Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Comparison of Propofol and thiopental as anaesthetic agents in electroconvulsive therapy

[1]Rajeev Kumar Garg, [2]Divyesh Vernwal

[1]Associate Professor, Department of Anaesthesia, ICARE Institute of Medical Sciences and Research, Haldia, West Bengal, India;
[2]Assistant Professor, Dept of Psychiatry, ICARE Institute of Medical Sciences and Research, Haldia, West Bengal, India

ABSTRACT:
Background: Electroconvulsive therapy (ECT) requires sedation with a short-term anaesthetic that interferes as little as possible in the convulsive threshold and in the duration and quality of the convulsion. The present study was conducted to assess Propofol and thiopental as anaesthetic agents in electro convulsive therapy. **Materials & Methods:** 74 patients of major depressivedisorders (MDD) of both genderswere divided into 2 groups of 37 each. In group I, anaesthesia included thiopental (1.5-2.5 mg/kg) and group II included propofol(0.75-1.5 mg/kg) and succinylcholine (0.5 mg/kg). Thepatients were preoxygenated and ventilated manually. Parameters such as major depressive disorder, severity of the event etc. was recorded. **Results:** Group I had 20 males and 17 females and group II had 18 males and 19 females.Development of the disorder was MDD single episodein 3 and 5 in group I and group II and MDD recurrent in 34 and 32 in group Iand group II respectively. Severity of the event was moderate seen in 1and 2, serious without psychotic symptomsin 17 and 15 and serious with psychotic symptoms in 19 and 20 in group I and group II respectively. Drug treatment given was antidepressants in 35 and 37, antipsychotic in 20 and 32, benzodiazepines in 10 and 4 and mood stabilizers in 32and 21 in group I and group II respectively. ECT parameters showed mean visual duration was 18.4 and 15.2, accumulated value was 204.1 and 156.8, EEG mean visual duration was 28.4 and 21.3 and accumulated value was 316.2and 214.8 in group I and II respectively. Dose of stimulation (mC) mean visual duration was 234.2 and 342.1 and accumulated value was 2453.2 and 3012.4, reduction of basal HDRS21 was 22.1and 22.5, reduction of basal GAF was 35.4 and 31.2 and days of hospital stay was 36.2and 41.2 in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** Both Propofol and thiopental as anaesthetic agents in electro convulsive therapy were found to be equally effective.
Key words: antidepressants, major depressivedisorders, psychotic symptoms

Received: 22 November, 2020 Accepted: 27 December, 2020

Corresponding Author: Divyesh Vernwal, Associate Professor, Department of Anaesthesia, ICARE Institute of Medical Sciences and Research, Haldia, West Bengal, India

This article may be cited as: Garg RK, Vernwal D. Comparison of Propofol and thiopental as anaesthetic agents in electroconvulsive therapy. J Adv Med Dent Scie Res 2021;9(1):163-166.

INTRODUCTION

Electroconvulsive therapy (ECT) requires sedation with ashort-term anaesthetic that interferes as little as possiblein the convulsive threshold and in the duration and quality of the convulsion, while simultaneously guaranteeinghaemodynamic stability of the patient.[1]It is accepted inguidelines, despite being a cause for controversy, that thetherapeutic effect of ECT depends on the production of ageneralised convulsion of an appropriate duration.It hasbeen postulated that the choice of anaesthetic could havesignificant consequences in the performance of ECT, as itmight affect the convulsive threshold and modify the duration of the seizure.[2]

Anaesthesia is required for the safe and effective conduct of ECT. Methohexitone, initially proposed by the American Psychiatric Association as the anaesthetic agent of choice for induction of anaesthesia in patients undergoing ECT, is no longer available in Malaysia and many parts of the world.[3] In its place, propofol is now extensively used as an induction agent for ECT. Propofol has been shown to reduce cognitive dysfunction following ECT, but it also significantly shortens the seizure duration. Propofol has been shown to have a better haemodynamicprofile and to facilitate more rapid post-crisis recovery.[4] However, it could shorten the seizures and increase the convulsive threshold, which

would lead to applying greater electrical stimulation. Consequently, the useof propofol might be associated with a greater number ofECT sessions, as well as with differences in clinical efficacyand increased appearance of adverse effects.[5]The present study was conducted to assessPropofol and thiopental as anaesthetic agents in electroconvulsivetherapy.

