every 5 minutes thereafter including airway maintenance. Patient was also observed for side effects. The time taken by the patient to recover from the initial dose was noted. A subsequent dose of Ketamine was given if the procedure was continued further. The duration of action of the subsequent dose was also noted. Once the procedure was over, the patient was allowed to recover in a calm place. The patients were said to be completely recovered from anaesthesia when they started responding to oral commands. They were then shifted to the ward.

Statistical Analysis: Descriptive data included mean, standard deviation and percentage which were determined for the study group. Paired 't' test was used to compare the mean values at different intervals with baseline measurements. P value of <0.05 was considered for significant difference.

RESULTS

Of the 200 selected patients of either sex, 84 patients were male and 116 were female. The age range was 10-40 yrs and the mean age was 24 ± 8.7. The majority of the patients belonged to the age group 21-30. The distribution of weight of the patients ranged from 20-75kgs with the mean weight of 46 ± 12kgs.

S.No	Type of Surgery No. of Cases	No. of Cases
1	Abdominal tubectomy	20
2	I and D	34
3	Skin grafting	2
4	Stunt removal	8
5	Secondary suturing	2
6	Excision Fibroadenoma Lipoma	 28 8
	Ganglion Sebaceous cyst	8 12
7	Wound debridement	4

8	K-wire removal	6
9	Lymph node biopsy	12
10	Circumcision	26
11	Disarticulation	6
12	Visualization of internal urethra	2
13	Cystoscopy	2
14	Perineal tear repair	2
15	External Fixator removal	6
16	MTP	2
17	D and C	6
18	Incisional biopsy	2
19	Bone marrow aspiration and infiltration	2

Table 1: Different surgical procedures conducted

Injection Ketamine 2-mg/kg body weight intravenous was given to the patients 2-3min after the injection of Diazepam and Atropine. The following were observed and noted during anaesthesia and in the recovery period.

Time of onset of anaesthesia: The time of onset of anaesthesia was taken from the time of intravenous administration of Ketamine to surgical anaesthesia. The time of onset of anaesthesia ranged from 20-54sec. The mean duration of onset was 34.3 ± 8.7sec.

Duration of action of initial dose and subsequent dose: The duration of action of initial dose of Ketamine after intravenous administration was noted. The least duration was 9min, and maximum was 20min, mean duration of action of initial dose was 16.9 ± 2.9.

70 patients required only the initial bolus dose while the other 30patients required a top up dose. The subsequent dose repeated was half the initial dose. The duration of action of the subsequent dose ranged from 7-12min and mean duration was 9.6 ± 1.5min.

In the study, all the patients showed rise in pulse rate. The mean rise in pulse rate was 14.5 ± 4.7 beats per min. The rise was statistical significant ($P < 0.05$) at 5 min and the pulse rate came to preanaesthetic levels at 30-35 min.

The blood pressure was recorded in all the cases. A rise in both systolic and diastolic pressure were seen in the cases. All patients had satisfactory analgesia and they required no analgesics in the immediate postoperative period.

DISCUSSION

Infact, Ketamine is the only available agent which can function as a sole anaesthetic because of its unique sedative, amnesic, analgesic, and anaesthetic properties and thus Ketamine may prove to be a useful addition to the armamentarium of an anaesthetist.[6]

Many authors have studied the characteristics of Ketamine hydrochloride as a sole anaesthetic agent in minor surgical procedures with regard to the duration of action, cardiovascular and respiratory changes and complications.[7]

The present study was conducted to evaluate the features such as induction time, analgesia and cardiovascular and respiratory effects.[8]

In a study conducted by Dhar et al on 110 patients undergoing minor surgical procedures using Ketamine as sole anaesthetic agent, it was observed that the incidence and severity of the unwanted side effects of Ketamine hydrochloride was significantly reduced by prior administration of diazepam intravenously. So, I have taken diazepam 0.2mg/kg IV and atropine 0.02 mg/kg IV as premedication in our study.[9]

A study by White PF et al stated that Ketamine 2mg/kg IV, given as a rapid bolus injection produced significant reduction in PaO2. In contrast, premedicated patients with Diazepam, Who received Ketamine 2mg/kg IV over 60seconds showed no significant change in PaO2.[10]

A study by Gudi et al stated that when the surgery was prolonged or when patients were coming out of the initial dose, subsequent dose of 1mg/kg of Ketamine was given. Even in our study, when the time of surgery was prolonged or when the patient came out of the initial dose, subsequent dose of 1mg/kg of Ketamine was given in 30 patients. The duration of action of the subsequent dose was 9.6 ± 1.5 (7-12) min.

CONCLUSION

Based on the review and clinical trials, it can be stated that Ketamine can be used as a sole anaesthetic drug with minimal adverse effects and maximal safety. It has the advantage of having a rapid and smooth beginning of action, minimal respiratory system depression, and intense analgesia during the intra-operative and post-operative period. However, the usage of benzodiazepines can successfully counteract the unpleasant side effects of ketamine. As a result, in most short surgical operations, ketamine can be used as the sole anaesthetic drug with significant success.

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