

Comparison of Propofol and Etomidate in Haemodynamic changes at the time of induction of general anesthesia

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ABSTRACT

Background: Unstable hemodynamics at the time of induction of general anesthesia can harm the patient, so stability of hemodynamics matters a lot.

Aim: To compare the hemodynamic effects of propofol at the time of induction of general anesthesia with etomidate for choosing the better inducing agent.

Methods: 100 patients of ASA class P₁&P₂ status under going elective general anesthesia for surgery were included after informed consent. Patients were divided into two groups A & B by using random number table. Each group comprised of 50 patients. In group A, propofol 2.5mg/kg body weight was given intravenously within 30 sec. In group B, Etomidate 0.3 mg/kg body weight intravenously with in 30 sec was given. Heart rate and blood pressure were recorded at interval of 30 sec for 3 min and after 3 min other drugs were given to patients and surgery allowed. The study design was quasi experimental and sampling techniques was purposive non-probability sampling. Student's t test was used and collected data were analyzed with the SPSS version 10.

Results: Significant decrease in hart rate, systolic and diastolic blood pressure was recorded with propofol and minimal hemodynamic changes were recorded with etomidate.

Conclusion: Etomidate is a better inducing agent as compared to propofol.

Keywords: Propofol, Etomidate, General Anesthesia, Hemodynamic changes.

INTRODUCTION

Etomidate is a potent intravenous anesthetic agent^{1,2}. Etomidate is a wonderful drug for high risk cardiac patient due to its stable haemodynamic response³. Favorable haemodynamic response of etomidate made it most common drug used for rapid –sequence induction in critically ill patients, patients with haemorrhagic shock and emergent intubation in fields⁴.

Etomidate has no specific effects on patient's respiratory and circulatory system and it is rapid acting drug⁵. It is a non-barbiturate carboxylated imidazole hypnotic agent^{6,7}.

Propofol is used for maintenance of sedation and general anesthesia in hospitals⁸. Propofol (2,6-diisopropylphenol) is a phenol derivative⁹. Propofol is a 1% aqueous solution containing glycerol, soybean oil and egg lecithin¹⁰. Propofol act on GABA_A receptors. Propofol potentiate the effects of inhibitory neurotransmitter GABA¹¹. Propofol is also used as total intravenous anesthesia for surgery¹². During general anesthesia most of the time tracheal intubation is done which is a gold standard to maintaining airway of patient. The procedure of laryngoscopy for tracheal intubation causes presser response which result in hemodynamic disturbance of patient¹³. So at that time such a inducing agent is required which maintain patient hemodynamics.

MATERIAL AND METHODS

After approval of study from ethic committee of service hospital Lahore, 100 patients of ASA class P₁ and P₂ status undergoing elective general anesthesia were included. Informed consents were obtained. The demographic information was recorded. Patients were divided into two groups A & B with the help of random number table. Each group comprised of 50 patients. All patients were NPO after midnight and intravenous lines were maintained with 18G branulas. Base line parameter were recorded before and during procedure with pulse oximeter, ECG and non-invasive blood pressure monitors. All patients of both groups received oxygen with face masks through circle system. No muscle relaxant and surgical stimulus was given during study period.

In group A propofol was used 2.5mg/kg body weight intravenously within 30 seconds. In group B etomidate was used 0.3mg/kg body weight intravenously within 30 seconds. Blood pressure and heart rate were recorded at interval of 30 seconds for three minutes continuously and this information was recorded on performa. After three minutes of observation, other drugs were given to patients according to their anesthesia plan and after maintenance of airway, surgery was allowed in all patients.

The study design was Quasi experimental and sampling technique was purposive non-probability sampling. Student's t-test was applied and collected data was analyzed with the help of SPSS version 10.

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RESULTS

Mean age in group A patients was 31.32±7.17 years and in group B it was 33.36±7.85 years. Mean weight in group A was 55.30±9.750 kg and in group B it was 55.34±9.151 kg. In group B we dropped one patient and select a new patient due to development of sever myoclonic fits. In group A patients there was a significant decrease in systolic, diastolic blood pressure and heart rate. In group B patients there was minimal haemodynamic changes were recorded.

