

COMPARATIVE STUDY ON HAEMODYNAMIC RESPONSES DURING INTUBATION USING ETOMIDATE, PROPOFOL AND THIOPENTONE IN LAPAROSCOPIC CHOLECYSTECTOMY SURGERIES.

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ABSTRACT

Tracheal intubation provides a patent airway. Direct laryngoscopy and intubation are noxious stimuli. Significant hypertension and tachycardia are associated with tracheal intubation under light anaesthesia. Nowadays, prevention of hemodynamic response by use of premedications & induction agents, thereby increasing the depth of anaesthesia. During laparoscopic cholecystectomy, haemodynamic changes occur to a greater extent than other non laproscopic surgeries. In my study Ninety (90) patients of ASA I & II physical status of either sex schedule for elective laparoscopic cholecystectomy surgeries. All the patients were preoxygenated with O₂ followed by Inj. Nalbuphine 0.1 mg / Kg & midazolam 0.05mg / Kg i.v. followed by induction agent either thiopentone, propofol or etomidate doses of 5mg/kg, 2mg/kg, 0.3mg/kg respectively & muscle relaxant rocuronium 1mg/kg was given. Laryngoscopy and intubation were done after complete jaw relaxation. Injection glycopyrolat 4 mg/ Kg IM, injection ranitidine 50mg and injection metoclopramide 10mg were given IV to the patients 45 minute before surgery. Haemodynamic parameters at pre induction, post induction and after intubation at 0min, 1min, 3min, 5min & 10min were taken into account for evaluation obtained from each group were analyzed statistically and compared by Average Standard Deviation and t test . p value less than 0.05 was considered significant and more than 0.05 was considered not significant. The finding of study, no significant change in HR, SBP, DBP, MAP in post induction and after intubation in etomidate group.

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INTRODUCTION

Tracheal intubation provides a patent airway, thus preventing obstruction as a result of either loss of consciousness, oedema or compression (i.e foreign body and tumor). Direct laryngoscopy and passage of endotracheal tube are noxious stimuli that can provoke adverse responses in the cardiovascular, respiratory and other physiological system. Significant hypertension and tachycardia are associated with tracheal intubation under light anaesthesia. The magnitude of the response is greater with increasing force and duration of laryngoscopy. The elevation in arterial pressure typically starts within 5sec laryngoscopy, peak in 1 to 2 minutes and return to control levels within 5 min. Haemodynamic changes start within seconds of direct laryngoscopy and there is a further increase in heart rate and blood pressure with passage of endotracheal tube.

Now - a - days, prevention of hemodynamic response by use of premedications induction agents, thereby increasing the depth of anaesthesia is a routine.

During laparoscopic cholecystectomy, haemodynamic changes occur to a greater extent than other non laproscopic surgeries. It is due to the effect of

pneumoperitoneum. Peritoneal insufflation to IAPs higher than 10 mm Hg induces significant alterations of haemodynamics. These disturbances are characterized by decrease in cardiac output, increased arterial pressures and elevation of systemic and pulmonary vascular resistances. Mean arterial pressure and heart rates remain unchanged or increased only slightly. The increase in systemic vascular resistance due to release of neurohumoral factor, i.e vasopressin and catecholamine. To overcome the adverse effect, choosing an ideal induction agent for laparoscopic cholecystectomy surgery is necessary.

An ideal induction agent should have a rapid and smooth onset of action, intra-operative amnesia and analgesia, provide optimal surgical conditions and adequate muscle relaxation with rapid recovery and have no adverse effects in the post-operative period.

The aim of my study to found out an ideal induction agent having least hemodynamic alteration for patients undergoing laparoscopic cholecystectomy operations taking into consideration etomidate, propofol and thiopentone as induction agents.

METHODS AND MATERIALS:

After obtaining approval from ethical committee of S.C.B.Medical College and Hospital, and written informed consent from patients, I studied 90 patients of age 20-45 years, both sexes of ASA Grade I and II randomly chosen undergoing laparoscopic cholecystectomy.

Patients are divided into three identical groups, 30 each basing on use of induction agents.

