

ORIGINAL ARTICLE

Efficacy of Ketofol and Propofol for electroconvulsive therapy in children

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ABSTRACT:

Background: Electro convulsive therapy is used to treat depression in the patients not responding to antidepressant therapy. The present study compared efficacy of Ketofol and Propofol for electroconvulsive therapy in motor seizure. **Materials & Methods:** 50 patients with motor seizure were divided into two groups of 25 each. Group I was given initial dose of 0.5mg/kg Propofol. Group II was administered an initial dose of 0.5mg/kg Ketofol (0.25 mg/kg of Propofol + 0.25 mg/kg of ketamine). Parameters such as motor seizure duration, hemodynamic profile and recovery times were recorded. **Results:** Group I had 14 males and 11 females and group II had 2 males and 13 females. Motor seizure duration was 21.5 seconds in group I and 27.4 seconds, time of spontaneous eye-opening was 580.8 seconds and 548.6 seconds, time of obeying commands was 728.3 seconds and 738.4 and time of spontaneous breathing was 340.1 and 312.6 in group I and II respectively. The difference was non-significant ($P > 0.05$). There was non-significant difference in group I and group II regarding heart rate (bpm), systolic BP (mmHg), diastolic BP (mmHg), MAP (mmHg) and SPO₂ (%) 1 minute and 5 minutes after seizure ($P > 0.05$). **Conclusion:** Both Ketofol and Propofol produced adequate motor seizure duration. Both agents can be comparable in terms of recovery parameters.

Key words: Electroconvulsive therapy, Ketofol, Propofol

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INTRODUCTION

Electro convulsive therapy (ECT) is used to treat depression in the patients not responding to antidepressant therapy. ECT may be associated with untoward consequences such as hypotension and bradycardia followed by hypertension and tachycardia. After awakening, patient may experience confusion, agitation, headache, and muscle stiffness.¹ Most ECT procedures are carried out with muscle paralysis under general anesthesia. Therapeutic adequacy of ECT can be determined by monitoring the seizure duration which can be done by either with electroencephalogram or by observation of motor seizure.² The purpose of anesthesia during ECT is to induce an unconscious state, and the agents used should not impact motor seizure. Thus, the type of anesthetic agents used in modified ECT becomes very important as all anesthetic agents have some seizure modifying properties.³

The motor seizure duration has been considered as a standard for determining the therapeutic adequacy.⁴ A motor seizure lasting 20–25 seconds at minimum is considered adequate for ECT. Seizures exceeding 120 seconds is considered as prolonged seizure and should be terminated with intravenous benzodiazepines.⁵ Common drugs used for ECT

anesthesia are Methohexital, Thiopental, Etomidate, and Propofol. Propofol has fast induction, smooth recovery, and minimal post-operative agitation. Its hypotensive effect is beneficial in counteracting ECT induced hypertension; however, disadvantage of propofol is dose-dependent decrease in seizure duration.⁶ The present study compared efficacy of Ketofol and Propofol for electroconvulsive therapy in motor seizure.

MATERIALS & METHODS

The present study consisted of 50 patients with motor seizure age ranged 10-17 years of both genders. All gave their written consent for the participation of the study.

Data such as name, age, gender etc. was recorded. patients were divided into two groups. Each group comprised of 25 patients. Group I was given initial dose of 0.5mg/kg Propofol. Group II was administered an initial dose of 0.5mg/kg Ketofol (0.25 mg/kg of Propofol + 0.25 mg/kg of ketamine). Parameters such as motor seizure duration, hemodynamic profile and recovery times were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Groups	Group I	Group II
Status	0.5mg/kg Propofol	0.5mg/kg Ketofol
M:F	14:11	12:13

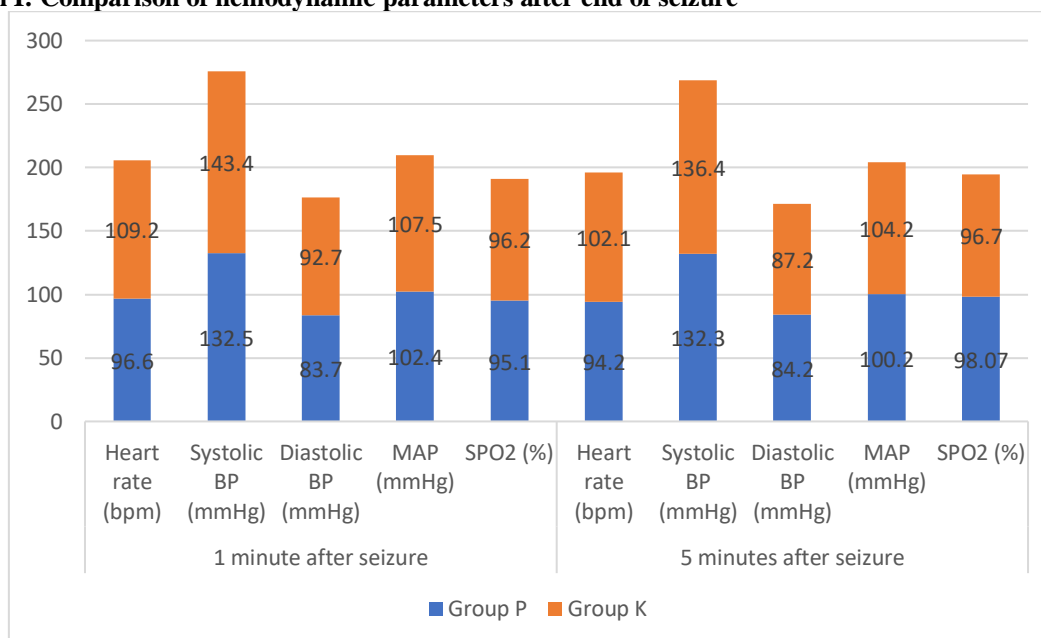
Table I shows that group I had 14 males and 11 females and group II had 2 males and 13 females.

