

A COMPARATIVE STUDY OF ETOMIDATE AND THIOPENTONE IN MODIFIED E. C. T

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SUMMARY

The study was undertaken to assess the value of etomidate in modified E. C. T. and compare the results with thiopentone sodium. Fifty patients of schizophrenia, depressive illness and manic depressive psychosis requiring E. C. T. were studied with thiopentone and etomidate in two subsequent sittings. The results indicate that induction time is approximately same with both the drugs. The shorter recovery time with etomidate in comparison to thiopentone proved to be of definite advantage specially to psychiatric out patients who rapidly have to regain consciousness and soon become alert enough to go back to their homes after treatment.

Thiopentone sodium is still the most commonly used anaesthetic agent for modified E. C. T. (Sargant and Slater 1963, Kalinowsky 1975) but the hang-over associated with its use is a definite disadvantage specially in psychiatric outpatient departments where patients have to go back to their homes soon after the treatment. Many new intravenous anaesthetic agents are being evaluated in modified E. C. T. in order to find a drug which is more safe, effective and has a rapid recovery period.

Etomidate is a potent, rapidly acting, non-barbiturate intravenous anaesthetic agent introduced into clinical practice by Doenicke et al (1973). The present study was undertaken to compare thiopentone sodium and etomidate as intravenous anaesthetic agents for modified electroconvulsive therapy.

Material and Methods

The investigation was carried out on 50 randomly selected patients attending mental health clinic of L. L. R. Hospital, Kanpur. Patients of both sexes between the age group of 16 to 60 years who had to undergo E. C. T. were taken up for the study. Every

patient was studied in the first two sittings of E. C. T. The relative drug responses of the two inducing agents were evaluated in their standard doses. In the first sitting, thiopentone sodium was used as induction agent in doses of 5 mg/kg body weight. In the second sitting etomidate was given in doses of 0.3 mg/kg of body weight. The patients were given nothing orally after 10 PM in the preceding night.

No premedication was given. Atropine in the dose of 1 mg I. V. was given with induction agent (Thiopentone Sodium). The induction time (in seconds) i.e. the time interval from start of injection to loss of eye reflexes was noted. Suxamethonium in the dose 0.7 mg/kg body weight was given and oxygenation by J. P. P. R. was done during apnoea. E. C. T. was given after proper relaxation. Intensity of convulsions were noted according to following grades: -

Grade I - Twitching of facial muscles and toes

Grade II - Soft generalised convulsions

Grade III - Unmodified convulsions

Total apnoeic period (in seconds) i.e. the

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time period from start of injection of suxamethonium to first post E. C. T. breath was noted. Patients were again gently ventilated with 100% oxygen using Boyles apparatus until adequate spontaneous respiration was restored. Recovery time (in minutes) i.e. the time interval between the loss of eye reflexes to return of response to verbal commands was noted.

The procedure was repeated in second sitting of E. C. T. in the same patient using Etomidate as induction agent at an interval of 2 days.

Results

Table 1
Age and sex distribution

Age group (years)	Sex		Total
	Male	Female	
16-25	4	12	16
16-35	3	6	9
36-45	9	2	11
46-55	3	4	7
56 & above	3	4	7
Total	22	28	50

Table 2
Diagnostic distribution of patients

Diagnosis	Number	Percentage
Schizophrenia	30	60
Involuntional depression	15	30
Manic depressive psychosis	5	10

Table 3
Mean induction time with the two drugs

Drug	Induction - time (in seconds)	t	level of significance
Thiopent- one sodium	32.3 ± 2.5	2.984	Not significant
Etomidate	33.6 ± 1.8		

Table 4
Intensity of convulsions after E. C. T. in the two groups of drugs

Intensity of convulsions	Thiopentone sodium		Etomidate	
	No.	%	No.	%
Grade I	42	84	40	80
Grade II	8	16	10	20
Grade III	-	-	-	-

Table 5
Mean total apnoeic period with the two drugs

Drugs	Total apnoeic period (in seconds)	Significance
Thiopentone sodium	160.2 ± 9.4	Not significant
Etomidate	166.4 ± 7.2	

Table 6
Mean recovery time with the two drugs

Drugs	Recovery time (in seconds)	Significance
Thiopentone sodium	8.6 ± 1.9	(p < .001) Highly significant
Etomidate	4.2 ± 1.1	

Discussion

Though thiopentone is the most popular inducing agent for modified E. C. T its use is not without risk specially in patients with cardiac and respiratory problems. The supremacy of the intravenous barbiturates for the rapid induction of anaesthesia has been challenged in recent years by a group of new drugs. Etomidate is one of them and it was thought worthwhile to try this drug as inducing agent for modified E. C. T.

