



## COMPARISON OF DEXMEDETOMIDINE AND FENTANYL ON INTUBATION CONDITIONS DURING AWAKE FIBREOPTIC BRONCHOSCOPIC INTUBATION- A RANDOMISED DOUBLE BLIND STUDY.

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### ABSTRACT

**INTRODUCTION:** Awake Fibreoptic Intubation is indicated in patients with anticipated difficult airway, failed tracheal intubation, unstable cervical spine injury. Drugs used for conscious sedation includes Benzodiazepines, opioids, Propofol, either alone or in combination. All these drugs, though results in favourable intubating conditions, may also result in upper airway obstruction, hypoventilation, difficult airway instrumentation and oxygen desaturation. In order to address and overcome these issues, we compared the effects of parenteral dexmedetomidine and fentanyl on favourable conditions during awake fibreoptic bronchoscopic intubation.

**MATERIALS AND METHODS:** A prospective, double blind, randomised study. 60 patients belonging to age group 25 to 60 years, ASA PS I & II posted for elective surgery under general anaesthesia with endotracheal intubation were randomly allocated into two groups. Group A (n=30) received injection dexmedetomidine, Group B (n=30) received injection fentanyl before awake fibreoptic bronchoscopic intubation. Hemodynamic parameters, cough score, postintubation tolerance score, Ramsay sedation score were noted in both groups. The observed data were analysed by SPSS version 21.0 software.

**RESULT:** Demographic variable such as age, weight, ASA physical status were comparable in both the groups. The mean heart rate at 5mins, 10mins after administration of study drug, intubation, 5mins postintubation are  $76.73 \pm 5.51$ ,  $73.63 \pm 5.99$ ,  $76.37 \pm 8.11$  and  $75.03 \pm 7.94$  respectively in Group A. The mean heart rate at 5mins, 10mins after administration of study drug, intubation, 5mins postintubation are  $78.57 \pm 5.04$ ,  $76.93 \pm 5.11$ ,  $103.30 \pm 4.21$  and  $99.37 \pm 4.02$  respectively. The mean MAP at 5mins, 10 mins after administration of study drug, intubation, 5 mins post intubation 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 A. The mean MAP at 5mins, 10mins after administration of study drug, intubation, 5 mins 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. The post intubation SpO<sub>2</sub> was  $97.10 \pm 1.77$  and  $93.43 \pm 1.17$  % for Group A and Group B respectively. In Group A mean Ramsay sedation score is  $2.87 \pm 0.43$  and in Group B the mean is  $2.13 \pm 0.35$ .

**CONCLUSION:** Dexmedetomidine group showed better hemodynamic stability and tolerance to awake endotracheal tube insertion through fibreoptic bronchoscope. Dexmedetomidine provides favourable intubating conditions during awake fibreoptic bronchoscope procedures with adequate sedation and without desaturation than fentanyl.

**KEYWORDS :** Dexmedetomidine, Fentanyl, conscious sedation, bronchoscopy

### INTRODUCTION:

Awake fibreoptic bronchoscopic intubation is indicated in patients with anticipated difficult airway, unstable cervical spine injury, failed tracheal intubation. It is important to prepare patients before the procedure which includes psychological preparation, antisialogogue administration, anaesthetising the airway to blunt the airway reflexes, adequate sedation and anxiolysis to obtain patient co-operation during airway instrumentation, while preserving airway patency and spontaneous respiration.

There are many drugs used for producing conscious sedation such as benzodiazepines, opioids, propofol<sup>1</sup> which can be used either alone or in combination. All these drugs, may result in upper airway obstruction, hypoventilation, oxygen desaturation and difficult airway instrumentation.

Therefore, an ideal agent for conscious sedation should ensure spontaneous ventilation with adequate airway patency, favourable intubating conditions, stable hemodynamics and should not produce respiratory depression. Hence, we compared the effects of parenteral dexmedetomidine<sup>2</sup> and fentanyl<sup>3</sup> on intubating conditions during awake fibreoptic bronchoscopic intubation<sup>4</sup>.

