Section: Anaesthesia

Original Research Article

COMPARISON OF DEXMEDETOMIDINE ALONE AND IN COMBINATION WITH KETAMINE DURING AWAKE FIBEROPTIC INTUBATION IN ORAL CANCER PATIENTS: A RANDOMIZED CONTROLLED STUDY

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ABSTRACT

Background: In India, chewing tobacco and betel nuts frequently lead to oral cancers. Treatment for oral cancer typically involves radical neck dissection followed by repair. These patients typically present at a late stage and pose a common issue to the anesthesiologist in terms of a difficult airway due to the tumor itself, a limited range of motion, and lastly a smaller inter incisor gap.
Objective: To compares the efficacy, patient tolerance, and safety profiles of sedation protocols utilizing Dexmedetomidine alone versus its combination with Ketamine during awake fiberoptic intubation (AFOI) in patients diagnosed with oral cancer**.**
Materials and Methods: A Randomized Controlled Study" by was conducted at Rohilkhand Medical College & Hospital, affiliated with Bareilly International University (2022–2025). The study systematically compares the efficacy, patient tolerance, and safety profiles of sedation protocols utilizing Dexmedetomidine alone versus its combination with Ketamine during awake fiberoptic intubation (AFOI) in patients diagnosed with oral cancer.
Results: The addition of ketamine to dexmedetomidine significantly enhanced sedation depth, with Group B (combination) achieving superior OAS scores compared to Group A (dexmedetomidine alone). Specifically, patients in Group B exhibited deeper sedation levels (Mean OAS: 3.43 vs. 2.99; $p<0.001$), translating into improved patient comfort. This finding underscores the clinical advantage of combining ketamine with dexmedetomidine, as ketamine potentiates sedation and analgesia without compromising spontaneous respiratory efforts. Regarding hemodynamic stability, both groups maintained stable vital parameters (heart rate and systolic blood pressure), demonstrating the drugs' comparable hemodynamic safety profiles throughout the procedure. The minimal fluctuations in hemodynamic parameters observed in both groups were clinically insignificant and remained within safe limits
Conclusion: The Group with combination drugs is a superior sedation strategy for awake intubation, offering better patient experience, deeper sedation, and enhanced procedural conditions without additional risks. Given its safety, effectiveness, and improved patient cooperation, this combination should be considered for routine clinical practice in difficult airway management**.**

Keywords: Dexmedetomidine, Dexmedetomidine with Ketamine, fiberoptic intubation, oral cancer patients.

INTRODUCTION

Some individuals may have radiotherapy or chemotherapy as their main form of treatment for oral cancer. For anesthesiologists, creating a patent airway for general anesthesia in these patients is always difficult and dangerous and hence, it is advised to do awake fibreoptic aided intubation, which can prevent the potentially fatal "can't intubate, can't ventilate scenario. For mouth, pharynx, larynx, and neck procedures, nasotracheal intubation gives the oncosurgeon the best possible working circumstances.[1]

The concept of being awake and nasotracheal manipulations may be quite distressing to the patient. Therefore, adequate time and effort must be put into psychologically and pharmaceutically preparing these individuals.[1]

Following vocal instructions and calmness are important during awake fiberoptic intubation while under intravenous (IV) anesthesia. For a patient to be comfortable, Cooperative, amnesic, hemodynamically stable, blunt their airway reflexes, and maintain a patent airway with spontaneous ventilation, sedation is desirable.[2]

Respiratory depression is a side effect of commonly used sedatives such as benzodiazepines, opioids, and propofol, especially when used at higher doses.[3]

Dexmedetomidine, an alpha 2-adrenoreceptor agonist, is a useful medication for fiberoptic intubation because it causes drowsiness and analgesia without impairing respiratory function. Dexmedetomidine is strongly recommended for AFOI as it provides easy awakening without displaying irritability as compared to propofol as a sedative.[4]

Ketamine, an NMDA antagonist, is used as an additional analgesic during surgery, ketamine has a low incidence of minor psychomimetic symptoms, nystagmus, and double vision. In randomized controlled studies, the combination of ketamine and dexmedetomidine produced excellent circumstances for awake FOI including good sedation, patient participation, and dry airway.[5]

