

Comparative assessment of side effects of etomidate and propofol: A double blinded study from urban Karnataka

Ramesh babu¹, Mohan^{2*}, Prashanth Vadigeri³, Sunil Kumar⁴, Rajashekar Mudaraddi⁵

^{1,5}Associate Professor, ²Assistant Professor, ³Senior Resident, Department of anaesthesiology, Navodaya Medical College and Hospital, Raichur, INDIA.

⁴Assistant Professor, Department of Anaesthesiology, Raichur Institute of Medical Sciences, Raichur, INDIA.

Email: mohanarya585412@gmail.com

Abstract

Background: Propofol and Etomidate is commonly used in anaesthesia practice. However pain on injection and myoclonus are the most common side effects of this drug. **Objectives:** To compare the side effects between Etomidate and Propofol. **Methodology:** In this prospective randomized double blinded study, we studied 60 patients randomly allocated into either group P (propofol group) or to group E (Etomidate group) of 30 each. All patients premedicated with inj. midazolam 0.02mg/kg IV, inj. Fentanyl 2 microgm/kg IV. Group P received propofol infusion at 0.5 mg/kg/hr and group E at 0.05mg/kg/hr until BIS value dropped to 50. Then patients were intubated with vecuronium 0.1mg/kg and anaesthesia maintained according to institutional protocol followed by extubation after adequate recovery. Hemodynamic parameters and side effects during induction were recorded between both groups until the infusion of study drug. **Results:** So prevalence of myoclonus was found to be 40% in Etomidate group. Prevalence of Thrombophlebitis in etomidate was found to be 13.3%. Proportion of patients experienced pain was more in Propofol group i.e. 36.7% as compared to Etomidate i.e. 20%. (>0.05). 10 patients in Etomidate group experienced nausea i.e. 33.3% as compared to 2 in Propofol group i.e. 6.7%. (<0.05). 3 patients in Etomidate group experienced vomiting i.e. 10% as compared to 1 in Propofol group i.e. 3.3% (>0.05) **Conclusion:** Myoclonus and Thrombophlebitis was observed in Etomidate group only (<0.05). Propofol causes more pain as compared to Etomidate (>0.05). Propofol causes less nausea (<0.05) and vomiting (<0.05) as compared to Etomidate.

Key Word: Side effects, Etomidate; Propofol

*Address for Correspondence:

Dr. Mohan, Assistant Professor, Department of Anaesthesiology, Navodaya Medical College and Hospital, Raichur, INDIA.

Email: mohanarya585412@gmail.com

Received Date: 02/01/2019 Revised Date: 23/01/2019 Accepted Date: 06/02/2019

DOI: <https://doi.org/10.26611/10159210>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
14 February 2019

INTRODUCTION

Over years there has been a continuous search for better and safer intravenous agent. Presently etomidate and propofol are popular, rapid acting and safe induction agent,

however these two drugs have different induction characteristics.¹ The discovery of IV anaesthetics has long been an important milestone in the development of anaesthesia. Prior to this, induction of general anaesthesia necessarily required inhalation of gases or vapour which was an unpleasant experience to most of the patients. Presently Etomidate and Propofol are popular rapid acting inducing agents.² In 1970 a new inducing agent 2, 6- di-isopropofol was discovered and introduced in clinical practice in 1977. Propofol was introduced clinically by kay and roly in 1977. As a new anaesthetic agent, it provides faster onset of action, anti emesis, potent attenuation of pharyngeal, laryngeal, tracheal reflex and adequate depth of anaesthesia during intubation and a clear and smooth recovery. It is a commonly used IV induction agent in recent years.^{3, 4, 5} However high doses can cause side

effects like hypotension due to direct myocardial depression and decreased peripheral vasodilatation along with venodilatation, respiratory depression/ apnea. It also causes pain on injection when injected into smaller veins. Pain is due to concentration of free propofol in the aqueous phase of emulsion.⁶ Etomidate is a carboxylated imidazole drug used for induction of general anaesthesia and sedation introduced into clinical practice in 1972. Preclinical experiments demonstrated that etomidate injection was associated with minimal hemodynamic changes or respiratory depression, features that were presumed to result in its unusually safety profile.⁷ However pain on injection and myoclonus are the most common side effects of this drug.⁸ Propofol and Etomidate is commonly used in anaesthesia practice. So we planned the study in Navodaya Medical College and Hospital, Raichur in order to assess the side effects of propofol and etomidate in patients undergoing surgeries under general anaesthesia and to find which causes less side effects.

