Original Research Article

A comparative study of profopol and thiopentone with respect to hemodynamic stability used for various surgeries at tertiary health care centre

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Abstract

Background: General anesthesia is a medically induced coma with loss of protective reflexes, resulting from the administration of one or more general anaesthetic agents. **Aims and Objectives:** A comparative Study profopol and thiopentone with respect to Hemodynamic stability used for various surgeries at tertiary health care centre. **Methodology:** This was a cross-sectional study carried out in the patients undergoing various surgeries at tertiary health care centre during the one year period i.e. January 2017 to January 2018 . In the one year period there were 50 patients with enrolled into the study with written and explained consent. The patients after all the standard anesthetic protocol were given general anesthesia to the patients and patients randomly allotted to the groups The patients after all the standard anesthetic protocol were given general anesthesia to the patients and patients randomly allotted to the groups i.e. Profopol (Group P) in a dose of Propofol (2.5mg/kg) and Thiopentone (Group T) Thiopentone (5mg/kg), both of them given IV Ketamine 0.5mg/kg as premedication .The hemodynamic parameters like Systemic BP, Diastolic BP and Heart Rate (HR) etc. was noted. The statistical analysis was done Chi –square test , and unpaired t-test and analyzed by SPSS 19 version. **Result:** In our study we have seen that Average age of the was 35± 3.46 and 36± 4.12 in the Group T and Group P was comparable (t =0.98,df = 49,p>0.05) and the ratio of Male : Female ratio was 1.08 and 1.27 was comparable (X2=0.08,df=49,p>0.05). Preop SBP was 123.4±9.83 and 125±11.21 was comparable (t=1.082,NS) ; SBP at (10 min) Was 156±8.92 and 143±9.13 was significant (t=3.78; P<0.01,S); SBP at (20 min) was 149.32 ±8.12 and 130±5.12 was significant (t=3.98,P<0.01,S); SBP at (30 min) was 139±4.52 and 119±4.92 (t=4.52 ,P<0.001,HS) . Preop DBP was 78.12±4.54 and 75±7.12 was comparable (t=0.98,NS) ; DBP at (10 min) Was 98±7.82 and 81±6.72 was significant (t=3.78; P<0.01,S); DBP at (20 min) was 86 ±3.42 and 77±4.35 was significant (t=4.75,P<0.01,S); DBP at (30 min) was 78±3.81 and 68±4.91 (t=5.12 ,P<0.001,HS) Preop HR was 98.4±5.67 and 97±4.98 was comparable (t=0.92,NS) ; HR at (10 min) Was 109±8.92 and 101±9.13 was significant (t=3.29; P<0.01,S); HR at (20 min) was 111.42 ±4.56 and 105±4.92 was significant (t=4.68 ,P<0.01,S); HR at (30 min) was 114±4.79 and 101±3.67 (t=5.98 ,P<0.001,HS). **Conclusion:** It can be concluded from our study that the Profopol found to be hemodynamically stable as compared to thiopentone hence whenever there is hemodynamical stability id utmost important in such cases the Profopol should be preferred over thiopentone.

Key Words: Profopol, thiopentone, General anesthesia , Hemodynamic stability.

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General anaesthesia is a medically induced coma with loss of protective reflexes, resulting from the administration of one or more general anaesthetic agents. It is carried out to allow medical procedures that would otherwise be intolerably painful for the patient; or where the nature of the procedure itself precludes the patient being awake. A variety of drugs may be administered, with the overall aim of ensuring unconsciousness, amnesia, analgesia, loss of reflexes of the autonomic nervous system, and in some cases paralysis of skeletal muscles. The optimal combination of drugs for any given

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patient and procedure is typically selected by an anaesthetist, or another provider such as an operating department practitioner, anaesthetist practitioner, physician assistant or nurse anaesthetist (depending on local practice), in consultation with the patient and the surgeon, dentist, or other practitioner performing the operative procedure. Propofol has been used in recent years as an effective alternative to the time-tested thiopentone for intravenous induction of anesthesia. Induction with propofol is smoother, almost equally rapid, has rapid awakening and orientation times, better intubating conditions and upper airway integrity compared to thiopentone sodium. [1] However, the major disadvantages of rapid induction with propofol are impaired cardiovascular and respiratory function which may put patients at greater risk from hypotension, bradycardia, and apnea. A decrease of 26-28% of systolic blood pressure, 19% of diastolic blood pressure and 11% of mean arterial pressure (MAP) without changes in stroke volume and cardiac output are observed when anesthesia is induced with 2 mg/kg body weight of propofol. [2,3] Sodium thiopental, also known as Sodium Pentothal (a trademark of Abbott Laboratories, not to be confused with pentobarbital), thiopental, thiopentone, or Trapanal (also a trademark) or Fatal-Plus in veterinary euthanasia contexts, is a rapid-onset short-acting barbiturate general anesthetic that is an analogue of thiobarbital. Sodium thiopental was a core medicine in the World Health Organization's List of Essential Medicines,[4] which is a list of minimum medical needs for a basic healthcare system, but was supplanted by propofol.[5] Despite this thiopental is still listed as an acceptable alternative to propofol, depending on local availability and cost of these agents.[5] So, being these two drugs are used routinely and cardiac stability is very important for general anesthesia hence we have used the effectiveness of profopol versus thiopentone for cardiac stability.