PREANAESTHETIC ASSESSMENT

All the patients are thoroughly assessed as follows

- Present and past history of Tuberculosis, Hypertension, Heart diseases, Bronchial asthma, Diabetes, any fainting attack. History to drug addiction like smoking, tobacco, chewing etc.
- General examination-patient age, sex, height, weight (obesity), physical status. Presence of anaemia, clubbing, jaundice, oedema, cyanosis, body deformity, kyphosis, scoliosis, pigeon chest etc.
- Systemic examination- Patients detailed examination of all the system was done paying particular importance to cardiovascular system and respiratory system.
- Criteria for difficulties in intubation like short neck, stiffneck, oedentulous, ankylosis of cervical joints, neck rigidity, mallampati grading was evaluated. Patients in whom abnormalities were detected in the examination were excluded in the study.

Pregnancy also excluded from the study.

All routine blood investigations were done in every patients including

Kidney function test & creatinine clearance (for excretory system)

Pulmonary function test(For Respiratory system)

Electrocardiogram, Echo (For Cardiovascular system)

Liver function test-Total Bilirubin, aggregated bilirubin,

SGOT, SGPT, Serum alkaline phosphatase. Adrenal cortical function test. Thyroid function test.

When any abnormality was suspected from history, general examination, systemic, local examination and special investigations were excluded from the study.

Preparation of the patient

Anaesthetic management

The preoperative room from the ward. Then intravenous line was secured. In the morning hours, patients were brought into the pre operative room from the ward. Then intravenous line was secured with an 18G intravenous catheter and Ringer's lactate was started.

All vital parameters like Pulse, Blood Pressure, Respiratory rate were recorded. Chest and heart rate were ausculted. Injection glycopyrolat 4µg/ Kg IM, injection ranitidine 50mg and injection matoclopramide 10mg were given to the patients 45 minute before surgery.

Then the patients were transferred to Operation Theatre and Monitor were attached. Pulse and Blood pressure were recorded before the injection of induction agent and were taken as baseline value. The technique for General anaesthesia were same for all the patients. All the patients were preoxygenated for 5 minutes with 100% oxygen followed by injection Nalbuphine 0.1 mg / Kg. and midazolam 0.05mg / Kg intravenously followed by induction agent either thiopentone, propofol or etomidate as follows :-

- Group I - Patient received etomidate 0.3mg/kg.

- Group II - Patient received propofol 2mg/kg.
- Group III - Patient received thiopentone 5mg/kg.

Intravenous line was flushed and muscle relaxant rocuronium 1mg/kg was given. Lungs are inflated with oxygen using bag mask ventilation till jaw is relaxed and apnea occurred. 90seconds after injection of relaxant, degree of jaw relaxation was noted every 15 seconds till complete relaxation.

Laryngoscopy and intubation were done with proper size cuffed endotracheal tube after complete jaw relaxation. Proper placement of tube was confirmed by auscultation of both the lung fields. The cuff of the tube was inflated with air till audible leakage of air had disappeared. Tube was then fixed and manual ventilation was carried out with Nitrous oxide 67% and 33% oxygen. An incremental dose of relaxants was given when the features of insufficient relaxation that is increased resistant to inflation of lung, rigidity of abdominal wall and bucking were appeared. At the end of operation, the residual neuromuscular blockade was reversed with injection Neostigmin 2.5 mg and injection Glycopyrrolate 0.5mg given together after respiratory effort was initiated by the patient. After watching adequate tidal exchange and return of protective reflexes, patients were extubated and observed till full recovery.

Adequacy of reversal was assessed by noting the following features:

- a. Protrusion of tongue.
- b. Wide opening of eye.
- c. sustain head lift for 5 seconds.
- d. Ability to take deep breath.
- e. Moving and raising the limbs.

After extubation, the patients were observed in postoperative care unit till complete recovery and then transferred to the ward and kept under observations till the next morning.

RECORDING

The following parameters were recorded:- Pulse, Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure.

Pre-induction: The value recorded just before the injection of intravenous induction agent which was taken as baseline value to study the wearing off effect of the induction agent at 10 minute of intubation.

Post-induction : Recordings taken after injection of the intravenous induction agent till injection of muscle relaxant which was taken as baseline value to study the haemodynamic changes of intubation till 10 minutes, after intubation.

