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COMPARATIVE EFFICACY OF THIOPENTONE AND PROPOFOL ON HAEMODYNAMIC CHANGES DURING MODIFIED ELECTROCONVULSIVE THERAPY

Anaesthesiology

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KEYWORDS

INTRODUCTION:

Modified ECT is a procedure in which generalized seizures lasting 25 to 150 seconds induced by the passage of electrical current through the brain under general anaesthesia and muscle relaxation are used for therapeutic purposes. Understanding the physiological effects of ECT and the pharmacology of the agents used during the treatment are prerequisites for providing optimal anaesthesia care. The use of general anaesthesia for ECT started since 1960's with quick acting barbiturates for the treatment of depression[1]. During the decades, anaesthetic techniques have evolved to improve the control and safety of administration of modern ECT. A number of anaesthetic agents and muscle relaxants have been used during the years and some of them have been discarded due to various undesirable effects.

Currently, a number of medications besides anaesthetic agents and muscle relaxants have been used during ECT including pre-treatment sedation, anticholinergic drugs and drugs to alleviate parasympathetic and sympathetic responses[2] .The perfect induction agent for ECT would ensure rapid unconsciousness, be painless on injection, would not affect seizure duration, provide rapid recovery and be inexpensive while providing rapid titrability, hemodynamic stability and a rapid recovery profile[2, 3]. No drug has yet been found to have all these characteristics. However, Methohexital, Thiopental, Propofol, Diazepam, Ketamine and etomidate have been used successfully as induction agents for ETC.

Seizure activity itself and different anaesthetic agents as well have different autonomic effects during recovery after modified ECT. Seizure activity is characteristically associated with an initial parasympathetic discharge followed by a more sustained sympathetic discharges. The initial phase is characterized by bradycardia and increased secretions associated with occasional marked bradycardia (<30 beats/min.) and even asystole (upto 6 seconds) followed by sustained hypertension and tachycardia. Transient autonomic imbalance can also produce arrhythmia and T wave abnormalities on the echocardiogram[4].

Different anaesthetic agents have somewhat different recovery profile and as modified ECT also provokes significant hemodynamic changes in terms of blood pressure, heart rate and intracranial pressure, the appropriate use of suitable anaesthetic agent is crucial for safe and fruitful outcome. Propofol is an anaesthetic agent commonly used for ambulatory surgery because it is associated with rapid recovery and a benign side effect profile. It is associated with a lower systemic blood pressure and heart rate in response to ECT as compared to barbiturates. It also has anticonvulsant effects as suggested by a shortened duration of electrically induced seizures in patients receiving this drug[5, 6]. Propofol administration is also associated with pain on injection which may be poorly tolerated by psychiatrically fragile patients. Use of thiopental, on the other hand, is associated with more hypertension and tachycardia than propofol, whereas avoiding pain on injection[5,6].

MATERIALS AND METHODS

The present study "Comparative efficacy of Thiopentone and Propofol on haemodynamic changes during Modified Electroconvulsive Therapy" was conducted at Department of Anaesthesiology, Bokaro General Hospital, Bokaro steel plant during a span of two years.

This was a randomized, double-blind, repeated measure crossover study. Randomization was done using computer generated random numbers.

Subjects

After obtaining approval from the Medical Ethics Committee, as well as the patient's consent, a total of 30 ASA I /II patients (20 males and 10 females) who were scheduled to undergo at least two ECTs from Psychiatry inpatient department fulfilling the inclusion/exclusion criteria were taken up for the study.

Patients were included from the department of psychiatry who had given informed consent, were between 18-65 years of age, with ASA I/II category and planned for at least two sittings of modified ECT. Patients with presence of comorbid cardiovascular, central nervous system disorders and other systemic illnesses like Diabetes, Hypertension, Renal/Hepatic disorders were excluded.