OBJECTIVES

1. To compare the side effects like pain on injection and postoperative nausea and vomiting
2. To compare the incidence of adverse effects like myoclonus and thrombophlebitis

RESULTS

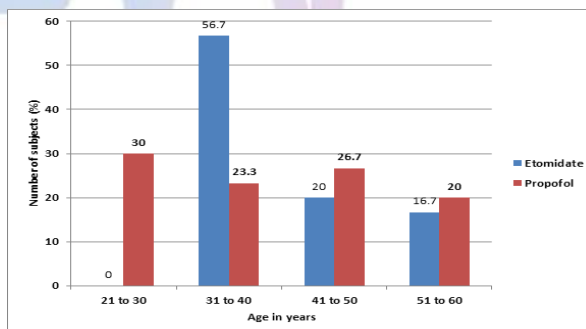


Figure 1: Bar diagram showing Distribution according to age group

In our study, we included 30 subjects in each group. In-group receiving Etomidate as intervention, majority were from 21-30 years age i.e. 17(56.7%) followed by 6 from 31-40 years age group (20%). In group receiving Propofol as intervention, majority were from 21-30 years age i.e. 9(30%) followed by 8 from 41-50 years age group (26.7%).

Table 1: Distribution according to occurrence of myoclonus

		Etomidate		Propofol	
		Frequency	Percent	Frequency	Percent
Myoclonus	Present	12	40.0	0	0.0
	Absent	18	60.0	30	100.0
	Total	30	100.0	30	100.0

Chi square test-11.88, p-0.0005(<0.05), Significant

MATERIALS AND METHODS

This double blind prospective randomized study was done from November 2016 to May 2018 on patients who were admitted to Navodaya Medical College and Hospital, Raichur and posted for elective surgeries requiring general anaesthesia. These patients were undergoing gynecological surgery, general surgery, or orthopedic surgery. The study has been conducted after obtaining clearance from ethical committee of the institution. Informed consent was taken from all the patients who participated within the study.

Inclusion criteria

1. Patients between the age group of 20 and 60 years belonging to American society of anesthesiology grade I to III undergoing surgery under general anaesthesia.
2. Those who are willing to participate after informed consent

Exclusion criteria

1. Patients allergic to any drugs
2. History of seizure disorder.
3. Presence of primary and secondary steroid deficiency or on steroid medication
4. Presence of hypotension.

Data analysis: Data entered in MS excel sheet and analysed by using SPSS 21.0 version IBM USA. Comparison of mean and SD between two groups was done by using unpaired t test to assess whether the mean difference between groups is significant or not.

Myoclonus was seen in 12 out of 30 subjects from Etomidate group. So prevalence of myoclonus was found to be 40% in Etomidate group. On the contrary this side effect was not observed with Propofol (<0.05). So Etomidate causes more myoclonus compared to Propofol.

