



COMPARATIVE STUDY OF HEMODYNAMIC RESPONSES TO ETOMIDATE VERSUS KETOFOFOL ANAESTHETIC INDUCTION IN PATIENTS UNDERGOING CABG SURGERY.

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Abstract

Background: Anaesthetic agents produces variable degree of hemodynamic changes. These changes are depend's on type of anaesthesia drug, dose and duration of exposure. Coronary artery bypass grafting surgery (CABG) is the commonest surgery performed cardiovascular surgery. The present study aimed to compare hemodynamic responses to etomidate versus ketofol anesthetic induction in patients undergoing CABG surgery.

Materials and Methods: The present study conducted in the department of anaesthesia, during the period of April 2025 to May 2026. A total of 70 patients undergoing CABG surgery divided into two groups each of 35. Group-I given Etomidate and group-II Ketofol. All the patient's demographic, clinical and hemodynamic data were collected and analyzed. Statistical Package for Social Sciences (SPSS 20.0) version used for analysis.

Results: The maximum number of patients had age between 51-60 years in both groups. Comparison of mean age between the groups not showed any significant difference. In both groups males are more than female. Comparison of mean weight between the groups not showed any significant difference. Systolic blood pressure (SBP) was decreased in both groups compared baseline with 2 min. Comparison of systolic blood pressure at 1 min, before laryngoscope (BL), immediately after laryngoscope (AL) and 2 min following laryngoscope between the groups showed significant difference. Diastolic blood pressure (DBP) at all times showed significant difference compared between the groups. Mean arterial pressure (MAP) was showed significant difference compared between the group-I and group-II. **Conclusion:** This study results concluded that patients received etomidate showed better cardiovascular effects compared to Ketofol.

Keywords: Etomidate, Hemodynamic response, Ketofol, Cardiovascular system, Blood Pressure, Mean arterial pressure (MAP).



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INTRODUCTION

Anaesthesia induction is often associated with a period of hemodynamic instability which could be a major problem in patients undergoing cardiovascular surgeries. Induction of anesthesia is one of the most critical step in cardiac anesthesia, especially in high risk individuals undergoing coronary artery bypass graft (CABG) surgery with left ventricular dysfunction. All the anesthetic agents often cause changes in cardiovascular disturbance directly or indirectly.

Anesthetic agents majorly act through sodium channels [1,2] which can depress or activate the cardiovascular system. Induction of anesthesia is associated with hypotension which could be a significant problem in patients undergoing CABG surgery because these patients cannot tolerate such depression. [3,4]

In addition, laryngoscopy and followed by intubation also stimulates the catecholamine surge which causes hypertension and tachycardia which can be detrimental to patients associated with cardiovascular diseases. Due to these type of variations in hemodynamic status may create an imbalance of oxygen supply and demand thus increasing the chances of myocardial ischemia in these patients. [5,6]

Thus the preservation hemodynamic stability during anaesthesia is very important to prevent the morbidity and mortality. [7] According review of literature it was evaluated the effects of a wide variety of induction agents and their combinations used to attain cardiovascular stability during anesthesia induction. At present there is no single anaesthetic drug suitable

for all patients. Etomidate is commonly used anesthetic agent with minimal cardiovascular and respiratory depressant effect. Studies showed that etomidate has better stability on cardiovascular parameters. [8,9]

Ketofol is a mixture of ketamine and propofol well known anesthetic agent used in various surgeries. Ketamine is a dissociative anesthetic agent which stimulate the cardiovascular parameters and propofol is a sedative agent which depresses the cardiovascular functions. Due to divergent effects of these two drugs which can minimize the cardiovascular patients undergoing CABG surgery. With this background the present study aimed to evaluate the hemodynamic responses to etomidate versus ketofol anaesthetic induction in patients undergoing CABG surgery.

MATERIALS AND METHODS

Study type: Comparative study

Study settings: The study was conducted in the Sri Jayadeva Institute of Cardiovascular Sciences and Research, Mysore, Karnataka.

Study period: April 2025 to May 2026

Inclusion criteria

- Patients undergoing CABG surgery

Exclusion criteria

- Pregnant women
- Drug allergy
- Asthma
- Patients on sedative and hypnotic drugs

Groups

Group-I: Etomidate (n=35)

Group-II: Ketofol (n=35)

Procedure

The study included 70 subjects undergoing CABG surgery divided into two groups. Both groups explained about study procedure and informed consent was obtained. All the patient's demographic and clinical observations were collected and recorded. Cardiovascular parameters Heart rate (HR) systolic blood pressure(SBP), diastolic blood pressure(DBP), mean arterial pressure (MAP) were recorded at baseline ,1 min after induction , before laryngoscope (BL), after laryngoscope (AL) and 2 min after airway manipulation . The collected data was recorded in excel sheet and used for analysis.

