ORIGINAL RESEARCH PAPER

Anaesthesiology

KEY WORDS: diagnostic direct laryngoscopy, superior laryngeal nerve, recurrent laryngeal nerve, hemodynamic stability.

"COMPARATIVE STUDY OF AIRWAY BLOCKS VERSUS GENERAL ANAESTHESIA FOR DIAGNOSTIC DIRECT LARYNGOSCOPY"

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ABSTRACT

BACKGROUND: Direct rigid laryngoscopy and general anaesthesia (GA) are associated with many problems. airway blocks can be considered as safer and easier alternative techniques especially among old and comorbid patients and conditions with difficult airways as well.

OBJECTIVE: The present study was conducted to compare efficacy of airway blocks versus general anaesthesia for diagnostic direct (rigid) laryngoscopy.

METHODS: A randomised comparative trial was conducted among patients undergoing diagnostic direct laryngoscopy (DLS) for peri laryngeal lesions. sixty patients of either sex aged between 20 to 70 years and categorised as American Society of Anesthesiologists (ASA) grade I, II, III or IV were divided under two goups of 30 patients each. Group-A underwent DLS with airway blocks and group-B underwent DLS under GA. Haemodynamic parameters and analgesia were interpreted statistically.

RESULTS: Difference in haemodynamic stability and quality of post- operative analgesia were primary outcomes. Patients in group-A were observed to be haemodynamically more stable as compared to group-B.

CONCLUSION: Regional airway blocks provide better haemodynamic stability and than general anaesthesia.

INTRODUCTION

Direct rigid laryngoscopy is a very common procedure performed to investigate and/or to treat lesions in the larynx with or without using operating microscope.[1]

Direct rigid laryngoscopy and general anaesthesia for this procedure, associated with complications like difficult airway, hypoxia, hypercarbia, arrhythmia, hypertension and tachycardia.[1] Postoperative complications like oedema, laryngospasm, sore throat and cough are also important concerns.[2] These patients are old age and have comorbidities like COPD, uncontrolled hypertension and diabetes, ischemic heart disease leads to high risk for general anaesthesia. These can be avoided if the procedure is conducted in a sedated but arousable patient with intact airway reflexes under regional anaesthesia.[4]

Recently many innovative regional techniques have been in practice by anaesthesiologist but blocks are also subjected to certain rate of complications or failure.[5,6]

We used landmark method for airway blocks. Even though general anaesthesia is a standard technique used for diagnostic direct laryngoscopy, use of airway blocks for the same can be a boon, especially for above mentioned conditions.

Thus, we designed this study to compare efficacy of regional anaesthesia/airway blocks versus general anaesthesia for diagnostic direct laryngoscopy (DLS) with objectives to study the haemodynamic changes during DLS and requirement of analgesia.

Methodology

This randomised (consecutive sampling with every alternate patient taken in either group), single blinded, comparative trial was conducted; patients of either sex aged between 20 and 80 years and categorised as American Society of Anesthesiologist (ASA) grade I, II, III or IV who reported from September, 2019 to March, 2021 were included in the study after obtaining valid written informed consent through consecutive sampling. The subjects were divided into two groups in proportion of 1:1. Patients with history of epilepsy/convulsions, presence of coagulopathies, hypersensitivity to any drug used in this study, pregnancy and lactation were excluded from the study.

Total 60 patients were enrolled in the study according to inclusion and exclusion criteria. Out of the total 60 patients, 30 were included under Group A (undergoing DLS with airway block) and the remaining 30 were included under Group B (undergoing DLS with GA).

Pre-anaesthetic check up was done a day before surgery which included a detailed history, general physical and systemic examination. Basic investigations include complete blood count, bleeding time, clotting time, fasting blood sugar, blood urea, serum creatinine, chest radiograph, electrocardiogram, viral markers (HIV, HbsAg, HCV) were done. Patients were kept nil per oral overnight. They were explained about airway blocks technique and general anaesthesia and written informed consent was taken from them and their close relatives.