METHODOLOGY

This was a cross-sectional study carried out in the patients undergoing various surgeries at tertiary health care centre during the one year period i.e. January 2017 to January 2018 . In the one year period there were 50 patients with enrolled into the study with written and explained consent. The patients after all the standard anesthetic protocol were given general anesthesia to the patients and patients randomly allotted to the groups i.e. Profopol (Group P) in a dose of Propofol (2.5mg/kg) and Thiopentone (Group T) Thiopentone (5mg/kg), both of them given IV Glycopyrolate 0.2mg, IV Ketamine 0.5mg/kg and IV Midazolam 0.03mg/kg as premedication The hemodynamic parameters like Systemic BP, Diastolic BP and Heart Rate (HR) etc. was noted. The statistical analysis was done Chi –square test, and unpaired t-test and analyzed by SPSS 19 version.

RESULT

Table 1: Distribution of the patients as per the age and sex

	Group T (n=25)	Group P (n=25)	p-value
Age (mean ±SD)	35± 3.46	36± 4.12	t=0.98,df=49,p>0.05
Sex			
Male	13	14	X^2=0.08,df=49,p>0.05
Female	12	11	

Average age of the was 35± 3.46 and 36± 4.12 in the Group T and Group P was comparable (t=0.98,df=49,p>0.05) and the ratio of Male : Female ratio was 1.08 and 1.27 was comparable (X2=0.08,df=49,p>0.05)

Table 2: Distribution of the patients as per the systolic BP

Characteristics / Duration in minutes after intervention	Group T (n=25)	Group P (n=25)	T' values (test of Sig.)	P Value	Remarks
Preop SBP	123.4±9.83	125±11.21	1.082	NS	NS
SBP (10 min)	156±8.92	143±9.13	3.78	P<0.01	S
SBP (20 min)	149.32 ±8.12	130±5.12	3.98	P<0.01	S
SBP (30 min)	139±4.52	119±4.92	4.52	P<0.001	HS

Preop SBP was 123.4±9.83 and 125±11.21 was comparable (t=1.082,NS) ; SBP at (10 min) Was 156±8.92 and 143±9.13 was significant (t=3.78; P<0.01,S); SBP at (20 min) was 149.32 ±8.12 and 130±5.12 was significant (t=3.98,P<0.01,S); SBP at (30 min) was 139±4.52 and 119±4.92 (t=4.52 ,P<0.001,HS)

Table 3: Distribution of the patients as per the diastolic BP

Characteristics / Duration in minutes after intervention	Group T	Group P	'T' values (test of Sig.)	P Value	Remarks
Preop DBP	78.12±4.54	75±7.12	0.98	NS	NS
DBP (10 min)	98±7.82	81±6.72	3.72	P<0.01	S
DBP (20 min)	86 ±3.42	77±4.35	4.75	P<0.01	S
DBP (30 min)	78±3.81	68±4.91	5.12	P<0.001	HS

Preop DBP was 78.12±4.54 and 75±7.12 was comparable (t=0.98,NS) ; DBP at (10 min)Was 98±7.82 and 81±6.72 was significant (t=3.78; P<0.01,S); DBP at (20 min) was 86 ±3.42 and 77±4.35 was significant (t=4.75,P<0.01,S); DBP at (30 min) was 78±3.81 and 68±4.91 (t=5.12 ,P<0.001,HS)

Table 4: Distribution of the patients as per the heart rate

Characteristics / Duration in minutes after intervention	Group T	Group P	'T' values (test of Sig.)	P Value	Remarks
Preop HR	98.4±5.67	97±4.98	0.92	NS	NS
HR (10 min)	109±8.92	101±9.13	3.29	P<0.01	S
HR (20 min)	111.42 ±4.56	105±4.92	4.68	P<0.01	S
HR (30 min)	114±4.79	101±3.67	5.98	P<0.001	HS

Preop HR was 98.4±5.67 and 97±4.98 was comparable (t=0.92,NS) ; HR at (10 min) Was 109±8.92 and 101±9.13 was significant (t=3.29; P<0.01,S); HR at (20 min) was 111.42 ±4.56 and 105±4.92 was significant (t=4.68 ,P<0.01,S); HR at (30 min) was 114±4.79 and 101±3.67 (t=5.98 ,P<0.001,HS).