Socio-demographic and other variables were recorded in the proforma designed for the study. All patients taken up for the study were examined one day before ECT and investigation reports were studied. Any kind of sedatives (e.g. Benzodiazepines) was withheld on the night before ECT. All the patients were premedicated with injection Atropine 0.6mg IM 60 minutes prior to administration of modified ECT. Anaesthesia was induced with either Thiopentone 2mg/kg or Propofol 1 mg/kg of body weight on random basis in the first sitting and the other drug was used in the next sitting. The doses were decided based on review of literature showing use of similar dose of these anaesthetic agents in studies on ECT[60]. Suxamethonium, in a dose of 0.5mg/kg body weight, was used as muscle relaxant and patients were ventilated with 100% Oxygen via anatomical face mask of appropriate size with the help of Magille's circuit. After relaxation of the jaw, a bite block was placed between the teeth. Conductive jelly was then applied over the fronto-temporal region. ECT was administered using Bilateral Fronto-Temporal electrode placement with intensity and duration of current being constant.

Monitoring of different haemodynamic profiles were done with the help of automated monitor on which pulse rate, systolic and diastolic Blood pressure, ECG & oxygen saturation were observed. Systolic & Diastolic Blood Pressure and Pulse rate were noted at baseline (before induction), just after induction and at one, five and fifteen minutes after ECT. Seizure duration was noted using "Isolated Arm Technique" in which cuff pressure in one hand was raised 20 mm Hg above systolic blood pressure prior to administration of Suxamethonium and duration of motor seizure in that arm was noted with the help of stop watch. Recovery from anaesthesia was assessed using the modified Aldrete Scoring, which includes SpO2, respiration, circulation, consciousness and activity level. Assessment of home readiness was done using the criteria of sit up unaided, stand up unaided and walk unaided upto ten meters after 30 min., 40 min. and 60 minutes of administration of ETC.

Assessment of Cognitive functions was done using Mini-Mental Status examination scale conducted before and 30 minutes after administration of ECT. Different adverse effects like nausea, vomiting, pain on injection site were also noted. Statistical analysis was done using Statistical Package for Social Science (SPSS).

RESULTS:

Table 1(a): Socio-demographic characteristics of the patient population (N = 30)

Variable	Mean ± SD
Age (years)	38.76 ± 10.77
Weight (kg)	62.83 ± 7.73

Table 1(b): Socio-demographic characteristics of the patient population (N=30)

Variables		N = 30
Sex	Male	20 (66.66)
	Female	10 (33.33)
Socio-economic status (SES)	Lower	16 (53.33)
	Middle	10 (33.33)
	Higher	4 (13.33)
Education	Illiterate	7 (23.33)
	Primary	11 (36.67)
	Secondary	8 (26.67)
	Graduate & above	4 (13.33)

Sample characteristics

Socio-demographic characteristics:

The mean age was 38.76 (± 10.77) years whereas the mean weight of the patients included in the study was 62.83 (± 7.73) kgs. Male participants were double, 20 (66.66%), as compared to females 10 (33.33%). With regard to socio-occupational status, 16 (53.33%) were from lower, 10 (33.33%) from middle and 4 (13.33%) were from higher socio-economic status. With regard to education, 7 (23.33%) were illiterate, 11 (36.67%) had got primary education (i.e. upto sixth standard), 8 (26.67%) had received secondary education (i.e. upto XIIth standard) whereas 4 (13.33%) were graduates or having higher education.

Table II: Comparison of baseline haemodynamic variables before administration of two induction agents during ECT

S. No.	Variables	Thiopentone Mean (± SD)	Propofol Mean (± SD)	T	P (2 tailed)
1.	Systolic BP	125.26(± 15.42)	129.66(±15.19)	-1.113	.270
2.	Diastolic BP	80.00(± 10.17)	82.33(± 9.35)	-0.925	.359
3.	Mean BP	95.08(± 11.56)	98.21(± 10.31)	-1.107	.273
4.	Pulse rate	83.80(± 8.37)	87.13(± 5.79)	-1.793	.08
5.	SpO2	96.66(± 0.80)	96.96(± 1.03)	-1.256	.21

Table II shows the comparison of baseline haemodynamic variables among patients before administration of two subsequent ECTs using different anaesthetic agents (Thiopentone and Propofol). It shows that the different baseline haemodynamic parameters were almost similar and no statistically significant difference was present on two occasions.