MATERIALS & METHODS

The present study comprised of 74patients of major depressivedisorders (MDD)of both genders. The consent was obtained from allenrolled patients.

Data such as name, age, gender etc. was recorded. The ECT was administered using ThymatronTMDGx andSystem IV (DGx and 2× dose/double dose stimulationprogrammes) following the clinical guidelines.Patients were divided into 2 groups of 37 each. In group I, anaesthesia included thiopental (1.5-2.5 mg/kg) and group II included propofol(0.75-1.5 mg/kg) and succinylcholine (0.5 mg/kg). Thepatients were preoxygenated and ventilated manually. Parameters such as major depressive disorder, severity of the event etc. was 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
Method	Thiopental (1.5-2.5 mg/kg)	Propofol(0.75-1.5 mg/kg)
M:F	20:17	18:19

Table I shows thatgroup I had 20 males and 17 females and group II had 18 males and 19 females.

Table II Comparison of parameters

Parameters	Variables	Group I	Group II	P value
Development ofthe disorder	MDD Single episode	3	5	0.01
	MDD recurrent	34	32	
Severity of the event	Moderate	1	2	0.03
	Serious without psychotic symptoms	17	15	
	Serious withpsychotic symptoms	19	20	
Drug treatment	antidepressants	35	37	0.05
	antipsychotic	20	32	
	benzodiazepines	10	4	
	Mood stabilizers	32	21	

Table II, graph I shows that development of the disorder was MDD single episode in 3 and 5 in group I and group II and MDD recurrent in 34 and 32 in group I and group II respectively. Severity of the event was moderate seen in 1and 2, serious without psychotic symptoms in 17 and 15 and serious with psychotic symptoms in 19 and 20in group I and group II respectively. Drug treatment given was antidepressants in 35 and 37, antipsychotic in 20 and 32, benzodiazepines in 10 and 4 and mood stabilizers in 32 and 21in group Iand group II respectively.The difference was significant (P< 0.05).

