e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 1786-1789

Original Research Article

Correlation of Sodium Thiopentone Dosage with Seizure Duration in Patients Undergoing Electroconvulsive Therapy: An Observational Prospective Study

Chaudhari Tejalben A.[1], Soni Sweta R.[2], Patel Krupali[3]

[1]Assistant Professor, Government Medical College, Surat, Gujarat, India
[2]Consultant Anaesthesiologist, Maitreya Hospital, Surat, Gujarat, India
[3]Assistant Professor, GMERS, Navsari, Gujarat, India

Received: 01-03-2026 / Revised: 15-04-2026 / Accepted: 21-05-2026
Corresponding author: Dr. Chaudhari Tejalben A.
Conflict of interest: Nil

Abstract

Background and Aim: There are very few studies evaluating the correlation between sodium thiopentone dosage and seizure duration in patients undergoing electroconvulsive therapy (ECT). We aimed to investigate this correlation and assess whether a history of previous ECT sessions influences the dosage requirement of thiopentone.

Methods: A total of 189 patients aged 18–60 years, of either sex, belonging to ASA physical status I–III and scheduled for ECT, were included in this study after obtaining approval from the Institutional Ethics Committee. The number of previous ECT sessions was recorded. Baseline heart rate, ECG, mean arterial pressure, and SpO_2 were monitored. General anesthesia was induced with 2.5% sodium thiopentone administered until loss of the eyelid reflex, and the dose required was recorded. Succinylcholine (0.5 mg/kg) was then administered. Seizure duration and recovery time were recorded. Descriptive statistical analysis was performed using SPSS version 28.

Results: Among the 189 patients, 84% were male and 16% were female. The mean age and body weight were 33.16 ± 11.60 years and 60.95 ± 11.71 kg, respectively. The mean thiopentone dose administered was 2.73 ± 0.56 mg/kg, while the mean seizure duration was 28.87 ± 10.07 seconds. The mean recovery time was 5.54 ± 1.33 minutes. The thiopentone dosage required during repeated ECT sessions remained similar. Heart rate showed a slight increase for up to 2 minutes after induction. Patients receiving ≤4 mg/kg of thiopentone demonstrated an average seizure duration of ≥28 seconds.

Conclusion: We conclude that sodium thiopentone, when administered in optimal doses, does not adversely affect the therapeutic seizure duration during ECT and provides timely recovery. Furthermore, a history of repeated ECT sessions does not significantly influence the thiopentone dosage requirement.

Keywords: Sodium Thiopentone, Electroconvulsive Therapy, Seizure Duration, Anesthesia.

DOI: 10.25258/ijcpr.18.6.286

Introduction

Electroconvulsive therapy (ECT) is a well-established and effective treatment modality for various psychiatric disorders, including major depression, bipolar disorder, and schizophrenia [1]. The therapeutic efficacy of ECT depends largely on the induction of an adequate generalized seizure, typically lasting at least 25 seconds [2]. To minimize complications and improve patient comfort, ECT is performed under general anesthesia using short-acting anesthetic agents and muscle relaxants [3]. However, anesthetic agents can influence seizure duration due to their anticonvulsant properties [4]. Thiopentone sodium, a barbiturate, has been widely used as an induction agent for ECT due to its rapid onset, short duration of action, and favorable hemodynamic profile [3,5]. Despite its widespread use, there are limited studies evaluating the correlation between thiopentone dosage and seizure duration, as well as its effects on recovery and hemodynamics. Additionally, repeated ECT sessions may alter seizure threshold, potentially affecting anesthetic requirements [6]. This study aims to evaluate the correlation between thiopentone dosage and seizure duration and to assess the effect of prior ECT exposure on drug requirement.

Materials and Methods

A total of 189 patients aged 18–60 years of either sex, belonging to ASA physical status I–III, scheduled for elective ECT were included after institutional ethical committee approval. Written informed consent was obtained.

Patients with full stomach, neuromuscular disorders, cardiovascular disease, epilepsy, bronchial asthma, tuberculosis, or known drug allergy were excluded. All patients were kept nil per oral for 6 hours prior to the procedure as per standard fasting guidelines[3]. Routine antipsychotic medications were continued until the day of the procedure [7]. Baseline heart rate, ECG, mean arterial pressure, and SpO_2 were recorded. Premedication included glycopyrrolate 0.2 mg intravenously. Patients were preoxygenated with 100% oxygen for 3 minutes. General anesthesia was induced using thiopentone sodium (2.5%) titrated to loss of eyelid reflex. Succinylcholine 0.5 mg/kg was administered to facilitate muscle relaxation [8]. Seizure duration was recorded using clinical observation. Hemodynamic parameters were monitored every 2 minutes for 10 minutes. Recovery time was defined as time from induction to response to verbal commands. Descriptive analysis was performed using SPSS version 28, and relevant statistical tests, including ANOVA, were applied wherever appropriate.