Table III: Mean change of haemodynamic variables from baseline at different time intervals

Variables	After Induction		1 min. after ECT		5 min. after ECT	
	Thiopentone Mean (±SD)	Propofol Mean(±SD)	Thiopentone Mean (±SD)	Propofol Mean(± SD)	Thiopentone Mean (±SD)	Propofol Mean(± SD)
Systolic BP (mmHg)	-0.933 (± 11.98)	-1.66 (±11.76)	17.40 (± 14.95)	14.33 (± 14.30)	1.73 (±12.23)	0.001 (± 9.46)
Diastolic BP (mmHg)	1.333 (± 6.28)	-3.33 (± 4.79)	12.20 (± 8.22)	5.66 (± 8.17)	0.01 (± 10.82)	-2.33 (± 8.17)
Mean BP (mmHg)	0.579 (± 7.85)	-3.109 (± 6.66)	14.156 (± 9.93)	8.44 (± 8.74)	0.799 (± 9.99)	-1.66 (± 7.717)
Pulse rate (per min.)	1.60 (± 11.83)	-4.00 (± 8.11)	14.26 (± 14.09)	5.26 (± 8.96)	0.533 (± 16.18)	-3.80 (± 4.11)
SpO2	-0.10 (± 0.547)	-0.166 (± 0.46)	-0.266 (± 0.639)	-0.166 (± 0.53)	-0.100 (± 0.547)	-0.100 (±0.402)

Table III shows the mean changes in different haemodynamic variables from baseline at three different time intervals, one just after induction and then at one & five minutes after administration of ECT, using Thiopentone and Propofol as induction agents at two subsequent sittings. After induction, the mean change in systolic BP was –0.933 (±11.98) mm Hg, in diastolic BP was 1.33 (±6.28) mmHg, in mean BP was 0.579 (±7.85) mmHg in Thiopentone group as compared to -1.66 (±11.76) mmHg, -3.33 (±4.79) mmHg and -3.109 (±6.66) mmHg respectively in Propofol group. Mean change in pulse rate was 1.60 (±11.83) per minute in Thiopentone group whereas it was -4.00 (±8.11) per minute in Propofol group. After ECT, at 1 minute, the mean change in systolic BP was 17.40 (±14.95) mmHg, in diastolic BP was 12.20 (±8.22) mmHg and in mean BP was 14.156 (±9.93) mmHg whereas in Propofol group it was 14.33 (±14.30) mmHg, 5.66 (±8.17) mmHg and 8.44 (±8.74) mmHg respectively. At 1 minute, mean change in pulse rate was 14.26 (±14.09) per minute in Thiopentone group as compared to 5.26 (±8.96) per minute in Propofol group. After 5 minutes of administration of ECT the mean change in systolic BP was 1.73 (±12.23) mmHg, in diastolic BP was 0.01 (±10.82) mmHg and in mean BP was 0.799 (±9.99) mmHg which was 0.001 (±9.46) mmHg, -2.33 (±8.17) mmHg and -1.66 (±7.717) mmHg respectively in Propofol group. The change in pulse rate was 0.533 (±16.18) per minute in Thiopentone group as compared to -3.80 (±4.11) per minute in Propofol group.

