

**ORIGINAL ARTICLE****Evaluation of Hemodynamic Efficacy of two different anaesthetic agents in patients undergoing Electroconvulsive Therapy: A Comparative Study**Archana Agrawal<sup>1</sup>, Somnath longani<sup>2</sup><sup>1</sup>Professor, <sup>2</sup>Associate Professor, Department of Anesthesia and Critical Care, Hind Institute of Medical Sciences Safedabad, Barabanki, U.P. India.**ABSTRACT:**

**Background:** Electroconvulsive therapy (ECT) is one of the most controversial treatments in medicine. In a comparison between propofol and etomidate, differences were found between motor seizure duration as observed by a physician and as recorded by electroencephalogram (EEG). Hence; we planned the present study to assess the efficacy of Propofol and Etomidate in patients undergoing ECT therapy. **Materials & Methods:** The present study included assessment of efficacy of two different anaesthetic agents in patients undergoing ECT therapy. A total of 40 patients were included in the present study were divided randomly into two study groups with 20 patients in each group. Group 1 included patients who were anaesthetized with etomidate, while group 2 included patients who were anaesthetized with propofol. ECT procedure was carried out in all the patients. Systolic and diastolic blood pressure of all the patients was recorded both before treatment and after treatment. All the results were analyzed by SPSS software. **Results:** A total of 40 subjects were included in the present study and were divided into two study groups with 20 patients in each group. We observed stable diastolic blood pressure in the etomidate group, where as in the other study group, no significant alteration in the diastolic blood pressure was seen. Systolic blood pressure was significantly elevated after treatment in both the study groups. **Conclusion:** Based on the overall performance, we recommend that both the anaesthetic solutions work with approximately equal hemodynamic efficacy in patients undergoing ECT.

**Key words:** Anaesthesia, Etomidate, Propofol.**Corresponding Author:** Dr. Somnath longani, Associate Professor, Department of Anesthesia and Critical Care, Hind Institute of Medical Sciences Safedabad, Barabanki, U.P. India.**This article may be cited as:** Agrawal A, Longani S. Evaluation of Hemodynamic Efficacy of two different anaesthetic agents in patients undergoing Electroconvulsive Therapy: A Comparative Study. J Adv Med Dent Scie Res 2017;5(12):107-110.

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**INTRODUCTION**

Electroconvulsive therapy (ECT) is one of the most controversial treatments in medicine. Opinions are often polarised; some consider electroconvulsive therapy to be effective and potentially lifesaving whereas others regard it as unhelpful and harmful and campaign energetically for it to be banned.<sup>1-4</sup> Several factors may be relevant to a higher rate of ECT utilization in the geriatric population. Medication has not been more effective than placebo for treatment of late-life depression in several studies, particularly in depressed patients with cerebral small-vessel disease.<sup>3-5</sup> In a comparison between propofol and etomidate, differences were found between motor seizure duration as observed by a physician and as recorded by electroencephalogram (EEG). Seizure durations were shorter for patients under the influence of propofol as compared to patients under the influence of etomidate.<sup>6</sup> Hence; we planned the present study to assess

the efficacy of Propofol and Etomidate in patients undergoing ECT therapy.

**MATERIALS & METHODS**

The present study was planned in the department of Anaesthesia and included assessment of efficacy of two different anaesthetic agents in patients undergoing ECT therapy. Ethical approval was taken from institutional ethical committee and written consent was obtained after explaining in detail the entire research protocol. Data information was collected from department of anaesthesia. Inclusion criteria for the present study included:

- Patients undergoing treatment in ECT unit,
- Patients responding well to the treatment therapy,
- Patients anaesthetized either propofol or etomidate,
- Patients in between age group of 20 years to 50 years,

- Patients with negative history of any systemic illness,
- Patients with any known drug allergy.

A total of 40 patients were included in the present study were divided randomly into two study groups with 20 patients in each group. Group 1 included patients who were anaesthetized with etomidate, while group 2 included patients who were anaesthetized with propofol. Detailed data of electrical dose along with motor duration seizure were recorded in all the patients. ECT procedure was carried out in all the patients. Systolic and diastolic blood pressure of all the patients was recorded both before treatment and after treatment. All the results were analyzed by SPSS software. Chi- square test was used for assessment of level of significant. P- value of less than 0.05 was taken as significant.

