Original Research Paper

Volume-8 | Issue-1 | January-2018 | PRINT ISSN - 2249-555X

Anesthesiology

OBSERVATIONAL STUDY OF THE EFFECTS OF INJ. ETOMIDATE AS AN INDUCING AGENT IN PATIENTS WITH LOW EJECTION FRACTION FOR NON CARDIAC SURGERIES

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ABSTRACT **Introduction:** Etomidate is a carboxylated imidazole derived nonbarbiturate & the most cardiostable inducing agent. However the adverse effects like myoclonus can be prevented by premedicating with fentanyl.

Method: 50 Patients with ejection fraction 25%-50%, of ASA III and IV posted for non cardiac surgery were premedicated with inj. fentanyl IV. After preoxygenation, induction was done with etomidate 0.3 mg/kg IV over 60 seconds, followed by normal protocol. HR, BP, SpO2, pain on injection & myoclonus were monitored at the time of induction 60, 80, 100 and 120 secs after giving the drug.

Result: There was no significant difference in HR & BP after induction with Etomidate with SD 83.576 ± 14.04, 120.2 ± 9.9 (systolic bp) respectively ($p > 0.05$) with no pain on injection and insignificant incidence of myoclonus (28 %) ($p>0.05$)

Conclusion: Etomidate is a Cardioprotective drug with no pain on injection and least complications and side effects.

KEYWORDS : general anaesthesia; etomidate; low ejection fraction; non cardiac surgeries.

INTRODUCTION:

Etomidate is a carboxylated imidazole- derived nonbarbiturate, non-narcotic, hypnotic agent mainly used for induction of general anaesthesia. It acts by modulating and mimicking Y- aminobutyric acid (GABA) type A receptor mediated chloride channel.1,2,3 It has rapid onset of anaesthesia leading to sleep in one arm- brain circulation time (approx 30 secs); short duration of action (2-3 mins) and rapid recovery without hangover effect. Etomidate is characterized by hemodynamic stability, minimal respiratory depression and cerebral protective effects3. Its lack of effect on sympathetic nervous system, baroreceptor reflex regulatory system 3,4,5 and its effect of increased coronary perfusion even on patients with moderate cardiac dysfunction makes it an induction agent of choice.

This study is an attempt to observe hemodynamic and other effects of inj. etomidate so that we can choose a safe induction agent in patients with low ejection fraction.

Material And Methodology

After permission and clearance from the ethical committee, this observational study was conducted in Department of Anesthesiology. Keeping the power of the study 80% and confidence limit 95%., we studied 50 patients of age 20 – 60 years, both the genders, with ejection fraction 25%-50% as per 2D Echo, belonging to Grade-III and IV of American Society of Anesthesiologist's (ASA) classification who were admitted for elective non cardiac surgeries. All the patients participating in the study were explained clearly about the purpose and nature of the study in the language they understood. They were included in the study only after obtaining a written informed consent.

Where as patients who refused for the study, allergic to any drug, having history of seizure disorder and having primary and secondary steroid deficiency or on steroid medication were excluded from this study.

A cross sectional analysis was made at the time of presentation. We collected the data for 6 months from July 2016 to Jan 2017 and analyze the data statistically.

A routine pre-operative examination of all the patients was done as per routine protocols on the previous day of surgery. Patients were kept nil by mouth at least eight hours before the operation.

On the day of surgery, patient was brought to the operation theatre. Intravenous line was secured with 18G cannula and the patients were given I.V. Fluids according to the requirement. Multipara monitors were attached and base line pulse rate, respiratory rate, non-invasive blood pressure, SPO2 and ECG were recorded.

All the patients were premedicated with inj. Glycopyrrolate 0.004 mg/kg iv, inj. Ondensatron 0.1 mg/kg iv. Intravenous inj. Fentanyl 2 mcg/kg was given 5 minute before induction. After preoxygenation, Induction of anaesthesia was done with inj. etomidate 0.3 mg/kg iv over 60 seconds. Loss of eye lash reflexes and lack of response to verbal commands was considered to be as end point of induction. Followed by this, inj. Succinylcholine 2mg/kg iv was given to facilitate tracheal intubation. Anaesthesia was maintained with 50% oxygen, 50% nitrous oxide along with inhalation agent and intravenous inj. Atracurium.

Time to loss of eye lash reflex, haemodynamic parameters (HR, SBP, DBP)- one minute before premedication, before induction and at the time of induction 60 ,80 ,100 and 120 secs after giving the drug were monitored. Pain on injection and Myoclonus were observed during induction. Side effects/ Complications if any were also observed.

