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HEMODYNAMIC CHANGES DURING LMA INSERTION FOLLOWING DEXMEDETOMIDINE AND PROPOFOL VERSUS FENTANYL AND PROPOFOL - A PROSPECTIVE COMPARATIVE DOUBLE BLIND STUDY

Dr Renu Devaprasath HOD, Dept. Anaesthesia, Dr Jeyasekharan Hospital, Nagercoil

Dr Jeyanthan T* Anaesthesiologist, Dr Jeyasekharan Hospital, Nagercoil *Corresponding Author

Dr Alex Francisco Nicholas Anaesthesiologist, Dr Jeyasekharan Hospital, Nagercoil

Dr Hari Prasad DNB Anaesthesia registrar, Dr Jeyasekharan Hospital,Nagercoil

Dr Unnikrishnan C P DNB Anaesthesia registrar, Dr Jeyasekharan Hospital,Nagercoil

ABSTRACT

Background and Aims: Laryngeal mask airway is a useful alternative to the endotracheal tube to provide general anaesthesia. LMA insertion usually produces hemodynamic changes and it's insertion requires optimal conditions to minimize the hemodynamic changes. This study compares the hemodynamic changes during LMA insertion with Propofol and Fentanyl Vs Propofol and Dexmedetomidine.

Methods: A prospective, double blind, comparative study conducted on 54 ASA 1 or 2 patients in the age group 18-60 years coming for procedures under GA. Patients were randomized into two groups of 27 each. Both group received propofol 2mg/kg for induction, Group F received fentanyl 2µg/kg and group D received dexmedetomidine 1µg/kg. HR, SBP, DBP and MAP were monitored prior to injection of the study drug and at following time intervals: after study drug, before insertion, after insertion,1,3,5 and 10 min after insertion.

Result: There are no significant change in HR, SBP, DBP & MAP after LMA insertion compared to pre LMA values in both groups.

Conclusion: There are no significant hemodynamic changes in both groups.

KEYWORDS : LMA, Propofol, Fentanyl, Dexmedetomidine

INTRODUCTION

For moderate to minor surgical procedures LMA is a useful alternative to provide general anaesthesia[1].

LMA insertion requires sufficient depth for suppression of airway reflexes. Popular method of providing anaesthesia for LMA insertion is with i.v propofol-which induces anaesthesia rapidly and suppresses airway reflexes. But iv propofol is associated with adverse effects like hypotention, apnea and pain on injection. So to reduce the dose of propofol and for analgesia opioid like fentanyl or alpha 2 agonist like dexmedetomidine are combined with propofol[2].

Review of literature does not show many studies on hemodynamic changes with these two drug combinations , which led us to this study.

Current study is to compare the hemodynamic changes during LMA insertion following dexmedetomidine with propofol versus fentanyl with propofol.

METHODS

After obtaining Scientific and Ethics committee clearance, 54 patients were selected and randomly allocated into two groups as per randomization method.

- Group F – patients getting propofol and fentanyl.
- Group D – patients getting propofol and dexmedetomidine.

- **INCLUSION CRITERIA:**
- ASA 1 and 2 patients
- Age 18-60 yrs
- Patients undergoing elective short surgical procedures under GA

- **EXCLUSION CRITERIA:**
- ASA 3 and 4 patients
- Anticipated difficult airway
- Patients with allergy to propofol,fentanyl or dexmedetomidine
- Pregnant patients
- Patients not willing to participate in the study

Written informed consent was obtained from the patient and standard protocols for General anesthesia were as follows:

- Premedication with Inj Ondansetron 4mg iv+ Inj Rabeprazole 20 mg iv given for all patients 1 hour prior to surgery.
- Patient shifted to the Operating room, connected to monitors for Pulserate(PR), Respiratory Rate(RR), Non-invasive blood pressure(NIBP), Oxygen Saturation(SpO_2) and Electrocardiogram(ECG) and baseline values recorded.
- The study drug, either Dexmedetomidine 1µg/kg or Fentanyl 2µg/kg diluted in 100ml normal saline so that the study drugs appeared to be identical in appearance. All patient care providers, including anesthesiologists, nurses and study personnel were blinded during group allocation.
- Pre-oxygenation done with facemask for 3 min. The study drug was given over 10 min. After 30sec, propofol 2mg/kg was given over 30sec for induction without any neuromuscular blocking agents. 90sec after the induction appropriate size LMA was inserted by Anaesthesiologist-I. Parameters observed were SBP,DBP,MAP,HR after study drug, before insertion, after insertion (defined as immediately after cuff inflation) and 1,3,5and 10 minute after insertion. All parameter were recorded by Anaesthesiologist-II. Both anaesthesiologists were blind to the study drug used.
- Maintenance of anaesthesia was done with 1 MAC of sevoflurane, 50% N_2O and 50% O_2