All 60 patient were administered premedication with inj. Emset 60ug/kg, inj. Glycopyrrolate 40 ug/kg given, Subjects who were in

1) group-A (n = 30), given gargles with 2% viscous lignocaine up to10 mL (200mg) followed by three puffs of 10% lignocaine (30 mg) 10 min later followed by superior laryngeal nerve block with 1% lignocaine (4mL/40 mg) followed by recurrent laryngeal nerve block with 4% lignocaine (2 mL/80 mg).
2) group-B (n = 40), induction done with inj. propofol 2 mg/kg and inj. succinylcholine 2 mg/kg after preoxygenation with 100 % o2 for 5-7 min.

For delivering airway blocks, first, for glossopharyngeal nerve block, 2% viscous up to 10 mL (200 mg) of lignocaine was given for gargling for 2 min and then the subject was told to expectorate. Gargling provided anaesthesia to the oral and pharyngeal mucosa but it did not cover the larynx and trachea adequately. After 10 min of gargling, 3 puffs of 10% lignocaine

(30 mg) were sprayed on the mucosa of oropharynx, soft palate, posterior portion of the tongue and the pharyngeal surface of the epiglottis[7,8].

For superior laryngeal nerve block, under sterile aseptic precautions, Patients were shifted to operating table, and they were made in supine position. Pulse and blood pressure were recorded non-invasively. An intravenous infusion was started in one of the forearm veins. With the patient lying in supine position, the head was maximally extended, The cornu of the hyoid bone was easily identified by palpating outwards from the thyroid notch along the upper border of the thyroid cartilage until the greater cornu was encountered just superior to its posterolateral margin. The non-dominant hand was used to displace the hyoid bone with contralateral pressure, bringing the ipsilateral cornu and the internal branch of the superior laryngeal nerve towards the anaesthesiologist. A 1.5 inch, 23-gauge needle was inserted in an antero infero medial direction until the lateral aspect of the greater cornu was contacted. The needle was retracted slightly after contacting the hyoid. After confirming negative aspiration for air and blood, 2 mL of local anaesthetic (1% lignocaine) without epinephrine was injected. The same procedure was repeated on the opposite side (total dose 40 mg).[7,9].

Finally, for recurrent laryngeal nerve block, the cricothyroid membrane was located by palpating the thyroid prominence goes in a caudal direction. Under sterile aseptic precautions after administration of local anaesthetic, a 22gauge needle with syringe containing 2mL of 4% lignocaine (80 mg) was passed perpendicular to the axis of the trachea and membrane was pierced. Needle was advanced till free air could be aspirated signifying that the needle was in the larynx. Instillation of local anaesthetic at this point resulted in coughing, thus, confirming the block[8].

Following observation were done
1. Intra op HR
2. Intra op MBP
3. Intra op Spo2

Intra op monitoring done for 0,5,10,15,20mins.

RESULT

Sixty patients were enrolled in our study. Demographic data was comparable in both groups. Procedure was common in males as compared to females in both groups. Majority of patients were of ASA grade-1 (46.78 %) followed by grade-2 (30%), grade-3(13 %) and 10 % patients had grade-4 in group-A. Similarly, in group-B, 56.6 % patients had grade-1 followed by 30 % in grade-2, 6.66 % in grade 3 and 6.66 % in grade 4 patients [Table 2]. This distribution of patients was according to randomisation of eligible patients coming in study duration.

In group A onset of sensory blockade was 11 ± 2.06 min and duration was 57.4 ± 5.04min (table 3)

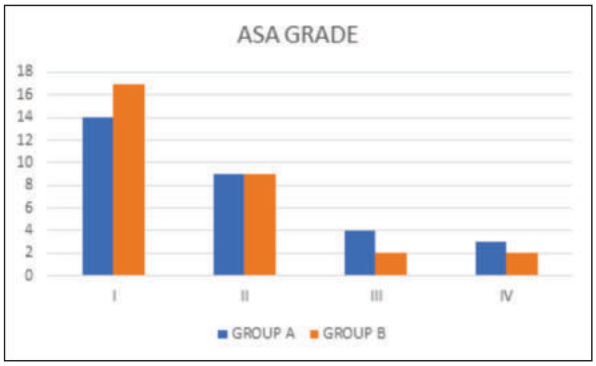
Table 1: Demographic Data

VARIABLE	GROUP A	GROUP B	P VALUE
AGE	57.6 ± 14.5	58.2 ± 13.92	0.872
SEX (M:F)	19:11	20:10	0.7866
WT	56.8 ± 13.92	56.1 ± 7.7	0.7602

