Original Article

A Comparative Study of Intravenous Dexmedetomidine-versus Propofol-based Sedation for Awake Fiberoptic Intubation Along with Airway Blocks in Cervical Discectomy Patients

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Abstract

Background: In unstable cervical spine, optimal intubation positioning of the patient may be unsafe. Awake intubation is indicated, which is rendered more comfortable by light sedation. **Aims and Objectives:** This study compared intravenous dexmedetomidine versus propofol-based sedation for awake fiberoptic intubation along with airway blocks. **Materials and Methods:** 100 ASA I and II patients with cervical PIVD are recruited for this study. Vital parameters such as heart rate, systolic BP (SBP), diastolic BP (DBP), mean arterial pressure (MAP), and SPO2 were monitored at regular intervals. Patient sedation score, endoscopy score, intubation score, post-intubation conditions, and discomfort score were also recorded. **Results:** There was no statistically significant difference between the two groups with respect to SBP, DBP, mean blood pressure (MBP), heart rate (HR), and SPO2. **Conclusions:** Dexmedetomidine appeared to offer better patient tolerance, better preservation of a patent airway, and spontaneous ventilation.

Key words: Airway blocks, awake fiber optic intubation, dexmedetomidine

Introduction

A difficult airway is one in which ventilation and/or intubation is difficult as a result of anatomic or pathologic problems or as a result of a situation such as an unstable cervical spine in which optimal intubation positioning of the patient may be unsafe.[1] The most favorable method in this situation is awake intubation, in which the patient can communicate if there is any change in neurologic status and in whom a post-intubation neurologic examination is possible. In many cases, awake intubation using a fiberoptic bronchoscope is the safest technique to secure the airway. In such cases, the choice of drug for sedation can be problematic because of respiratory depression effects. In particular, conventional sedatives like the benzodiazepines, propofol, or opiates have respiratory-depressant properties that may be detrimental in tenuous airway situations.[1] At times, intubation becomes a dire emergency with the use of above mentioned drugs and the plan of having an awake intubation might fail.[1]

Target controlled propofol infusion in a dose range of 0.8–1.2 μg/ml has been used for conscious sedation during awake fiberoptic intubation. It has quick onset of action and rapid recovery, but it does not provide analgesia and amnesia and may need small dose of midazolam to ensure amnesia. Overdose of propofol may cause unconsciousness, respiratory depression, and hypotension.[2]

Dexmedetomidine is a drug whose clinical profile makes it especially well suited for this task. It is a highly specific α2-agonist that can produce sedation, anxiolysis, and analgesia. The preservation of arousability and respiratory depression sparing properties would allow for safer conduct of awake fiberoptic intubations in difficult airway cases, and it would also allow for a patient's cooperation during neurologic assessment in cases of cervical spine instability.[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.[2]

The literature regarding awake fiberoptic intubation carried out under dexmedetomidine based sedation in cervical disc surgeries is limited. So, this study was undertaken to evaluate the beneficial effects of dexmedetomidine based sedation in comparison to the commonly used sedatives such as propofol.

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Materials and Methods

The present study was conducted in the Department of Anesthesiology at Sri Sathya Sai Institute of Higher Medical Sciences, Whitefield, Bangalore.

In this prospective study, 100 American Society of Anesthesiologists (ASA) Grades I and II patients, aged between 20 and 60 years, and undergoing elective cervical disc surgeries were enrolled for the study after obtaining ethical committee approval and written informed consent. They were randomly divided by computer-generated random tables into two groups as Group I and Group II, with each group consisting of 50 patients.

Fiberoptic intubation was carried out by the senior anesthesiologist experienced in this technique. Group I received intravenous dexmedetomidine. It was diluted with normal saline to a concentration of 4 mcg/ml. Patients received a loading infusion dose of dexmedetomidine 1 mcg/kg over 10 min and a maintenance dose of 0.5 mcg/kg until the endotracheal intubation was secured. Group II patients received intravenous propofol, which was given undiluted as a bolus dose of 1 mg/kg over 5 min.

Pre-operative visit was conducted on the previous day of surgery and a detailed history was taken. General and systemic examinations of the cardiovascular, respiratory, and central nervous systems were carried out. In addition, the airway was assessed. Patient was explained about the technique of awake fiberoptic intubation with airway blocks under sedation. Routine laboratory investigations like complete hemogram, ECG, urine analysis, serum creatinine, blood sugar, and X-ray chest were carried out.

