A Randomised Comparative Study of Dexmedetomidine v/s Fentanyl during awake Fibreoptic Nasotracheal intubation

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Abstract: Introduction: AFOI is recommended in patients with anticipated difficult airway. Optimal intubating conditions, maintaining patent airway along with patient's comfort are major hurdles. Ideal sedation regimen would provide patient comfort, obtundation of airway reflexes, hemodynamic stability, amnesia and maintenance of patent airway with spontaneous respiration. Method: 30 patients of each group with ASA grade 1 and 2 between 20-60 years were selected. Patients were divided in two groups receiving inj. Dexmedetomidine 0.5 µg/kg and inj Fentanyl 2 µg/kg respectively. Hemodynamic parameters, Success rate, Intubating conditions, sedation, hypoxial were analyzed. Results: Patients receiving dexmedetomidine had better hemodynamic stability, sedation, patient tolerance than fentanyl. Conclusion: Dexmedetomidine provide better fibreoptic intubation conditions than fentanyl however both provide optimal conditions without any significant complications. [Shah S NJIRM 2017; 8(1):116-119]

Key words: Awake fibreoptic intubation, dexmedetomidine, Fentanyl

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Introduction: Awake Fibreoptic intubation (AFOI) is recommended for patients with anticipated difficult airway, failed intubation, unstable cervical spine injury where optimum conditions for direct laryngoscopy are difficult to achieve[1]. Patient preparation is very important prior to AFOI, which includes obtundation of airway reflexes, sedation, anxiolysis, amnesia, free of oropharyngeal blood and secretions while preserving spontaneous respiration[2].

Fentanyl is phenyl piperidine derivative synthetic opioid similar to but more 100 times potent than morphine. It provides analgesia, amnesia, decreases laryngoscopic stress response. **µ**-receptor stimulation causes dose dependent [1].

Dexmedetomidine is a central α_2 agonist, acts on presynaptic α_2 receptors to provide negative feedback causing less neurotransmitters available at post synaptic α_1 receptors[2], produces hypnosis, amnesia, analgesia, anxiolysis and sympatholysis with minimal respiratory depression. It provides conscious sedation, thus patient is sleepy but easily arousable[1].

Airway blocks are usually performed on sedated, spontaneously ventilating "awake" patients requiring tracheal intubation, to abolish or blunt reflexes such as laryngospasm and coughing[3] The aim of our study is to compare optimal AFOI conditions in two study groups along with incidence of desaturation.

Material and Methods: Institutional ethical committee approval and written informed consent were taken. This randomised double blind study was conducted among 60 patients of any sex with ASA grade 1 and 2 aged between 20-60 years.

Statistical analysis was done by using paired t- test and chi square test for numerical data and Mann Whitney for ordinal data. The SPSS software was used for analysis. P value <0.05 was considered statistically significant

Exclusion criteria were Patient's refusal, Alcohol or drug abuser, Allergy to any study drug, Bradycardia, AV block, heart failure or On drugs known to cause changes in heart rate and B.P, Liver disease, thrombocytopenia, coagulopathy , Significant renal and pulmonary disease

Preanaesthetic check up will be done and procedure will be explained along with consent.

I.V. line will be secured and will be premedicated with Inj. Glycopyrrolate 0.01mg/kg and Inj. Midazolam 1 mg i.v 30 minutes before procedure. Airway blocks (nasal packing for ophthalmic & maxillary division of trigeminal nerve, glossopharyngeal, superior laryngeal and translaryngeal blocks) will be given. Patients will be divided in two groups

Group D: inj. Dexmedetomidine 0.5 µg/kg over
Group F: inj Fentanyl 2 µg/kg over 10 min.

Vitals were recorded in the preoperative area, after inj Midazolam, after study drug infusion and every 5 min till patient is given general anaesthesia Success rate, Intubating conditions, sedation, hypoxia will be analyzed.

-Intubating conditions:
Vocal cord movement[4]

- open
- moving
- closing
- closed

Coughing[4]

- none
- slight
- moderate
- severe

Patient tolerance (5 point fibreoptic intubation comfort score)[4,5]

- no reaction
- slight grimacing
- heavy grimacing
- verbal objection
- defensive movement of head or limbs

Ramsay sedation score[2,5]

- anxious, agitated, restless
- cooperative, oriented, tranquil
- responds to command
- asleep with brisk response to stimulus
- asleep with sluggish response to stimulus
- asleep with no response

Hemodynamic parameters[3]

- Bradycardia: heart rate <50/ min
- Tachycardia: 20% increase in heart rate from baseline
- Hypertension: 20% increase in blood pressure from baseline
- Hypotension: 20% decrease in blood pressure from baseline