RESULTS

TABLE-1: Comparison Of Pre-LMA HR To Post LMA,1,3,5 & 10 Min HR In Both Groups

Pairwise Comparisons							
GROUP	(I) TIME	(J) TIME	Mean Difference (I-J)	Std. Error	P VALUE (SIGNIFICANT IF <0.001)[b]	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
GROUP D	Before LMA Insersion	After LMA Insertion	-.333	.456	1.000	-1.920	1.254
		After 1min	.370	.545	1.000	-1.525	2.266

		After 3min	.741	.522	1.000	-1.075	2.557
		After 5min	1.148	.716	1.000	-1.342	3.638
		After 10min	1.704	.647	.392	-.547	3.954
GROUP F	Before LMA Insersion	After LMA Insertion	-2.519	.770	.085	-5.200	.163
		After 1min	-.889	.752	1.000	-3.505	1.727
		After 3min	.481	.800	1.000	-2.301	3.264
		After 5min	1.667	.885	1.000	-1.413	4.747
		After 10min	2.519	.829	.151	-.367	5.404

TABLE-2 : Comparison Of Pre-LMA SBP To Post LMA,1,3,5 & 10Min SBP In Both Groups

Pairwise Comparisons							
GROUP	(I) TIME	(J) TIME	Mean Difference (I-J)	Std. Error	P VALUE (SIGNIFICANT IF <0.001)[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
GROUP D	Before LMA Insersion	After LMA Insertion	.222	.598	1.000	-1.857	2.302
		After 1min	1.630	.716	.879	-.863	4.123
		After 3min	2.815*	.547	.001	.911	4.718
		After 5min	3.963*	.614	<0.001	1.825	6.101
GROUP F		After 10min	3.852*	.622	<0.001	1.688	6.016
	Before LMA Insersion	After LMA Insertion	-1.000	.912	1.000	-5.174	1.174
		After 1min	-.074	.560	1.000	-2.021	1.873
		After 3min	.815	.547	1.000	-1.089	2.718
		After 5min	1.407	.583	.647	-.621	3.436
		After 10min	2.222*	.635	.047	.014	4.430

Table-3 :Comparison Of Pre-LMA DBP To Post LMA,1,3,5 & 10min DBP In Both Groups

Pairwise Comparisons							
GROUP	(I) TIME	(J) TIME	Mean Difference (I-J)	Std. Error	P VALUE (SIGNIFICANT IF <0.001)[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
GROUP D	Before LMA Insersion	After LMA Insertion	.222	.598	1.000	-1.857	2.302
		After 1min	1.630	.716	.879	-.863	4.123
		After 3min	2.815*	.547	.001	.911	4.718
		After 5min	3.963*	.614	<0.001	1.825	6.101
		After 10min	3.852*	.622	<0.001	1.688	6.016
GROUP F	Before LMA Insersion	After LMA Insertion	-1.000	.912	1.000	-5.174	1.174
		After 1min	-.074	.560	1.000	-2.021	1.873
		After 3min	.815	.547	1.000	-1.089	2.718
		After 5min	1.407	.583	.647	-.621	3.436
		After 10min	2.222*	.635	.047	.014	4.430

Table-4 :Comparison Of Pre-LMA MAP To Post LMA,1,3,5 & 10min MAP In Both Groups.

