Original Research Article

A Study on Etomidate versus Propofol for Induction of General Anaesthesia- A Comparative Study

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Abstract

Background and Objectives: Induction of anaesthesia is a critical part of anaesthesia practice. Sudden hypotension, arrhythmias and cardiovascular collapse are life threatening complications following injection of induction agent in hemodynamically unstable patients. It is desirable to use a safe agent with fewer adverse effects. Present clinical study was conducted to evaluate the induction time, hemodynamic changes like blood pressure, Heart rate during pre induction, induction and post induction and untoward effects like pain on injection, myoclonus and post operative nausea and vomiting.**Methods:** In a prospective, randomized, double blind study, 80 patients of ASA Grade I and II in the age group 18-65 years of either sex scheduled for elective surgery were divided into two groups of 40 each. Premedication was given as InjGlycopyrrolate, Midazolam, and Pentazocine. Induction was done with InjEtomidate 0.3mg/kg in Group "E" and InjPropofol 2mg/kg in Group "P" followed by injection succinylcholine 2mg/kg for intubation and anesthesia was maintained with 40% O_2 +60% N_2O and Isoflurane and intermittent vecuronium 0.05mg/kg. Two groups were compared with respect to the induction time, hemodynamic parameters like Blood pressure, Heart rate(HR) during Pre induction, Induction and Post induction were recorded. The induction time was calculated after loss of eye lash reflex. The adverse effects like pain on injection, myoclonus and post operative nausea and vomiting (PONV) during postoperative period observed.**Results:** Induction time was faster in Etomidate group compared to Propofol group. Mean induction time in Group E and Group P were 22.60±4.91 seconds and 26.95±3.86 seconds respectively. Time for induction in Etomidate was significantlyshorter compared to Propofolgroup(p value <0.05). Hemodynamic changes like Heart rate increased in Propofol group compared to Etomidate at 1min, 2min and 3min at induction and post induction and it was statistically significant(p value ≤0.001). Compared to Propofol group, Etomidate group patients showed stable Systolic blood pressure (SBP) at 1min, 2min and 3min at induction time and it was statistically significant(p value ≤0.001). After intubation, SBP decreased in Propofol group at 1 min, at 2 min compared to Etomidate group at 1min, at 2 min and it was statistically significant (p value≤ 0.001 at 1 min and p= 0.009 at 2 min). At 3 min, there no statistically significant difference of SBP among two group. Following induction, compared to Propofol group , Etomidate group patients showed stable Diastoloc blood pressure(DBP) at 1min, 2min and 3min at induction time and it was statistically significant(p value =0.002 at 1 min, p =0.001 at 2 min and p =0.027 at 3 min). After intubation, there no statistically significant difference of DBP among two group. Following induction, compared to Propofol group , Etomidate group patients showed stable Mean arterial pressure(MAP)at 1min, 2min and 3min at induction time and it was statistically significant(p value <0.001). After intubation, there is statistically significant difference of MAP among two groups at 1 min (p value 0.028). There is no statistically significant difference of MAP among two groups at 2 min (p value 0.088) and at 3 min (p value 0.238). Compared to Propofol group, pain on injection is less in Etomidategroup(p<0.001). 3 patients showed myoclonus(grade1) and 5 patients showed PONV in Etomidate group.**Conclusion:** By the present study, Etomidate is better intravenous inducing agent compared to Propofol for its hemodynamic stability, less incidence of pain on injection and less induction time. Only drawback was incidence of myoclonus and Post operative Nausea and Vomiting.

Keywords: Etomidate, Propofol, Hemodynamics, General anaesthesia.

Introduction

Induction of anesthesia is a critical part of anesthesia practice. Sudden hypotension, arrhythmias and cardiovascular collapse are life threatening complications following injection of induction agent in hemodynamically unstable patients. It is desirable to use a safe agent with fewer adverse effects.Patients safety has always been a major concern for the physicians of both ancient and modern eras[1].