Post intubation : Recordings taken, just after intubation(0min), 1 minute, 3 minute, 5 minute and 10 minute after intubation. Any untoward effects during, after the operation were recorded.

Monitoring :

Vital parameter like pulse, Blood pressure, SpO₂, Electrocardiography, ETCO₂ continuously monitored throughout the intraoperative period.

Pulse and Blood pressure recordings were done every 5minutes after my recording for the study was over. More frequent

recording were done when any alteration in pulse volume was noted. The average of all the values was taken as maintenance value.

Patients were kept under observation in the recovery room and vital parameters like pulse, blood pressure, SpO2 and respiration rate were recorded at an half an hour interval till the patients were completely oriented to the surrounding and subsequently recorded at two hourly interval till night and finally the patients were checked the next morning.

Preinduction,post induction and after intubation 0min,1min,3min,5min and 10min were taken into account for evaluation/assessment of haemodynamic response to endotracheal intubation. The data obtained from each group were analyzed statistically and compared by Average, Standard Deviation and t test .p value less than 0.05 was considered significant and more than 0.05 was considered not significant..

OBSERVATIONS:

Ninety (90) patients of ASA I & II physical status, patients of either sex, between age 20-45 years,, weight 30-60 Kg, schedule for elective laparoscopic cholecystectomy surgeries were selected.

90 patients of either sex will be randomly assigned into three groups.

Group I (n=30) receiving Etomidate,

Group II (n= 30) receiving Propofol

Group III (n = 30) receiving Thiopentone as induction agent.

The observations were complied and the result were analyzed statistically.

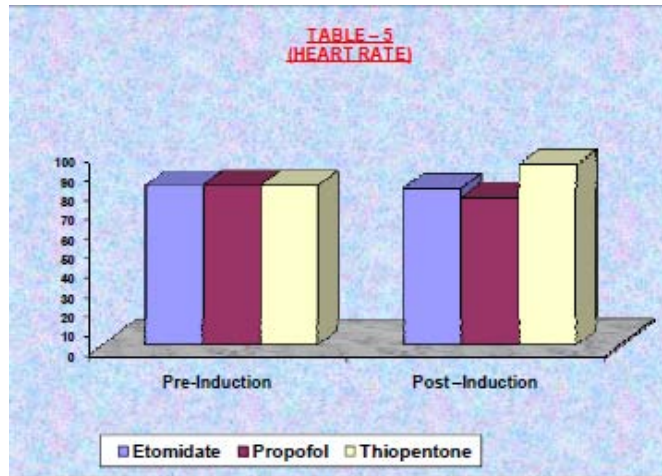
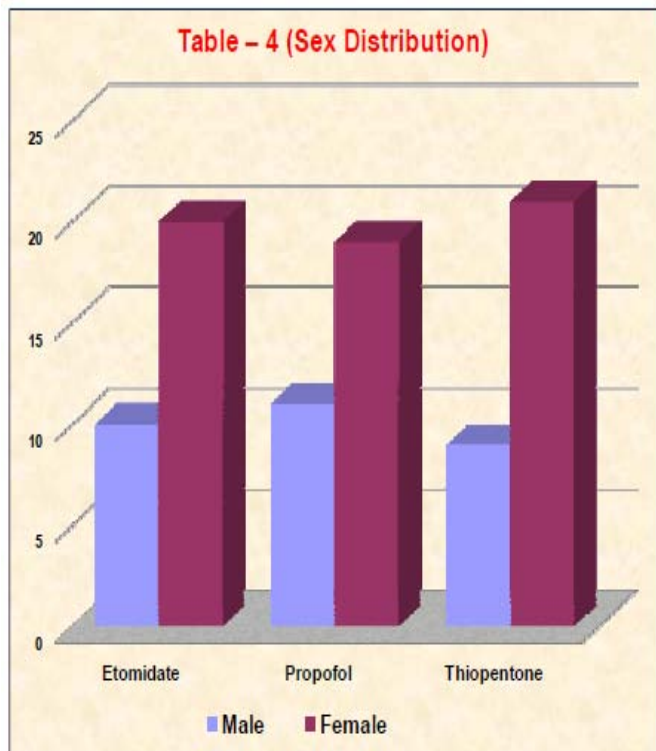
TABLE 3: AGE + WEIGHT

OBSERVATION	ETOMIDATE	P
AGE	36.56+- 5.06	0.31
WEIGHT	50.10 +- 7.68	0.31

Table 3 depicts the mean age + SD (in years) and the mean weight + SD(in kg)of the patients in the three study groups were statistically similar with regards to the mean age and weight of patients.