A low dose of ketamine infusion (4 mcg/kg/min) may reduce the need for postoperative painkillers while having little influence on the ventilatory drive and analgesic Characteristics. A concurrent bolus dose of ketamine minimizes the bradycardia and hypotension that have been linked to dexmedetomidine by reducing the xerostomia that is generated by the drug.[5]

Dexmedetomidine also lessens the unfavorable rise in airway secretions, and the cardiac effects of ketamine and delirium-inducing medications are also lessened by dexmedetomidine.[6]

Fiberoptic intubation is a useful method for securing the airway in anticipated challenging situations, lower airway pathology, intubation situations, damaged airways, and when neck Extension should be avoided.[5] During fiberoptic intubation while awake sedation If left undisturbed, the patient should be calm, go to sleep, and obey verbal directives.[5]

Available conventional sedatives such as benzodiazepines, opioids, and propofol cause respiratory depression, especially when used in higher doses. Dexmedetomidine, an α2-adrenoreceptor agonist, is a valuable drug for fiberoptic intubation as it induces sedation and analgesia without depressing respiratory function4. In addition, xerostomia is commonly reported by patients. These two effects make dexmedetomidine highly desirable for awake fiberoptic nasotracheal intubation4. Unlike patients sedated with propofol, patients receiving dexmedetomidine are easily arousable without expressing irritation.[7] The relative sympatholysis achieved during dexmedetomidine infusions is an additional benefit in a procedure that may lead to elevations of heart rate (HR) and blood pressure.[8]

This research is both timely and significant in advancing the understanding of sedation strategies during AFOI, offering valuable insights to anesthesiologists, surgeons, and other stakeholders involved in the perioperative care of oral cancer patients.

Despite the theoretical benefits, limited clinical evidence exists to validate the efficacy and safety of this combination in oral cancer patients undergoing AFOI. This study is designed to address this gap by systematically comparing the outcomes of Dexmedetomidine alone and in combination with Ketamine.

The rationale for this study lies in its potential to improve clinical practices and patient outcomes. Findings from this research could offer evidence-based recommendations for anesthesiologists, contributing to safer and more effective airway management strategies in oral cancer patients. Additionally, the study holds broader implications for improving procedural protocols in other patient populations requiring AFOI.

MATERIALS AND METHODS

This Randomised Controlled study (Ctri Number: REF/2024/05/085134) was conducted among patients posted for elective surgery of oral malignancies in Department of Anaesthesiology, Rohilkhand Medical College and Hospital, Bareilly during 1st August 23 - 31st July 24,

Inclusion Criteria: Patients fulfilling the following:

- American society of Anaesthesiologist (ASA grade II or III)[5].
- Between 20-60yrs[5].
- Either sex.
- Mpg Grade 3 & 4[1].

Exclusion Criteria

- Obstructed Nasal Passage
- Bleeding Disorders

- Patients Allergic to the medication used within the trial
- Patient with Diabetes Mellitus and Hypertension or Cardiac diseases.

Consent: The study purpose, procedure involved, likelihood of potential discomfort and associated risks and benefits of the procedure were made clear to the patients in a language that was best understood by the individual, who then gave their written informed consent.

Sample Size: In our study a total of 70 patients will be included which were statistically calculated by using the software, power and sample size program G power version 3.1.[9]

The sample size calculated in each group is 35.

Methodology

Following institutional Ethical committee approval and informed consent, we enrolled the patients. This prospective, randomized, double-blind, comparative study included 70 willing participants with age groups between 20-60 years, ASA Grade II or III with predicted challenging airways who were posted for elective surgical procedures were included. After a detailed pre-anesthetic checkup (including complete airway assessment), routine fasting guidelines were explained, and anti-aspiration prophylaxis was given to all the patients the night before the surgery and coming morning of the surgery.

The Holiday Segar Formula was followed to start an intravenous line (IV) of 18 gauge and ringer lactate infusion in the pre-operative room. Following the baseline measurement of blood pressure (BP), heart rate (HR), and oxygen saturation, the patency of both the nares was checked and 4 drops of xylometazoline nasal drops were instilled in the more patent nostril. 15 minutes before the procedure, the patient was given a nebulizer treatment of 4 ml of 4% lignocaine to numb the airway. All the Patients were given inj. Glycopyrolate 0.2 mg IM.