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The induction of general anesthesia allowed Surgeons to operate with careful deliberation on patients made totally unaware and pain free. With this arose the problem of inducing quick and reversible unconsciousness with minimal side effects. This was initially tried with inhalation agents and later intravenous agents.

The ideal intravenous induction agent would provide hypnosis, amnesia, analgesia, muscle relaxation without undesirable cardiac and respiratory depression and pleasantly induce anesthesia in one arm brain circulation time and completely wears off in a few minutes.

The research for a better inducing agent which has good control of hemodynamic changes during intubation, The different agent like Etomidate have been tried with varied success[2].

The Etomidate was introduced into anesthesia by Alfred Doenicke in 1972. It is an imidazole derivative used primarily for induction of anesthesia. It has a rapid onset of effect and a rapid offset even after a continuous infusion. The induction dose is 0.2 to 0.3mg/kg[3] Induces anesthesia through GABA receptors in the CNS, Etomidate for procedural sedation has been used in emergency departments for many years[1].Myoclonus is a serious problem in patients either with open globe injury or emergency nonfasting conditions[4].

Etomidate is an induction agent with minimal cardiovascular side effects making it especially useful for cardiac compromised patients and for those in whom hypotension must be avoided during induction of anesthesia. Etomidate conversely maintains hemodynamic stability through preservation of both sympathetic out flow and autonomic reflexes[5]Old, sick and critically ill patients, Etomidate should be preferred over Propofol to maintain hemodynamic stability and early recovery. It is associated with considerably less injection pain in children compared with Propofol with added lidocaine[6].

Etomidate is preferred for patients with poor left ventricular function as it provides stable cardiovascular profile. Propofol, on the other hand may cause a reduction in SVR and subsequent hypotension[7].

Etomidate is used as an alternative to Propofol or other barbiturates for the IV induction of anesthesia, especially in the presence of an unstable cardiovascular system[5].The fast onset of anesthesia and high therapeutic index for cardiovascular side effects are helpful during a rapid sequence induction.Propofol has been the routine induction agent of anesthesia. It is 2,6 di-isopropylphenol, first demonstrated by Kay and Rolly in 1977 and it was approved for use in later on 1985. It is most popular induction agent with its favourable characteristics of rapid and smooth induction and recovery, decrease incidence of nausea and vomiting, tec. While on other side decrease blood pressure, dose dependent depression of ventilation, pain on ejection are the major drawbacks. The induction dose is 1 to 2mg/kg for loss of consciousness[3].A serious problem with the use of Propofol is the high incidence of pain on injection[4]. Hypotension induced by Propofol is mediated by inhibition of sympathetic nervous system and impairment of baroreflex regulatory mechanisms[8].

Our study allows evaluation of Etomidate in comparison with Propofol as an induction agent. This study aims an attempt to compare hemodynamic changes such as change in blood pressure and heart rate during induction and intubation as a primary outcome and pain on injection, myoclonic movements, post operative nausea and vomiting as a secondary outcome.

Aim and objectives

To compare the efficacy and safety of Etomidate versus Propofol as an induction agent in General anesthesia with respect to the following parameters:

1. Hemodynamic changes like Heart rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP) during Pre- induction, Induction and Post induction.
2. Any adverse effects like Pain at injection site, Myoclonus and Post operative nausea and vomiting.

Methodology

This clinical study was conducted on 80 patients aged between 18 to 65 years undergoing Elective surgeries under general anaesthesia in Ayaan Institute of Medical Sciences.After institutional ethical committee approval, 80 patients belonging to ASA grade 1 or 2 aged between 18 to 65 years, undergoing elective surgeries under general anaesthesia were randomly selected. All patients were visited and evaluated thoroughly on the previous day of surgery. Thorough history and complete physical examination was undertaken.Routine relevant investigations conducted includes

- Blood – complete hemogram, bleeding time, clotting time, random blood sugar
- Renal function test
- HIV and HbsAg,
- ECG

Any other special investigation if necessary were done for all patients. Informed written consent of the patients was taken.