Pairwise Comparisons							
GROUP	(I) TIME	(J) TIME	Mean Difference (I-J)	Std. Error	P VALUE (SIGNIFICANT IF <0.001)[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
GROUP D	Before LMA Insersion	After LMA Insertion	.481	.537	1.000	-1.389	2.352
		After 1min	2.148*	.569	.024	.168	4.129
		After 3min	3.370*	.684	.001	.991	5.750
		After 5min	4.037*	.648	<0.001	1.781	6.293
		After 10min	4.444*	.761	<0.001	1.796	7.093
GROUP F	Before LMA Insersion	After LMA Insertion	-2.556	.928	.297	-5.785	.674
		After 1min	-.593	.510	1.000	-2.367	1.182
		After 3min	.370	.553	1.000	-1.552	2.293
		After 5min	1.000	.602	1.000	-1.093	3.093
		After 10min	1.593	.595	.356	-.478	3.663

Comparison of the HR,SBP,DBP&MAP-BEFORE LMA INSERTION with the AFTER LMA INSERTION is statistically non significant with a p value of >0.001 in group D

Comparison of the HR,SBP,DBP&MAP-BEFORE LMA INSERTION with the AFTER LMA INSERTION is statistically non significant with a p value of >0.001 in group F

TABLE-5 : Distribution Of Age,Weight,Height And BMI

	GROUP	N	Mean	Std. Deviation	t	df	P VALUE
AGE	GROUP D	27	29.67	5.277	-0.132	52	0.895
	GROUP F	27	29.89	6.936			

WEIGHT	GROUP D	27	57.56	5.925	0.318	52	0.752
	GROUP F	27	57	6.878			
HEIGHT	GROUP D	27	153.56	8.911	0.765	52	0.448
	GROUP F	27	151.78	8.154			
BMI	GROUP D	27	24.48148	2.485966	-0.415	52	0.68
	GROUP F	27	24.77778	2.753646			

There is no significant difference in the distribution of age,weight,height and BMI between two groups

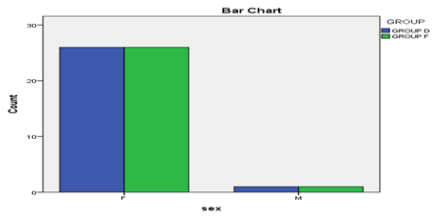

Figure-1: Sex Distribution In Two Groups

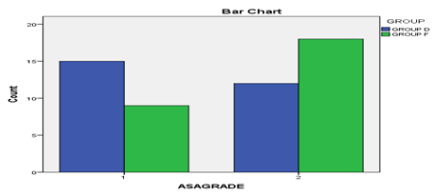

Figure-2 :asa Distribution In Two Groups

No significant difference in distribution of sex and ASA between two groups

DISCUSSION

The best way of securing airway is by tracheal intubation. However, it is associated with many complications. So for moderate to minor surgical procedures, laryngeal mask airway (LMA) has proved to be a useful alternative.

LMA insertion also requires obtundation of airway reflexes. Hence propofol has been the most preferred agent. But when used alone it causes significant cardiorespiratory depression. In order to decrease the adverse effects of propofol other drugs have been combined with it and studied.

Previous studies compared the efficiency of drugs like fentanyl, morphine, ketamine, midazolam, nalbuphine, esmolol and dexmeditomidine with propofol for LMA insertion.

Previous studies comparing fentanyl and dexmedetomidine with propofol for the ease of LMA insertion and hemodynamic changes used different concentration of drugs and they infused it over different durations. In our study we used 2 µg/kg of fentanyl and 1µg/kg of dexmedetomidine and infused over 10min.

Demographic profile

In our study the demographic data of patient age, sex, height, weight, BMI & ASA were similar in both groups.

In our study there was no significant change in HR, SBP, DBP, MAP after LMA insertion compared to pre LMA values in both group. Thus our study showed there is no significant difference in the effectiveness of blunting the hemodynamic response to LMA insertion in both groups.

But study by **Surabhi et al** showed no significant change in post LMA HR compared to pre LMA HR in dexmedetomidine group, but in fentanyl group there was significant change. These results were different from our study results[3].

Study by **Shalaka Sandeep** et al also showed haemodynamics were comparable between the dexmedetomidine-propofol and fentanyl-propofol groups during LMA insertion[4].

Study by **Priyanka Dabas** et al concluded that more attenuation of haemodynamic response in dexmedetomidine group compared to fentanyl group. But in our study both drugs equally blunted the stress response to LMA insertion[5].

In most previous studies dexmedetomidine was found more effective in attenuating pressor response to LMA insertion. But in our study both drugs were equally effective.

CONCLUSION

This study concluded that, Hemodynamic changes were insignificant during LMA insertion following 1µg/kg dexmedetomidine and propofol versus 2 µg/kg fentanyl and propofol

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