Table 4: shows that female sex distribution is higher than male sex in my study group.

HEART RATE (MEAN +/- SD)



Group	Pre-Induction	Post-Induction	0 min	1 min	3 min	5 min	10 min
Etomidate	82.1 ± 5.24	80.76 ± 5.27	83.56 ± 5.05	82.2 ± 4.91	82.73 ± 4.98	81.63 ± 4.8	82.33 ± 5.2
Propofol	82.2 ± 5.77	75.93 ± 5.36	85.8 ± 5.65	84.55 ± 5.29	81.25 ± 5.05	76.83 ± 4.78	82.55 ± 4.93
Thiopentone	82.3 ± 7.9	92.8 ± 6.4	112.1 ± 7.49	111.05 ± 7.59	103.5 ± 7.57	94.25 ± 7.23	92.57 ± 6.95
p-value		P = 0.0001	P = 0.05	P = 0.05	P = 0.05	P = 0.001	P = 0.05
p-value		P < 0.0001	P < 0.05	P < 0.0001	P < 0.0001	P < 0.0001	P < 0.0001

Table 5 shows the mean changes in heart rate in three study groups and comparison among them to pre-induction (baseline value). Post-induction and after intubation, in etomidate group. heart rate did not significantly change compared to pre-induction But in propofol group, post induction heart rate significantly decreased and after intubation, significantly increased compared to the pre-induction. In thiopentone group, post-induction and after intubation heart rate increased significantly compared to pre-induction.

TABLE - 6
HEART RATE
(MEAN +/- SD)

Observation Time	Etomidate	p-Value	Propofol	p-Value	Thiopentone	p-Value
Post Induction	80.76 ± 5.27		75.93 ± 5.36		92.8 ± 6.4	
AFTER INTUBATION	0 min	P=0.04	85.8 ± 5.65	P<0.0001	112.1 ± 7.49	P<0.0001
	1 min	p>0.05	84.56 ± 5.29	P<0.0001	111.06 ± 7.59	P<0.0001
	3 min	p>0.05	81.26 ± 5.05	P<0.001	103.5 ± 7.57	P<0.0001
	5 min	p>0.05	76.83 ± 4.78	p>0.05	94.26 ± 7.23	p>0.05
	10 min	p>0.05	82.56 ± 4.93	P<0.0001	92.67 ± 6.96	p>0.05

Table 6- Post-inductions was taken as baseline value. In etomidate group nheart rate did not change significantly after intubation. In propofol group and thiopentone group heart rate increased significantly after intubation as compared to post-induction (baseline value).

TABLE - 7
SYSTOLIC BLOOD PRESSURE (SBP)

Observation Time	Etomidate	p-value	Propofol	p-value	Thiopentone	p-value
Pre Induction	Mean ± SD		Mean ± SD		Mean ± SD	
Post Induction	0 min	123.7 ± 5.54	124.33 ± 3.71		124.56 ± 4.53	
	1 min	121.93 ± 5.43	94.1 ± 6.78	<0.0001	116.26 ± 5.57	<0.0001
	3 min	124.03 ± 5.65	121 ± 4.74	P<0.001	129.73 ± 5.03	P = 0.0001
	5 min	123.93 ± 5.66	119.5 ± 4.08	P<0.0001	128.7 ± 5.12	P <0.01
	10 min	123.43 ± 5.3	107.3 ± 7.18	P<0.0001	123.66 ± 4.73	P >0.05
After Intubation	5 min	122.55 ± 5.13	95.5 ± 5.7	P<0.0001	116.3 ± 4.93	P<0.0001
	10 min	123.13 ± 5.7	122.80 ± 3.82	P >0.05	119.33 ± 5.85	P<0.001