Table IV: Between group (Thiopentone and Propofol) differences of different Haemodynamic Variables (After induction) from baseline

	Thiopentone Mean (±SD)	Propofol Mean (±SD)	t	p
Systolic BP	-0.933 (± 11.98)	-1.66 (± 11.76)	0.239	.812
Diastolic BP	1.333 (± 6.28)	-3.33 (± 4.79)	3.232	.002*
Mean BP	0.579 (± 7.85)	-3.10 (± 6.66)	1.962	.055
Pulse rate	1.60 (± 11.83)	-4.00 (± 8.11)	2.138	.037*
SpO2	-0.10 (± 0.547)	-0.166 (± 0.46)	0.510	.612

(* Statistically significant)

Table IV shows that just after induction, there was statistically significant difference ($p<0.05$) between Thiopentone and Propofol group with respect to mean change in diastolic BP and pulse rate. With use of Thiopentone diastolic BP had increased by 1.333 (± 6.28) mmHg whereas in case of Propofol there was a fall of -3.33 (± 4.79) mmHg. Considering pulse rate, it had increased in Thiopentone group by 1.60 (± 11.83) per minute as compared to fall of 4.00 (± 8.11) per minute in Propofol group. The mean BP was also lower in the propofol group which showed a trend towards significance.

Table V: Between group (Thiopentone and Propofol) differences of different Haemodynamic Variables (At 1 minute after ECT) from baseline

	Thiopentone Mean (±SD)	Propofol Mean (±SD)	t	p
Systolic BP	17.40 (± 14.95)	14.33 (± 14.30)	.811	.420
Diastolic BP	12.20 (± 8.22)	5.66 (± 8.17)	3.08	.003*
Mean BP	14.15 (± 9.93)	8.44 (± 8.74)	2.36	.021*
Pulse rate	14.26 (± 14.69)	5.26 (± 8.96)	2.86	.006*
SpO2	-0.266 (± 0.639)	-0.166 (± 0.53)	-.659	.513

(* Statistically significant)

Table V shows mean differences in haemodynamic variables after 1 minute of administration of ECT during two consecutive ECTs using Thiopentone and Propofol alternatively. It shows significant differences in terms of diastolic BP, mean BP and pulse rate changes during ECT using Thiopentone and Propofol. With Thiopentone use the increase in diastolic BP was 12.20 (±8.22) mmHg, increase in mean BP was 14.15 (±9.93) mmHg and increase in pulse rate was 14.26 (±14.69) per min. whereas with Propofol use the increase was 5.66 (±8.17) mmHg, 8.44 (±8.74) mmHg and 5.26 (±8.96) per min. respectively.

Table VI: Between group (Thiopentone and Propofol) differences of different Haemodynamic Variables (At 5 minutes after ECT) from baseline

	Thiopentone Mean (±SD)	Propofol Mean (±SD)	t	p
Systolic BP	1.733 (± 12.23)	0.001 (± 9.46)	.614	0.542
Diastolic BP	0.01 (± 10.82)	-2.33 (± 8.17)	.942	0.350
Mean BP	0.79 (± 9.99)	-1.66 (± 7.17)	1.07	0.289
Pulse rate	0.53 (± 16.18)	-3.80 (± 4.11)	1.42	0.161
SpO2	-0.10 (± 0.547)	-.100 (± 0.402)	.000	1.00

Table VI shows mean differences in haemodynamic variables after 5 minutes of administration of ECT during two consecutive ECTs using Thiopentone and Propofol alternatively. At 5 minutes, there was no

significant difference ($p<0.05$) found in any of the measured haemodynamic variables during different sessions of ECT using two different anesthetic agent (Thiopentone and Propofol).

Table VII: Between group (Thiopentone and Propofol) differences of different Haemodynamic Variables (At 15 minutes after ECT) from baseline

	Thiopentone Mean (±SD)	Propofol Mean (±SD)	t	p
Systolic BP	0.40 (±10.45)	-0.80 (± 4.62)	0.575	0.568
Diastolic BP	0.001 (± 10.55)	-0.866 (± 4.15)	0.418	0.677
Mean BP	0.247 (± 9.60)	-0.95 (± 3.40)	0.644	0.522
Pulse rate	-6.67 (± 12.69)	-0.466 (± 3.13)	0.168	0.868

Table VII shows mean differences in haemodynamic variables after 15 minutes of administration of ECT during two consecutive ECTs using Thiopentone and Propofol alternatively. At 15 minutes, there was no significant difference ($p<0.05$) found in any of the measured haemodynamic variables during different sessions of ECT using two different anesthetic agent (Thiopentone and Propofol).