Table 2 : Asa Grade

ASA GRADE	GROUP A	GROUP B	P VALUE
I	9(30%)	9(30%)	0.7633
II	14 (46.78%)	17(56.66%)	
III	4(13%)	2(6.66%)	
IV	3(10%)	2(6.66%)	

Chi-square test was use
P value <0.05 is significant



Figur 1: Asa Grade

Table 3: Intraoperative Hr (beats/min)

VARIABLE	GROUP A MEAN ± SD	GROUP B MEAN ± SD	P VALUE
0 MIN	91.03 ± 6.69	93.13 ± 7.07	0.2505
5 MIN	90.13 ± 5.73	94.43 ± 4.64	0.0026
10 MIN	85.26 ± 3.67	99.93 ± 4.85	<0.0001
15 MIN	81.6 ± 3.87	102.86 ±4.34	<0.0001
20 MIN	78.73 ± 4.99	101 ± 6.69	<0.0001

Student's t-test;
P value <0.05: significant

Figur 2: Intraoperative Hr

In both group, rise in mean blood pressures and pulse rate was not more than 20%–30% of baseline, still patients in group A were statistically more stable compared to group B with significant *P* value (<0.05).

The intraoperative mean heart rate changes in group A were from (91.03 ± 6.69 / min) to (78.73 ± 4.99/min)and group B were (93.13 ± 7.07/min) to(101 ± 6.69/min) (table 4,figur 3) which was statistically highly significant and showed better analgesia and patient comfort with group A as compared to group B.

We observed that the patients mean blood pressure at the time of start of induction was same in both groups but as the procedure continued, group A showed a fall in mean blood pressure (96.83 ± 5.82 mmHg) to (89.6 ± 3.57 mmHg), (table 5, figure 4) with the pain relief during the procedure. In group B there was initial fall in the blood pressure due to the induction with propofol from 95.7 ± 4.96 mmHg to 93.6 ± 5.93 mmHg in the first 5 minutes after which it was increased to 97.26 ± 6.67 mmHg by the end of procedure.

Table 4: Intraoperative Map (mmhg)

VARIABLE	GROUP A MEAN ± SD	GROUP B MEAN ± SD	P VALUE
0 MIN	96.83 ± 5.82	95.7 ± 4.96	0.4586
5 MIN	94.6 ± 4.21	93.6 ± 5.93	0.4926
10 MIN	92.8 ± 3.96	100.1 ± 5.41	<0.0001
15 MIN	90.4 ± 3.87	96.5 ± 6.04	<0.0001

20 MIN	89.6 ± 3.57	97.26 ± 6.67	<0.0001

Student's t-test;
P value <0.05: significant

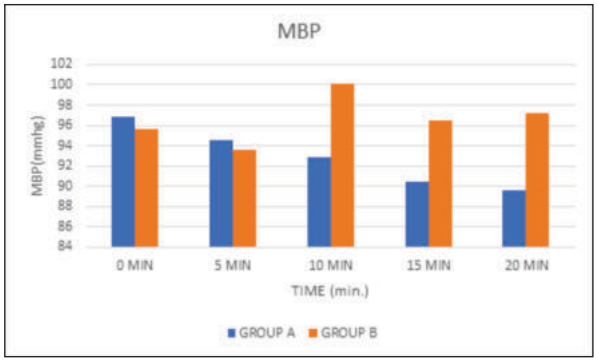


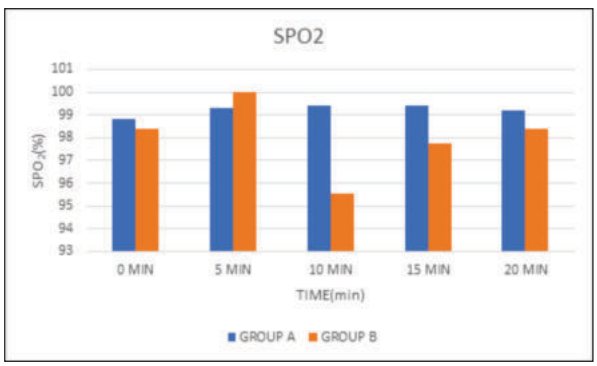
Figure 3: Mbp
In group B , SPO2 Was decrease from baseline up to mean of 95.5 compare to group A with significant

p value (0.0001)(table 6).

