

## A RANDOMIZED DOUBLE BLIND PROSPECTIVE STUDY COMPARISON BETWEEN DEXMEDETOMIDINE AND FENTANYL ON INTUBATION CONDITIONS DURING AWAKE FIBROPTIC BRONCHOSCOPIC INTUBATION

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### Abstract

It is important to prepare patients including psychological preparation, antisialogogue administration, anaesthetising the upper airway to blunt the airway reflexes, adequate sedation, anxiolysis while preserving airway patency and spontaneous breathing. There are many drugs that have been used for producing conscious sedation such as Benzodiazepines, opioids, propofol which can be either used alone or in combination.

**Materials and Methods:** This study done at Dept of Anaesthesiology, Esic medical college and hospital Kalaburagi. Sixty patients of ASA physical status 1 or 2 for elective surgical procedures being done under general anaesthesia with endotracheal tube was taken into account for my study.

**Results:** Age distribution of these patients in the two groups in the above table showed that  $40.97 \pm 4.07$  and  $39.93 \pm 3$  in years is the mean age group of the Group A and Group B respectively.

**Conclusion:** From the above study it is concluded that dexmedetomidine provides favourable intubating conditions fibroptic bronchoscope guided intubation.

**Keywords:** Intubation, Awake

### Introduction

Awake fibroptic intubation (AFOI) is indicated in patients with anticipated difficult airway, failed tracheal intubation, unstable cervical spine injury where positioning for laryngoscopy is difficult. It is important to prepare patients including psychological preparation, antisialogogue administration, anaesthetising the upper airway to blunt the airway reflexes, adequate sedation, anxiolysis while preserving airway patency and spontaneous breathing. There are many drugs that have been used for producing conscious sedation such as Benzodiazepines, opioids, propofol which can be either used alone or in combination. Midazolam administration results in amnesia and sedation. Propofol usage produces rapid onset of action and reduced context sensitive half life with profound amnesia. Opioids example: Fentanyl and Remifentanyl administration results in attenuating hemodynamic response and in reduction of discomfort during the passage of FOB through vocal cords. All of the above drugs result in favourable intubating conditions, the incidence of oxygen desaturation is high. One must be cautious not to cause hypoxia (which may cause fatal complications) in difficult airway scenarios. Propofol if used in high doses can cause loss of muscle tone of upper airway muscles which in turn causes difficulty in negotiation of FOB beyond the epiglottis and may even result in apnea.

Therefore an ideal agent for conscious sedation should ensure Spontaneous ventilation with adequate airway patency, patient cooperation favourable intubating conditions and stable

hemodynamics and should not produce respiratory depression.

**Materials and Methods**

Sixty patients of ASA physical status 1 or 2 for elective surgical procedures being done under general anaesthesia with endotracheal tube was taken into account for my study.

Patients under age groups between 25 to 60 years of both sexes were taken for the prospective, randomised, double blinded study by comparing dexmedetomidine and fentanyl for intubation using fibroptic bronchoscopic technique. This study was approved by our ethical committee in our institution and informed consent was obtained from the patients and then the study was conducted.

**Inclusion Criteria:**

ASA 1 & 2 Patients.

Age :25 to 60 years Surgery : Elective Mallampatti I and II

Who have given valid informed consent.