Table VIII (a): Comparison of different clinical variables between Thiopentone and Propofol group

S. No	Variables	Thiopentone Mean(±SD)	Propofol Mean(±SD)	t	p
1.	Seizure duration (Seconds)	37.43 (± 9.57)	29.56 (± 5.66)	3.872	<.001*
2.	MMSE Score (Mean change at 30 min. from baseline)	-.766 (± 1.25)	-.166 (± 0.461)	-2.465	.01*
3.	Modified Aldrete Scoring (total score)	9.888 (± 0.379)	10.00 (± 000)	-2.408	.019*

(* Statistically significant)

Table VIII (a) shows changes in seizure duration, cognitive function assessment using Mini mental status examination (MMSE) score and modified Aldrette score among Thiopentone and Propofol group. It shows that the mean seizure duration using Thiopentone was 37.43 (±9.57) seconds as compared to 29.56 (±5.66) seconds using Propofol, which was statistically significant. Change in cognitive function, after 30 minutes of administration of ECT, using MMSE shows that the mean decline in score using Thiopentone was .766 (±1.25) as compared to decline of 1.66 (±.461) using Propofol and the difference was found to be statistically significant. Difference in total score of Modified Aldrete score was 9.888 (±0.379) in thiopentone group and 10.00 in Propofol group, which was also found to be statistically significant.

Table VIII (b): Comparison of different clinical variables between Thiopentone and Propofol group

S. No	**Variables**	**Thiopentone N (%)**	**Propofol N (%)**	χ^2 **(df =1)**	**p**
1.	Aldrete Scoring Consciousness Arousable on call Fully awake	 5 (16.7%) 25 (83.3%)	 0 (0%) 30 (100%)	5.455	0.052
2.	Home readiness				
	Sit up				
	At 30 min.	29 (96.7%)	30 (100%)	1.017	1.00
	At 40 min	30 (100%)	30 (100%)	#	#
	At 50 min	30 (100%)	30 (100%)	#	#
	Stand up Unaided				
	At 30 min	26 (86.7%)	30 (100%)	4.286	0.112
	At 40 min	30 (100%)	30 (100%)	#	#
	At 50 min	30 (100%)	30 (100%)	#	#
	Walk unaided				
	At 30 min	10 (33.3%)	30 (100%)	30.00	<.001*
	At 40 min	26 (86.7%)	30 (100%)	4.286	0.112
	At 50 min	30 (100%)	30 (100%)	#	#

(# No statistics was computed as variables in both the groups were equal.)

($p<0.05$ was considered as significant)

Table VIII (b) shows differences in Aldrette scoring at 30 minutes and home readiness score among Thiopentone and Propofol group. In Thiopentone group 25 (83.3%) patients were fully awake and 5 (16.7%) patients were "arousable on call" whereas in propofol group all 30 patients were "fully awake" at 30 minutes, which showed a trend towards significance. In Home readiness, significant difference was found in "walk unaided" score where only 10 (33.3%) patients could walk unaided at 30 minutes when using Thiopentone as compared to 30 (100%) patients when using Propofol. Other parameters although different to some extent between Thiopentone and Propofol group but were not statistically significant.

Table IX: Comparison of different adverse effects between Thiopentone and Propofol group

S. No.	Adverse effects	Thiopentone n (%)	Propofol n (%)	2 (df =1)	p
1.	Nausea and vomiting Present Absent	 2 (6.7%) 28 (93.7%)	 0 (0%) 30 (100%)	2.069	0.492
2.	Pain on injection Present Absent	 0 (0%) 30 (100%)	 3 (10%) 27 (90%)	3.158	0.237
3.	Others Headache Present Absent Myalgia Present Absent Headache and myalgia both Present Absent	 3 (10%) 27 (90%) 1 (3.3%) 29 (96.7%) 2 (6.7%) 28 (93.3%)	 2 (6.7%) 28 (93.3%) 1 (3.3%) 29 (96.7%) 1 (3.3%) 29 (96.7%)	0.613	0.892