Result

Table 1: Patient characteristics

Age (years) (mean ± SD)	33.16 ± 11.60
Gender (Male: Female)	158:31 (84%:16%)
Weight (kg) (mean ± SD)	60.95 ± 11.71
ASA class II: III	173: 16 (91.53%: 8.47%)

Table 2: Outcome measures:

	Average (mean ± SD)
Thiopentone dosage (mg/kg)	2.73 ± 0.56
Duration of seizures (seconds)	28.87 ± 10.07
Recovery time (minutes)	5.54 ± 1.33

Table 3: Impact of previous number of past ECT on Thiopentone Dosage:

No. of previous ECTs	No. of Patients	Average of Thiopentone dosage (mg/kg) (mean ± SD)	Average of seizure duration (seconds) (mean ± SD)
0 number	51	2.69 ± 0.49	29.22 ± 8.61
1-10 number	125	2.75 ± 0.60	28.64 ± 10.51
>10 number	13	2.79 ± 0.51	29.77 ± 11.68

Table 4: Seizure duration in relation to Thiopentone dose given:

Dosage of thiopentone (mg/kg)	Average of duration of seizure (seconds)	No. of Patients (%)
1.6-2.1	28.65	20(11%)
2.1-2.6	27.89	66(35%)
2.6-3.1	30.35	55(29%)
3.1-3.6	29.94	35(19%)
3.6-4.1	28.25	8(4%)
4.1-4.6	19.33	3(2%)
4.6-5.1	21.00	2(1%)
Total	28.87	189(100%)

Hemodynamic changes:

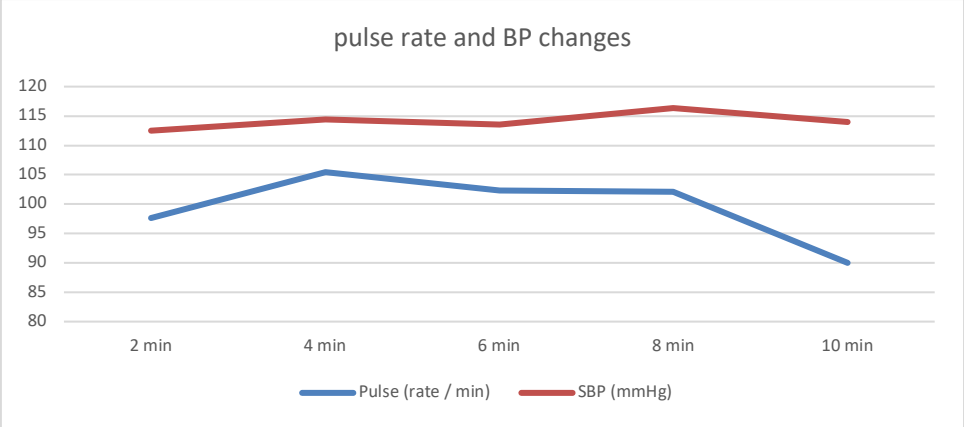

Figure 1: Pulse rate and BP changes

Discussion

The present study evaluated the relationship between thiopentone dosage and seizure duration in patients undergoing electroconvulsive therapy (ECT). The principal findings were that thiopentone, administered at a mean dose of 2.73 ± 0.56 mg/kg, produced an adequate therapeutic seizure duration of 28.87 ± 10.07 seconds with rapid recovery and acceptable haemodynamic stability. Furthermore, the number of previous ECT sessions did not appear to influence thiopentone requirements or seizure duration.

An adequate seizure duration is considered an important determinant of ECT efficacy, with a duration of at least 25 seconds generally regarded as therapeutically effective. [1,2] In our study, the mean seizure duration remained within the therapeutic range, indicating that thiopentone does not significantly suppress seizure activity when administered in titrated subanaesthetic doses. Similar findings have been reported by previous studies evaluating anaesthetic agents used during ECT. [6]

We observed that seizure duration was maintained at thiopentone doses up to approximately 4 mg/kg. However, a reduction in seizure duration was seen at higher doses, which may be attributed to the dose-dependent anticonvulsant properties of barbiturates. [4] This finding highlights the importance of careful dose titration to achieve adequate anaesthesia while preserving seizure quality.

