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# Study to Compare Dexmedetomidine and Midazolam-Fentanyl Combination for Sedation During Awake Fibreoptic Intubation at A Tertiary Care Teaching Hospital

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## ABSTRACT

**Background**: Awake fibreoptic intubation (AFOI) is considered the gold standard technique for securing the airway in patients with anticipated difficult intubation while maintaining spontaneous ventilation and protective airway reflexes. Successful AFOI requires an optimal balance between adequate sedation, patient cooperation, analgesia, anxiolysis, maintenance of spontaneous respiration, and hemodynamic stability. The choice of sedative agent plays a critical role in determining procedural success and patient comfort. Dexmedetomidine, a highly selective α2-adrenergic receptor agonist, has gained popularity because it produces cooperative sedation with minimal respiratory depression. Traditionally, combinations of midazolam and fentanyl have been widely used because of their sedative and analgesic properties; however, these agents may be associated with respiratory depression, airway obstruction, and less predictable sedation.

**Aim**: To compare dexmedetomidine with the midazolam–fentanyl combination for sedation during awake fibreoptic intubation with respect to patient comfort, intubating conditions, patient's reaction and adverse events.

**Methodology**: Group-I patients (n=30) received dexmedetomidine 1µg/kg bolus infusion over 10 minutes, followed by infusion of 0.1 µg/kg/hr titrated to 0.7 µg/kg/hr whereas Group-II patients (n=30) received i.v fentanyl 2µg/kg bolus followed by midazolam infusion of 0.02-0.1mg/kg/hr until they were adequately sedated i.e. Ramsay Sedation Score (RSS) of 3 .Intraoperatively Total Comfort Score, 5 point FOI score was noted and Questionnaire assessment was done 24 hours after surgery.

**Results**: During preoxygenation, the mean TCS was not statistically significant different between the two groups but during FOS and during intubation, the mean TCS was lower in group-1than group-2and the difference between the two groups was statistically significant ($p< 0.05$). Significant differences in the patient's reaction to tube were found during FOS and after intubation between the two groups with lower reaction in dexmedetomidine group($p\leq0.05$). During follow-up assessment 24 hours after the surgical procedure, the dexmedetomidine group patients judged their sedation more positively and were having less pain and discomfort during the procedure than fentanyl plus midazolam patients.

**Conclusion**: Based on the findings presented in this dexmedetomidine appears to provide more favorable conditions for awake fibreoptic intubation by producing cooperative sedation, maintaining spontaneous ventilation, preserving airway reflexes, and ensuring superior patient comfort with improved hemodynamic stability.

***Keywords****: Awake fibreoptic intubation; Dexmedetomidine; Midazolam; Fentanyl; Difficult airway; Conscious sedation; Fibreoptic bronchoscopy; Airway management; Hemodynamic stability; Patient comfort.*

## INTRODUCTION

Airway management remains one of the most fundamental responsibilities of an anesthesiologists. Failure to establish or maintain a patent airway can rapidly lead to hypoxia, irreversible neurological injury, and death. Consequently, accurate preoperative airway assessment and careful planning are essential components of safe anesthetic practice. Although advances in airway devices and techniques have improved success rates, management of the anticipated difficult airway continues to present significant clinical challenges. Awake fibreoptic intubation (AFOI) is widely regarded as the preferred technique for securing the airway in patients with anticipated difficult laryngoscopy or intubation. The technique allows endotracheal intubation while the patient remains conscious or lightly sedated, maintains spontaneous breathing, and retains protective airway reflexes. Unlike conventional laryngoscopy performed after induction of general anesthesia, AFOI minimizes the risk of complete airway obstruction following induction and muscle relaxation. For these reasons, it remains the recommended approach in numerous difficult airway situations.

Common indications for awake fibreoptic intubation include restricted mouth opening due to temporomandibular joint disorders, oral malignancy, maxillofacial trauma, cervical spine instability, severe rheumatoid arthritis affecting cervical mobility, previous difficult intubation, airway tumors, post-radiation fibrosis, congenital craniofacial abnormalities, and obesity associated with anticipated difficult ventilation. In these situations, maintenance of spontaneous ventilation until the airway is secured provides an important safety advantage.