Graph I Comparison of parameters

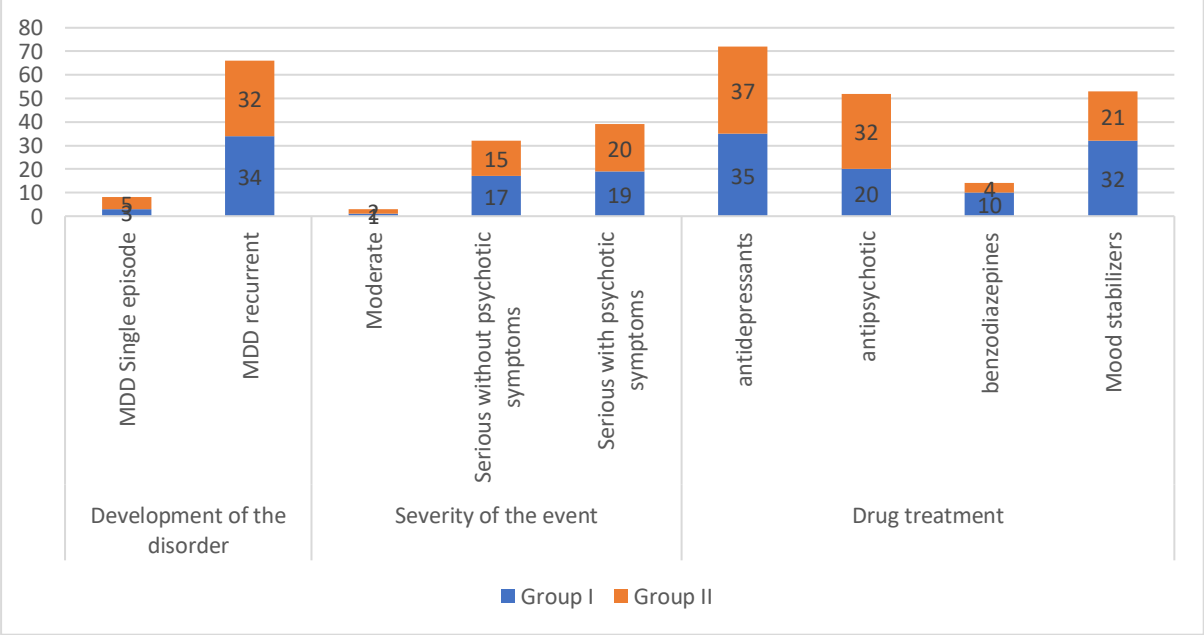
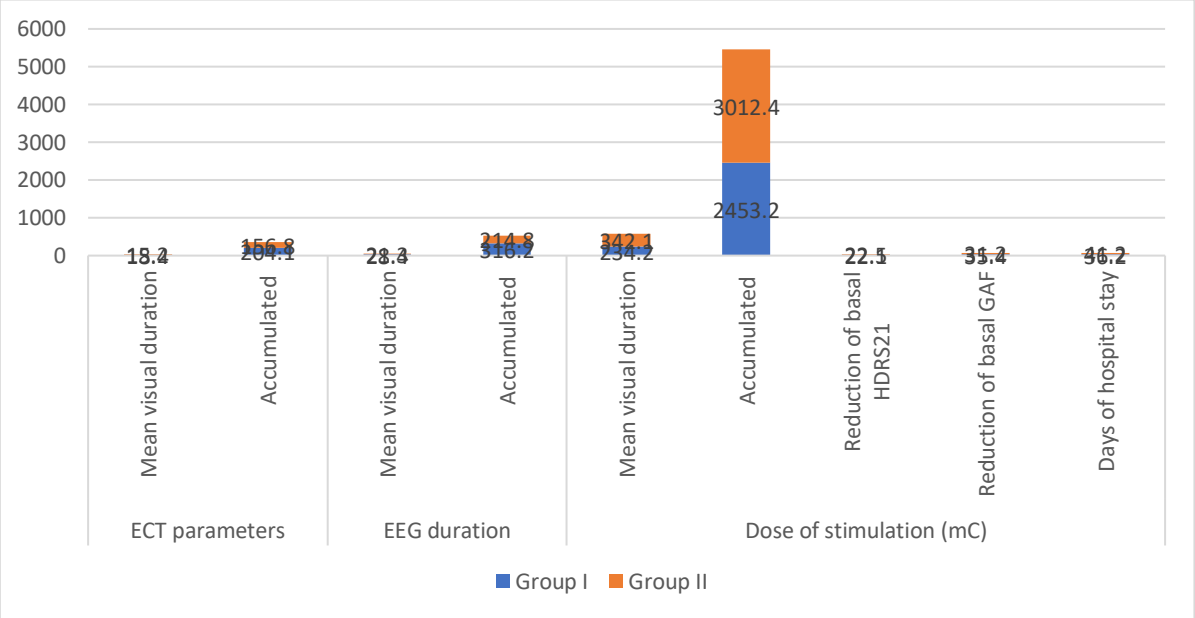


Table III Electroconvulsive therapy

Parameters	Variables	Group I	Group II	P value
ECT parameters	Mean visual duration	18.4	15.2	0.01
	Accumulated	204.1	156.8	
EEG duration	Mean visual duration	28.4	21.3	0.03
	Accumulated	316.2	214.8	
Dose of stimulation (mC)	Mean visual duration	234.2	342.1	0.04
	Accumulated	2453.2	3012.4	0.02
	Reduction of basal HDRS21	22.1	22.5	0.91
	Reduction of basal GAF	35.4	31.2	0.12
	Days of hospital stay	36.2	41.2	0.05

Table III, graph II shows that ECT parameters showed mean visual duration was 18.4 and 15.2, accumulated value was 204.1 and 156.8, EEG mean visual duration was 28.4 and 21.3 and accumulated value was 316.2 and 214.8 in group I and II respectively. Dose of stimulation (mC) mean visual duration was 234.2 and 342.1 and accumulated value was 2453.2 and 3012.4, reduction of basal HDRS21 was 22.1and 22.5, reduction of basal GAF was 35.4 and 31.2 and days of hospital stay was 36.2 and 41.2 in group I and II respectively. The difference was significant (P< 0.05).