All patients undergone routine monitoring procedures on the operating table, such as electrocardiography, noninvasive blood pressure monitoring, and pulse oximetry. The patient's airway was anesthetized 30 mins prior to surgery by spraying 10% lignocaine in two puffs on the posterior pharyngeal wall and the patient was asked to withhold as much of 10% of lignocaine as possible. By doing so, the posterior pharyngeal wall was briefly anesthetized.

Thereafter patient was given a bilateral Superior Laryngeal Nerve block with 1% plain Xylocaine (2 ml each) and transtracheal instillation (Recurrent laryngeal nerve) of 1% Xylocaine (2 ml). The Hoarseness of the voice was taken as an adequate effect.

The patients were split into "GROUP A & GROUP B" at random. In group A the patient received Inj. Dexmedetomidine with a dose of 1 mcg/kg over 10 minutes alone and in group B patient was received Inj. Dexmedetomidine with a dose of 1mcg/kg over 10 minutes along with Inj ketamine at the dose of 1 mg/kg.

At 4 liters per minute, nasal prong oxygen supplementation began and was maintained till the start of Awake Fiberoptic Intubation.

The patient was receiving the drug as per the group assigned. After the administration of the drug, the level of sedation was assessed at this moment using the Observer's Assessment of Alertness/sedation (OAS) score. Then a lubricated nasopharyngeal airway of appropriate size was inserted in the contralateral nostril.

The breathing circuit was then being connected to the end of this airway administering 100% oxygen during the procedure. The (OAS) Score was modified to determine the sedation score.

Following receiving study drug infusions for 10 minutes, an Flexometallic Endotracheal tube (ETT) was fitted over the Fiberscope, which was then inserted via the patient's nostril with the appropriate lubricant gel. Following visualization of the glottis and vocal cords, the vocal cord was crossed by the fiberoptic and entered into the trachea, and the ETT was then passed across it and positioned just above the carina. To avoid the fiberscope from moving out of view, the carinae were always being held there. The ETT

was positioned 3-5 cm above the carina and attached to the anesthetic breathing circuit. The placement of the tube was confirmed with direct vision on the screen and by 5-point auscultation. General anesthesia was then induced and maintained to provide anesthesia, amnesia, analgesia, and muscle relaxation during the surgery as per institutional protocol.

During the procedure, the following observations were recorded and compared.

- Hemodynamic profile including systolic blood pressure(SBP), diastolic blood pressure(DBP), MAP, or mean arterial pressure and HR was recorded baseline (pre-sedation), after sedation(at10min), immediately before intubation, and subsequently at 1 min, 3 mins 5 mins and 10 mins after intubation. Clinically Relevant hypotension (defined as the decrease in Systolic Blood Pressure > 30% from baseline values) was initially treated with Rapid I.V infusion of 100 ml of Ringer`s lactate solution over a 5 min period. When it was found to be ineffective, 6mg Phentermine I.V. was given. The occurrence of clinically relevant Bradycardia (defined as Heart Rate reduction < 50bpm) was treated with 0.5mg I.V. Atropine.
- OAS score of the amount of sedation prior to beginning intubation. Score 5 = Appropriate verbal response, Score 4 = Lethargic response, Score 3 = Only in response to a loudly uttered name, Score 2 = Response following light shaking, Score 1 = Reaction to unpleasant stimuli Score 0 = No response.

- Intubation score – This score included observation of Vocal cord movement Score1 = Open, Score 2 = Moving , Score 3 = Closing, Score 4 = Closed.[10]
- Cough score (Score1=None, Score2=Slight, Score3=Moderate,
- Score 4=Severe).[11]
- Intubation time - From inserting the fiberscope to confirmation of nasotracheal intubation by the appearance of end-tidal CO2 (EtCO2) curve.
- Number of attempts of intubation: A maximum of 2 attempts of AFOI was taken, after 1st failed attempt patient was reconciled and 2nd attempt was taken after 5 minutes. If two efforts at intubation were unsuccessful, the patient was removed from the research and nasotracheal intubation was performed using standard techniques or an elective tracheostomy.
- Patient tolerance was assessed by comfort score, whose value is (Score 1 = No reaction, 2 = Slight grimacing, 3 = Heavy grimacing, 4 =Verbal objection, 5 = Defensive movement of head or hands.[11]
- Any complication such as Desaturation or vomiting during and after the procedure were noted.