After informed consent was taken, patients were kept nil per orally after 12 midnight on the previous night of surgery. Pre-medication consisted of tab Ranitidine 150 mg given orally to the patient to reduce the amount of acid in the stomach and tab diazepam 10 mg given with sips of water for anxiolysis 90 min before shifting the patient to the operating theater. Antisialagogue glycopyrrolate 0.2 mg i.m. was administered 30–45 min prior to application of the local anesthetic.[2]

Pre-operatively, pulse rate, blood pressure (BP), electrocardiogram, non-invasive BP, and oxygen saturation were recorded in the operation theater after connecting the patient to standard anesthesia monitor. Peripheral venous access and arterial line were established after local infiltration of lignocaine, and monitoring was continued. Oxygen was administered to the patient by nasal prongs. The study and control medications were administered as intravenous infusion and the patient was assessed constantly to ensure that he/she responds to verbal commands tongue, superior epiglottis, aryepiglottic folds, arytenoids, and laryngeal mucosa to just above and excluding the vocal cords. Utilizing 22 gauge hypodermic needle, 2 ml of 2% lidocaine with adrenaline was administered. Recurrent laryngeal nerve block was carried out with transtracheal injection of 4 ml of 2% lidocaine without adrenaline, mounted on a 22-guage venous cannula to block sensory innervation to the vocal cords and trachea and motor innervation to the vocal cords.[2]

Ovassapian airway was then lubricated with lidocaine jelly and gently placed in the patient's mouth. The chin lift and jaw thrust maneuvers and protrusion of the tongue moved the soft tissues and improved the view through the fiberscope. These maneuvers also helped to prevent airway obstruction in the sedated patient.

Insertion cord of fiberoptic intubation (FOB) loaded with flexometallic tube (size: 8.0 and 8.5 mm ID for male patients and 7–7.5 mm ID for female patients) was advanced gently through the airway under epiglottis through the cords into the trachea; the tube was gently railroaded into the midtracheal position. Position of the tube was confirmed as the fiberscope was withdrawn and reconfirmed by bag movement, auscultation, and capnography.

Vital parameters such as heart rate (HR), systolic BP (SBP), diastolic BP (DBP), mean arterial pressure (MAP), and SPO2 were monitored at regular intervals. Patient sedation score, endoscopy score, intubation score, post-intubation conditions, and discomfort score were also recorded using a data collection form.

Tachycardia response was defined as 20% increase in HR from the pre-intubation value.

Hypertensive response was defined as 20% increase from pre-induction BP.

Hypotension was defined as BP < 20% of pre-induction BP.[3]

Severe hypotension, defined as BP < 40% of pre-induction value, was treated with intravenous fluids or small bolus dose of ephedrine as the rescue drug.

Bradycardia was defined as HR < 60 beats/min and was treated with intravenous atropine 20 mcg/kg.[3] Sedation score was assessed using modified Steward score.[3]

After positioning and assessing the neurological integrity by the operating neurosurgeon, patients were anesthetized with standard anesthesia technique consisting of fentanyl 2 μg/kg, thiopentone 2–3 mg/kg, and pancuronium 0.08 mg/kg body weight. Maintenance was carried out with oxygen and nitrous oxide in a ratio of 33:67 and isoflurane 0.8%, supplemented with top-up doses of fentanyl 0.5 μg/kg and pancuronium 0.03 mg/kg. On completion of surgery, the residual paralysis was reversed with inj. Neostigmine 0.05 mg/kg i.v. and atropine 0.02 mg/kg or glycopyrrolate 0.005 mg/kg i.v., and extubated on table.

Patients were transferred to the post-operative ICU for overnight stay and subsequently to the ward after confirming an adequate level of consciousness with intact reflexes.

Procedure after failed awake fiberoptic intubation

When awake intubation failed due to patient developing prolonged coughing, discomfort, and severe resistance during

bronchoscopy or tracheal intubation, it was considered as study failure and the patient was intubated with fiberoptic bronchoscope under general anesthesia (GA) after induction with standard doses of thiopentone, fentanyl, and pancuronium.