Inclusion criteria

- Age: 18-65years
- Gender : male or female
- ASA grade: 1-11
- Patients posted for elective surgeries under general anaesthesia
- Patients who are willing and able to give informed written consent

Exclusion criteria

- Emergency surgeries
- ASA grade III or IV
- Patients with history of hypersensitivity to Etomidate and Propofol
- Patient refusal
- Presence of known primary or secondary adrenal insufficiency or on steroid medication
- Pregnant and lactating women

Preoperative assessment done and all patients will be given with

- Tab Ranitidine 150mg HS
- Tab Alprazolam 0.5mg HS, the previous night of the elective surgery.

The patients were randomly allocated to one of the following two groups

Group E: Comprised of 40 patients induced with injection **Etomidate** 0.3mg/kg iv for induction of general anaesthesia.

Group P: Comprised of 40 patients induced with injection **Propofol** 2mg/kg iv for induction of general anaesthesia.

In the operating room all patients were positioned and were secured suitable IV line.

Following parameters like Pulse rate, Non invasive blood pressure, Oxygen saturation were monitored.

Prior to the induction of Anaesthesia, all patients were premedicated with inj glycopyrrolate 0.01mg/kg, inj midazolam 0.05mg/kg and inj pentazocine 0.5mg/kg

body weight I V for 10 minutes before induction and preoxygenated with 100% Oxygen for 3 minutes.

Patient induced with either inj Etomidate 0.3mg/kg (Group E) or Propofol 2mg/kg (Group P) administered I V during 30 to 60 seconds.

The Induction time was calculated from the start of injection of either drugs to the loss of Eyelash Reflex.

Cessation of the respiration for more than 10 seconds was considered as apnoea time.Patient intubated after relaxing with inj Succinylcholine 2mg/kg, with appropriate size endotracheal tube. Anaesthesia was maintained with 33% Oxygen+ 66% Nitrous oxide+ Non depolarizing muscle relaxants(Vecuronium 0.05mg/kg)+ appropriate inhalational agent Isoflurane. At the end of surgery, patient reversed with injGlycopyrollate 0.01mg/kg and inj Neostigmine 0.05mg/kg. When patient had good respiratory efforts, extubated. Patient was shifted to recovery room later.

Parameters observed

1) Pre Induction period

After pre-treatment with injGylcopyrollate, inj Midazolam and injPentazocine but before induction of anaesthesia HR, SBP, DBP and MAP were recorded at the time interval of 1, 3, 5 minutes. These values formed the base line values for future comparison.

2) Induction period

Induction time: The time from the start of injection of induction agent up to the loss of Eyelash reflex – seconds.

Hemodynamic changes: With respect to the HR, SBP, DBP ana MAP during induction at interval of 1, 2 3 minutes were recorded.

Pain score: Pain on injection was measured using 4 Graded Scale 0 – No pain

1 – Verbal complaint of pain
2 – Withdrawal of arm
3 – Both verbal complaint and withdrawal of arm
Apnoea: Cessation of respiration for more than 10 seconds was considered apnoea.

3) Immediately after Induction

HR, SBP, DBP and MAP were recorded at intervals of 1, 2, 3 minutes.

Complications: The occurrence of adverse effects enumerated below were noted.

- Nausea and Vomiting
- Myoclonus

0 - No cyclic movements
1 - Minor cyclic movements
2 - Moderate cyclic movements 3 – Major cyclic movements

Results are presented as the mean (SD) unless and otherwise stated. Data was entered into Microsoft Excel (windows7; version 2007) and analyses were done using the Statistical package for social sciences(SPSS) for windows software(version 22.0;SPSS Inc, Chicago).Descriptive statistics such as mean and standard deviation (SD) for continuous variables, frequencies and percentages were calculated for categorical variables were determined. Association between Anaesthesia group and other categorical variables like Gender were analysed using chi-square test of independence. Comparison of mean of various quantitative variables like Heart rate were analysed using unpaired or student t test. Bar charts and Pie charts were used for visual representation of the analysed data. Line diagrams were used to show trends of HR, SBP, DBP and MAP over time. Level of significance was set at 0.05.

