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Original Article

Assessment of efficacy of Ketofol and Propofol for electroconvulsive therapy

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ABSTRACT:

Background: Electroconvulsive therapy is a common treatment method used in severe depression and other psychiatric diseases. The present study compared efficacy of Ketofol and Propofol for electroconvulsive therapy in motor seizure. **Materials & Methods:** 60 patients with motor seizurewere divided into two groups of 30 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, hemodynamicprofile and recovery times were recorded. **Results:** Motor seizure duration (sec) was 25.5 and 28.4, time of spontaneous eye-opening (sec) was 592.8 and 544.8 and time of obeying commands (sec) was 720.3 and 734.2 and time of spontaneous breathing (sec) was 342.1 and 307.2 in group I and II respectively. The difference was significant (P< 0.05). There was non- significant difference in Group P and group K 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

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. 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. Moreover, the electrical current applied during the ECT stimulates the autonomic nervous system and leads to haemodynamic changes in both systemic and cerebral circulations.[2]

The motor seizure duration has been considered as a standard for determining the therapeutic adequacy.[3] 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.[3] Common drugs used for ECT anesthesia are Methohexital, Thiopental, Etomidate, and Propofol. Propofol has fast induction, smooth recovery, and minimal post-operative agitation.[4] Its hypotensive effect is beneficial in counteracting ECT induced hypertension; however, disadvantage of propofol is dose-dependent decrease in seizure duration. 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.[5] The present study compared efficacy of Ketofol and Propofol for electroconvulsive therapy in motor seizure.

MATERIALS & METHODS

The present study comprised of 60 patients with motor seizureof with American Society of Anesthesiologists (ASA) physical status I and II of either gender was included. Ethical approval was obtained before starting the study. All gave their written consent for the participation of the study.

Demographic data such as name, age, gender etc. was recorded and patients were divided into two groups of 30 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). Baseline hemodynamic parameters such as SBP, DBP, MAP, SPO2 and HR were taken and recorded. The patient was premeditated with Glycopyrolate 0.2 mg 30 minutes before the procedure. Preoxygenation was done via facemask at the rate of 5litre/min for 5 minutes. Parameters such as motor seizure duration, hemodynamicprofile and recovery times were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Comparison of parameters

Parameters	Group I	Group II	P value
Motor seizure duration (sec)	22.5	28.4	0.04
Time of spontaneous eye-opening (sec)	592.8	544.8	0.92
Time of obeying commands (sec)	720.3	734.2	0.91
Time of spontaneous breathing (sec)	342.1	307.2	0.84

Table I, graph I shows that motor seizure duration (sec) was 25.5 and 28.4, time of spontaneous eye-opening (sec) was 592.8 and 544.8 and time of obeying commands (sec) was 720.3and 734.2and time of spontaneous breathing (sec) was 342.1 and 307.2 in group I and II respectively. The difference was significant (P< 0.05).

Graph I Comparison of parameters

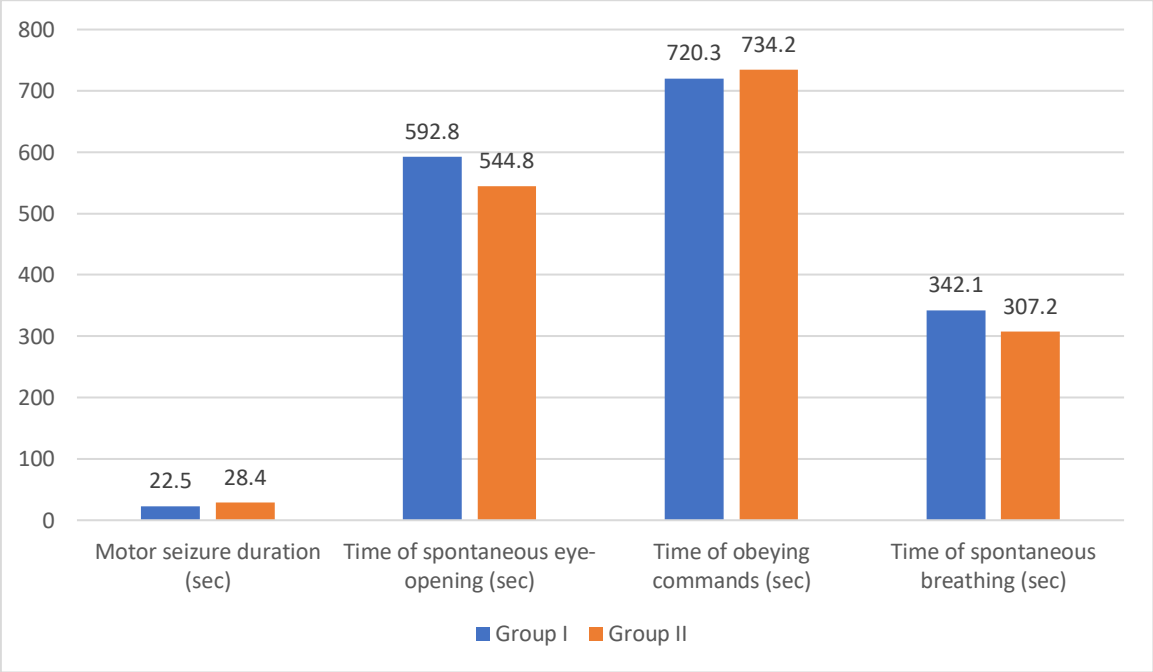

Table II Comparison of hemodynamic parameters after end of seizure

Duration	Parameters	Group P	Group K	P value
1 minute after seizure	Heartrate(bpm)	96.6	109.2	0.06
	SystolicBP(mmHg)	132.5	143.4	0.09
	DiastolicBP(mmHg)	83.7	92.7	0.82
	MAP(mmHg)	102.4	107.5	0.81
	SPO2(%)	95.1	96.2	0.92
5 minutes after seizure	Heartrate(bpm)	94.2	102.1	0.78
	SystolicBP(mmHg)	132.3	136.4	0.62
	DiastolicBP(mmHg)	84.2	87.2	0.32
	MAP(mmHg)	100.2	104.2	0.91
	SPO2(%)	98.07	96.7	0.64

Table IV 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

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.[6]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.[7]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.[8] The present study compared efficacy of Ketofol and Propofolfor electroconvulsive therapy in motor seizure.

We observed that motor seizure duration (sec) was 25.5 and 28.4, time of spontaneous eye-opening (sec) was 592.8 and 544.8 and time of obeying commands (sec) was 720.3 and 734.2 and time of spontaneous breathing (sec) was 342.1 and 307.2 in group I and II respectively. Krystal et al[9] retrospectively 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.Okamoto et al[10] compared ketamine and propofol in ECT anaesthesia for treatment-resistant depression patients. They observed an earlier recovery in patients who received ketamine.Zarate et al[11] 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 days 27.

We found that there was non- significant difference in Group P and group K regarding heart rate (bpm), systolic BP (mm Hg), diastolic BP (mm Hg), MAP (mm Hg) and SPO2 (%) 1 minute and 5 minutes after seizure (P>0.05).Erdogan et al[12]evaluated the effect of a ketamine:propofol combination ('ketofol') for electroconvulsive therapy on seizure activity, haemodynamic response and recovery parameters, and to compare with these with the effects of propofol alone. Twenty-four patients underwent a total of 144 electroconvulsive therapy sessions, allocated in this prospective, double-blind, crossover study. Patients were randomly assigned to receive 1 mg/kg ketofol (0.5 mg/kg propofol plus 0.5 mg/kg ketamine) 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).

Rasmussen et al[13] 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.

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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