Statistical analysis

Statistical software, namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0, and R environment ver. 2.11.1, were used for the analysis of the data, and Microsoft word and Excel were used to generate graphs, tables, etc., The proposed number of patients required for the study was 100 (a sample size of 50 patients per group), which was required to produce a statistical power of 80% (0.80). The level of significance was 5% ($P < 0.05$). All the data are expressed as mean ± Standard Deviation for quantitative data and number (%) for the categorical data type. Statistical analysis was done with Chi-square test or Fischer's exact test for descriptive and nominal data. For continuous repeated measured values of BP and HR, Student's *t*-test with Bonferroni correction or Pearson's product moment correlation was used.[4]

Observations and Results

The present study was carried out on a total of 100 patients and intravenous dexmedetomidine (study group) was compared with propofol-based sedation (control group) for awake fiberoptic intubation along with airway blocks in cervical discectomy patients.

Demographic data

The mean age in dexmedetomidine group (study group) was 42.92 ± 9.26 years, with a range of 20–60 years. The mean age in propofol group (control group) was 42.06 ± 9.72 years, with a range of 21–60 years. There was no statistically significant difference in age, gender, and height and weight distribution.

Hemodynamic data

The hemodynamic parameters taken into consideration were BP (systolic, diastolic, and mean) and HR. They were recorded at baseline, 5 min after bolus sedation, at the time of intubation, 15 s after intubation, 30 s after intubation, 60 s after intubation, 90 s after intubation, 120 s after intubation, 180 s after intubation, at the 4th minute, and at 5 min after intubation.

Baseline values

Hemodynamic variables measured immediately after the patient was wheeled to the operating room were taken as "baseline" values. In the dexmedetomidine group, the baseline values were: SBP 133.16 ± 11.92 mmHg, DBP 83.62 ± 7.02 mmHg, MBP 100.14 ± 7.80 mmHg, and HR 76.40 ± 8.51 bpm. In the propofol group, the baseline values were: SBP 132.04 ± 13.51 mmHg, DBP 83.50 ± 8.46 mmHg, MBP 99.64 ± 9.30 mmHg, and HR 78.52 ± 6.89 bpm. There was no statistically significant difference between the two groups with respect to SBP ($P = 0.661$), DBP ($P = 0.939$), MBP ($P = 0.771$), and HR ($P = 0.174$).

Heart rate

HR was comparable between both the groups at baseline. After 5 min of bolus infusion, there was statistically significant fall in HR from the baseline values in the dexmedetomidine (study) group (68.60 ± 7.28) compared to the propofol (control) group (77.72 ± 8.69). There was statistically significant increase in HR during intubation of the control group (86.60 ± 10.84) compared to the study group (71.08 ± 8.33) with a P value < 0.001. There were statistically significant differences ($P < 0.001$**) between the groups with respect to changes in HR at various points of time after intubation. In the study group, mean HR remained lower than baseline values (76.40 ± 8.51), maximum mean decrease in HR was 65.52 ± 6.18 at 5 min after intubation, and none of the patients had bradycardia (HR < 50), whereas in the control group (P), maximum mean decrease in HR was 75.70 ± 8.59 at 5 min after intubation, mean increase in HR from baseline was 86.60 ± 10.84 during intubation, and HR reached baseline values at 120 s and remained lower after that.

Systolic blood pressure

At baseline, SBP changes in both the groups were comparable. There were significant differences between the groups with respect to changes in SBP at various points of time after intubation. The rise in SBP at the time of intubation was significantly higher in the propofol group (141.73 ± 13.35 mmHg) compared to the dexmedetomidine group (126.42 ± 10.41 mmHg) with $P < 0.001$. SBP remained lower than baseline after 5 min of bolus infusion till 5 min post-intubation in the study group, whereas SBP in the control group decreased from the baseline value after 5 min of bolus infusion (132.04 ± 13.51 vs. 125.40 ± 11.57), but there was significant increase in SBP from the baseline value during intubation (141.73 ± 13.35 vs. 132.04 ± 13.51), which then started to decrease and reached close to baseline values by 60 s and remained so thereafter till 5 min af ter intubation. The intergroup variation in SBP during intubation and till 5 min after intubation showed significantly lower values in patients of dexmedetomidine group as compared to those in propofol group ($P < 0.001$).

Diastolic blood pressure

Baseline DBP values in both the groups were comparable. There was decrease in DBP in both the groups from the baseline values, but the mean fall in DBP was lower in the propofol group (76.74 ± 6.99) as compared to the dexmedetomidine group (79.20 ± 7.94) after 5 min of bolus infusion. There was a significant fall in DBP in the dexmedetomidine group at various points of time after intubation and during intubation, as compared to the propofol group.