**Exclusion Criteria:**

Not satisfying inclusion criteria Emergency surgery

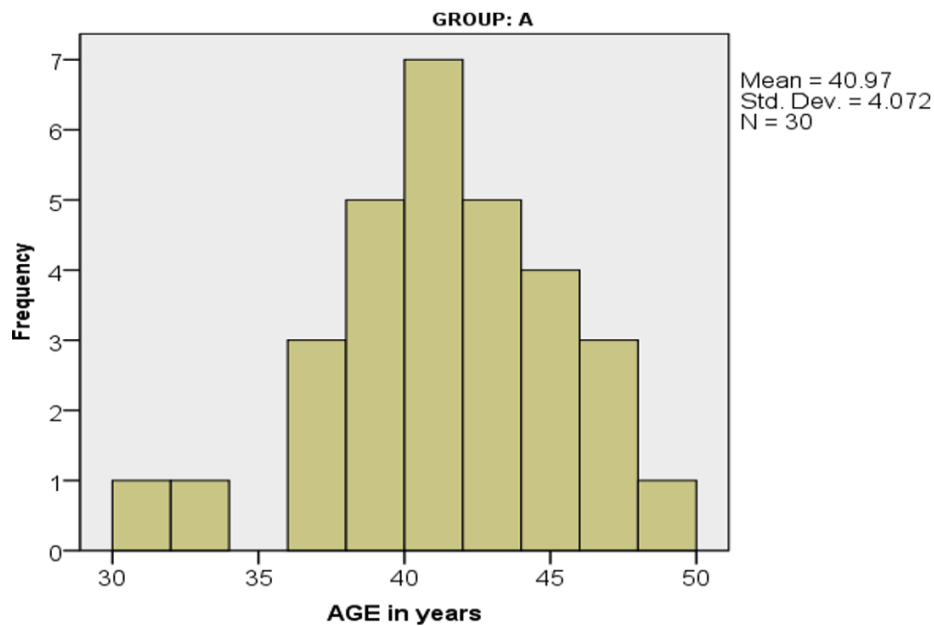
Lack of written informed consent

**Results**

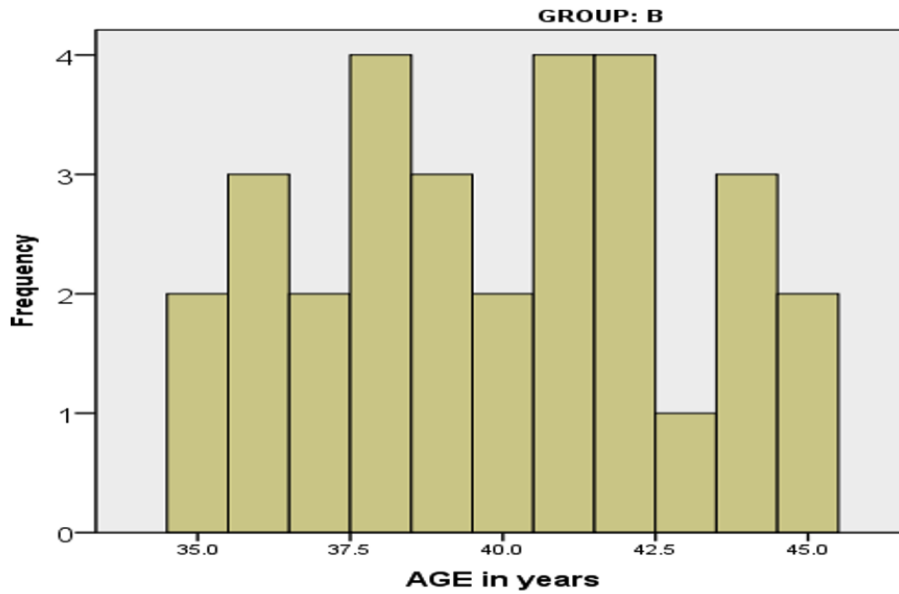
**Table: Age Difference Between Two Groups**

AGE	GROUP A	GROUP B
TOTAL	30	30
MEAN	40.97	39.93
STANDARD DEVIATION	4.07	3.00
P value by 't' test	0.268	

Age distribution of these patients in the two groups in the above table showed that  $40.97 \pm 4.07$  and  $39.93 \pm 3$  in years is the mean age group of the Group A and Group B respectively. This showed that there was no significant statistical difference occurred between Group A and Group B in age distribution according to the p value of 0.268.