Table II: Comparison of parameters

Parameters	Group I	Group II	P value
Motor seizure duration (sec)	21.5	27.4	0.05
Time of spontaneous eye-opening (sec)	580.8	548.6	0.82
Time of obeying commands (sec)	728.3	738.4	0.71
Time of spontaneous breathing (sec)	340.1	312.6	0.94

Table II shows that motor seizure duration was 21.5seconds in group I and 27.4seconds, time of spontaneous eye-opening was 580.8seconds and 548.6 seconds, time of obeying commands was 728.3seconds and 738.4 and time of spontaneous breathing was 340.1 and 312.6 in group I and II respectively. The difference was non- significant (P> 0.05).

Graph I: Comparison of hemodynamic parameters after end of seizure



Graph I shows that there was non- significant difference in group I and group II regarding heart rate (bpm), systolic BP (mmHg), diastolic BP (mmHg), MAP (mmHg) and SPO2 (%) 1 minute and 5 minutes after seizure (P>0.05).

DISCUSSION

Electroconvulsive therapy (ECT) is a common treatment method used in severe depression and other psychiatric diseases. Currently, most ECT procedures are carried out with muscle paralysis under general anaesthesia.^{7,8} The anticonvulsant properties of sedative and hypnotic drugs used during general anaesthesia may reduce the efficacy of ECT.¹ It is important to establish an accurate balance between adequate anaesthesia depth and optimal seizure duration.⁹ Moreover, the electrical current applied during the ECT stimulates the autonomic nervous system and leads to haemodynamic changes in both

systemic and cerebral circulations.¹⁰ Ketofol, (an admixture of ketamine and propofol), is recently being tried as an induction agent in ECT. The cardiovascular properties of both propofol and ketamine balance each other in maintaining hemodynamic stability.^{11,12} The present study compared efficacy of Ketofol and Propofol for electroconvulsive therapy in motor seizure.

We observed that group I had 14 males and 11 females and group II had 2 males and 13 females. Motor seizure duration was 21.5 seconds in group I and 27.4 seconds, time of spontaneous eye-opening was 580.8 seconds and 548.6 seconds, time of obeying commands was 728.3 seconds and 738.4 and time of spontaneous breathing was 340.1 and 312.6 in group I and II respectively. Rasmussen et al¹³ used ketamine during ECT in 10 patients with no extension of motor and EEG seizure length. They used ketamine at higher doses (1.04 to 3.12 mg/kg)

and later in the course they noted that these factors were possible explanations for why ketamine seizures were not longer.

We found that there was non-significant difference in group I and group II regarding heart rate (bpm), systolic BP (mmHg), diastolic BP (mmHg), MAP (mmHg) and SPO₂ (%) 1 minute and 5 minutes after seizure ($P>0.05$). Erdogan et al¹⁴ assessed the effect of a ketamine:propofol combination for electroconvulsive therapy on seizure activity, haemodynamic response and recovery parameters, and to compare with these with the effects of propofol alone. 24 patients underwent a total of 144 electroconvulsive therapy sessions. Patients were randomly assigned to receive 1 mg/kg ketofol or 1 mg/kg propofol 1% for anaesthesia induction. Seizure duration and quality, haemodynamic data, recovery parameters and side-effects were recorded and analysed between groups. Both motor and electroencephalography seizure durations in the ketofol group (29 ± 17 and 41 ± 17 seconds, respectively) were similar to that in the propofol group (28 ± 13 and 38 ± 16 seconds, respectively). Postictal suppression index was higher in the ketofol group (89.63 ± 7.88) than in the propofol group (79.74 ± 14.6).

Krystal et al¹⁵ investigated cases in which ECTs with methohexitone produced seizures lasting shorter than 25 seconds, despite maximal stimulation, and reported that the addition of ketamine at a mean dose of 1.31 (0.7 to 2.8) mg/kg increased seizure duration in 30 of 36 cases. Zarate et al¹⁶ used a single dose of intravenous ketamine (0.5 mg/kg in 40 minutes) and observed improvement in depression starting between 110 minutes and seven days²⁷.

The limitation the study is small sample size.

CONCLUSION

Authors found that both Ketofol and Propofol produced adequate motor seizure duration. Both agents can be comparable in terms of recovery parameters.

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