Statistical Analysis

Descriptive statistics was performed by calculating mean and standard deviation for the continuous variables. Nominal categorical data between the groups were contrasted bymeans of chi-square goodness-to-fittest. The software used for the statistical analysis was SPSS (statistical package for social sciences) version 23.0. The p-value was taken significant when less than 0.05 ($p<0.05$) and Confidence interval of 95% was taken.

RESULTS

In our study mean age of cases in group A was 39.91 years and in group B, it was 42.05 years. There was no noteworthy variation in the mean age of patients between group A and group B.

The gender distribution in both groups is well-balanced and not a confounding factor affecting any measured outcomes.

Both groups have a significantly higher count of males compared to females.

The distribution is visually similar between the two groups, reinforcing the statistical finding that gender distribution does not significantly differ (p-value = 0.733).

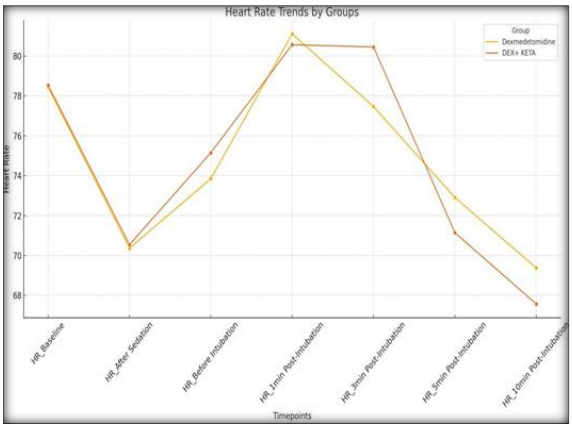

Figure 1: Represents Heart Trends by Group

Figure 1: The line chart above illustrates the heart rate trends across different timepoints, grouped by the "Group" variable. Each line represents a group's average heart rate at various stages, providing a clear comparison.

Table 1: Represents Heart Rate Trend Analysis

Timepoint	Group A Mean	Group B Mean	Group A Std	Group B Std	P-Value
HR_Baseline	78	78	12.20	11.09	0.97
HR_After Sedation	70	70	12.18	12.80	0.95
HR_Before Intubation	73	75	10.95	12.36	0.64
HR_1min Post-Intubation	81	80	11.46	12.69	0.85
HR_3min Post-Intubation	77	80	10.81	11.00	0.26
HR_5min Post-Intubation	72	71	9.80	9.54	0.44
HR_10min Post-Intubation	69	67	9.72	8.93	0.42

The Table 1 includes: Mean and standard deviation for both groups at each timepoint, the p-value indicating the statistical significance of differences between the two groups.

Heart Rate Trends

Objective: To assess how heart rate varied during different stages of the procedure for both groups.

Timepoints Analyzed: Baseline (before any drug administration), After Sedation, Before intubation, 1 minute, 3 minutes, 5 minutes, and 10 minutes post-intubation.

Findings

Both groups maintained relatively stable heart rates throughout the procedure. Example at baseline:

Group A: Mean = 78 bpm, Standard Deviation = 12.2 bpm. Group B: Mean = 78 bpm, SD = 11.1 bpm.

Post-intubation heart rates showed slight variations but remained within a safe range for both groups.

Statistical Results

P-values for all comparisons were above > 0.05, indicating no statistically significant differences in heart rate trends between the two groups.

Clinical Interpretation:

Both regimens provide equivalent control over heart rate during procedures.

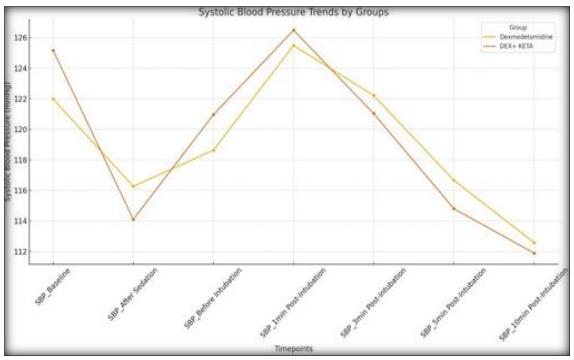

Figure 2: Represents systolic blood pressure (SBP) across different timepoints

Figure 2: The chart above depicts the trends in systolic blood pressure (SBP) across different timepoints, grouped by the "Group" variable. This visualization allows comparison of SBP dynamics between groups during various stages.

