International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391

A Study of Relation of Propofol Dose to Attain Induction in Anesthesia when used with Dexmedetomidine

Dr Panchakshari[1], Gowda. D. Patil[2]

Associate Professor, Kanachur Institute of Medical Sciences, Mangalore

Abstract: ***Since a combination of propofol and dexmedetomidine can cause both beneficial and adverse effects on the patient, it would be ideal to titrate the dosage of dexmedetomidine to retain its desirable effects while negating its side effects. Different doses of dexmedetomidine have been used with an induction agent for attenuation of hemodynamic response to intubation. Dexmedetomidine a potent, highly selective α2 adrenoreceptor agonist possess desirable properties like sedation, analgesia, sympatholysis and reduces the anaesthetic requirement.***

Keywords: Propofol, Dose, Attain, Induction, Dexmedetomidine

1. Introduction

Since a combination of propofol and dexmedetomidine can cause both beneficial and adverse effects on the patient, it would be ideal to titrate the dosage of dexmedetomidine to retain its desirable effects while negating its side effects. Different doses of dexmedetomidine have been used with an induction agent for attenuation of hemodynamic response to intubation. Propofol, barbiturates, and benzodiazepines are all associated with profound hemodynamic adverse effects at doses needed to attenuate response to laryngoscope and intubation 1.As it is impractical to achieve sufficient depth to prevent sympathetic response to intubation solely with a single agent, adjuvants like opioids, β blockers, calcium channel blockers,vasodilators, etc areused2. It is essential to remember that, time of laryngoscope and intubation should coincide with the peak affect of agents used to minimize the hemodynamic stimulation. Opioids are widely used adjuvants and appear to give a graded response in blunting hemodynamic responses. While 2 µg/kg of fentanyl given before induction partially attenuates cardiovascular response, higher doses that prevent a hemodynamic response to intubation are associated with the risk of adverse effects3.

A bolus of 1.5 mg/kg of lignocaine given intravenously adds 0.3 MAC of anesthetic potency and can blunt hemodynamic responses to intubation4. Kasten and co – workers showed that lignocaine administered (3 mg/kg) intravenously is associated with significant attenuation of hemodynamic response to endotracheal intubation5.

α2 agonists like clonidine have been used extensively in the past forattenuation of sympathoadrenal stimulation caused by tracheal intubation andsurgery. They have the desirable properties of sedation, anxiolysis, andanalgesia with no respiratory depression. In addition α2 agonists also sympatholytic and antinociceptive effects that contribute to hemodynamicstability during surgical stimulation. They also reduce the dose requirement ofintravenous and volatile anaesthetics.6 Dexmedetomidine is a potent and highly selective α2 adrenoreceptoragonist which was approved for clinical use in 1999 and recently introduced inIndia. It has all the above mentioned properties and can impart significantbenefits in the peri-operative use.6

In spite of the multiple desirable effects of dexmedetomidine, bradycardia and hypotension remain clinically significant adverse effects. Highdoses of dexmedetomidine can result in a decreased heart rate and cardiacoutput, with a biphasic dose response relation for BP. High doses ofdexmedetomidine can also be a cause of systemic and pulmonaryhypertension.

In this study, we compared and evaluated the different doses of dexmedetomidine for the effect on induction dose of propofol and hemodynamic effects.

2. Aims and Objectives

To study the relation of Propofol Dose to Attain Induction in Anesthesia when used with Dexmedetomidine.

3. Materials and Methods

This study was conducted on 400 patients posted for elective surgeryunder general anaesthesia in Justice Kanachur Institute of Medical Sciences, Deralakatte,Mangalore. The study was conducted from 1/10/2015 to 1/06/2016.

Patients were randomly allocated to one of the four study groups i.e. group A,B,C,D by computer generated sequence to receive a study

drug diluted to 20 ml via an infusion pump over 20 minutes.

- Group A received 1 µg/kg of dexmedetomidine.
- Group B received 0.6 µg/kg of dexmedetomidine.
- Group C received 0.3 µg/kg of dexmedetomidine.
- Group D received 20 ml of normal saline.

The relation of Propofol Dose to Attain Induction in Anesthesia when used with Dexmedetomidine was studied.

4. Results

There is significant intergroup difference between the four groups for induction dose of propofol (p<0.001). Mean propofol dose for loss of eyelash reflex in the groups A, B, C and D were 48.63 mg, 59.48 mg, 71.51 mg, 88.42 mg. Similarly the mean propofol dose for loss of verbal response in the groups A, B,C and D were 47.97 mg, 58.7mg, 71.72 mg , 88.75 mg. Significant differences existed between all groups(<0.001).

Table 1: Propofol dose

Propofol dose (mg)	*Group*	*Mean (mg)*	*Std. Deviation*	*Significance (p)*
For loss of eyelash reflex	A	48.63	16.246	<0.001
	B	59.48	21.095	
	C	71.51	25.79	
	D	88.42	20.886	
For verbal response	A	47.97	15.184	<0.001
	B	58.7	21.067	
	C	71.72	26.728	
	D	88.75	21.299	

Table 2: Propofol dose in mg/kg

Group	*Weight(kg)*	*Propofol dose(mg/kg)*	
		Eyelash reflex	*Verbal response*
A	52.16	0.93	0.91
B	54.74	1.08	1.07
C	55.25	1.29	1.29
D	53.76	1.64	1.65

5. Discussion

There was significant intergroup difference between the four groups in terms of propofol requirement for induction (p<0.001). Mean propofol dose for loss of eyelash reflex and verbal response was 48.63 mg (0.93 mg/kg) and 47.97 mg (0.91 mg/kg) respectively in group A. This was much lesser than the dose needed in the control group (1.64 and 1.65 mg/kg for loss of eyelash reflex and verbal response).

Ghodki et al (2012) noted that mean dose of propofol required for induction was 37.5 mg (0.75 mg/ kg) with 1 µg/kg of dexmedetomidine IV given pre induction. 52 However they noted the dose of propofol needed to achieve entropy of 40-60 as compared to loss of verbal response and eyelash reflex in our study.

6. Conclusion

Dexmedetomidine reduced the induction dose of propofol; a maximum reduction was seen along with 1 µg/kg followed by 0.6 µg/kg and 0.3 µg/kg.

References

[1] Kimura T, Watanabe S, Asakura N, Inomata S, Okada M, Taguchi M. Intracranial pressure, mean arterial pressure, and heart rate following midazolam or thiopental in humans with brain tumors. Anesth Analg. 1994 Aug;79(2):378-81
[2] Bajwa SJ, Kaur J, Singh A, Parmar S, Singh G, Kulshrestha A et al Attenuation of pressor response and dose sparing of opioids and anaesthetics with pre-operative dexmedetomidine. Indian J Anaesth. 2012 Mar;56(2):123-8
[3] Kautto H Attenuation of the circulatory response to laryngoscopy and intubation by fentanyl. Acta Anaesthesiol Scand. 1982 Jun;26(3):217-21
[4] Himes RJ, DiFazio C, Burney R: Effects of lidocaine on the anesthetic requirements for nitrous oxide and halothane. Anesthesiology 1977; 47:437
[5] Kasten GW, Owens E. Evaluation of lidocaine as an adjunct to fentanyl anesthesia for coronary artery bypass graft surgery. Anesth Analg 1986; 65:511
[6] Arcangeli A, D Alo C, Gaspari R Dexmedetomidine Use in General Anaesthesia. Curr Drug Targets. 2009 Aug;10(8):687-95