Grades of Pain on injection was measured as follows:

0 : no pain,
1 : grimace,
2 : withdrawal of the arm,
3 : both verbal complain and withdrawal of the arm

Severity of myoclonus was graded as follows:

0 = no myoclonus;
1 = minormyoclonus; (short movement of a body segment e.g., a finger or a wrist)
2 = moderatemyoclonus; (mild movement of two different muscle groups e.g., face and arm)
3 = severe myoclonus. (intense myoclonic movement in two or more muscle groups, fast adduction of a limb).

Intraoperative fluid was calculated and replaced according to the patient weight and NBM status.

Patient was extubated as per routine protocols.

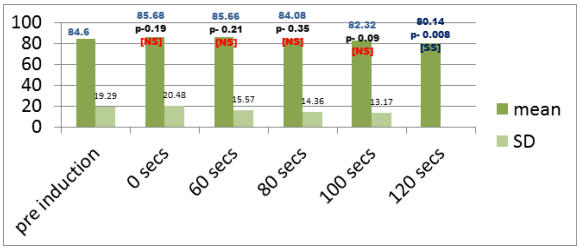
Observation And Results

The various observations were summarized as follows:-

Demographic data

Age- mean age of patients in my study was 48 yrs, ranging from 35 yrs to 65 yrs.
Sex- male: female- 1:1.
EF- Mean and Standard Deviation of the patients having EF in the range 20 – 40 % is 33.8 ± 5.6
ASA III: ASAIV – 23:27 i.e. 0.85:1

Graph 1: Difference of Mean in Heart Rate at Different Time Intervals



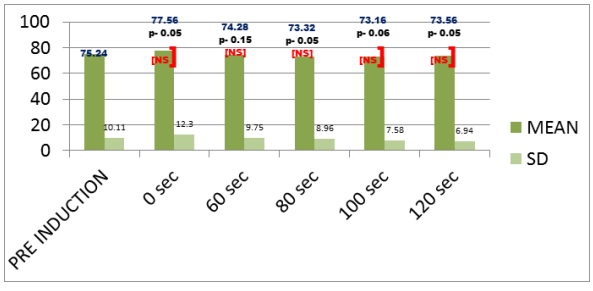
Mean of all the patients for pre induction vitals, 0 sec, 60, 80, 100, 120 secs is 83.57 ± 14.04 and p value is 0.20 (compared with pre induction) P value < 0.05 only at 120 seconds which makes a significant difference from the pre induction pulse.

Graph 2: Difference of Mean in Systolic BP at Different Time Intervals

Mean of all the patients for 0 sec, 60, 80, 100, 120 secs is 120.2 ± 9.96 and p value is 0.48 (compared with pre induction)

P values for SYS BP is > 0.05 from 0 to 120 secs which is not a significant difference from the pre induction sys bp.

Graph 3 : Difference of Mean in Diastolic BP at Different Time Intervals



Mean of all the patients for 0 sec, 60, 80, 100, 120 secs is 74.37 ± 8.64 and p value is 0.14 (compared with pre induction)

Graph 4: Myoclonus

GRADES	NUMBER OF PATIENTS
0	36 (72%)
1	6 (12%)
2	5 (10%)
3	3 (6%)

Incidence of Myoclonus was seen in 14 patients out of 50 which is about 28% with no pain on injection and no other side effects.

DISCUSSION

The hemodynamic stability seen with etomidate may be due to its unique effect on both sympathetic nervous system and baroreceptor function. So it leads to increased coronary perfusion even on patients with moderate cardiac dysfunction makes it an induction agent of choice.

Etomidate causes depression of reticular activating system and mimics inhibitory effects of GABA. It appears to bind to a subunit of GABA type A receptor, thus increasing its affinity for GABA. It also has disinhibitory effects on parts of nervous system that control extrapyramidal motor activity. [7,8] The dose of etomidate utilized by various studies ranges from 0.2 to 0.4mg/kg. Thomas J Ebert et al stated the doses at higher end of spectrum for etomidate may cause direct myocardial depression[9]. In this study dose 0.3 mg/kg etomidate had no myocardial depression.

Omid Azimaraghi, Yasaman Aghajani et al stated that pre tretment with iv ondensatron significantly reduces the pain on injection of etomidate as ondenstaron possesses antinoceptive properties.[11]

Stockham RJ, Stanley TH, Pace NL et al stated that pretreatment with iv fentanyl blunts the pharynolaryngeal reflex on intubation and decrease the incidence of myoclonus associated with etomidate.[12]

CONCLUSION

Etomidate is a safe option in patients prone to hemodynamic fluctuation at induction in patients with low EF with low incidences of myoclonus and no pain on injection.

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