Results

A clinical study of 80 patients belonging to ASA grade 1 or 11 undergoing elective surgeries under general anaesthesia was done.

Table 1: Comparison of Age between two groups (N = 80)

Parameter	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Age (in Years)	38.73 (13.94)	30.62 (12.74)	0.008**

Age wise distribution of patients in group E and group P are shown. The average mean age were 38.73±13.94 in group E and 30.62±12.74 in group P respectively and it wasstatistically significant (p value 0.008).

Table 2: Comparison of weight between two groups (N = 80)

Parameter	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Weight (kg)	54.60 (9.21)	54.60 (9.21)	NA
Unpaired t Test, P Value **Significant			

Weight wise distribution of patients in group E and group P are shown. The average mean weight were 54.60±9.21 in group E and 54.60±9.21 in group P respectively and it was statistically not significant.

Table 3: Association between Type of Anaesthesia and Gender (N = 80)

Gender	Group	
	Etomidate (n=40) n (%)	Propofol (n=40) n (%)
Male	22 (55.0)	13 (32.5)
Female	18 (45.0)	27 (67.5)

Sex wise distribution of patients in group E and group P are shown. The average mean sex were 22±55 male patients and 18±45 female patients in group E and 13±32.5 male patients and 27±67.5 female patents in group P respectively and it was statistically significant(p value 0.043).

Table 4: Association between Type of Anaesthesia and ASA Score (N = 80)

ASA Score	Group	
	Etomidate (n=40) n (%)	Propofol (n=40) n (%)
1	28 (70.0)	34 (85.0)
2	12 (30.0)	6 (15.0)

Among 40 patients of Etomidate group, 28 patients are ASA grade 1 and 12 patients are ASA grade 11. Among 40 patients of Propofol group, 34 patients are ASA grade 1 and 6 patients are ASA grade 11. There is no statistically significant of ASA grade among two patients.

Table 5: Types of Surgeries in Two Study Groups

Types of Surgeries	Etomidate Group	Propofol Group
Ent Surgeries	30	33
Orthopedic Surgeries	5	7
Laprocsopic Abdominal Surgeries	5	0
Total	40	40

Majority of the surgeries in both groups are ENT surgeries.

Table 6: Comparison of Induction time (IT) between two Study Groups (N = 80)

IT (Sec)	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
	22.60 (4.91)	26.95 (3.86)	<0.001**

Table shows induction time in Group E and Group P respectively. Mean induction time in Group E and Group P were 22.60±4.91 seconds and 26.95±3.86 seconds respectively. Time for induction in Etomidate was significantly shorter compared to Propofol group(p value <0.05).

Table 7: Comparison of Heart Rate between two Study Groups (N = 80)

Heart Rate	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Pre-Induction			
1 min	82.60 (14.02)	82.70 (15.39)	0.976*
3 min	82.45 (14.13)	78.85 (12.87)	0.237*
5 min	81.30 (13.06)	78.20 (11.74)	0.268*
Induction			
1 min	82.75 (13.26)	96.25 (11.19)	<0.001**
2 min	82.75 (14.63)	96.45 (9.45)	<0.001**
3 min	83.25 (14.47)	92.55 (8.62)	0.001**
Post-Induction			
1 min	84.60 (13.46)	98.20 (10.05)	<0.001**
2 min	83.40 (11.87)	97.05 (10.12)	<0.001**
3 min	83.15 (11.46)	95.50 (9.89)	0.001**