**Graph: Age distribution in Group A**



Graph: Age distribution in Group B

Table 1: Weight Distribution Between Two Groups

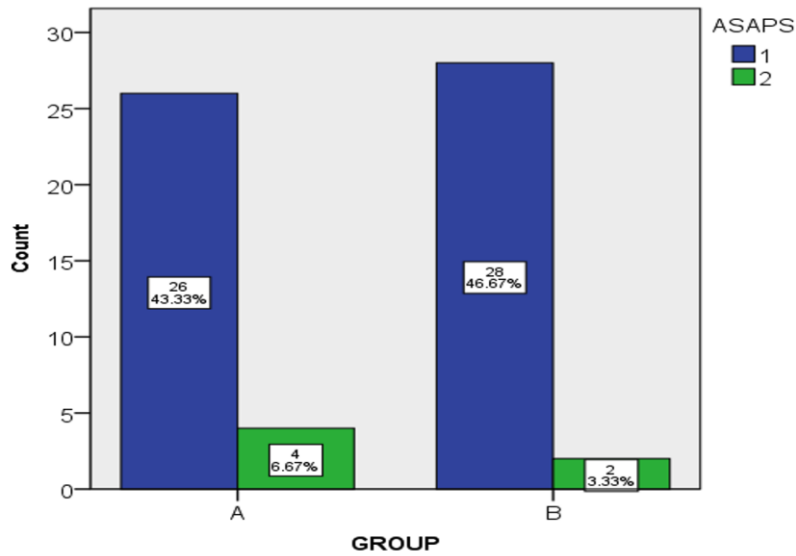
WEIGHT	GROUP A	GROUP B
TOTAL	30	30
MEAN	60.3	60
STD.DEVIATION	3.385	2.761
P value by 't' test	0.668	

Weight distribution of the patients in both groups in the above table shows that  $60.3 \pm 3.385$  and  $60 \pm 2.761$  is the mean weight of Group A and Group B respectively. It showed that there was no significant statistical difference between Group A and Group B in weight distribution according to p value of 0.668

Table : Asa Status Between Two Groups

GROUP	ASAPS		Total	Fisher exact p value
	1	2		
A	26 (86.66%)	4 (13.33%)	30 (100%)	0.238
B	28 (93.33%)	2 (6.66%)	30 (100%)	
Total	54 (90%)	6 (10%)	60 (100%)	

The ASA status of the two groups are as follows, Group A has 26 patients under ASA I (86.6%) and Group B has 28 patients under ASA I (93.33%). Group A has 4 patients under ASA II (13.3%) and Group B has 2 under ASA II (6.66%). There was no significant statistical difference between these groups given by fisher p value of 0.238.



Graph : Asa Status Between two Groups

Table : Inter Group Comparison for Heart Rate Between Group A And Group B

HR	GROUP	N	MEAN	Std. Deviation	p Value By 't' Test
Baseline	A	30	80.03	5.81	0.942
	B	30	80.13	4.74	
5 min	A	30	76.73	5.51	0.184
	B	30	78.57	5.04	
10 min	A	30	73.63	5.99	0.025*
	B	30	76.93	5.11	
Intubation	A	30	76.37	8.11	< 0.001*
	B	30	102.30	4.21	
5 min post intubation	A	30	75.03	7.94	< 0.001*
	B	30	99.37	4.02	

In Group A, the basal mean heart rate was 80.03 ±5.81 bpm. The mean heart rate after 5min 10 min after administration of study drug in 5 min ,10,intubation,post intubation 5 min are 76.73 ±5.51,73.63 ±5.99,76.37 ±8.11 and 75.03 ± 7.94 respectively.

In Group B, the basal mean heart rate was 80.13 ±4.74 bpm.The mean heart rate after 5min,10min after administration of study drug in 5 min,10min,intubation,post inbution are 78.57±5.04,76.93 ±5.11,103.30 ±4.21 and 99.37 ±4.02 respectively.

There is no statistical difference in the mean heart rate of base line,5 min and 10 min between Group A and Group B. There was significant statistical difference in the mean heart rate at intubation and post intubation p value less than 0.05.

Table: Inter Group Comparison for Map Between Group A and Group B

Map	Group	N	Mean	Std. Deviation	p Value by 't' Test
Baseline	A	30	88.57	2.69	0.269
	B	30	89.47	3.51	
	A	30	86.80	2.33	

<b>5 min</b>	B	30	87.37	3.58	0.470
<b>10 min</b>	A	30	85.77	2.56	0.869
	B	30	85.63	3.58	
<b>Intubation</b>	A	30	87.83	5.73	< 0.001*
	B	30	107.80	2.59	
<b>5 min post intubation</b>	A	30	87.30	4.94	< 0.001*
	B	30	105.00	2.52	

In Group A, basal mean MAP was  $88.57 \pm 2.69$  mmHg. The mean MAP after 5min, 10 min after administration of study drug in 5 min, 10 min, intubation, post intubation 5 min are  $86.80 \pm 2.33$ ,  $85.77 \pm 2.56$ ,  $87.83 \pm 5.73$  and  $87.30 \pm 2.52$  mmHg respectively.