Objective: To evaluate the effect of each drug protocol on SBP during various procedural stages. Timepoints Analyzed: Baseline, After sedation, Before intubation, 1 minute, 3 minutes, 5 minutes, and 10 minutes post-intubation.

Findings: SBP trends were comparable between groups at all timepoints. Example at baseline: Group A: Mean = 121 mmHg, SD = 8.02 mmHg. Group B: Mean = 125 mmHg, SD = 9.64 mmHg.

After sedation, SBP slightly decreased in both groups, reflecting the sedation effect.

Statistical Results: P-values across timepoints were >0.05, suggesting no significant differences.

Clinical Interpretation: Both drugs effectively stabilize SBP during the procedure.

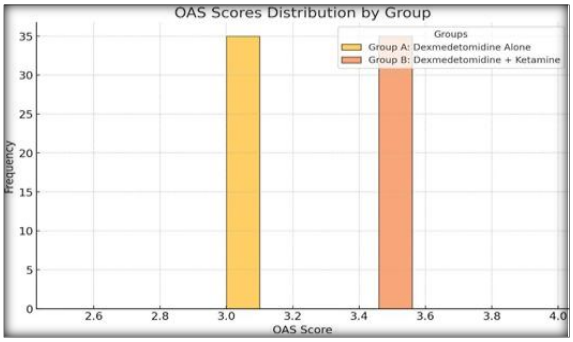

Figure 3: OAS Score Trends by Group

Figure 3: The chart above compares the OAS (Observer's Assessment of Sedation) scores across different groups

OAS (Observer's Assessment of Sedation) Score

Objective: To measure the depth of sedation during the procedure. Findings:

Here are the calculated values for the OAS (Observer's Assessment of Sedation) scores:

Group A: Mean: **2.997.** Standard Deviation: **.140**

Group B: Mean: **3.430.** Standard Deviation: **0.170**

P-value: $\mathbf{8.30 \times 10^{-18}}$ (highly significant)

This indicates a statistically significant difference between the two groups, with Group B showing better sedation scores

Table 2: Represents Vocal Cord Movement Score

Group	Mean	Standard Deviation	P-Value
Group A	2.63	1.29	0.8506
Group B	2.57	1.24	0.8506

Table 6: The table summarizes the mean, standard deviation, and p-value for the Vocal Cord Movement Score for both groups.

Vocal Cord Movement Score

Objective: To assess vocal cord mobility during intubation. Findings:

Mean scores: 2.63 Group A vs. 2.57 Group B.

Statistical Results:

P-value = 0.85 (no significant difference).

Clinical Interpretation:

Both protocols ensure comparable vocal cord mobility during intubation

Table 3: Cough Score Analysis

Group	Mean	Standard Deviation	P-Value
Group A	1.49	0.51	0.8144
Group B	1.51	0.51	0.8144

Table 7: The table provides the mean, standard deviation, and p-value for the Cough Score for both groups.

Cough Score

Objective: To quantify coughing during the procedure. Findings:

Mean scores: 1.49 Group A vs. 1.51 Group B. Scores suggest minimal coughing in both groups.

Statistical Results

P-value = **0.81 (no significant difference).**
Clinical Interpretation

Both drugs equally suppress the cough reflex during procedures

Table 4: Patient comfort score analysis

Group	Mean Comfort Score	Standard Deviation	P-Value
Group A	3.09	1.44	
Group B	2.50	1.20	
P-Value			0.001

Table 8: The table presents the mean, standard deviation, and p-value for the Patient Comfort Score for both groups

Patient Comfort Scores

Objective: To assess patient-reported comfort levels post-procedure. Findings:

1. Mean Comfort Score:

- Group A: The mean comfort score is 3.09, indicating moderate patient comfort during awake fiberoptic intubation (AFOI).
- **G**roup B: The mean comfort score is significantly lower at 2.50, reflecting better patient comfort compared to Group A.

2. Standard Deviation:

- Group A: 1.44, showing slightly higher variability in comfort scores.
- Group B: 1.20, indicating more consistent comfort scores among
- patients.

3. P-value:

The **p-value is 0.001**, indicating a **highly statistically significant** difference between the two groups, favoring Group B for better patient comfort

Table 5: Attempts of Intubation Analysis

Group	Mean	Standard Deviation	P-Value
Group A	1.16	0.09	3.75
Group B	1.02	0.10	3.75

Table 9: The table presents the mean, standard deviation, and p-value for the number of attempts at intubation for both groups

Attempts of Intubation

Objective: To determine the number of attempts required for successful intubation. Findings: Group A required ~ 1.16 attempts on average.