Table 2: Distribution according to occurrence of Thrombophlebitis

		Etomidate		Propofol	
		Frequency	Percent	Frequency	Percent
Thrombophlebitis	Present	4	13.3	0	0.0
	Absent	26	86.7	30	100.0
	Total	30	100.0	30	100.0

Fischer's exact test-1.96, $p=0.16(>0.05)$, Not Significant

Thrombophlebitis was seen in 4 out of 30 subjects from Etomidate group. So prevalence of Thrombophlebitis in etomidate was found to be 13.3%. On the contrary this side effect was not seen with Propofol (<0.05)

Table 3: Distribution according to occurrence of Pain

		Etomidate		Propofol	
		Frequency	Percent	Frequency	Percent
Pain	Present	6	20.0	11	36.7
	Absent	24	80.0	19	63.3
	Total	30	100.0	30	100.0

Chi square test-2.05, $p=0.14(>0.05)$, Not Significant

Pain perceived by the patients in both groups. But proportion was more in Propofol group i.e. 36.7% as compared to Etomidate i.e. 20%. It means Propofol causes more pain as compared to Etomidate (>0.05)

Table 4: Distribution according to occurrence of Nausea

		Etomidate		Propofol	
		Frequency	Percent	Frequency	Percent
Nausea	Present	10	33.3	2	6.7
	Absent	20	66.7	28	93.3
	Total	30	100.0	30	100.0

Chi square test-6.66, $p=0.0009(<0.05)$, Significant

10 patients in Etomidate group experienced nausea i.e. 33.3% as compared to 2 in Propofol group i.e. 6.7%. So nausea is more seen in etomidate group (<0.05).

Table 5: Distribution according to occurrence of Vomiting

		Etomidate		Propofol	
		Frequency	Percent	Frequency	Percent
Vomiting	Present	3	10.0	1	3.3
	Absent	27	90.0	29	96.7
	Total	30	100.0	30	100.0

Fischer's exact test-1.04, $p=0.34(>0.05)$, Not significant

3 patients in Etomidate group experienced vomiting i.e. 10% as compared to 1 in Propofol group i.e. 3.3% (>0.05)

DISCUSSION

Myoclonus: In our study, myoclonus was seen in 12 out of 30 subjects from Etomidate group. So prevalence of etomidate was found to be 40%. On the contrary this side effect was not seen with Propofol Poornima shivanna *et al*⁹ (2017) in her study observed that myoclonus was observed among 4 patients induced with propofol when compared to 27 patients induced with etomidate with p value <0.001 . Incidence of nausea was 22.9% in propofol group compared to 71.4% in etomidate group and incidence of vomiting was 22.8% in propofol group compared to 77.1% in etomidate group both with p value <0.001 . So they

concluded that etomidate is better for its hemodynamic stability over propofol along with less incidence of pain on injection. Only drawback was incidence of myoclonus and post-operative nausea and vomiting.

Pain: In our study, pain perceived by the patients in both groups. But proportion was more in Propofol group i.e. 36.7% as compared to Etomidate i.e. 20% Gooding JM¹⁰ study with etomidate induction showed transient apnea in 16%³⁴ Among forty patients in group I, 12 had mild pain on injection, In group II 15 patients had mild pain, moderate and severe pain in 3 and 1 patients respectively. Incidence of pain on injection in group I patients is 30%.

In group II mild in 37.5%, moderate and severe pain in 0.75% and 0.25% respectively. Prakash K. Dubey¹¹ noticed mild pain in 12, moderate and severe pain in 8 and 6 respectively with propofol induction in 65 patients. Doenicke A¹² noted mild pain in 2, moderate and severe pain in 4 and 1 respectively with etomidate with propylene glycol induction in 12 patients. Vijaykumar, T. K *et al*¹³ observed that among forty patients in group E, 10 patients developed grade I myoclonus, grade II and grade III in 5 and 1 patients respectively. Among forty patients in group P, 3 patients developed grade I myoclonus (p<0.005)

Nausea and vomiting: In our study, 10 patients in Etomidate group experienced nausea i.e.33.3% as compared to 2 in Propofol group i.e. 6.7%. In our study, 3 patients in Etomidate group experienced vomiting i.e. 10% as compared to 1 in Propofol group i.e. 3.3% M.St.Pierre *et al*¹⁴ found that for etomidate Vs propofol 14.6% Vs 14.2% male and 26.8% Vs 27.5% female patients were nauseated during first two post-operative hours. The incidence of vomiting was higher in women receiving etomidate (20.8% Vs 10%). We also found that the incidence of vomiting is higher in etomidate group with a p value of <0.001.