The Heart rate showed no significant increases in both Etomidate and Propofol group after pre medication. There is a slight decrease in heart rate in both groups and this was not statistically significant.
Following induction, heart rate increased in Propofol group from the base line values. 82.70±15.39 bpm before induction to 96.25±11.19 at 1 min, 96.45±9.45 at 2 min and 92.55±8.62 at 3 min. There is slight increase in heart rate from base line values in Etomidate group 82.60±14.02 bpmbefore induction to 82.75±13.26 at 1 min, 82.75±14.63 at 2 min and 83.25±14.47.
Compared to Propofol group , Etomidate group patients showed stable heart rate at 1min, 2min and 3min at induction time and it was stastically significant(p value ≤0.001)There is increase in Heart rate after intubation in Propofol group 98.20±10.05 at 1 min, 97.05±10.12 at 2 min and 95.50±9.89 at 3 min compared to Etomidate group. This was statistically significant (p value≤0.001).

Table 8: Comparison of SBP between two Study Groups (N = 80)

SBP	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Pre-Induction			
1 min	121.95 (17.38)	124.80 (14.86)	0.433*
3 min	121.30 (15.96)	122.45 (13.92)	0.732*
5 min	120.60 (15.44)	121.70 (13.81)	0.738*
Induction			
1 min	121.65 (14.60)	102.35 (10.95)	<0.001**
2 min	120.68 (12.67)	103.20 (10.03)	<0.001**
3 min	120.55 (13.06)	105.57 (9.03)	<0.001**
Post-Induction			
1 min	121.25 (11.88)	113.10 (9.18)	0.001**
2 min	121.95 (12.18)	115.50 (9.21)	0.009**
3 min	120.80 (11.37)	117.20 (9.36)	0.126*

Vital signs like systolic blood pressure(SBP) showed no significant increases in both Etomidate and Propofol group after pre medication and it was not stastically significant.Following induction, SBP decreased in Propofol group from the base line values. 124.80±14.86 mmHg before induction to 102.35±10.95 at 1 min, 103.35±10.03 at 2 min and 105.57±9.03 at 3 min. There is stable SBP from base line values in Etomidtae group 121.95±17.38 mmHg before induction to 121.65±14.60 at 1 min, 120.68±12.67 at 2 min and 120.55±13.06 at 3 min. Compared to Propofol group , Etomidate group patients showed stable SBP at 1min, 2min and 3min at induction time and it was stastically significant(p value ≤0.001)
After intubation, SBP decreased in Propofol group 113.10±9.18 at 1 min, 115.50±9.21 at 2 min compared to Etomidate group 121.25±11.88 at 1min, 121.95±12.18 at 2 min and it was stastically significant (p value≤ 0.001 at 1 min and p= 0.009 at 2 min). At 3 min, there no stastically significant difference of SBP among two group.

Table 9: Comparison of DBP between two Study Groups (N = 80)

DBP	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Pre-Induction			
1 min	78.50 (12.36)	80.50 (10.72)	0.442*
3 min	77.45 (11.17)	79.35 (10.52)	0.436*
5 min	77.90 (12.45)	78.75 (10.18)	0.739*
Induction			
1 min	77.50 (10.43)	70.60 (8.86)	0.002**
2 min	78.05 (9.89)	71.00 (8.49)	0.001**
3 min	77.40 (9.64)	73.05 (7.49)	0.027**
Post-Induction			
1 min	78.80 (9.21)	76.25 (8.00)	0.190*
2 min	78.80 (9.41)	76.85 (8.17)	0.326*
3 min	78.60 (8.70)	76.90 (8.30)	0.374*

Vital signs like Diastolic blood pressure(DBP) showed no significant increases in both Etomidate and Propofol group after pre medication and it was not statistically significant.