Group B required ~ 1.02 attempts on average.
Statistical Results:
P-value = 3.75# (no significant difference).
Clinical Interpretation:
Both regimens provide similar ease of intubation

Table 6: Time of intubation analysis

Group	Mean Intubation Time (mins)	Standard Deviation	P-Value
Group A	4.51	3.29	0.604
Group B	4.10	3.29	0.604

Table 10: The table summarizes the mean, standard deviation, and p-value for the time of intubation for both groups.

(P-Value = 0.604) The p-value is much greater than 0.05, meaning the difference in intubation times between the two groups is **not statistically significant.**

This suggests that the choice of using Group A alone vs. Group B does not significantly impact intubation time.

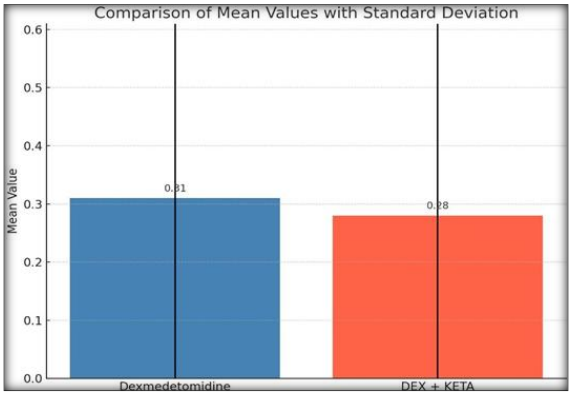

Figure 4: Complication across patients group

Figure 11: The bar chart above illustrates the distribution of complications across different patient groups. Each bar represents the count of a specific complication within a group, enabling easy comparison of complication rates

Observations

- **Mean Values:** Group A: 0.31, Group B: 0.28, The mean for Group B is slightly lower than for Group A.
- **Standard Deviation (Error Bars):**

Both groups have a similar standard deviation (~0.48), represented by the black vertical error bars.
The large error bars indicate high variability within each group.
P-Value: 0.792, which is much greater than 0.05, indicating no statistically significant difference between the two groups.

Table 7: Analysis of complication

Group	Mean	Standard Deviation	P-Value
Group A	0.31	0.48	0.792
Group B	0.28	0.48	0.792

Table 11: The table provides the mean, standard deviation, and p-value for the presence of complications for both groups.

Analysis

- **Mean Values:**
- Group B has a lower mean (0.28) than Group A (0.31).
- The difference (0.03) is **very small**, indicating minimal variation between groups.
- **Standard Deviation (0.48 for both groups):**
- The variability in both groups is **almost identical**, meaning the spread of data points is similar.
- **P-Value (0.792):**

Since **0.792 > 0.05**, there is **no statistically significant difference** between the two groups.

DISCUSSION

This study included a total of 70 patients undergoing awake fiberoptic intubation (AFOI) for oral cancer surgery at Rohilkhand Medical College & Hospital, Bareilly.
The participants were randomly assigned to two groups, ensuring a balanced comparison of sedation protocols.
The study included patients classified as **ASA Grade II & III**, ensuring a comparable level of anesthetic risk.
Maintaining hemodynamic stability is a key concern during AFOI, as sedation can lead to hypotension, bradycardia, or hypertensive responses to intubation.
The present study observed that:
Heart Rate (HR) remained stable in both groups, with no significant difference (p >0.05). Systolic Blood Pressure (SBP) showed minor decreases post-sedation in both groups but remained within safe clinical limits. Prior studies by **Sinha et al. (2014)** and **Dashmana et al. (2014)**, which showed that Dexmedetomidine, due to its α2-adrenergic agonist activity, reduces sympathetic outflow, causing mild bradycardia and hypotension. However, the addition of Ketamine, a sympathomimetic agent, may have counteracted the bradycardic effect, leading to comparable hemodynamic stability between the groups.[5,12]
This is consistent with **El Sharkawy et al. (2019)**, who found that Ketamine offsets Dexmedetomidine-induced hypotension, making the combination beneficial for highrisk cardiac patients.[13]
The findings suggests that Group B may provide safe hemodynamic stability, making it a preferable choice for AFOI in patients at risk of hypotension due to sedation.