CONCLUSION

Myoclonus and Thrombophlebitis was observed in Etomidate group only (<0.05). Propofol causes more pain as compared to Etomidate (>0.05). Propofol causes less nausea (<0.05) and vomiting (<0.05) as compared to Etomidate. There was no significant difference with regard to nausea and vomiting between the two groups.

REFERENCES

1. AK Bhargava, R Setlur, and D Sreevastava, Correlation of Bispectral index and Guedel's Stages of Ether Anaesthesia; *Anesth Analg* 2004;98:132-4
2. Douglas, R B David, J W Great memories in the history of anaesthesia. Thomas, EJ, Paul RK, Wylie and Churchill Davidson's, A practice of anaesthesia. London Publishers; 2003:10-11
3. Leonara T, Fahy, Vanmourik, G.A.Utting, J.E. A comparison of the induction characteristics of thiopentone and propofol. *Anaesthesia*,1985;40:939-944
4. Martin, I.G., Edward, C, Clarie Herrington. A controlled investigation with propofol, thiopentone and methohexitone. *Can j Anaesth*, 1987;34(5):478-83
5. Mc Keating, k,*et al*. The effects of thiopentone and propofol on upper airway integrity. *Anaesthesia*, 1998;43:638-40
6. Supriya Aggarwal, Vipin Kumar Goyal, Shashi Kala Chaturvedi,Vijay Mathur, Birbal Baj, Alok Kumar. A comparative study between propofol and etomidate in patients under general anaesthesia. *Rev Bras Anesthesiology*. 2015: 1-7
7. Vijaykumar, T. K., Dr. Santoshkumar Alalamath and Dr. Shivanand, K. L 2016. "A comparative study of etomidate and propofol for induction of general anaesthesia", *International Journal of Current Research* 8, (11), 41783-41789.
8. Poornima shivanna.Comparision of Induction Characteristics and Hemodynamic Parameters of Propofol Versus Etomidate in Patients Undergoing Surgeries under General Anaesthesia, a Bispectral Index Guided Study *International Journal of Innovative Research in Medical Science (IJIRMS)* 2017; 02(11): 1458-66
9. Poornima shivanna.Comparision of Induction Characteristics and Hemodynamic Parameters of Propofol Versus Etomidate in Patients Undergoing Surgeries under General Anaesthesia, a Bispectral Index Guided Study *International Journal of Innovative Research in Medical Science (IJIRMS)* 2017; 02(11): 1458-66
10. Gooding JM, Corssen G: Etomidate: an ultrashort-acting nonbarbiturate agent for anesthesia. *Anaesthesia Analgesia* 1976; 55: 286.
11. Prakash K. Dubey, Arun Kumar. Pain on Injection of Lipid Free Propofol and Propofol Emulsion medium chain triglycerides A comparative study. *Anaesthesia Analgesia* 2005; 101: 1060-2.
12. Doenicke A, Roizen MF, Nebauer AE, *et al*. A comparison of two formulations for etomidate, 2-hydroxypropyl-beta-cyclodextrin (HPCD) and propylene glycol. *Anaesthesia Analgesia* 1994; 79:933-939.
13. Vijaykumar, T. K., Dr. Santoshkumar Alalamath and Dr. Shivanand, K. L 2016. "A comparative study of etomidate and propofol for induction of general anaesthesia", *International Journal of Current Research* 8, (11), 41783-41789.
14. M. St Pierre, M. Dunkel, A. Rutherford and W. Hering. Does etomidate increase postoperative nausea? A double-blind controlled comparison of etomidate in lipid emulsion with propofol for balanced anaesthesia. *European Journal of Anaesthesiology*, Volume 10 : October 2000, pg 634-64

Source of Support: None Declared
Conflict of Interest: None Declared