AFOI is a technique which allows a flexible endoscope to pass through oral or nasal route to provide a clear visualisation of the vocal cords and subsequent passage of an endotracheal tube into the trachea under direct vision. During this process good topicalization of the airway is necessary to obtund the sensory afferent impulses from the oropharyx and laryngotracheal region. But irony is that despite of good topicalization fibreoptic broncoscopy can still be percieved as an unpleasant experience. To emeliorate this discomfort topical anaesthesia is supplemented with a good sedative agent. Kopman et al. highlighted its advantages as early as 1975 in a review of 267 awake intubations. [1] The ideal sedative for AFOI would provide anxiolysis, analgesia, amnesia, low incidence of recall of the procedure, suppress the cough and gag reflex, easily titrable, without the risk of airway compromise and adverse hemodynamic consequences. In the last three decades, several classes of drugs have been used for AFOI e.g. benzodiazepines like midazolam, opioids like fentanyl, sufentanil, remifentanil, alpha2 agonists like clonidine and dexmedetomidine and intravenous induction agents like ketamine and propofol etc. [2,3,4,5] A successful awake intubation relies upon a crucial balance between acceptable sedation and adequate respiration. Standardization of such safer levels of sedation for AFOI is difficult to determine. Nevertheless, the quest for the ideal drug for conscious sedation for an AFOI is an ongoing process. In this study, the intubating conditions of dexmedetomidine alone versus fentanyl -midazolam combination was compared for AFOI.

## MATERIAL AND METHODS

After the Institutional Ethics Committee approval, the study was conducted in Sudha Medical College & Hospital, Kota, Rajasthan, in 60 patients aged between 18-60 years, ASA Grade I and II scheduled for elective surgery. A written informed consent was obtained from each patient. The patients were randomly divided in two groups of 30 each.

### Exclusion Criteria:

Patient's refusal, Baseline heart rate<60, Baseline blood pressure<100/50, Coagulopathy, History of nasal surgery/nasal trauma, Nasal polyp, Cardiovascular disease, Liver cirrhosis, Alcohol and drug abusers, Mentally ill patients, Allergic to the drugs used in the study, patients on drugs like digitalis, beta blockers, calcium channel blockers known to produce changes in heart rate and blood pressure cirrhosis.

Preanaesthetic checkup was done in every patient. All patients were given inj. Glycopyrrolate (0.2mg) i.m 30 min before the elective surgery. Base line vital parameters of all the patients like HR, SBP, DBP, SpO were documented.

**Group-I** patients (n=30) received dexmedetomidine 1µg/kg bolus infusion over 10 minutes, followed by infusion of 0.1 µg/kg/hr titrated to 0.7 µg/kg/hr until they are adequately sedated.

**Group-II** patients (n=30) received i.v fentanyl 2µg/kg bolus followed by midazolam infusion of 0.02-0.1mg/kg/hr until they are adequately sedated i.e Ramsay Sedation Score (RSS) of 3.

Patients were placed in supine position. Each nostril was checked for patency. The nostril with least resistance was chosen for nasal intubation. Nasal mucosa was sprayed with vasoconstrictor xylometazoline (0.1%) and with two puffs of 10% lignocaine. 2% lignocaine viscous gargles were done to achieve adequate topical anaesthesia. For further topical anaesthesia two puffs of 10% lignocaine were sprayed over tonsillar pillars and back of throat. When fiberscope reached upto the vocal cords, 2 ml of 2% lignocaine with some air was injected through the epidural catheter inserted over the

working channel of the fiberscope. When vocal cords were crossed 2 ml of 2% lignocaine with some air was injected in the upper part of trachea. Supplemental doses of lignocaine upto a maximum of 9mg/kg were administered to the airway. On reaching the carina endotracheal tube was railroaded over the fibrescope. The endotracheal tube was secured and G.A was administered.

**Intraoperatively**

Comfort scale values were recorded by the anesthesiologist (performing the procedure) during pre-oxygenation, at FOS and at the introduction of ET tube.