Table IX shows different adverse reactions associated with use of thiopentone and propofol. Nausea and vomiting was reported by 2 (6.7%) patients after thiopentone use, pain on injection was present in 3 (10%) patients with propofol use , headache was present in 3 (10%) patients with thiopentone use and 2 (6.7%) patients with propofol use, myalgia was reported by 1 (3.3%) patient each in both the groups whereas headache and myalgia both were present in 2 (6.7%) patients with thiopentone group and 1 (3.3%) patients with propofol use.

DISCUSSION:

ECT offers a useful, safe, and, in some cases, lifesaving intervention. It involves the passage of a brief electrical current through the brain to induce a generalized central nervous system (CNS) seizure under general anesthesia and muscle relaxation.

The baseline haemodynamic variables among patients before administration of two subsequent ECTs using different anaesthetic agents (Thiopentone and Propofol) were measured and found to be almost similar and no statistically significant difference was present (Table II of result). This similarity in baseline haemodynamic profile before two consecutive ECTs indicates that the changes in these variables at different times found in this study were attributed mostly to drug factor rather than the patient factor.

The most important cardiovascular effect of propofol is a decrease in arterial blood pressure during induction of anaesthesia. Heart rate does not change significantly but it reduces the tachycaric response to hypotension. In our study also there was reduction in systolic BP, diastolic BP and mean BP in propofol group that was more than the thiopentone group just after induction but statistically significant difference ($p<0.05$) was present only with respect to mean change in diastolic BP and pulse rate (Table IV of result). The mean BP was also lower in the propofol group which showed a trend towards significance. These results were in parlance with study by Nishiyama[8] et al. (1996) who had also concluded that the blood pressure, heart rate and rate pressure product were significantly higher at one minute after intubation as compared with those before induction in thiopentone group than in propofol group.

Significant changes in haemodynamic function occur during each ECT treatment. Immediately following the electrical stimulus, a period of increased parasympathetic tone produces profound bradycardia and asystole that can last several seconds followed by sympathetic

overactivity lasting few minutes. In our study statically significant increase in diastolic BP, mean BP and pulse rate was observed at one minute after ECT using Thiopentone as compared with use of propofol. These findings can be explained on the basis that at one minute after ECT there is remission of increased parasympathetic tone and it is predominantly taken over by sympathetic system. Relatively less change from baseline in propofol group with respect to these variables indicates towards better control of post-ECT haemodynamic changes with propofol. Analysis of the data by Weigner[13] et al. (1991) has also suggested that propofol was more effective in controlling hemodynamic response to ECT than etomidate and thiopentone, but none of these agents was adequate, and had recommended the use of beta blockers such as esmolol and labetalol for its control.

During the electrically formed seizures of ECT, activation of the autonomous system and a sudden elevation of the catecolamines in the circulatory system are observed after initial parasympathetic stimulation, causing a short but significant increase in heart rate and blood pressure[1, 14]. In our study no significant difference was found in any of the measured haemodynamic variables at 5 and 15 minutes after ECT using two different anesthetic agents (Thiopentone and Propofol) rather there was minor decrease in diastolic BP, mean BP and pulse rate with the use of propofol (Table VI and VII of result). This can be explained on the basis of interplay between effects of ECT and propofol on haemodynamic profile as supported with the results of studies by Jones[16] et al. (1994) and Villalonga[17] et al (1993). He has also found significantly greater decrease in mean arterial pressure with propofol when compared to thiopentone (P = 0.01). Another study by Aun[9] et al. (1993) also compared the haemodynamic responses to i.v. propofol with thiopentone in children and found that reduction in mean arterial pressure was significantly greater after propofol (28-31%) than after thiopentone (14-21%) (P = 0.001).