Statistical analysis

The study was expressed in number, percentage, mean and standard deviation. Statistical Package for Social Sciences (SPSS 20.0) Version used for analysis. Unpaired t test applied to find the statistical significant between the groups. p value less than 0.05 consider statistically significant at 95% confidence interval.

RESULTS

The maximum number of patients had age between 51-60 years in the both groups. 2 in group-II and 3 in group-I had age between 71-80 years. 14 in group-I and 15 in group-II had age between 51-60 years. Comparison of mean age between the groups not showed significant difference. Males are more number compared to females in both groups.

Comparison of mean weight between the groups not showed significant difference. (Table-1 and Graph-1) Systolic blood pressure compared between the groups at different time periods. At baseline both group patients had similar levels. Comparison of systolic blood pressure at 1 min, BL, AL and after 2 min showed significant difference.

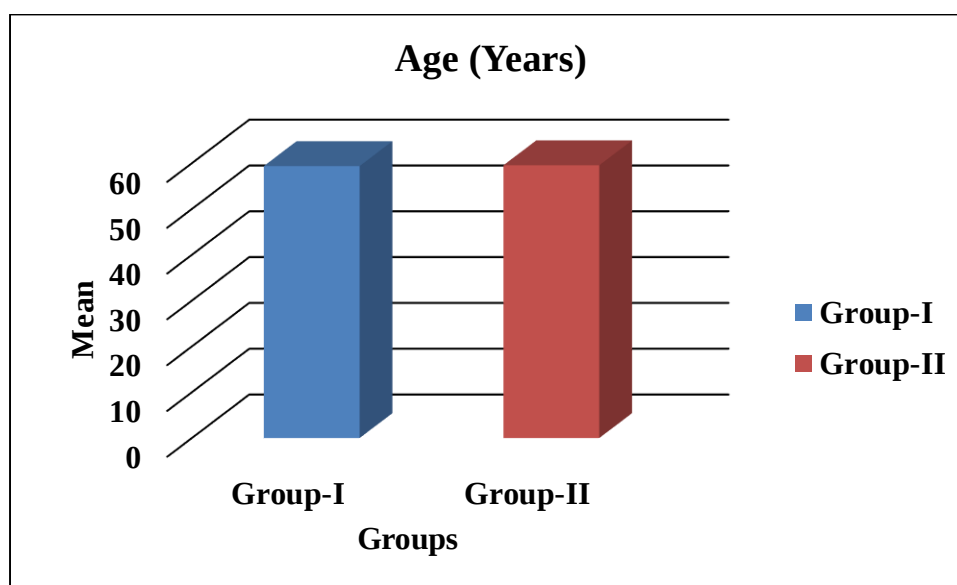
In both groups SBP was lesser than baseline value. Group-I showed less increase in the SBP than group-II at different times. (Table-2) Comparison of DBP between the groups at baseline, 1 min, BL and after 2 min did not show any significant difference except at after laryngoscope (AL) group-II showed significant ($p < 0.05$) increase of DBP (86.17) compared to group I (77.86) (Table-3).

Comparison of mean arterial pressure at baseline between the groups not showed any significant difference. 1 min, BL, AL and at 2min MAP showed significant difference between the groups. At all the time periods group-I showed better MAP than group-II. (Table-4) Mean heart rate was compared between the groups at baseline, 1 min, BL, AL and at 2 min not

showed any significant difference. At different study time intervals the change in heart rate between the groups were statistically insignificant). Group-I showed better pattern of heart rate compared to group-II. (Graph-2)

Table-1: Comparison of demographic data between the groups

Groups	Group-I (MEAN±SD)	Group-II (MEAN±SD)
Age (Years)		
40-50	6	5
51-60	14	15
61-70	12	13
71-80	3	2
Gender		
Male	23	25
Female	12	10
Weight (kg)	65.43±10.82	63.03±8.79



Graph-1: Comparison of mean age between the groups

Table-2: Comparison of systolic blood pressure between the groups at different time periods

Systolic blood pressure	Group-I (MEAN±SD)	Group-II (MEAN±SD)
Baseline	174.09±22.00	172.60±30.40
1 min	138.69±27.32	150.54±30.12*
BL	130.43±24.75	147.54±21.04*
AL	139.94±26.50	158.89±27.41*
2 min	130.03±28.75	139.69±22.03*

(*p<0.05 significant)

Table-3: Comparison of diastolic blood pressure between the groups at different time periods