Hypoxia: $SpO_2 \leq 90\%$
Success rate: Successful intubation or failure

Results: The mean age of dexmedetomidine group was 40.20 ±5.36 years, range of 20 to 60 years. The mean age group in fentanyl group was 41.50 ±6.22, with range of 20 to 60 years. There was no statistically significant difference in demographic data (age, gender, weight and height)

Table1: Demographic Data

Data	Dexmedetomidine	fentanyl	P value
Age(years)	40.20 ±5.36	41.50 ±6.22	>0.05
Weight(kg)	68.40 6.88	66.89 7.08	>0.05
Gender(M:F)	25:5	27:3	>0.05

Hemodynamic data: The baseline parameters (pulse, mean B.P, SpO_2 sedation score) of both the study groups were comparable, with p value > 0.05

After midazolam injection also parameters (pulse, mean B.P, SpO_2 sedation score) of both the study groups were comparable, with p value > 0.05

After study drug infusion there was statistically significant decrease in heart rate in dexmedetomidine group (66.50±6.02) as compared to fentanyl group (80.02±9.04)

Statistically significant increase in heart rate was observed during intubation in fentanyl group (88.05±10.02) as compared to dexmedetomidine group(70.06±5.30), with P value< 0.05,. None of the patient developed significant tachycardia or bradycardia in both the groups. There were statistically significant differences in heart rate among both the groups at various point of time during and after intubation

Baseline Mean B.P was comparable in both the study groups, with dexmedetomidine group having mean B.P 98.88±8.08 and fentanyl group having mean B.P. 96.06±9.04.

After study drug infusion there was statistically significant fall in mean B.P in dexmedetomidine group (90.2±5.08) as compared to fentanyl group (93.04±8.02). Mean BP was also lower in dexmedetomidine group as compared to fentanyl group during and after intubation at various points of time. None of the group observed significant hypotension.

None of the patient in any study group developed hypoxia, SpO_2< 90%, at any point of time. Patient tolerance was assessed by 5 point comfort score which was lower in dexmedetomidine group as compared to fentanyl group, illustrating that there was better procedure tolerance in dexmedetomidine group. Airway preparation was better in dexmedetomidine group as compared to fentanyl group as shown in table 2. Ramsay sedation score was lower in dexmedetomidine group. Dexmedetomidine group achieved sedation score 3.04±0.543 and propofol group achieved 2.02±0.234, p value being <0.0001

Table 2: Dexmedetomidine Compared To Fentanyl

Parameter	Dexmedetomidine	fentanyl	P value
Vocal cord movement (1/2/3/4)	22/6/1/1	12/14/2/2	<0.05
Coughing (1/2/3/4)	12/11/6/1	11/12/4/3	>0.05
Success(n)	30	30	1

Discussion: AFOI is recommended in patients with anticipated difficult airway. Optimal intubating conditions, maintaining patent airway along with patient's comfort are major hurdles[1]. Ideal sedation regimen would provide patient comfort, obtundation of airway reflexes, hemodynamic stability, amnesia and maintenance of patent airway with spontaneous respiration[2]

Dexmedetomidine is a central α_2 agonist, acts on presynaptic α_2 receptors to provide negative feedback causing less neurotransmitters available at post synaptic α_1 receptors[2], produces hypnosis, amnesia, analgesia, anxiolysis and sympatholysis with minimal respiratory depression. It provides conscious sedation, thus patient is sleepy but easily arousable[1].

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Glycopyrrolate premedication improves visualization during laryngoscopyby reducing secretions; thus providing better visualization, less dilution of topical local anaesthetic agent[6]

Chu et al[4] observed better intubating conditions and better patient tolerance in dexmedetomidine group as compared to fentanyl group with 1μg/kg[7]. Similar observation was done by *Mondal S et*al comparing dexmedetomidine with fentanyl 2μg/kg.[1]

Bergese et al[8] found that midazolam and dexmedetomidine combination is more effective than midazolam alone during awake fibreoptic intubation[8]. Their results were similar to our study

Mondal S et al[1] observed better hemodynamic stability in dexmedetomidine patients as compared to fentanyl patients[1]. *Ryu et al* compared dexmedetomidine with remifentanyl and observed no significant difference in sedation score, heart rate, mean blood pressure and patient satisfaction score in both groups[9].*Chalam KS* observed better hemodynamic stability in dexmedetomidine group than propofol group[3]. We too observed better hemodynamic stability in dexmedetomidine patients than fentanyl patients.

Grant et al[6] reported moderate sedation with dexmedetomidine without respiratory depression[10]. Gupta K[6] also found better sedation and better hemodynamic stability with dexmedetomidine. We observed lower sedation scores with better patient tolerance in patients receiving dexmedetomidine. However success rates were similar in both the groups

Conclusion: Dexmedetomidine provides better awake fibreoptic intubating conditions (hemodynamic, sedation, patient tolerance) than fentanyl due to its pharmacodynamics properties. However both provide optimal conditions for fibreoptic intubation resulting in successful intubation without any significant complications

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