The aim of ECT is to obtain generalized convulsions over 25 seconds[63]. Because the seizure is the therapeutic agent, the duration of seizure discharge is a significant variable of therapeutic efficacy. Reducing the duration of convulsive activity in the brain reduces the therapeutic efficacy. In our study the mean seizure duration using Thiopentone was 37.43 (±9.57) seconds as compared to 29.56 (±5.66) seconds using Propofol, which was statistically significant (Table VIII(a) of result. Although the mean duration of seizure was significantly less with propofol but it was more than 25 seconds that is required for therapeutic efficacy and so not hampering the efficacy of ECT. This result is in agreement with results by Boey & Lai[5] (1990) and Avramov & White[15] (1994) which have found reduction in seizure duration during ECT with use of propofol. The doses of anaesthetic agents used in these studies were also similar to our study and they proposed that propofol cannot be considered as an appropriate agent owing to its antiseizure activity but as the mean seizure duration was found to be more than 25 seconds required for therapeutic efficacy in our study, its use can't be thought as detrimental for the efficacy.

Cognitive adverse effects of ECT are important limiting factor and show great individual variability. Most patients experience a period of postictal and postanesthetic confusion that lasts about 30 minutes, although the duration can (rarely) extend to hours. Memory loss is a major adverse effect of ECT and can have both retrograde and anterograde components. Our study also depicted statistically significant difference in cognitive functions, assessed with Mini Mental Status Examination (MMSE) at 30 minutes from induction, among thiopentone and propofol group and relatively less cognitive impairment was associated with propofol (Table VIII(a) of result). The study results were similar to study by Heath[11] et al. (1990) who also found early recovery of memory function in the propofol group.

In our study recovery from anaesthesia was assessed using the modified Aldrete Scoring, which includes SpO2, respiration, circulation, consciousness and activity level, and assessment of home readiness was done using the criteria of sit up unaided, stand up unaided and walk unaided upto ten meters after 30 min., 40 min. and 60 minutes of administration of ECT. Statistically significant Difference in total Modified Aldrete score at 30 minutes was also found in thiopentone and Propofol group (Table VIII (a) of result) which signified relatively early recovery with propofol as shown in studies by Runcie[10] et al. (1993) and Zaidi[36] et al. (2000). All these studies have found propofol to offer quick recovery compared to thiopentone sodium. Among items of modified Aldrette Scoring, a trend towards significance was observed in regaining consciousness which would have been significant with larger sample size as found in studies by Boey and Lai[5] (1990). In Home readiness scale also, significant difference ($p < 0.001$) was found in "walk unaided" score where only 10 (33.3%) patients could walk unaided at 30 minutes when using Thiopentone as compared to 30 (100%) patients when using Propofol which was similar to the study by Boey and Lai[5] (1990) where the ability to walk 10 meters 20 minutes after anaesthesia was significantly better with propofol ($p < 0.0001$) as compared to thiopentone.

During the application of ECT, complications can occur at the induction and recovery stages. In the induction stage of our study, three patients (10%) complained of injection pain with use of propofol but this problem was solved by slower injection and the use of larger veins as in studies with Celebioglu[12] et al. (1999). In the recovery period, complications such as headache, dizziness, emesis and cough can be observed[1, 14]. Nausea and vomiting was reported by 2 (6.7%) patients after thiopentone use but by none with propofol use. Headache and myalgia was also reported more commonly with thiopentone use but was not statistically significant. We did not encounter any myoclonus or increased tonus-related complications.

In view of the data provided, it can be concluded that patients undergoing ECT should be evaluated by an anesthesiologist before treatment. Anesthesia that is applied during ECT should aim to reduce seizure-related complications and obtain a short recovery period by the use of quick-acting drugs which do not interfere with seizure duration[1, 14]. Taking these things under consideration propofol appears to be a safe anesthetic for ECT, with minimal side effects. In our study, it was found to be superior to thiopentone in attenuating the physiological response to ECT, with milder hemodynamic change. Compared with thiopentone, propofol reduced the duration of seizure, but whether this affects the efficacy of ECT or not is still questionable.

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