**COMFORT SCALE, AS MODIFIED FROM AMBUEL ET AL**

| Parameter | Score Assessment |
|---|---|
| Alertness | 1.Deeply asleep |
| | 2.Lightly asleep |
| | 3.Drowsy |
| | 4 Fully awake and alert |
| | 5 Hyperalert |
| Calmness | 1.Calm |
| | 2. Slightly anxious |
| | 3. Anxious |
| | 4. Very anxious |
| | 5. Panicky |
| Respiratory Response | 1. No coughing and no spontaneous respiration |
| | 2. Spontaneous respiration |
| | 3. Occasional cough |
| | 4. Coughing regularly |
| | 5. Frequent coughing or choking |
| Crying | 1. Quiet breathing, no crying |
| | 2. Sobbing or gasping |
| | 3. Moaning |
| | 4. Crying |
| | 5. Screaming |
| Physical Movement | 1. No movement |
| | 2. Occasional slight movement |
| | 3. Frequent slight movements |
| | 4. Vigorous movement limited to the extremities |
| | 5. Vigorous movements including torso and head |
| Muscle Tone | 1. Muscles totally relaxed, no muscle tone |
| | 2. Reduced muscle tone |
| | 3. Normal muscle tone |
| | 4. Increased muscle tone and exing of ngersand toes |
| | 5. Extreme muscle rigidity and exing of ngersand toes |
| Facial Tension | 1. Facial muscle totally relaxed |
| | 2. Facial muscle tone normal, no facial muscle tension evident |
| | 3. Tension evident in some facial muscles |
| | 4. Tension evident throughout facial muscles |
| | 5. Facial muscles contorted and grimacing |
| Total Score | 35 |

The total comfort score for each patient was calculated by adding the scores of the 7 comfort categories at each time point. One of the independent, study- blinded observers assessed patient's reaction to placement of the fiberoptic scope and the endotracheal tube on a 5 point FOI score:

| Patient's reaction | Score |
|---|---|
| 1. No reaction | 1 |
| 2. Slight grimacing | 1 |
| 3. Severe grimacing | 1 |
| 4. Verbal objection | 1 |
| 5. Defensive movement of head, hands or feet | 1 |

The surgical procedure then proceeded as planned. 24 hours after the surgical procedure, each patient was questioned by one of the blinded observers to assess his/her experience with the AFOI.

**QUESTIONNAIRE ASSESSMENT 24 HOURS AFTER SURGERY**

| Questions | Possible Answers |
|---|---|
| 1. How was the sedation for your procedure | 1=Excellent |
| | 2= Good |
| | 3= Fair |
| | 4= Poor |
| 2. Do you think you needed any adjustment in the amount of sedation you received | 1= Needed less |
| | 2= Right amount |
| | 3= Needed more |
| 3. Do you remember the start of the procedure when the scope was inserted | 1= No |
| | 2= Yes |
| 4. Do you remember being awake during the procedure | 1= No |
| | 2= Yes |
| 5. Do you remember the end of the procedure when the scope was removed | 1= No |
| | 2= Yes |
| 6. How much discomfort or pain did you experience during the procedure | 1= None |
| | 2= Mild |
| | 3= Moderate |
| | 4= Severe |

**Statistical Analysis**

The results obtained in the study are presented in tabulated manner and analysed using IBM SPSS statistics software version 20.0. Statistical analysis was carried out using Student's t-test. Hemodynamic variables were expressed as Mean ± SD. P value< 0.05 was regarded as statistically significant, and P value >0.05 was regarded as non significant.

**OBSERVATIONS**

**Table-I Demographic Data**

| Demographic | Group 1 | Group 2 | P value |
|---|---|---|---|
| Age(years) | 43.80±12.3 | 40.50±12.06 | 0.29 |
| Weight (kg) | 62.93±6.53 | 63.53±4.71 | 0.68 |
| Sex (F/M) | 24-Jun | 22/8 | 0.54 |

Difference between demographic data was statistically insignificant among the two groups.

**Table-2 Total Comfort Score**

| TCS | Group 1 | | Group 2 | | P value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Preoxygenation | 14.1 | 1.18 | 14.37 | 0.89 | 0.328 |
| FOS | 15.93 | 1.57 | 16.8 | 1.03 | 0.014* |
| Intubation | 17.87 | 1.5 | 18.97 | 1.75 | 0.011* |

During preoxygenation, the mean TCS was not statistically significant different between the two groups but during FOS and during intubation, the difference in mean TCS between the two groups was statistically significant.($p<0.05$).

**Table-3 Patient's Reaction To The Procedure**

| Reaction | Group 1 | | Group 2 | | P value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| FOS | 2.77 | 1 | 3.43 | 0.81 | 0.007* |
| Intubation | 2 | 0.58 | 2.43 | 0.56 | 0.005* |

Significant differences in the patient's reaction were found during FOS and after intubation between the two groups. ($p\leq0.05$).