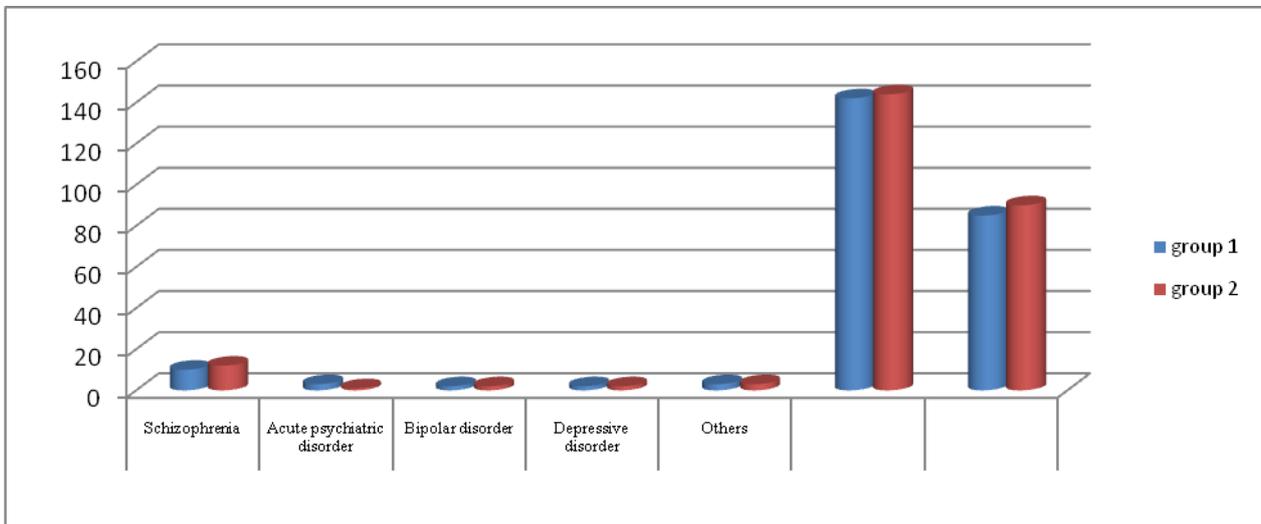
**RESULTS**

A total of 40 subjects were included in the present study and were divided into two study groups with 20 patients in each group. Group 1 and Group 2 included patients who were anaesthetized with etomidate and propofol respectively. Mean age of the patients of group 1 and group 2 was 40.5 years and 38.2 years respectively. Mean systolic and diastolic blood pressure before treatment in patients of group 1 was 142 and 85 mm of Hg and in patients of group 2 was 144 and 90 mm of Hg respectively. We observed stable diastolic blood pressure in the etomidate group, where as in the other study group, no significant alteration in the diastolic blood pressure was seen. Systolic blood pressure was significantly elevated after treatment in both the study groups.

**Table 1:** Demographic details of the patients

Parameter	Group 1	Group 2
<b>Mean age (years)</b>	40.5	38.2
<b>Psychiatric diagnosis</b>	Schizophrenia	10
	Acute psychiatric disorder	3
	Bipolar disorder	2
	Depressive disorder	2
	Others	3
<b>Systolic blood pressure before treatment</b>	142	144
<b>Diastolic blood pressure before treatment</b>	85	90

**Graph 1:** Description of demographic details of the patients



**Table 2:** Hemodynamic changes occurring in both the study groups after treatment

	Group 1	Group 2	p- value
<b>Systolic blood pressure after treatment</b>	99	108	0.22
<b>Diastolic blood pressure after treatment</b>	144	165	0.02*