Following induction, DBP decreased in Propofol group from the base line values. 80.50±10.72 mmHg before induction to 70.60±8.86 at 1 min, 71.00±8.49 at 2 min and 73.05±7.49 at 3 min. There is stable DBP from base line values in Etomidtae group 78.50±12.36 mmHg before induction to77.50±10.43 at 1 min, 78.05±9.89 at 2 min and 77.40±9.64 at 3 min. Compared to Propofolgroup ,Etomidate group patients showed stable DBP at 1min, 2min and 3min at induction time and it was statistically significant(p value =0.002 at 1 min, p =0.001 at 2 min and p =0.027 at 3 min)

After intubation, DBP in Propofol group 76.25±8.00 at 1 min, 76.85±8.17 at 2 min, 76.90±8.30 at 3 min. DBP in Etomidate group 78.80±9.21 at 1min, 78.80±9.41 at 2 min, 78.60±8.70 at 3 min. There no statistically significant difference of DBP among two group.

Table 10: Comparison of MAP between two Study Groups (N = 80)

MAP	Group		P Value
	Etomidate (n=40) Mean (SD)	Propofol (n=40) Mean (SD)	
Pre-Induction			
1 min	92.93 (13.77)	95.25 (11.67)	0.418*
3 min	92.00 (12.48)	93.75 (11.06)	0.509*
5 min	92.48 (13.11)	93.08 (10.85)	0.739*
Induction			
1 min	92.23 (11.40)	81.13 (8.95)	<0.001**
2 min	92.35 (10.34)	81.73 (8.35)	<0.001**
3 min	91.75 (10.17)	83.93 (7.50)	<0.001**
Post-Induction			
1 min	92.90 (9.77)	88.45 (7.90)	0.028**
2 min	93.12 (9.88)	89.68 (7.86)	0.088*
3 min	92.55 (9.16)	90.25 (8.09)	0.238*

Vital signs like Mean arterial blood pressure(MAP) showed no significant increases in both Etomidate and Propofol group after pre medication and it was not statistically significant.Following induction, MAP decreased in Propofol group from the base line values. 95.25±11.67 mmHg before induction to 81.13±8.95 at 1 min, 81.73±8.35 at 2 min and 83.93±7.50 at 3 min. There is stable MAP from base line values in Etomidtae group 92.93±13.77 mmHg before induction to 92.23±11.40 at 1 min, 92.35±10.34 at 2 min and 91.75±10.17 at 3 min. Compared to Propofol group , Etomidate group patients showed stable MAP at 1min, 2min and 3min at induction time and it was statistically significant(p value <0.001). After intubation, MAP in Propofol group 88.45±7.90 at 1 min, 89.68±7.86 at 2 min, 90.25±8.09 at 3 min. MAP in Etomidate group 92.90±9.77 at 1min, 93.12±9.88 at 2 min, 92.55±9.16 at 3 min. There is statistically significant difference of MAP among two groups at 1 min (p value 0.028). There is no statistically significant difference of MAP among two groups at 2 min (p value 0.088) and at 3 min (p value 0.238).

Table 11: Association between Type of Anaesthesia and Pain Score (N = 80)

Pain Score	Group	
	Etomidate (n=40) n (%)	Propofol (n=40) n (%)
0	38 (95.0)	21 (52.5)
1	2 (5.0)	11 (27.5)
2	0 (0.0)	5 (12.5)
3	0 (0.0)	3 (7.5)

Compared to Propofol group, pain on injection is less in Etomidate group. Pain Score among two groups is statistically significant(p value < 0.001).

Table 12: Association between Type of Anaesthesia and Myoclonus (N = 80)

Myoclonus	Group	
	Etomidate (n=40) n (%)	Propofol (n=40) n (%)
0	37 (92.5)	40 (100.0)
1	3 (7.5)	0 (0.0)

Myoclonus is a side effect of Etomidate induction drug. Among 40 patients, 3 patients showed myoclonus (grade 1 – Minor cyclic movements). No myoclonus in Propofol group.