Table:1 Comparison of only Systolic Blood pressure (mm Hg) at different time intervals in the study Groups

Study Groups	(n)	Mean	Std.Dev	Student's t test
At 0 Second				
Group A Propofol	50	130.68	10.468	t-value = 2.940 p-value = 0.09
Group B Etomidate	50	127.16	10.302	
At 30 Second				
Group A Propofol	50	125.20	10.971	t-value = 0.404 p-value = 0.68
Group B Etomidate	50	124.32	10.790	
At 1 minute				
Group A Propofol	50	118.44	10.897	t-value = -2.138 p-value = 0.03
Group B Etomidate	50	123.06	10.710	
At 1 minute 30 seconds				
Group A Propofol	50	112.00	11.429	t-value = -1.836 p-value = 0.05
Group B Etomidate	50	118.06	18.329	
At 2 minutes				
Group A Propofol	50	105.38	10.751	t-value = -6.291 p-value < 0.01
Group B Etomidate	50	119.36	11.458	
At 2 minutes 30 seconds				
Group A Propofol	50	99.70	9.711	t-value = -9.258 p-value < 0.01
Group B Etomidate	50	119.56	11.653	
At 3 minutes				
Group A Propofol	50	96.40	8.751	tvalue=111.464 p-value < 0.01
GroupB Etomidate	50	119.66	11.369	

Table:2 Comparison of only Diastolic Blood pressure (mm Hg) at different timeintervals in the study Groups

Study Groups	(n)	Mean	Std. Deviation	Student's t test
At 0 Second				
Group A Propofol	50	80.26	8.238	t-value=2.570 p-value=0.12
Group B Etomidate	50	76.30	7.129	
At 30 Second				
GroupAPropofol	50	75.70	8.512	t-value=-0.382 p-value=0.70
GroupB Etomidate	50	76.30	7.129	
At 1 minute				
Group A Propofol	50	70.36	8.216	t-value= -3.679 p-value=<0.01
Group B Etomidate	50	76.00	7.071	
At 1 minute 30 seconds				
Group APropofol	50	65.92	8.285	t-value=5.394 p-value=<0.01
Group B Etomidate	50	74.06	6.723	
At 2 minutes				
Group APropofol	50	61.72	7.915	t-value=-7.465 p-value<0.01
Group B Etomidate	50	72.28	6.115	
At 2 minutes 30 seconds				
Group APropofol	50	56.96	7.475	t-value=-0.161 p-value<0.01
Group B Etomidate	50	72.38	6.442	
At 3 minutes				
Group APropofol	50	56.96	7.616	t-value=-1.114 p-value<0.01
Group B Etomidate	50	72.52	6.325	

Table 3: Comparison of only Heart Rate (P/mint) at different time intervals in the study Groups

Study Groups	(n)	Mean	Std. Deviation	Student's t test
At 0 Second				
Group APropofol	50	84.84	13.941	t-value = 1.983 p-value = 0.09
Group B Etomidate	50	81.06	7.107	
At 30 Second				
Group APropofol	50	82.88	8.867	t-value = 1.472 p-value = 0.14
Group B Etomidate	50	80.80	6.052	
At 1 minute				
Group APropofol	50	76.00	8.236	t-value = -2.307 p-value = 0.02
GroupB Etomidate	50	80.34	6.879	
At 1 minute 30 seconds				
Group APropofol	50	73.38	7.486	t-value = -5.140 p-value = < 0.01
GroupB Etomidate	50	79.98	6.137	
At 2 minutes				
Group APropofol	50	68.60	7.527	t-value = 3.967 p-value < 0.01
Group B Etomidate	50	79.20	5.599	
At 2 minutes 30 seconds				
Group APropofol	50	64.78	6.982	t-value = -11.192 p-value < 0.01
GroupB Etomidate	50	78.94	5.593	
At 3 minutes				
Group APropofol	50	62.98	8.326	t-value = -11.507 p-value < 0.01
Group B Etomidate	50	79.24	5.524	

DISCUSSION

Haemodynamic changes like hypotension, hypertension and bradycardia at the time of induction of general anesthesia are very common¹⁴. These changes are pronounced in diabetic and hypertensive patients and approximately 451 million people suffering from diabetes¹⁵. Cardiovascular complications causes morbidity and mortality in patient¹⁶. To address such complications different regimens are applied like fluids, vasopressin and combinations of drugs^{14,17}. That's why in this study we compare the etomidate with propofol and found that at the time of induction of general anesthesia haemodynamics were more stable in etomidate group (group B). In the study of XuJS et al they observed haemodynamics in elderly and shock patients and their results favor my study¹⁸. In the study of Bendel et al they found that in patients with aortic disease more hypotension was observed with propofol as compared to etomidate, so his results favor the result of my study¹⁹. The findings of a Deitch et al also support my study that use of etomidate as part f a prehospital rapid sequence intubation protocol is associated with haemodynamic stability and low incidence of hypotension²⁰. The study of Song JC et al they found that during RCP the patients who received etomidate were more stable haemodynamically as compared with propofol²¹. Similarly in the study of Zheng H et al they found more stable haemodynamics with etomidate as compared to propofol²². At the end of discussion we conclude from our study that etomidate is a better inducing agent and we use it safely in patients with both stable and unstable hemodynamic changes.

CONCLUSION

Etomidate is a better inducing agents as compared to propofol as it causes minimal haemodynamic changesat the ime of induction of general anesthesia.

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