Graph II Electroconvulsive therapy



DISCUSSION

The use of electroconvulsive therapy (ECT) for the treatment of psychiatric disorders dates back to 1937. Since then, its indication has become more diversified and includes the vast majority of major depressive disorders, bipolar mood disorders and even post-partum psychosis.[6] Electroconvulsive therapy is considered to be one of the important treatment modalities available. It has the advantage of producing a more rapid response compared to conventional treatment, an important consideration in the management of patients with suicidal tendencies.ECT has a well-established role in the management of patients who have not responded to psychopharmacological treatment.[7] Many studies documenting the efficacy of ECT for depressive illness have been published, finding ECT superior to 'sham' ECT and to medications in the treatment of patients with severe depressive illness, particularly those with psychotic and suicidal symptoms.[8,9]The present study was conducted to assess Propofol and thiopental as anaesthetic agents in electroconvulsivetherapy.

We found that group I had 20 males and 17 females and group II had 18 males and 19 females.Martínez-Amorós Eet al[10]determined the influence of propofol and thiopental as anaesthetics in electro-convulsive therapy (ECT), as regards, seizure duration, electrical charge, clinical efficacy,cardiovascular profile, and presence of adverse cognitive effects on 127 patients who received bilateral ECT for thetreatment of a major depressive episode.The mean seizure duration in the propofol group was significantly shorter than inthe thiopental group (21.23 ± 6.09 versus 28.24 ± 6.67 s, $P < 0.001$). The mean stimulus chargewas 348.22 mC in the propofol group, and 238 mC in the thiopental group ($P < 0.001$). Propofolwas associated with a lower increase in blood pressure. There were

no differences betweengroups in treatment response or presence of adverse effects.

We found that development of the disorder was MDD single episodein 3 and 5 in group I and group II and MDD recurrent in 34 and 32 in group I and group II respectively. Severity of the event was moderate seen in 1 and 2, serious without psychotic symptoms in 17 and 15 and serious with psychotic symptoms in 19 and 20 in group I and group II respectively. Drug treatment given was antidepressants in 35 and 37, antipsychotic in 20 and 32, benzodiazepines in 10 and 4 and mood stabilizers in 32and 21 in group I and group II respectively. Tan et al[11]compared the effects of etomidate and propofol on seizure duration as well as haemodynamic parameters in patients undergoing ECT. Twenty patients aged between 18 and 70 years were recruited. Group I received etomidate 0.3 mg/kg for the first course of ECT (Group IA) and propofol 1.5 mg/kg for the second ECT (Group IB), while Group II received propofol for the first ECT (Group IIA) and etomidate for the second ECT (Group IIB). There was a washout period of two to three days in between procedures. Parameters recorded included motor seizure duration, electroencephalogram seizure duration, blood pressure and heart rate. Analysis demonstrated neither period effect nor treatment period interaction. Etomidate was associated with a significantly longer motor and electroencephalogram seizure duration compared with propofol.