Table 13: Association between Type of Anaesthesia and PONV (N = 80)

PONV	Group	
	Etomidate (n=40) n (%)	Propofol (n=40) n (%)
Absent	35 (87.5)	40 (100.0)
Present	5 (12.5)	0 (0.0)

Propofol induction drug has antiemetic property. Among 40 patients of Etomidate group, 5 patients showed post operative Nausea and Vomiting (PONV). No PONV in propofol group patients.

Table 14: Adverse Effects Between Two Study Groups

Adverse Effects	Etomidate Group (N=40)	Propofol Group (N=40)
Pain on Injection	2	19
Myoclonus	3	0
PONV	5	0

Pain on injection was present in 19 patients in Propofol group and in 2 patients in Etomidate group. Post operative nausea and vomiting (PONV) present in 5 patients in Etomidate group and nill in Propofol group. Myoclonus present in 3 patients among Etomidate group and nill in Propofol group.

Discussion

The Induction of general anesthesia allowed Surgeons to operate with careful deliberation on patients made totally unaware and pain free. With this arose the problem of inducing quick and reversible unconsciousness with minimal side effects. This was initially tried with inhalation agents and later intravenous agents.The ideal intravenous induction agent would provide hypnosis, amnesia, analgesia, muscle relaxation without undesirable cardiac and respiratory depression and pleasantly induce anesthesia in one arm brain circulation time and completely wears off in a few minutes[9].

Propofol has been the routine induction agent of anesthesia. It is 2,6di-isopropylphenol, first demonstrated by Kay and Rolly in 1977 and it was approved for use in later on 1985. It is most popular induction agent with its favourable characteristics of rapid and smooth induction and recovery, decrease incidence of nausea and vomiting, tec. While on other side decrease blood pressure, dose dependent depression of ventilation, pain on injection are the major drawbacks.The induction dose is 1 to 2 mg/kg for loss of consciousness[3].A serious problem with the use of propofol is the high incidence of pain on injection.Hypotension induced by propofol is mediated by inhibition of sympathetic nervous system and impairment of baroreflex regulatory mechanisms[4].This study was undertaken to know the features of injEtomidate as an intravenous induction agent in Elective surgeries when administered in a dose of 0.3 mg/kg in comparision with injPropofol 2 mg/kg. The effects of these two drugs on Induction time, Hemodynamic changes during Pre induction, Induction time and Post induction time and complications were observed.In our study, a randomised clinical comparative evaluation of InjEtomidate 0.3 mg/kg (Group E) and InjPropofol 2 mg/kg (Group P) was done. 80 patients ASA grade 1 – 11 undergoing elective surgeries participated in our study. The two groups were studied with respect to the Age, Sex and Weight. Induction time was compared.

Induction Time-According to our study, the Induction Time with injEtomidate was significantly shorter when compared with injPropofol. The mean induction time in Etomidate group was 22.60 ±4.91 seconds and with Propofol group was 26.95 ±3.86 seconds., which was statistically significant(p<0.001).Mean induction time in Group A was 72.00 ± 2.60 s and in Group B was 69.83 ± 2.019 s and the difference was statistically significant (P = 0.001The Shagun Bhatia Shah et al., Reduced induction doses 0.15mg/kg for etomidate and 0.98 mg/kg for propofol, sufficed to give an adequate anaesthetic depth based on entropy.

Pain on Injection

In the present study, the incidence of pain on injection was higher with Propofol in 19 patients and 2 in Etomidate group. It was statistically significant(p<0.001).

Supriya Aggarwal et al compared Propofol and Etomidate in patients under general anesthesia. They selected 100 ASA 1&2 patients of age group 18-60years schedulded for elective surgical procedure under general anesthesia. Pain on injection was more in propofol group compared to etomidate group[9].

Sarabjit Kaur et al compared induction characteristics of Propofol-lipuro and Etomidate-lipuro in cardiacpatients in non cardiac surgery. Study concluded that pain on injection is less with Etomidate group[10]

Myoclonus

In the present study, the incidence of Myoclonus was 3 in 40 patients with Etomidate, compared to nill in Propofol group. But it was statistically not significant.