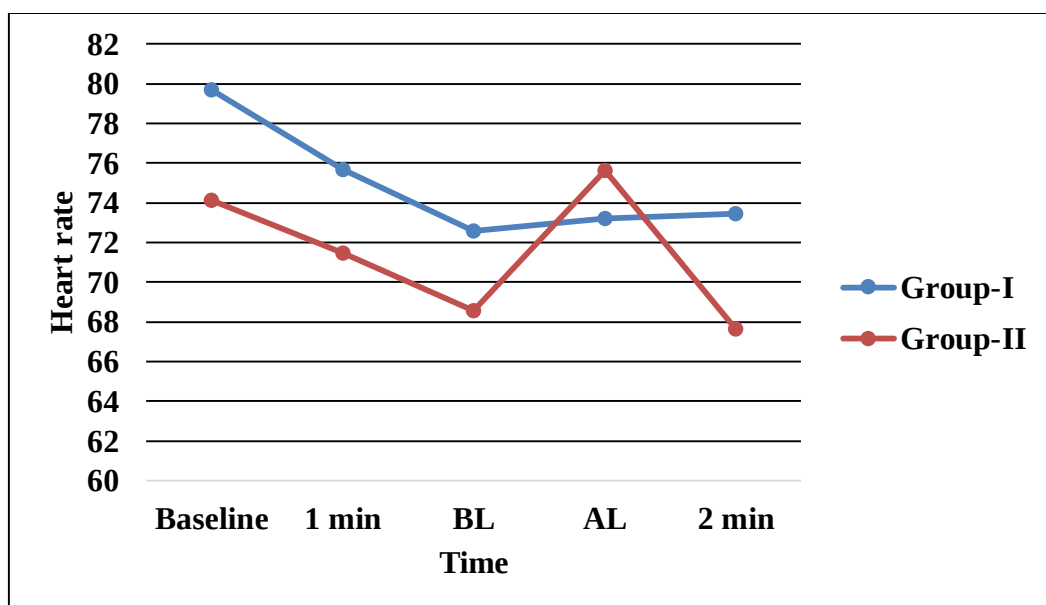
Diastolic blood pressure	Group-I (MEAN±SD)	Group-II (MEAN±SD)
Baseline	86.37±10.04	85.00±14.92
1 min	76.29±12.60	80.46±12.49
BL	74.71±12.69	77.54±14.95
AL	77.86±15.60	86.17±18.49*
2 min	72.77±13.51	75.57±13.73

(*p<0.05 significant)

Table-4: Comparison of mean arterial pressure between the groups at different time periods

Mean arterial pressure	Group-I (MEAN±SD)	Group-II (MEAN±SD)
Baseline	120.57±13.89	119.49±16.00
1 min	98.89±16.93	107.77±17.24*
BL	94.94±16.10	102.43±15.14*
AL	101.80±20.30	114.26±21.77*
2 min	93.26±19.55	100.11±15.61*

(*p<0.05 significant)



Graph 2: Comparison of mean heart rate between the groups at different time periods.

DISCUSSION

The prevalence of patients with compromised left ventricular function undergoing CABG is significantly increasing. [10] According to studies CABG is a safe and effective treatment for patients with severely compromised left ventricular function with coronary artery disease.[11] Cardiovascular stability is the most important for any anesthetic agent used for anesthesia induction in patients undergoing CABG surgery majorly patients with a poor cardiovascular issues.

Various studies have investigated the effects of different anesthetic agents used for induction. In the present study we compared the hemodynamic effects of etomidate and ketofol in patients undergoing CABG surgery. The study results showed that etomidate showed better hemodynamic changes compared to ketofol. Aghdaii et.al evaluated the effects of etomidate-midazolam versus propofol ketamine combination during anesthesia in patients undergoing CABG surgery. The results of the study concluded that hemodynamic response at different time intervals in the two groups showed significant higher CI with patients undergoing on pump CABG surgery.[12]

Pandey et.al study found that etomidate provide more stable hemodynamic values when compared to propofol in patients compared ventricular function, undergoing CABG surgery.[13] Masoudifar et.al and Aggarwal et.al studies have confirmed that using etomidate during anesthesia induction in elective procedures results in greater hemodynamic stability compared to propofol.[14, 15] Shah SB et.al study demonstrated that etomidate gives stability without requiring any rescue drug as compared to the need for a stability drug with propofol before and during surgical procedure. [16] However, in the present study we found that etomidate provide better cardiovascular and hemodynamic stability compare to ketofol patients undergoing CABG surgery.

CONCLUSION

The study results concluded that patients received etomidate showed better cardiovascular stability than ketofol. Patients with any preexisting cardiovascular diseases can use etomidate than ketofol to avoid cardiovascular complications during surgery.

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