The primary objectives of the study are indicators of patient comfort during and after awake fibreoptic bronchoscopic intubation such as cough score, Post intubation tolerance score, hemodynamic parameters. The secondary objectives of the study are assessment of sedation by Ramsay sedation<sup>5</sup> score and oxygen desaturation<sup>6</sup> by pulse oximetry.

### MATERIALS AND METHODS:

Sixty patients of ASA physical status 1 and 2 for elective surgical procedure done under general anaesthesia with endotracheal tube was included for the study. This study was approved by ethical committee in our institution and study was conducted after obtaining informed consent from patients.

### INCLUSION CRITERIA:

- ASAPS I and 2.

- Age 25 to 60 years.
- Elective surgery.
- Mallampatti class I and II.

### EXCLUSION CRITERIA:

- Emergency Surgery.
- Patient with difficult airway.
- Pregnant female.
- Allergy to drugs used.
- Full stomach patients.
- Coagulopathy.
- Bradycardia
- Patients with severe cardiovascular, respiratory, renal, hepatic diseases.

All patients satisfying the inclusion criteria, after obtaining preoperative assessment, were randomised under closed envelope method and were informed about the procedure and written and informed consent were obtained. Demographics such as age, weight and height were noted. All patients were premedicated with Tablet Alprazolam 0.5 mg and Tablet Ranitidine 150 mg, the previous night before surgery.

Injection Glycopyrrolate 0.2 mg IM given 45 minutes before intubation. Patient was shifted to operation theatre and monitors ECG, NIBP, SPO<sub>2</sub> attached and baseline parameters were noted.

After obtaining IV access with 18G venflon, xylometazoline nasal drops was instilled, 4ml of 4% lignocaine was used for nebulising the upper and lower airway and 10% oral lignocaine spray was used before the procedure.

For Group A patients, injection dexmedetomidine hydrochloride  $1 \mu\text{g}/\text{kg}$  in 100 ml NS infused over 10 minutes and for Group B patients, injection fentanyl citrate  $2 \mu\text{g}/\text{kg}$  in 100ml NS infused over 10 minutes. After achieving Ramsay sedation score of more than 2, flexible fibreoptic bronchoscopy guided tracheal intubation with appropriate sized endotracheal tubes were done. Intubation condition was evaluated by cough score and post intubation tolerance score.

Hemodynamic parameters such as heart rate, mean arterial blood pressure, SpO<sub>2</sub> were measured at baseline, at intervals of 5,10 minutes following study drug administration, intubation and 5 minutes post intubation were noted. Surgery proceeded with maintenance of anaesthesia.

**Ramsay Sedation Score<sup>7</sup>:**

- 1= anxious, agitated, restless.
- 2= cooperative, oriented, tranquil.
- 3= sedated but responds to command.
- 4= asleep, brisk glabellar reflex, responds to loud noise.
- 5= asleep, sluggish glabellar reflex or responds to loud noise.
- 6= asleep with no response to a painful stimulus.

**Cough Score:**

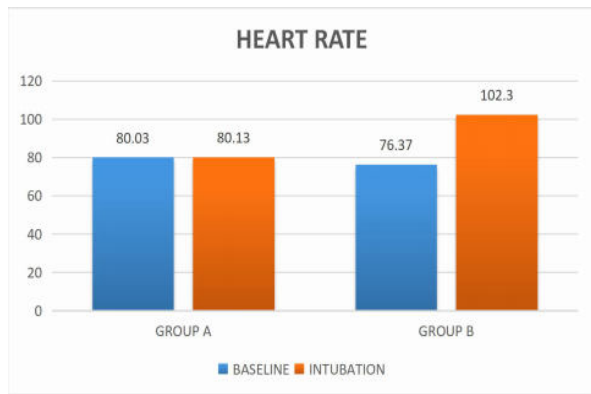
- During Bronchoscopy,
- 1= no cough.
  - 2= slight cough (no more than 2 cough in sequence).
  - 3= moderate cough (3-5 cough in sequence).
  - 4= severe cough (> 5 cough in sequence).