In Group B, basal mean MAP was  $80.13 \pm 4.74$  mmHg. The mean heart rate after 5min, 10min after administration of study drug in 5 min, 10min, intubation, post intubation are  $87.37 \pm 3.58$ ,  $85.63 \pm 3.58$ ,  $107.80 \pm 2.59$  and  $105.00 \pm 2.52$  mmHg respectively.

There is no statistical difference in the mean MAP of base line, 5 min and 10 min between Group A and Group B. There was significant statistical difference in the mean MAP at intubation and postintubation p value less than 0.05 by 't' test.

**Table: Comparison of scores for intubation between group A and group B**

	Group	N	Mean	Std. Deviation	P value by 't' Test
<b>Ramsay Sedation Score</b>	A	30	2.87	0.43	< 0.001*
	B	30	2.13	0.35	
<b>Cough Score</b>	A	30	2.10	0.40	< 0.001*
	B	30	2.97	0.41	
<b>Post Intubation Score</b>	A	30	1.27	0.45	< 0.001*
	B	30	1.90	0.31	

In Group A Ramsay sedation score mean  $2.87 \pm 0.43$  and Group B the mean was  $2.13 \pm 0.35$  there was significant statistical difference between these two groups by the p value <0.001.

## Discussion

In case of difficult airway scenarios, awake intubation is essential. Awake fiberoptic bronchoscope guided intubation is one of the best methods in securing airway in a case of difficult airway. For AFOI, many drugs have been used for producing sedation while preserving spontaneous respiration.

Dexmedetomidine, which is an alpha-2 agonist, produces sedation, analgesia, adequate hemodynamic stability, amnesia, and anti-sialogogue effects which are beneficial during AFOI. It produces sedation which resembles natural sleep but is arousable through the postsynaptic receptors in the locus ceruleus with minimal respiratory depression action.

Fentanyl citrate is a phenylpiperidine, which is a synthetic opioid which produces sedation, hemodynamic stability, analgesia which are useful for AFOI. But there is a risk of respiratory depression, chest wall rigidity, vomiting, nausea as their side effects.

We have compared dexmedetomidine and fentanyl for conscious sedation for awake fiberoptic intubation. Group A was given with dexmedetomidine 1 mcg/kg and Group B was given with fentanyl 2 mcg/kg and parameters such as Ramsay sedation score, cough score, postintubation score, SPO<sub>2</sub>, heart rate and mean arterial pressure were measured and compared. Sampling size 60 each group had 30 patients each.

We observed that postintubation score in Group A (out of 30 patients) 22 patients had better

tolerance endotracheal tube than Group B (out of 30 patients) 5 patients with p value <0.01. Majority of the patients in Group A (27 out of 30) were having cough score <2 and in Group B (4 out of 30) patients were having cough score <2 with p value <0.001.

Penden et al., found that that bradycardia was observed in the patients of healthy volunteers following dexmedetomidine administration and that can be prevented by administration of glycopyrrolate before intubation thereby preventing the side effects of dexmedetomidine.<sup>1</sup>

Bergese et al found that dexmedetomidine when administered at dose of 1 mcg/kg was beneficial for intubation through bronchoscope even without topical anaesthesia or airway nerve block.<sup>2</sup>

In our study, comparison of heart rate and mean arterial pressure were compared between the two groups. We observed that dexmedetomidine group had better hemodynamic stability than fentanyl group. The baseline heart rate and mean arterial pressure was no significant difference in both the groups. There was a statistical significant in Heart rate in post intubation when compared with the base line in Group B p value <0.001. There is no change in the heart rate in the group A in the post intubation period when compared with the baseline with p value <0.001.