Sedation Quality (OAS Score)

One of the most significant findings was the higher sedation scores in the Group B (p< 0.001). The combination provided deeper and more stable sedation compared to Dexmedetomidine alone. Previous studies, such as those by **Maroof et al. (2005)** and **Hall et al. (2000)**, have demonstrated that Dexmedetomidine alone provides adequate sedation for AFOI but lacks analgesia. Ketamine, an NMDA receptor antagonist, adds an analgesic component, thereby improving sedation quality and reducing patient distress during fiberoptic intubation.[14,15]
A similar study by **Jamgade et al. (2021)** found that patients who received Dexmedetomidine+ Ketamine had better tolerance and deeper sedation than those receiving Dexmedetomidine alone. This supports the hypothesis that Ketamine enhances the sedative effects of Dexmedetomidine while preserving airway Reflexes.[16]
For awake intubation in oral cancer patients, where cooperation and minimal distress are essential, addition of Ketamine to Dexmedetomidine superior sedation quality.

Intubation Conditions

- The study found **no significant difference (p = 0.85)** in vocal cord movement scores between the two groups.
- This indicates that both sedation protocols provided adequate conditions for fiberoptic intubation.

This aligns with findings from **Abdelmalak et al. (2007)**, who reported that Dexmedetomidine alone provides sufficient sedation for smooth intubation[17].
The addition of Ketamine did not alter vocal cord conditions, reinforcing that both regimens are suitable for AFOI.

Cough Suppression

- Both groups showed similar cough scores (p = 0.81), indicating effective cough suppression.
- Prior studies, including those by **Tsai et al. (2010)**, confirm that Dexmedetomidine suppresses airway reflexes, reducing cough and gag reflexes during intubation.[11]

Clinical Implication

Since both groups had similar intubation conditions in terms of cough suppression, as it is well known fact that Ketamine doesn't suppress reflex, the choice between Group A or Group B should depend on patient specific factors such as comfort and sedation depth.

Patient Comfort

- The Dexmedetomidine + Ketamine group had significantly better comfort scores **(p = 0.001)**.
- Patients in this group showed less facial grimacing and distress, suggesting superior patient tolerance.

Similar findings were reported in a study by **Sinha et al. (2014)**, where patients receiving Dexmedetomidine + Ketamine had less anxiety and better procedural acceptance than those receiving Dexmedetomidine alone.[5]
Another **systematic review by Tang et al. (2021)** found that patients undergoing AFOI with Dexmedetomidine + Ketamine reported higher satisfaction due to better pain relief and amnesia.[18]

Clinical Implication

Improved comfort translates to better patient experience, reducing stress-induced complications. This makes Group B the preferred choice for anxious or uncooperative patients undergoing AFOI.

Time to Intubation & Success Rates

- No significant difference (p = 0.604) in intubation time was observed between the two groups.
- Both groups had a high success rate on the first attempt.

These findings align with **Chavan et al. (2020)**, who found that Dexmedetomidine alone and in combination with Ketamine did not impact intubation time[1].

Clinical Implication

Since both regimens ensure fast and successful intubation, the selection of drugs can be based on other patient factors like comfort and hemodynamics.

Complications

- No significant difference (p = 0.792) in complication rates between groups.
- Common complications included sore throat, mild desaturation, and airway trauma, but none were severe.

The safety profile of Dexmedetomidine + Ketamine aligns with previous literature, including studies by **Johnston et al. (2013)** and **Kumari et al. (2021)19**.

Clinical Implication

Since Group B does not increase complications, it is a safe option for difficult airway patients requiring AFOI

CONCLUSION

The study strongly supports the use of Dexmedetomidine + Ketamine for awake fiberoptic intubation, particularly in patients with difficult airways, as it optimizes
sedation, improves comfort, and ensures stable hemodynamics. This combination can be beneficial in other airway management scenarios beyond oral cancer cases, such as trauma, congenital abnormalities, and previous airway surgeries.
The Group with combination drugs is a superior sedation strategy for awake intubation, offering better patient experience, deeper sedation, and enhanced procedural conditions without additional risks. Given its safety, effectiveness, and improved patient cooperation, this combination should be considered for routine clinical practice in difficult airway management.

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