**Table-4 Questionnaire Assessment 24 Hrs After Surgery**

| Question | Group 1 | | Group 2 | | P value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Q1 | 1.67 | 0.6 | 2.33 | 0.6 | < 0.001* |
| Q2 | 1.9 | 0.4 | 2.2 | 0.55 | 0.019* |
| Q3 | 1.4 | 0.49 | 1.67 | 0.47 | 0.039* |

| | | | | | |
|---|---|---|---|---|---|
| Q4 | 1.2 | 0.4 | 1.47 | 0.5 | 0.029* |
| Q5 | 1.13 | 0.34 | 1.6 | 0.49 | < 0.001* |

Significant differences were found between the two groups on answers to all the questions ($p \leq 0.05$).

## DISCUSSION

The need for conscious sedation during an AFOI is now widely accepted. The practice of conscious sedation has been revolutionized in the past decade, by the introduction of drugs with unique pharmacokinetic properties, such as propofol, remifentanil and dexmedetomidine, Dexmedetomidine is a non selective αagonist. The overall response is 2 related to the stimulation of αadrenoreceptors located in CNS and 2 spinal cord. These receptors are involved in sympatholysis, sedation, [7] and antinociceptive effects. α receptors in locus caeruleus are 2 [8] responsible for their sedative and hypnotic effect. Despite sound levels of sedation with dexmedetomidine, there is limited respiratory [9] depression providing wide safety margins. In a study, comparing the effects of remifentanil and dexmedetomidine on respiratory parameters in normal volunteers, the hypercapnic ventilator response was unaffected even at doses that produced unresponsiveness to [10] vigorous stimulation. Fentanyl provides potent analgesia with minimum sedative effect. Benzodiazepines enhanced the sedation and amnesia and improved patients comfort when added to fentanyl and even to dexmedetomidine. Benzodiazepines alone cannot substitute for inadequate analgesia and topicalization with local anaesthetics. So, a combination of opioid and benzodiazepine provides better intubating conditions and attenuation of pressor response to awake fibreoptic intubation as compared to either drug alone. In this study the intubating conditions with preoperative dexmedetomidine alone versus midazolam and fentanyl was compared during awake fibreoptic nasotracheal intubation.

This study showed that dexmedetomidine provides better intubating conditions as compared to fentanyl and midazolam as Total Comfort was statistically significant different among the two groups.

This results are similar to those observed by Mondal S et al (2015) who compared dexmedetomidine and fentanyl in 60 patients and observed [11] better intubating conditions in dexmedetomidine group. A study by Chu et al (2010) also compared dexmedetomidine and fentanyl for sedating 60 oral cancer patients undergoing AFOI and observed that dexmedetomidine produced better intubating conditions than [12] fentanyl. Similarly, studies by Bergese et al.[ 2010 [ 14] ] [13] Patrick BS et al (2010) found that patients were more comfortable in dexmedetomidine plus midazolam group as compared to midazolam alone.

While comparing the patient's tolerance in this study, by using 5 point fibreoptic intubation comfort score, it was found that there was significant difference between two groups ($p<0.05$} suggesting that dexmedetomidine had better patient tolerability. Similar results were reported by S Mondal et al (2015) while comparing dexmedetomidine [11] and fentanyl group during AFOI. Chu et al (2010) also compared dexmedetomidine and fentanyl for sedating 60 oral cancer patients undergoing AFOI and observed better tolerance to intubation in dexmedetomidine group as compared to fentanyl group. [12] Patrick BS et al (2010) also reported better patient's tolerance while comparing the efficacy of dexmedetomidine with midazolam and midazolam alone for sedation during AFOI in 55 patients [14].

During follow-up assessment 24 hours after the surgical procedure, the dexmedetomidine group patients judged their sedation more positively than did fentanyl plus midazolam patients. The dexmedetomidine patients had less pain and discomfort during the procedure than fentanyl plus midazolam patient. The fentanyl plus midazolam patients needed more sedation during the procedure than the dexmedetomidine patients. However there were no differences between the groups in either recall of the procedure or awareness of fibreoptic scope removal at the end of the procedure . Overall the dexmedetomidine patients were more satisfied with the procedure than the fentanyl plus midazolam group patients.