Another important observation was that repeated ECT sessions did not significantly alter thiopentone requirements or seizure duration. Patients with multiple prior ECT sessions required doses comparable to those undergoing their first treatment, suggesting that repeated ECT exposure has minimal influence on anaesthetic requirements in routine clinical practice. [8]

With regard to haemodynamic responses, a transient increase in heart rate and blood pressure was observed following ECT, with values returning towards baseline during recovery. These findings are consistent with the known autonomic response to ECT. [11] Our findings are comparable with those of Gupta et al., who reported similar haemodynamic responses among thiopental, propofol, and etomidate during ECT, supporting the cardiovascular stability observed with thiopentone in the present study. [12]

Thiopentone continues to be a useful induction agent for ECT because of its favourable balance between seizure duration, haemodynamic stability, and recovery profile. Previous studies have shown that propofol is associated with shorter seizure duration because of its stronger anticonvulsant effect, whereas thiopentone better preserves seizure activity while maintaining acceptable haemodynamic stability. [7,13] In the present study, thiopentone maintained an adequate mean seizure duration of 28.87 seconds with a mean recovery time of 5.54 ± 1.33 minutes, supporting its suitability as an induction agent for ECT.

The strengths of the present study include its prospective design and relatively large sample size. However, certain limitations should be acknowledged. Seizure duration was assessed clinically rather than by electroencephalographic monitoring, and formal correlation analysis between thiopentone dose and seizure duration was not performed. Future comparative studies with objective seizure monitoring may provide additional insights.

Overall, the findings of this study support the continued use of thiopentone as an induction agent for ECT owing to its ability to maintain adequate seizure duration, provide haemodynamic stability, and facilitate rapid recovery.

Conclusion

Thiopentone sodium in subanesthetic doses does not significantly affect seizure duration during ECT and provides stable hemodynamics with rapid recovery. Repeated ECT sessions do not

significantly influence thiopentone dosage requirements or seizure duration.

References

1. Abrams R. Electroconvulsive Therapy. 4th ed. New York: Oxford University Press; 2002.
2. American Psychiatric Association. The Practice of Electroconvulsive Therapy: Recommendations for Treatment, Training, and Privileging. 2nd ed. Washington, DC: American Psychiatric Association; 2001.
3. Miller RD, Cohen NH, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Young WL. Miller's Anesthesia. 8th ed. Philadelphia: Elsevier Saunders; 2015.
4. Dundee JW, Wyant GM. Intravenous Anaesthesia. 2nd ed. Edinburgh: Churchill Livingstone; 1988.
5. Payne NA, Prudic J. Electroconvulsive therapy: Part I. A perspective on the evolution and current practice of ECT. J Psychiatr Pract. 2009;15(5):346-368.
6. Ding Z, White PF. Anesthesia for electroconvulsive therapy. Anesth Analg. 2002;94(5):1351-1364.
7. Rasmussen KG. Propofol for ECT anesthesia: A review of the literature. J ECT. 2014;30(3):210-215.
8. Sackeim HA. The anticonvulsant hypothesis of the mechanisms of action of ECT: Current status. J ECT. 1999;15(1):5-26.
9. Andrade C. Medication management during electroconvulsive therapy: General principles and practical recommendations. J Clin Psychiatry. 2016;77(9):e109-e117.
10. Butterworth JF, Mackey DC, Wasnick JD. Morgan and Mikhail's Clinical Anesthesiolog y. 6th ed. New York: McGraw-Hill Education; 2018.
11. Weiner RD, Reti IM. Key updates in the clinical application of electroconvulsive therapy. Int Rev Psychiatry. 2017;29(2):54-62.
12. Gupta S, Sharma R, Kumar A, et al. Cardiovascular Effects of Anaesthesia in ECT: A Comparison of Etomidate, Propofol and Thiopental. Eur J Cardiovasc Med. 2023;13(6):[please insert page numbers from the published article].
13. Avramov MN, Husain MM, White PF. The comparative effects of methohexital, propofol, and etomidate for electroconvulsive therapy. Anesth Analg. 1995;81(3):596-602.