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EFFECTS OF INTRAVENOUS CLONIDINE ON HEMODYNAMIC PARAMETERS IN PATIENTS UNDERGOING MODIFIED ECT

Dr. A. Asghar Ali — Assistant Professor, Department Of Anaesthesiology, Thoothukudi Government Medical College, Thoothukudi, Tamil Nadu, India

Dr. Karthikeyan Natarajan* — Assistant Professor, Department of Anaesthesiology, Pudukottai Government Medical College, Pudukottai, Tamil Nadu, India *Corresponding Author

ABSTRACT

Aim: To evaluate the effects of intravenous clonidine (1mcg/kg) on hemodynamic responses, duration of seizure activity and recovery characteristics to modified ECT

Materials and methods: This prospective randomized crossover clinical trial was performed on 30 patients aged 20-50 years with ASA I and II who were candidates for ECT. Prior to ECT, each patient received intravenous infusion of clonidine (1 mcg/kg) or a normal saline 10 minutes prior to induction. Baseline Heart rate, systolic, diastolic and mean arterial pressures were noted. The same parameters at 1, 2, 5,10,20,30,60 minutes and 2,4 hrs were noted. Motor Seizure duration and Time to recovery noted. Statistical analysis was done using paired students' t' test

Results: Attenuation of maximum rise in the heart rate, systolic BP, diastolic BP and mean arterial pressure and increase in recovery time by intravenous clonidine (1 mcg/kg) was evident and statistically significant when compared with control group.

KEYWORDS : Electroconvulsive Therapy, Hemodynamic Response, Intravenous Clonidine

Introduction

Electroconvulsive therapy (ECT) is the most effective treatment available for the acute treatment of depression in patients who do not respond to medications[1] .The efficacy of ECT has also been well documented in mania and some forms of schizophrenia[2]. The aim of ECT is to produce a grand mal seizure. It is the seizure rather than the electrical stimulus which is responsible for the therapeutic effect. The seizure also causes wide spread physiological changes, particularly affecting the cardiovascular and the nervous system[3] .These are most commonly a transient period of hypertension and changes in the heart rate (HR), which can be hazardous as many patients who require ECT are elderly and have cardiac and cerebrovascular diseases. These cardiovascular changes may be altered using various preanesthetic agents with anesthetic drugs and convulsions can be reduced by the usage of muscle relaxants.

The ideal premedicant should have sedative, anti-anxiety, analgesic, anti-emetic, and anti sialogogue properties and should not impair cardiovascular stability or depress the respiration. α2 adrenergic agonists attenuate stress-induced sympathoadrenal responses to painful stimuli, improve intraoperative hemodynamic stability, and reduce anesthetic requirements during surgery. Clonidine is centrally acting α2 adrenergic agonist with well- characterized antihypertensive properties. α2-adrenoceptor agonists are mainly used as antihypertensive agents but have many properties of ideal premedicant[4]

Aim

- To evaluate the effects of intravenous clonidine on hemodynamic response to modified ECT
- To assess the duration of seizure activity and recovery characteristics.

Materials and methods:

This is a randomised prospective double blinded cross over study conducted in our institution. Age 18-60 years, Schizophrenia, mania, depression, ASA I-II are included in this study and exclusion criteria was Cardiovascular disease, Cerebrovascular disease, Intracranial hypertension, Respiratory tract disease, Patients with HR less than 60 bpm, SBP less than 100 mm of Hg, Patients with contraindication for ECT

A total of 30 patients were scheduled for the study. Pre- anaesthetic evaluation was done on the day before the procedure. A written informed consent was taken from their relatives. The study was done in repeated crossover pattern. In ECT room, drugs were prepared by my collegue not involved in the study. Administering drugs and monitoring were done by the principal investigator who did not know about the preparation. Patients were allocated as Group S when received 100ml of plain normal saline intravenously over 10minutes prior to induction. Same patients were allocated Group C when received clonidine 1 µg/kg in 100ml saline. Premedication T. Ranitidine 150 mg & NPO from 10 pm. Inj.Glycopyrrolate 0.2 mg i.m. 30 min before procedure & 18 gauge i.v. cannula was inserted. Standard monitors such as HR,SBP, DBP, MAP, ECG and SpO2 & baseline parameters were noted before securing IV cannula. Study drug or saline was administered. Preoxygenation for 3 min, Inj. Propofol 1mg/kg i.v was given. Right forearm was isolated with tourniquet & Inj. Suxa 0.5 mg/kg iv given. After placing Bite block, ECT was given Mask ventilation with 100% oxygen continued until patient resumed adequate spontaneous breathing.