Table 7- mean change in SBP in three study groups. Pre-induction was taken as baseline value. In etomidate group, Post-induction and after intubation, SBP did not change significantly as compared to preinduction. But in propofol group , SBP decreased significantly in postinduction and after intubation SBP again increased. In thiopentone group, SBP decreased but less than propofol and after intubation SBP increased. In propofol and etomidate group, at 10 minutes SBP returned to pre-induction value, but not in case of thiopentone group

TABLE - 8

SYSTOLIC BLOOD PRESSURE (SBP)

Observation Time	Etomidate Mean ± SD	p-Value	Propofol Mean ± SD	p-Value	Thiopentone Mean ± SD	p-Value
Post Induction	121.93 ± 5.43		94.1 ± 6.78		116.26 ± 5.57	
After Intubation	0 min	P>0.05	121 ± 4.74	P<0.0001	129.73 ± 5.03	P<0.0001
	1 min	P>0.05	119.6 ± 4.08	P<0.0001	128.7 ± 5.12	P<0.0001
	3 min	P>0.05	107.3 ± 7.18	P<0.0001	123.66 ± 4.73	P<0.0001
	5 min	P>0.05	96.6 ± 5.7	P>0.05	118.3 ± 4.93	P>0.05
	10 min	123.13 ± 5.7	P>0.05	122.8 ± 3.82	P<0.0001	119.33 ± 5.85

Table 8 - Post induction was taken as baseline value. After intubation SBP increased significantly in propofol and thiopentone groups, but not in etomidate group compared to post-induction.

TABLE - 9

DIASTOLIC BLOOD PRESSURE (DBP)

Observation Time	Etomidate Mean ± SD	p-Value	Propofol Mean ± SD	p-Value	Thiopentone Mean ± SD	p-Value
Pre Induction	81.5 ± 4.8263		80.3 ± 3.8	P<0.0001	81.4 ± 4.46	
After Intubation	Post Induction	79.16 ± 4.68	61.3 ± 2.89	P<0.05	73.0 ± 4.66	P<0.0001
	0 min	81.36 ± 4.77	79.8 ± 4.26	P>0.05	87.73 ± 4.68	P<0.0001
	1 min	81.32 ± 4.78	79.23 ± 4.19	P>0.05	85.46 ± 4.66	P<0.001
	3 min	81.3 ± 4.7	75.26 ± 3.68	P>0.05	78.66 ± 4.47	P<0.05
	5 min	79.9 ± 4.9	64.83 ± 5.06	P>0.05	73.7 ± 4.67	P<0.0001
10 min	81.93 ± 5.0	78.80 ± 3.90	P>0.05	77.96 ± 5.29	P<0.01	

Table 9 - Shows mean change in DBP in three study groups and comparison of them with pre-induction value (Baseline value). In etomidate group; Post-induction and after intubation, DBP did not change significantly. But in propofol and thiopentone DBP decreased after induction and again increased after intubation. In etomidate and propofol group DBP returned to pre-induction (base line value) at 10 minute, but not in case of thiopentone

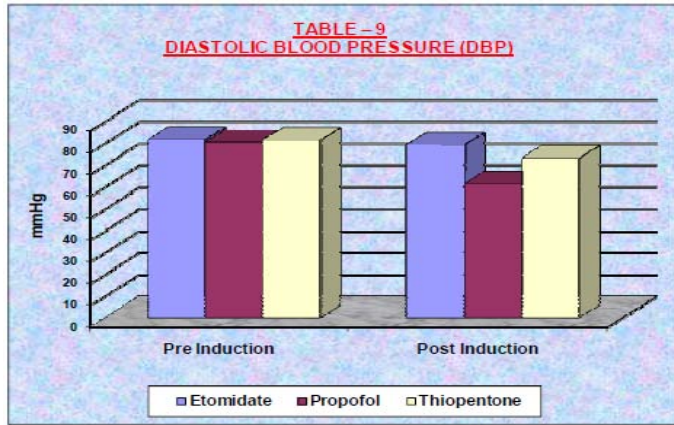


TABLE - 9
DIASTOLIC BLOOD PRESSURE (DBP)