The induction time with thiopentone found in our study was 32.3 ± 2.5 seconds. Different workers (Dundee 1957), Wyant and Barr (1960) and Fox et al (1968) have found different induction times with thiopentone varying from 15 to 150 seconds. The marked variability in different studies

Table 7
Side effects with the two drugs

Side effects	Thiopentone sodium		Etomidate	
	No. of cases	Percentage	No. of cases	Percentage
I - During Induction				
Involuntary muscle movements	3	6.0	18	36.0
Flushing	2	4.0	-	-
Laryngospasm	-	-	-	-
Pain during injection	-	-	20	40.0
Hiccough	-	-	1	2.0
II - Early				
Prolonged apnoea	-	-	-	-
Cynosis	-	-	-	-
Arrhythmias	4	8.0	-	-
Nausea, vomiting	6	12.0	3	6.0
Secretions	2	4.0	2	4.0
Marked confusion	-	-	1	2.0
III - Late				
Drowsiness	13	26.0	-	-
Headache	10	20.0	2	4.0
Thrombophlebitis	1	2.0	5	10.0

could be due to dose of the drug, the speed of injection and the sensitivity of the patient. The present study has revealed more or less similar induction time (33.6 ± 18 sec.) with etomidate as well. The studies of Morgan et al (1975) and Famewo et al (1977) have shown nearly similar findings. They have found induction time of etomidate to be in the range of 10 to 65 seconds depending on the dose, rate of injection and the type of premedication. The intensity of convulsions was more or less same with the two types of drugs. Nearly 80% patients in both the groups exhibited grade I convulsions.

The simple test of the response to verbal commands was taken as criteria for recovery. The recovery time with thiopentone was much longer 8.6 ± 1.9 minutes as compared to 4.2 ± 1.1 minutes with etomidate.

This difference in recovery time between the two drugs was found to be statistically significant. Similar results with regard to recovery time of etomidate have also been reported by O' Carroll (1977). The drowsiness associated with thiopentone is a definite disadvantage particularly in busy psychiatric clinics where the large number of patients are given E.C.T's who are sent back to their homes after treatment.

The early recovery time seen with etomidate is a desirable feature specially in psychiatric out patient departments where the patients have to go home immediately after E.C.T. Shortening of the recovery time can save lot of valuable time of the anaesthetist without compromising safety of the patients.

There was no difference in the total

apnoeic period between thiopentone (160.2 ± 9.4 seconds) and etomidate (166.4 ± 7.2). The apnoeic period does not affect the suitability of the either of the agent.

Some pain during injection was complained by 40% of the patients with etomidate while thiopentone did not cause pain in any patient during injection. Involuntary muscle movements during induction were seen in 6% cases with thiopentone and in 36% patients with etomidate. The high incidence of pain during injection and involuntary muscle movements are also reported by Fragen et al (1976), Goodling et al (1976) and O'Carroll et al (1977). The pain and involuntary muscle movements were short lived and the patients had no problems in this respect after the treatment was over. The incidence of arrhythmias with thiopentone was 8% while no cardiac irregularities were observed with the use of etomidate. The observed cardiovascular stability with the use of etomidate is an additional quality which can make it more useful in psychiatric patients with cardiovascular disorders requiring electroconvulsive therapy. The frequency of nausea and vomiting with thiopentone was higher (12%) as compared to etomidate (6%). The occurrence of excessive secretions was more or less equal. 26% patients with thiopentone showed post E.C.T drowsiness, while no patient with etomidate had drowsiness.

Conclusion

Thiopentone shows smooth rapid induction. Patients have definite barbiturate hangover and tendency to sleep after electroconvulsive therapy. Etomidate induction is associated with involuntary muscle movements and some pain during injection. Early and uneventful recovery shows its distinct advantage over thiopentone sodium. Etomidate definitely has a place as intravenous anaesthetic agent for

E.C.T and more clinical trials are called for its further evaluation.

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