\*: Significant

## DISCUSSION

In the present study we observed approximate similar hemodynamic efficacy of etomidate and propofol in patients undergoing ECT. Singh PM et al compared systematically the efficacy of etomidate against other induction agents in terms of seizure duration (both electroencephalography (EEG) and motor). They searched the PubMed, Embase, and Cochrane registry for trials evaluating etomidate against methohexital, propofol, or thiopental for duration of EEG or motor seizure in patients undergoing ECT. Specific adverse effects reported were also identified. Seventeen trials were identified involving 704, 84, 2491, and 258 setting of ECT using etomidate, methohexital, thiopental, and propofol, respectively. In the etomidate group, pooled EEG seizure duration was longer by 2.23 seconds (95% confidence interval [CI], -3.62 to 8.01;  $P = 0.456$ ) than methohexital, longer by 17.65 seconds (95% CI, 9.72-25.57;  $P < 0.001$ ) than propofol, and longer by 11.81 seconds (95% CI, 4.26-19.35;  $P = 0.003$ ) than thiopental. Pooled motor seizure duration was longer in etomidate group by 1.45 seconds (95% CI, -4.79 to 7.69;  $P = 0.649$ ) than methohexital, longer by 11.13 seconds (95% CI, 6.64-15.62;  $P < 0.001$ ) than propofol, and longer by 3.60 seconds (95% CI, 2.15-5.06;  $P < 0.001$ ) than thiopental. Myoclonus (6 trials) and painful injection (4 trials) were commonest adverse effects with etomidate.<sup>7</sup> As advocated by previous authors, Etomidate is better in terms of seizure duration potential (both motor and EEG) than propofol and thiopental.<sup>7-10</sup> Khalid N et al investigated if etomidate improves seizure duration compared with thiopental in cases where eliciting seizures becomes problematic. During their routine delivery of ECT at a general psychiatric hospital in Cardiff, UK, they observed 5 patients who had ECT courses with thiopental and did not achieve adequate seizure duration despite very high electric stimulation. They later relapsed and received second courses of ECT under etomidate. They compared the seizure duration and the electric charge needed to produce the seizures for a total of 46 pairs of ECT sessions given under the 2 anesthetics on the same patients. The average electric stimulation dose required to induce seizures was reduced from 638 to 497 millicoulombs (95% confidence interval, 60-221;  $P = 0.001$ ). Despite the lower dose, the length of observed seizure duration increased by 10.3 seconds (65%) and that of the electroencephalograph-recorded duration increased by 8.7 seconds (41%) ( $P < 0.001$ ). Etomidate has a distinct advantage over thiopental in producing seizures of adequate duration during ECT and should be used as the first-line measure in augmenting seizures in patients who have very high seizure thresholds.<sup>11</sup> Rosa MA et al compared post anesthetic time for patient recovery after electroconvulsive therapy, as measured by the post anesthetic Recovery Score of Aldrete and Kroulik, using three different types of hypnotic drugs (propofol, etomidate and thiopental). Thirty patients were randomized to receive one of the three drugs ( $n = 10$  in each group), during a course of electroconvulsive therapy treatment. Patients and raters were blinded to which drug

was received. Main treatment characteristics were recorded (as total electric charge received seizure threshold, number of treatments, and the mean time for recovery) along the whole treatment. Thiopental and propofol were associated with a significance increase in charge needed to induce a seizure ( $p < 0.0001$ ) when compared to etomidate, as well as a significant decrease of time for recovery ( $p = 0.042$ ). These findings suggested that, although there seems to be no difference in the clinical outcome across these three drugs, propofol offers the best recovery profile. However, it makes a higher mean electric charge necessary.<sup>12</sup> Hoyer C et al compared different anesthetics for ECT regarding their impact on seizure quality and different seizure parameters. We retrospectively compared ketamine ( $n = 912$  anesthetics), etomidate ( $n = 227$  anesthetics), thiopental ( $n = 2,751$  anesthetics), and propofol ( $n = 42$  anesthetics) on their influence on general seizure quality and different seizure parameters by multivariate repeated measurement regression analyses. The use of ketamine and etomidate as anesthetics led to seizures that were overall higher in quality and also longer in motor seizure activity when compared to anesthesia with thiopental and propofol. Ketamine was most favorable concerning central inhibitory potential that was indirectly quantified by concordance and postictal suppression. The worst seizure quality was observed with propofol anesthesia; further, this substance had a negative impact on autonomic activation and seizure duration. Based on the data of this retrospective study, the use of ketamine or etomidate as anesthetic in ECT might be advantageous due to the induction of high-quality seizures.<sup>13</sup>

## CONCLUSION

From the above results, the authors concluded that based on the overall performance, both the anaesthetic solutions work with approximately equal hemodynamic efficacy in patients undergoing ECT. However; future research is recommended.

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