DISCUSSION

Hemodynamic stability is very much important during induction of general anaesthesia in surgical patients. Thus, anaesthetic agent with minimum effect on heart rate (HR) and blood pressure (BP) would be the agent of choice for general anaesthesia. Use of inhalational anaesthetics can cause progressive cardiopulmonary depression. Thus, use of non-inhalational anaesthetic agents can decrease the requirement of inhalational anaesthetics which lead to less cardiovascular depression1. Intravenous anaesthetics have a faster onset with minimal side effects than inhalation anaesthetics and are used commonly in induction of general anaesthesia for most of the surgical procedures. The concept of intravenous anaesthesia was first established in 19202. Thiopentone, the most widely used intravenous inducing agent was first administered in 1934 by Waters and Lundy. Even today thiopentoneremains the gold standard against which all newer intravenous induction agents are compared. Hypertensive and hypovolemic patients are more sensitive to thiopentone, characterised by exaggerated hypotensive effects which is due to decrease in myocardial contractility as well as peripheral vasodilation[3,4]. Propofol came into use for practice in 1984. It produces rapid, smooth induction of anaesthesia and fast recovery with decrease incidence of postoperative nausea and vomiting. Thus propofol appears to be a suitable alternative induction agent. The cardiovascular depressant properties of propofol are similar or greater than those of thiopentone5.Propofol is likely to cause profound hypotension in hypovolemic or previously hypertensive patients and those with cardiac disease. Reduced myocardial contractility and decreased systemic vascular resistance could be the reason for decrease in blood pressure[6,7]. In our study we have seen that Average age of the was 35± 3.46 and 36± 4.12 in the Group T and Group P was comparable (t=0.98,df=49,p>0.05) and the ratio of Male : Female ratio was 1.08 and 1.27 was comparable (X2=0.08,df=49,p>0.05) Preop SBP was 123.4±9.83 and 125±11.21 was comparable (t=1.082,NS) ; SBP at (10 min) Was 156±8.92 and 143±9.13 was significant (t=3.78; P<0.01,S); SBP at (20 min) was 149.32 ±8.12 and 130±5.12 was significant (t=3.98,P<0.01,S); SBP at (30 min) was 139±4.52 and 119±4.92 (t=4.52 ,P<0.001,HS) Preop DBP was 78.12±4.54 and 75±7.12 was comparable (t=0.98,NS) ; DBP at (10 min) Was 98±7.82 and 81±6.72 was significant (t=3.78; P<0.01,S); DBP at (20 min) was 86 ±3.42 and 77±4.35 was significant (t=4.75,P<0.01,S); DBP at (30 min) was 78±3.81 and 68±4.91 (t=5.12 ,P<0.001,HS) Preop HR was 98.4±5.67 and 97±4.98 was comparable (t=0.92,NS) ; HR at (10 min) Was 109±8.92 and 101±9.13 was significant (t=3.29; P<0.01,S); HR at (20 min) was 111.42 ±4.56 and 105±4.92 was significant (t=4.68 ,P<0.01,S); HR at (30 min) was 114±4.79 and 101±3.67 (t=5.98 ,P<0.001,HS). These findings are similar to Rakesh Kushwaha 13 *et al* they found in the propofol and group thiopentone , Heart rate, both systolic (SBP) and diastolic blood pressure (DBP) were recorded during induction and at 1 minutes, 2 minutes, 3 minutes and 4 minutes interval after intubation. Thirty patients in each group were included during study period. After induction, there was fall in both mean SBP and DBP after an

increase during intubation which was more in group T ($p<0.05$). The statistically significant difference was observed only at 1min between two groups for SBP (P value <0.05). The mean heart rate was almost similar at pre induction time in both the groups ($p>0.05$). There was rise in heart rate during intubation in both the groups, thereafter heart rate started decreasing. The fall was similar in both the group at any given point of observation (P value >0.05). Both propofol and thiopentone alter the blood pressure and heart rate during induction in surgical patients which are more pronounced in thiopentone but these changes return close to baseline value earlier in case of propofol. So, propofol could be the preferred inducing agent in hemodynamically unstable patients.

CONCLUSION

It can be concluded from our study that the Profopol found to be hemodynamically stable as compared to thiopentone hence whenever there is hemodynamical stability id utmost important in such cases the Profopol should be preferred over thiopentone.

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