**Post intubation tolerance score after endotracheal intubation:**

- 1= cooperative.
- 2= minimal resistance.
- 3= severe resistance.

**RESULTS:**

There is no significant statistical difference in terms of age, weight, ASA physical status between Group A and Group B. There is no statistical difference in the mean heart rate and mean arterial pressure a baseline,5 mins and 10 mins following study drug administration between Group A and Group B. There is significant statistical difference in the mean heart rate,mean arterial pressure at intubation, 5 minutes post intubation with a p value by 't' test of less than 0.001 (figure 1).There was tachycardia and high blood pressure during and following intubation procedure in Group B than Group A. The baseline Spo<sub>2</sub> is comparable between the two groups.

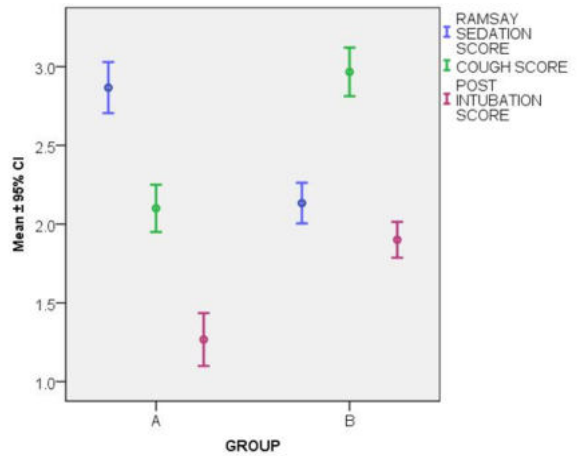


**FIGURE 1: INTER GROUP COMPARISON FOR HEART RATE BETWEEN GROUP A AND GROUP B.**

	GROUP	N	MEAN	STD. DEVIATION	p VALUE BY 't' TEST
RAMSAY SEDATION SCORE	A	30	2.87	0.43	< 0.001*
	B	30	2.13	0.35	
COUGH SCORE	A	30	2.10	0.40	< 0.001*
	B	30	2.97	0.41	
POST INTUBATION SCORE	A	30	1.27	0.45	< 0.001*
	B	30	1.90	0.31	

**FIGURE 2: COMPARISON OF SCORES FOR INTUBATION BETWEEN GROUP A AND GROUP B.**

There is statistically significant difference in the post intubation Spo<sub>2</sub> value between Group A and B with p value < 0.001.



**FIGURE 3: INTERGROUP COMPARISON OF COMFORT SCORE BETWEEN GROUP A AND GROUP B.**

There is significant statistical difference between Group A and B in terms of cough score at intubation, Post intubation tolerance score, Ramsay sedation score with a p value < 0.005 by 't' test (figure 2 & 3).

**DISCUSSION**

Dexmedetomidine, an alpha - 2 agonist produces sedation, analgesia, amnesia, sympatholysis, antisialagogue effect which are beneficial during awake fiberoptic bronchoscopic intubation<sup>8</sup>. The sedation produced by it resembles natural sleep.

Fentanyl citrate, a phenylpiperidine and a synthetic opioid produces sedation, analgesia but there is risk of nausea, vomiting, chest wall rigidity, respiratory depression. In this study, we found better hemodynamic stability, patient cooperation and tolerance to awake fiberoptic bronchoscopic intubation in Group A patients. Majority of 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.

Pendew et al observed bradycardia in patients following dexmedetomidine administration among healthy volunteers which was not seen in our study. Bergese et al found that dexmedetomidine<sup>9</sup> administered at a dose of 1 µg/kg was beneficial for intubation through bronchoscope without topical anaesthesia or airway nerve block. Incidence of desaturation following intubation<sup>10</sup> in Group B was significantly higher than in Group A.

**CONCLUSION:**

We conclude that dexmedetomidine provides favourable intubating conditions for awake fiberoptic bronchoscopic intubation with better hemodynamic parameters, adequate sedation without desaturation than fentanyl.

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