Hemodynamic parameters at 1, 2, 5,10,20,30,60 minutes and 2,4 hrs. HR fall > 20% from baseline, Inj. Atropine 0.6 mg IV given. BP fall > 20% from baseline, Inj. Ephedrine 6mg IVgiven. Motor Seizure duration noted and tourniquet deflated. Time to recovery noted. Statistical analysis was done using paired students' t' test.

RESULTS & OBSERVATION

Demographic Data:

In this study 30 patients of different age groups of either sex and different psychistric illness was selected randomly.

Table 1 : Population Parameters

Parameters	(n=30)	(100%)
Age		
Below 20 yrs	4	13.30%
21-30 yrs	9	30%
31-40 yrs	14	46.70%
Above 50 yrs	3	10%
Sex		
Male	17	56.70%
Female	13	43.30%
Psychiatric disease		
BPD	17	56.70%
Shizophrenia	13	43.30%

Hemodynamic parameters

Compared with the control group, significant differences were found in the baseline hemodynamic values in both groups. The pre-ECT treatment HR,SBP,DBP and MAP values were significantly lower in the Group C (clonidine) compared with the Group S (control). In addition, the maximum changes in both HR,SBP,DBP and MAP after the ECT stimulus were smaller in the Group C (clonidine) compared with the Group S (control).

SBP, DBP and MAP:

The SBP when compared with control group showed a statistically significant decrease in clonidine group at 0,1,2 min and DBP showed a statistically significant decrease in clonidine group at 0,1,2, and 5 min. When MAP compared with control group it showed statistically significant decrease in clonidine group at 1,2,5 minutes.

Table 2 : Comparison of SBP, DBP and MAP

Time	Group S (SBP)	Group C (SBP)	Group S (DBP)	Group C (DBP)	Group S (MAP)	Group C (MAP)
0 min	118.63±6.5	113.7±4.6 p = 0.001	80±5.0	76.60±4.2 p =0.007	92.6±4.86	89.17±4.34 P = 0.006
1 min	165.57±16.6	134.7±5.4 p =0.000	108.80±9.8	91.27±4.0 p = 0.000	126.73±11.81	105.43±4.81 P = 0.000
2 min	141.07±12.8	121.4±4.2 p = 0.000	93.77±8.6	81±3.4 P = 0.000	110.27±11.13	94.23±3.25 P = 0.000
5 min	122.4±8.5	117.6±2.7 p = 0.005	84.10±8.3	77.60±2.7 P = 0.000	97.67±9.01	90.67±2.63 P = 0.000
10 min	119.1±5.9	115.9±6.2 p = 0.012	79.73±6.5	76.80 ±1.9 P = 0.023	92.27±6.7	89.47±2.16 P = 0.033

SpO2 :

At any time after the drug administration and the ECT stimulus, there is no statistically significant difference in saturation between both groups (p value >0.05)

Heart rate:

When heart rate were compared it showed statistically significant decrease in clonidine group than with control group at 0,1,2,5,and 10 min.

Table 3 : Comparison of Heart Rate

	Group S	Group C	P value
0 min	94.07±8.34	76.40±6.72	0.000
1 min	126.50±9.41	88.80±5.56	0.000
2min	101.03±8.70	81.10±5.03	0.000
5 min	92.43±5.70	77.90±4.64	0.000
10 min	88.17±5.29	78.47±4.91	0.000

Seizure duration and Time of recovery:

There is no statistically significant change in seizure duration between both groups.When compared with control group there is statistically significant increase in recovery time in clonidine group.

Table 4 : Comparison of Seizure duration and Time of recovery

	Group S	Group C	P value
Seizure duration (sec)	36.57±3.42	35.40±3.41	0.191
Time to recovery (min)	10.03±2.28	27.13±3.62	0.000

Discussion

In our study there is a significant fall in SBP,DBP,MAP in clonidine group campared to normal saline which is consistent with study done by Fu Wen et al[5] on oral clonidine effects on ECT. similar results were obtained by Ravichandra Dodawad et al[6], on effects of 0.6µg/kg of dexmedetomidine in the attenuation of stress response after electroconvulsive therapy In our study, there is significant fall in heart rate in clonidine group which is consistent with results obtained by Ravichandra Dodawad et al, but in study done by Fu Wen et al there is no significant difference in heart rate In our study, there is no significant change in seizure duration between two groups .same results were obtained by Fu Wen et al Time to recovery does not show significant changes in study by Fu Wen et al.But in our study time to recovery is more in clonidine group which may be advantageous as it reduces postictal agitation in patients undergoing ECT.

Conclusion:

To conclude, clonidine at a dose of 1µg/kg attenuates the hemodynamic response of ECT without any change in the seizure duration with a slight delay in time for recovery.

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