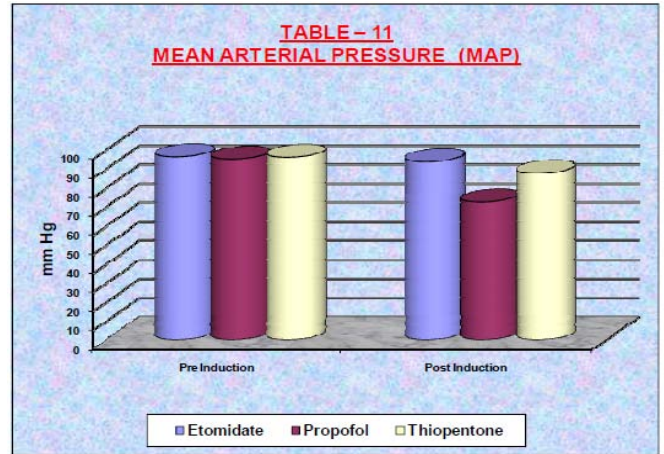


TABLE - 11
MEAN ARTERIAL PRESSURE (MAP)

TABLE - 10
DIASTOLIC BLOOD PRESSURE (DBP)

Observation Time	Etomidate Mean ± SD	p-value	Propofol Mean ± SD	p-value	Thiopentone Mean ± SD	p-value
Post Induction	79.16 ± 4.68		61.3 ± 2.89		73.0 ± 4.66	
After Intubation	0 min	P>0.05	79.8 ± 4.26	P<0.0001	87.73 ± 4.58	P<0.0001
	1 min	P>0.05	79.23 ± 4.19	P<0.0001	85.46 ± 4.55	P<0.0001
	3 min	P>0.05	81.3 ± 4.7	P<0.0001	78.66 ± 4.47	P<0.0001
	5 min	P>0.05	79.9 ± 4.9	P>0.05	73.7 ± 4.67	P<0.05
	10 min	81.93 ± 5.0	P>0.05	78.8 ± 3.90	P<0.001	77.96 ± 5.29

TABLE - 11
MEAN ARTERIAL PRESSURE (MAP)
MEAN +/- SD

Observation Time	Etomidate Mean ± SD	p-value	Propofol Mean ± SD	p-value	Thiopentone Mean ± SD	p-value	
Pre-induction	95.99 ± 4.88		94.76 ± 3.15		95.73 ± 3.65		
After Intubation	0 min	P>0.05	72.19 ± 3.34	P<0.0001	87.32 ± 3.76	P<0.0001	
	1 min	P>0.05	93.83 ± 3.26	P>0.05	98.57 ± 3.98	P=0.01	
	3 min	95.29 ± 4.64	P>0.05	94.48 ± 3.5	P>0.05	99.27 ± 4.50	P<0.001
	5 min	95.29 ± 4.64	P>0.05	86.39 ± 3.48	P<0.0001	93.73 ± 4.17	P<0.05
	10 min	95.99 ± 4.8	P>0.05	73.07 ± 3.40	P<0.0001	88.55 ± 3.45	P<0.0001
			P>0.05	93.40 ± 3.24	P>0.05	93.79 ± 3.75	P<0.05

Table 10 - Post-induction was taken as baseline value. After intubation, in case of etomidate group DBP did not change. But in case propofol group and thiopentone group, DBP increased significantly compared to baseline value

Table 11 - Mean MAP in three study groups. Here, Pre-Induction was the baseline value. In etomidate group, Post-induction and after intubation, MAP did not change significantly. But in propofol and thiopentone group, post-induction, MAP decreased significantly and after intubation again MAP increased. In propofol and etomidate group, MAP returned to baseline at 10 minute, but not in case of thiopentone