Table 5 : Spo2 (%)

VARIABLE	GROUP A MEAN ± SD	GROUP B MEAN ± SD	P VALUE
0 MIN	98.8 ± 1.6	98.3 ± 1.47	0.2643
5 MIN	99.3 ± 1.32	100 ± 0	0.0005
10 MIN	99.4 ± 1.08	95.5 ± 5.10	0.0001
15 MIN	99.4 ± 0.84	97.7 ± 1.72	<0.0001
20 MIN	99.2 ± 1.27	98.3 ± 1.47	0.0247

Student's t-test, P value <0.05 : significant



Figur 4 : Spo2

DISCUSSION:

Diagnostic DLS for peri-laryngeal lesions is a very common procedure and is conventionally performed under GA in our institute(GKGH,GAIMS,BHUJ). While GA has its own advantages, it can become risky, in dealing with difficult airway, fragile growths, bleeding polyps and patients with multiple comorbidities. In such a situations, airway blocks are life saving for patients as well as a boon for anaesthesiologists. However, airway blocks although technically simple, require a considerable amount of practice and skill. Therefore, we did a study to compare general anaesthesia with airway blocks for diagnostic DLS.

In 2009, V TRIVEDI, B PATIL. done a prospective randomised study of 100 patients divided into two groups was done to compare the effects of regional airway nerve blocks versus general anaesthesia to evaluate intr-aoperative hemodynamic changes and compare the level of post op analgesia and sedation in both groups. study showed significant hemodyanamic changes in group2 with significant rise in mean arterial pressure and pulse rate during perioperative period. Whereas in group1there was a stability in mean arterial pressure and pulse rate perioperatively.[9]

In 2012 ,Gunjan sharma & Vandana Trivedi done a prospective randomised study of 100 patients divided into two groups was done to compare the effects of regional airway nerve blocks versus general anaesthesia to evaluate intra-operative haemodynamic changes and compare the level of postoperative analgesia and sedation in both the groups. In group I whole airway block including bilateral superior laryngeal nerve block with bilateral glossopharyngeal block and recurrent laryngeal nerve block was given and in group II general anaesthesia was given. They concluded that significant haemodyanamic changes in group II with significant rise in mean arterial pressure and pulse rate during peri-operative period. Whereas in group I there was a stability in mean arterial pressure and pulse rate peri-operatively.[10]

Gupta et al.in 2014 also compared two methods of airway anaesthesia, namely, ultrasonic nebulisation of local anaesthetics and airway blocks.[11] They found that there was no statistically significant difference in blood pressure between both groups at any time interval.

In 2000, Kundra et al. also compared two methods of anaesthetising the airway for awake fiberoptic nasotracheal intubation and found that the mean HR and BP in the nebulisation group were significantly higher during endotracheal tube insertion.[12]

In a study, Chatrath et al. in 2016 evaluated haemodynamic changes under combined regional nerve blocks during awake orotracheal fiberoptic intubation and concluded that there was statistically significant increase in heart rate, systolic blood pressure and diastolic blood pressure at each minute during fiber optic bronchoscopy.[13] Maximum changes were seen at the time of intubation from the basal value, which was significant and gradually normalised towards the basal levels after 3rd–4th min of intubation and even lesser after 10 min of monitoring.

In our study, in group with airway block was more haemodynamically stable as compared to in group with general anesthesia as we gave all three nerve blocks (glossopharyngeal nerve, superior laryngeal nerve, recurrent laryngeal nerve) and did not intubate the patients as in our institute DLS is traditionally done under general anaesthesia without intubation.

CONCLUSION:

General anaesthesia is a definitive technique for managing diagnostic DLS but Regional airway blocks provide better haemodynamic stability, especially for patients who fall into higher ASA grades (grade 3 and grade 4), have impaired haemodynamic stability and have anticipated difficult airway.

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