Dexmedetomidine results in stable hemodynamic parameters because of its inhibition of noradrenaline thereby reducing the sympathetic response to intubation. Dexmedetomidine infusion can cause bradycardia, hypotension, atrial fibrillation and hypertension particularly in high doses. However in our study there was no incidence of bradycardia because of glycopyrrolate administration.

Side effects:

Fentanyl has a respiratory depressant action and also chest wall rigidity effects which can lead to desaturation and hypoxia that can be treated with insufflation of oxygen through the side port in the bronchoscope.

But in case of dexmedetomidine it results in sedation without respiratory depression and airway obstruction. In our study the incidence of desaturation was observed less in Group B than Group A patients of p value <0.001. **Tsai CJ et al.**,<sup>3</sup> did a double blind, randomised, prospective clinical study to evaluate the clinical efficacy and safety of dexmedetomidine as premedication with propofol infusion for fiberoptic intubation. 46 adult patient with temporomandibular joint ankylosis planned for gap arthroplasty was chosen. They were divided into two groups.

Group D & Group P of 23 patients each. Group D patients received premedication dexmedetomidine 1mcg/kg infused over 10 min followed by sedative propofol infusion. The control Group P received only propofol infusion for sedation.

They observed that dexmedetomidine with propofol group provided satisfactory intubating conditions than propofol alone. Dexmedetomidine appears to provide preservation of patent airway better intubating conditions and hemodynamic stability with less adverse effects.

**Guler et al.**,<sup>4</sup> did a randomised double blinded study using single bolus of dexmedetomidine to attenuate the airway and circulatory responses of tracheal extubation. They selected sixty patients randomly divided into 2 groups, of 30 each. First group they gave 0.5mcg/kg dexmedetomidine and saline in the second group 5 min before the end of the surgery over 60 seconds.

Monitoring by the number of cough per patient after extubation. They concluded that dexmedetomidine group had median cough score less and rise in heart rate blood pressure was comparatively less than placebo group. Single dose of dexmedetomidine of 0.5 mcg/kg dexmedetomidine attenuate the hemodynamic response of extubation.

**Menda F et al.**,<sup>5</sup> studied that effect of dexmedetomidine in attenuating hemodynamic responses in endotracheal intubation for patients coming for fast-track coronary artery bypass grafting.

They divided 30 patients into 2 groups one with dexmedetomidine that is compared with

placebo. Dexmedetomidine group was given with 1mcg/kg in 100ml of normal saline over 15 min. and placebo group was given with 100ml of normal saline over 15 min.

They have measured systolic blood pressure, diastolic blood pressure, mean arterial pressure and heart rate at time intervals of 1, 3, 5 min. After the intubation. All the above mentioned parameters that has been measured for the patients with dexmedetomidine was significantly lowered than the placebo group in reducing hemodynamic response to intubation. **Ryu et al**<sup>6</sup> studied by comparing sedative dexmedetomidine and remifentanyl for intubation through fibroptic bronchoscopy. They found that there was no significant difference in sedative effects MAP, heart rate between these two drugs. but patient satisfaction score, desaturation and cough score is significantly lower in dexmedetomidine than remifentanyl.

**Chu et al.**<sup>7</sup> observed that dexmedetomidine along with topical anaesthesia provides better intubation conditions, amnesia, patient tolerance, hemodynamic response for Awake fibroptic intubation. they also stated that dexmedetomidine can be effectively used during AFOI for difficult airway situations with only minimal hemodynamic effects.

**Sulaiman s et al.**<sup>8</sup> studied the effectiveness of dexmedetomidine compared with placebo in attenuating the stress response to the endotracheal intubation for patients undergoing off pump CABG. They observed that dexmedetomidine pretreatment with the dose of 0.5mcg/kg as 10 min infusion prior to induction is effective in attenuating the hemodynamic response for laryngoscopy and intubation

### Conclusion

From the above study it is concluded that dexmedetomidine provides favourable intubating conditions fibroptic bronchoscope guided intubation, had better hemodynamic conditions and provided adequate sedation than fentanyl without desaturation.

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