TABLE - 12
MEAN ARTERIAL PRESSURE (MAP)
MEAN + SD

Observation Time	Etomidate Mean + SD	p-Value	Propofol Mean + SD	p-Value	Thiopentone Mean + SD	p-Value
Post Induction	93.4 ± 4.7		72.09 ± 3.34		87.32 ± 3.76	
After Intubation	0 min 95.95 ± 4.65	P > 0.05	94.48 ± 3.51	P < 0.0001	99.27 ± 4.5	P < 0.0001
	1 min 95.95 ± 4.46	P > 0.05	92.83 ± 3.26	P < 0.0001	98.57 ± 3.98	P < 0.0001
	3 min 95.29 ± 4.64	P > 0.05	86.39 ± 3.54	P < 0.0001	93.73 ± 4.17	P < 0.0001
	5 min 95.29 ± 4.64	P > 0.05	73.07 ± 3.48	P > 0.05	88.55 ± 3.46	P > 0.05
	10 min 95.99 ± 4.8	P > 0.05	93.40 ± 3.24	P < 0.0001	93.79 ± 3.75	P < 0.0001

Table 12 - Post-induction taken as baseline values. After intubation, in etomidate group, MAP did not change significantly. But in propofol and thiopentone group, MAP increased significantly after intubation

DISCUSSIONS

In all the three groups(etomidate, propofol, thiopentone); heart rate and blood pressure were taken in stepwise manner, at pre induction, post induction and after intubation at 0,1,3,5 and 10minutes.The recorded values were tabulated for age, weight ,sex, heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure. The result of the study was compared with observation of other workers in this field of work taking steps to account for the differences as far as possible. The discussion of the various aspect of this study is as follows:-
Age of the patients(in years): In Group I(etomidate), GroupII(propofol) and GroupIII (thiopentone),the mean age of patients were 36.56,36.60 and36.93 respectively. Almost equal age wise distribution were observed in all the 3 groups

Weight of the patients(in kg)

The weight of the patients has been considered for the purpose of dosage calculation of anaesthetic drugs used. In Group

I (etomidate) Group II (propofol) Group III (thiopentone),the mean weight of the patients were50.10,51.06 and50.20 respectively. No significant variation exists in between the three groups. (Table,3).

Sex Distribution :

Maximum number of patients were female patients. No significant variation exists in between the three groups. (Table 4).

HAEMODYNAMIC CHANGES :

Table -5,7,9 and11 shows the mean heart rate, mean systolic blood pressure, mean diastolic blood pressure and mean of mean arterial pressure in pre induction, post induction, after intubation at 0,1,3,5 and 10 minutes respectively.

In etomidate group, pre induction heart rate was 82.10 + 5.24.In post induction heart rate was 80.76 + 5.27 and after intubation 0min,1min,3min,5min and 10min heart rate were 83.56 + 5.06, 82.2 + 4.91,82.73 + 4.98,81.63 + 4.8 and 82.33 + 5.2 respectively. There was no significant change in heart rate in post induction and after intubation as compared with pre induction .Also there was no significant change after intubation as compared with post induction (Table5,6) In etomidate group pre induction SBP was123.7 + 5.54.In post induction SBP 121.93 + 5.43.Again SBP after intubation 0 min, 1min 3min ,5min10min were 124.03 + 5.65, 123.93 + 5.66,123.43 + 5.3,122.56 + 5.13, 123.13 + 5.7 respectively. There was no significant change in SBP in post induction and after intubation compared to pre induction value and also no significant change after intubation compared to pre induction and post induction value (Table-7,8). In etomidate group, pre induction DBP was 81.5 + 4.82. In post induction, DBP was 79.16 + 4.68. After intubation 0 min, 1min, 3min, 5min, 10min DBP were 81.36 + 4.77, 81.32 + 4.78,81.3 + 4.7,79.9 + 4.9 and 81.93 + 5.0 respectively. There was no significant change in DBP in post induction and after intubation compared to pre induction and after intubation compared to post induction. (Table9,10). In etomidate group pre induction MAP was 95.99 + 4.88.In post induction MAP was 93.4 + 4.7 and after intubation 0min, 1min, 3min, 5min and 10 min MAP were 95.85 + 4.82, 95.29 + 4.65, 95.29 + 4.64, 95.29 + 4.64 and 95.99 + 4.8 respectively. There was no significant change in MAP in post induction and after intubation compare to pre induction and after intubation compare to post induction. (Table11,12) These findings of this study corroborates with the study reports of *Gooding JM et al(1977)*, *Vanacker et al(1993)*,*Kulka et al (1993)*,*Ebert et al(1992)*, *Zaugg et al(2002)* and *Paris et al (2003)*. But in case of propofol group, pre induction heart rate was 82.2 + 5.77.In post induction heart rate decreased to 75.93 + 5.36 ,which was highly significant as compared with pre induction value. Again heart rate increased significantly after intubation compared with pre- induction and post-induction and returned to pre-induction value in 10min and post induction heart rate value in 5 min (Table5,6).Similarly pre induction SBP ,DBP and MAP were 124.33 + 3.71, 80.3+ 3.8, 94.76+ 3.15 respectively. Post induction SBP, DBP and MAP were significantly decreased to 94.1 + 6.78,61.3 + 2.89 and72.19+ 3.34 respectively. After intubation, SBP ,DBP and MAP again increased . At 10min after intubation blood pressure returned to pre