Patients who received dexmedetomidine had lower total comfort score during fiberoscope insertion and endotracheal intubation as compared to those who received fentanyl and midazolam thereby implying better intubating conditions with dexmedetomidine. Similarly 5 Point FOI scores were lower in dexmedetomidine group indicating a better tolerance to AFOI. Within 24 hours of surgery, patients judged their own AFOI experience. Patients who received dexmedetomidine judged their sedation more positively than those who received fentanyl and midazolam. Apart from sedation, dexmedetomidine patients reported less pain and discomfort during the procedure, leading to more satisfaction.

## CONCLUSION

Based on the findings presented in this dexmedetomidine appears to provide more favorable conditions for awake fibreoptic intubation by producing cooperative sedation, maintaining spontaneous ventilation, preserving airway reflexes, and ensuring superior patient comfort with improved hemodynamic stability. In conclusion, the use of dexmedetomidine at 1mcg/kg bolus over 10 minutes, with maintenance rates of 0.1-0.7 μg/kg/hr offer better tolerance, preservation of a patent airway and spontaneous ventilation, while maintaining hemodynamic stability during AFOI.

## REFERENCES

1. Kopman AF, Wallman SB, Ross K, Surks SN. Awake endotracheal intubation: a review of 267 cases. AnesthAnalg 1975; 54: 323-7.

2. Lallo A, Billard V. Bourgain JsL. A comparison of propofol and remifentanil target control infusion to facilitate fiberoptic nasotracheal intubation. Anaesthesia and Analgesia 2009; 108: 852-7
3. Stamenkovic DM, Hassid M. Dexmedetomidine for beroptic intubation of a patient with severe mental retardation and atlantoaxial instability. Acta Anaethesiologica Scandinavica 2006; 50: 1314-5
4. Knolle E, Oehmke MJ, Gustorff B, Hellwagner K, Kress HG. Target-controlled infusion of propofol for fibreoptic intubation. European Journal of Anaesthesiology 2003; 20: 565-9
5. Machata AM, Gonano C, Holzer A, et al. Awake nasotracheal fibreoptic intubation: patient comfort, intubating condition, haemodynamic stability during conscious sedation with remifentanil. Anaesthesia and Analgesia 2003; 97: 904-8
6. Ambuel B, Hamlett KW, Marx CM, et al. Assessing distress in Pediatric Intensive Care Env: The COMFORT Scale. J Pediatr. Psychol 1992; 17(1): 95-109.
7. Paris A, Tonner PH. Dexmedetomidine in anesthesia. CurrOpinAnaesthesiol 2005; 18: 412-18
8. Guo TZ, Jiang JY, Buttermann AE, Maze M. Dexmedetomidine infusion into locus ceruleus produces antinociception. Anaesthesiology 1996; 84: 873-881.
9. Venn RM, Hell J, Grounds RM. Respiratory effects of dexmedetomidine in the surgical patient requiring intensive care. Crit Care 2000; 4: 302-308.
10. HSU YW, Cortine LI, Robertson KM. Dexmedetomidine pharmacodynamics, part 1. Crossover comparison of the respiratory effects of dexmedetomidine and remifentanil in healthy volunteers. Anesthesiology 2004; 101: 1066-1076.
11. Sudeshna Mondal, Sarmila Ghosh, Susmita Bhattacharya, Brojen Choudhury, SuchismitaMallick, and Anu Prasad. Comparison between dexmedetomidine and fentanyl on intubation conditions during awake beroptic bronchoscopy: A randomized double-blind prospective study J AnaesthesiolClinPharmacol. 2015 Apr-Jun; 31(2): 212–216.
12. S, Wang FY, Hsu HT, Lu IC, Wang HM,TsaiCJ:The effectiveness of dexmedetomidine infusion for sedating oral cancer patients undergoing awake fibreoptic nasal intubation.EurJAnaesthesiol 2010;27(1):36-40.
13. Bergese SD, Candiotti KA, Bokesch PM, Zura A, Wisemandle W, Bekker AY. A Phase IIIb, randomized, double-blind, placebo-controlled, multicenter study evaluating the safety and efficacy of dexmedetomidine for sedation during awake fibreoptic intubation.Am J Ther. 2010; 17(6): 586-95.
14. Patrick BS, Sergio D, Thomas D, Soleded F, Roger D. A comparative study of dexmedetomidine with midazolam and midazolam alone for sedation during elective awake fibreoptic intubation. Journal of Clinical Anesthesia. 2010; 22: 35-40