We observed that ECT parameters showed mean visual duration was 18.4 and 15.2, accumulated value was 204.1 and 156.8, EEG mean visual duration was 28.4 and 21.3 and accumulated value was 316.2 and 214.8 in group I and II respectively. Dose of stimulation (mC) mean visual duration was 234.2 and 342.1 and accumulated value was 2453.2 and 3012.4, reduction of basal HDRS21 was 22.1 and 22.5, reduction of basal GAF was 35.4 and 31.2 and days of hospital stay was 36.2 and 41.2 in group I and II respectively. Geretsegger Cet al[12]the influence of the anesthetics methohexital and propofol on EEG seizure parameters, seizure-quality measures, vital signs, and oxygen saturation (SpO2) and end-tidal carbon dioxide tension (ETCO2) was investigated; 146 treatments of 31 patients were analyzed. Significant differences were observed between agents for mean postictal pulse and blood pressure values. With methohexital, there was a clear postictal increase of mean blood pressure from 126/78 mm Hg to 161/102 mm Hg, whereas there was no increase with propofol ($p = 0.00$), and with methohexital, a postictal increase of the mean pulse rate from 81 to 90 beats/min and a slight decrease with propofol (79 to 78 beats/min). There were no differences in the SpO2 and ETCO2. The mean seizure duration for unilateral treatments was significantly longer with methohexital compared with propofol but there was no difference for the seizure-quality measures: postictal suppression index (propofol 79.7%, methohexital 77.4%) and mean integrated amplitude (30.2/31.8) were the same for both anesthetic agents. The results show that differences in seizure duration are unrelated to seizure-quality measures.

CONCLUSION

Authors found that both Propofol and thiopental as anaesthetic agents in electroconvulsivetherapywere found to be equally effective.

REFERENCES

1. Folk JW, Kellner CH, Beale MD, Conroy JM, Duc TA. Anesthesiafor electroconvulsive therapy: a review. J ECT. 2000;16:157-70.
2. Walder B, Seeck M, Tramèr MR. Propofol [correction of propofol]versus methohexital for electroconvulsive therapy, a meta-analysis. J NeurosurgAnesthesiol. 2001;13:93-8.
3. Bowley CJ, Walker HAC. Anaesthesia for ECT. In: Scott, editor.The ECT handbook. 2nd ed. London: Royal College of Psychia-trists; 2005.
4. Kellner C. Lessons from the methohexital shortage. J ECT.2003;19:127-8.
5. Rosa MA, Rosa MO, Marcolin MA, Fregni F. Cardiovascular effectsof anesthesia in ECT: a randomized, double-blind comparison ofetomidate, propofol, and thiopental. J ECT. 2007;23:6-8.
6. Bernardo M, Arrufat F, Pintor L, Catarineu S, Buisán E, Ballús C.Patterns of the use of electroconvulsive therapy in Barcelona.Med Clin (Barc). 1996;106:201-4.
7. Bertolín-Guillén JM, Peiró-Moreno S, Hernández-de-Pablo ME.Patterns of electroconvulsive therapy use in Spain. EurPsychi-atry. 2006;21:463-70.
8. Avramov MN, Husain MM, While PF. The comparative effects ofmethohexital, propofol, and etomidate for electroconvulsivetherapy. AnesthAnalg. 1995;81:596-602.
9. Villalonga A, Bernardo M, Gomar C, Fita G, Escobar R, PachecoM. Cardiovascular response and anesthesic recovery in electro-convulsive therapy with propofol or thiopental. Convuls Ther.1993;9:108---11.15
10. Martínez-Amorós E, Ortiz VG, Moli MP, Capdevila ML, Albaigés EC, Garcia-Parés G, Álvarez NC, Sarachaga MU. Propofol and thiopental as anaesthetic agents in electroconvulsive therapy: A retrospective study in major depression. Revista de Psiquiatría y Salud Mental (English Edition). 2014 Jan 1;7(1):42-7.
11. Tan HL, Lee CY. Comparison between the effects of propofol and etomidate on motor and electroencephalogram seizure duration during electroconvulsive therapy. Anaesthesia and intensive care. 2009 Sep;37(5):807-14.
12. Geretsegger C, Rochowanski E, Kartnig C, Unterrainer AF. Propofol and methohexital as anesthetic agents for electroconvulsive therapy (ECT): a comparison of seizure-quality measures and vital signs. The Journal of ECT. 1998 Mar 1;14(1):28-35.