induction value and 5 min after intubation, blood pressure returned to post induction value (Table 7,8,9,10,11,12). The findings of the of this study corroborates with the study report of *Coates D et al(1985)*, *Larsen R et al(1988)*, *Van Aken H et al(1988)*, *Ebert TJ et al(1992)* In thiopentone, pre-induction heart rate was 82.3 + 7.9. In post-induction mean heart rate increased to 92.8 + 6.4. There was significant increase in heart rate in post induction as compared to pre induction. Heart rate was again increased after intubation and never came to pre induction level at 10 min after intubation. But compared with post induction heart rate value, heart rate returned to post induction value 5 min after intubation (Table 5,6). Pre induction SBP, DBP and MAP were 124.66 + 4.53, 81.4 + 4.46 and 95.73 + 3.65 respectively. In post induction, SBP, DBP and MAP significantly decreased to 116.26 + 5.57, 73.0 + 4.66 and 87.32 + 3.76 respectively. Again SBP, DBP and MAP increased after intubation. At 10 min blood pressure did not return to pre induction value. (Table 11, 12). The findings of the study corroborates with the study report of *Seltzer J et al(1980)*, *Tarabdar S et al(1980)*, *Mustola et al(1995)*.

SUMMARY AND CONCLUSION:

The study "*Comparative study on haemodynamic response among etomidate, propofol and thiopentone during intubation*" was carried out in 90 patients of ASA Grade I&II of either sex, aged between 20 to 45 years, posted for laparoscopic cholecystectomy in S.C.B Medical College & Hospital, Cuttack during the period from July 2009 - December 2011, after approval from the institutional authorities and informed consent. 90 patients were divided randomly in three groups of 30 each

_ Group I-Received etomidate.
_ Group II -Received protocol.
_ Group III- Received thiopentone.

All the patients were anaesthetized in the following sequence. Premedication, pre oxygenation, induction agents, relaxant injection, intubation and maintenance using close control technique followed by reversal and recovery. The effects of the intravenous induction agents were observed in relation to haemodynamic changes

_ Pre induction
_ Post induction
_ After intubation 0 min, 1 min, 3 min, 5 min & 10 min.

The observations of this study were compared with the observations of other workers in this field. Thorough discussion and necessary explanation were sought as far as possible for the discrepancies in observations with other workers.

The observations of this study were also compared among the three groups and summarized as follows.

The finding of the study were:

There was no significant change in Heart rate, Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure in post induction and after intubation in etomidate group.

In propofol group, from pre induction to post induction, Heart rate decreased significantly, but Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure decreased more significantly and from post induction to intubation, above parameters again increased significantly.

The above parameter returned to pre induction value at 10 min after intubation.

In thiopentone group, from pre induction to post induction, Heart rate increased significantly but Systolic blood pressure, Diastolic blood pressure and Mean arterial pressure were decreased, which were not as high as propofol. From post induction to intubation, again Heart rate increased and Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure increased significantly as compared with propofol. The above parameter did not return to pre induction value at 10 min after intubation.

From the above observations and discussion, it is concluded that etomidate attains the most of the properties of an ideal

Induction agent in comparison to propofol and thiopentone as far as the hemodynamic responses during intubation is concerned in laparoscopic cholecystectomy operations. Between propofol and thiopentone, propofol is better because after laryngoscopy and intubation, heart rate and blood pressure changes more in case of thiopentone than propofol. Haemodynamic changes return to baseline value first in case of etomidate, then propofol, then thiopentone.

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