Supriya Aggarwal et al compared Propofol and Etomidate in patients under general anesthesia. They selected 100 ASA 1&2 patients of age group 18-60years schedulded for elective surgical procedure under general anesthesia. The incidence of Myoclonus was 18 in 50 patients with Etomidate, compared to nill in Propofol group. But it was statistically not significant[9]

Post operative Nausea and Vomiting

In our study, the Incidence of post operative nausea and vomiting is more in Etomidate group compared to Propofol group. PONV were observed in 5(12.5%) of Etomidate group compared to Propofol group.

Sarabjit Kaur et al compared induction characteristics of Propofol-lipuro and Etomidate-lipuro in cardiac patients in non cardiac surgery. Study concluded that more patients had PONV after giving etomidate injection as compared to propofol injection.

Heart Rate

The influence of Propofol and Etomidate on heart rate is controversial. Heart rate may increase, decrease or change minimally following administration of these drugs. The reason for these differences is not clear.Present study showed no significant increase of HR in both Etomidate and Propofol group after pre medication. There is a slight decrease in heart rate in both groups and this was not statistically significant.Following induction, heart rate increased in Propofol group from the base line values. 82.70±15.39 bpm before induction to 96.25±11.19 at 1 min, 96.45±9.45 at 2 min and 92.55±8.62 at 3 min. There is slight increase in heart rate from base line values. 82.60±14.02 bpm before induction to 82.75±13.26 at 1 min, 82.75±14.63 at 2 min and 83.25±14.47. Compared to Propofol group , Etomidate group patients showed stable heart rate at 1min, 2min and 3min at induction time and it was stastically significant(p value ≤0.001).There is increase in Heart rate after intubation in Propofol group 98.20±10.05 at 1 min, 97.05±10.12 at 2 min and 95.50±9.89 at 3 min compared to Etomidate group. This was statistically significant (p value≤0.001).

Sarabjit Kaur et al The mean heart rate measured at various time intervals was comparable in the two groups (P > 0.05). In propofol-lipuro group clinically significant bradycardia was observed in two 2 (6.7%) patients immediately after induction and in none of the patients in etomidate-lipuro group[10]

Blood Pressure

Propofol induced hypotension is due to reduction of sympathetic activity causing vasodilatation, direct effect on intracellular calcium mobilization, inhibition of prostaglandin synthesis in endothelial cells etc. The haemodynamic stability seen with Etomidate may be due to its lack of effect on sympathetic nervous system, baroreceptor function and capacity to bind and stimulate peripheral alpha 2-B adrenergic receptors with a subsequent vasoconstriction.

Present study

Vital signs like systolic blood pressure(SBP) showed no significant increases in both Etomidate and Propofol group after pre medication and it was not statistically significant.Sarbjith et al[10] Study showed, the mean SBP and DBP measured before induction was stable and comparable in two groups (P > 0.05). Immediately after induction, SBP and DBP decreased in both the groups but fall was significantly more in the propofol group as compared to etomidate group. After intubation blood pressure increased slightly in both groups but remained on the lower side in the propofol group as compared to etomidate group. Later on at 1, 3 and 5 min after intubation SBP remained significantly low in the propofol group than in the etomidate group (P = 0.000). At 1 min after intubation DBP was significantly low in Group A as compared to Group B (P = 0.36). After that SBP and DBP remained stable and were comparable in both the groups till the end of the procedure. Etomidate is a better alternative to propofol as an induction agent in cardiac patients because of hemodynamic stability.

Conclusion

In conclusion, Etomidate is better Inducing agent of general anaesthesia compared to Propofol for its Hemodynamic stability, less incidence of Pain on injection and less Induction time. Only drawback was high incidence of Myoclonus and Post operative Nausea and Vomiting. Finally concluded that Etomidate is a better alternative to Propofol for Induction of general anaesthesia in view of Hemodynamic stability.

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