Mean arterial pressure

Baseline values of MAP in both the groups were comparable. There were significant differences between the groups with respect to changes in MAP at various points of time after intubation. There was decrease in MAP in both the groups from the baseline values, but the fall in MAP was lower in the propofol

group (93.00 ± 7.74) as compared to the dexmedetomidine group (95.10 ± 8.28) after 5 min of bolus infusion. There was a significant fall in MAP in the dexmedetomidine group at various points of time after intubation compared to the propofol group, but statistically more significant fall was noted during intubation (95.02 ± 7.46 vs. 103.22 ± 17.53) (*P* value = 0.003**).

Respiratory rate and oxygen saturation

Baseline saturation and respiratory rate (RR) in both the groups was comparable. There were significant differences between the groups with respect to changes in RR. There was statically highly significant (*P* < 0.001**) increase in RR after 5 min of bolus infusion (16.84 ± 1.33 vs. 12.34 ± 1.33), during intubation (17.94 ± 1.78 vs. 13.20 ± 1.21), and up to 5 min after intubation in the study group. Brief apnea was observed in a few patients who required frequent awakening (5–10 s) in the control group. No apnea was observed in patients of dexmedetomidine group.

There were no significant differences between the groups with respect to changes in SpO2 after bolus infusion, during intubation, and after intubation clinically.

Patient sedation score (modified Steward score) between the groups

Consciousness (0–4)

Forty-one patients out of 50 (82%) in the study (D) group had a consciousness score of 2 (eyes open on command), whereas in the control (P) group, 17 patients (34%) had a score of 2 (eyes open on command) and 20 patients (40%) had a score of 1 (response to ear pinching). Thus, there was significantly increased percentage of patients with score 2 in the study group (82% vs. 34%) wherein the patients were lightly asleep and easily arousable, responding to commands, and were calm and cooperative. Better conscious score [2 (1–3)] was more associated with the study group compared to the control group [1 (1–3)] Table 1.

Airway (0–3) score

Thirty-one patients out of 50 (62%) in the study (D) group had an airway score of 3 (opens mouth, coughs on command), compared to 17 patients (34%) in the control (P) group. Three patients (6%) in the study (D) group had an airway score of 0 (airway obstruction needing jaw retraction/oro-pharyngeal airway), whereas in the control (P) group, 15 patients (30%) had a score of 0 (airway obstruction needing jaw retraction/ oro-pharyngeal airway). Thus, dexmedetomidine group had statistically significant less airway obstruction compared to propofol group (6% vs. 30%, with score 0). Study (D) group had better airway scores compared to control (P) group with *P* < 0.001** Table 2.

Activity score (0–2) in the two groups

Activity score of 2 (raising arm on command) was found in 42 patients out of 50 (84%) in the study group (D), whereas in the control (P) group, 26 patients (52%) had a score of 2. Score 0 (no movement) was seen in 7 patients (14%) of the control (P) group compared to 2 patients (4%) in the study (D) group. Thus, the higher activity score was significantly associated with the study (D) group with *P* = 0.003** Table 3.

Discomfort score (0–3) between the two groups

Discomfort score of 0 (no discomfort) was seen in 35 patients out of 50 (70%) in the study (D) group compared to 26 out of 50 (52%) in the control (P) group. Fifteen (30%) patients had a score of 1 (probable mild discomfort, no patient resistance) in the study group versus 19 (38%) in the control group. Four (8%) patients had a score of 2 (restless patient, minimal patient resistance) and 1 (2%) patient had a score of 3 (restless patient, severe patient resistance) in the control group, who was considered as study failure and had been given GA and intubated. Better discomfort scores were significantly associated with the study group with *P* = 0.050* Table 4.

Endoscopy score (0–5) between the two groups

Endoscopic score of 0, i.e. no response to endoscopy (FOB), was obtained in 27 patients out of 50 (54%) in the study (D) group compared to 17 (34%) in the control group. Two patients had a score of 5, i.e. prolonged coughing to endoscopy in the control group. Fourteen patients (28%) in the study group had a score of 3–4, compared to 22 (44%) in the control group. Thus, the study group showed significantly lower endoscopy scores with *P* = 0.098+ [Table 5].

Intubation score (0–5) between the two groups

Fifteen (30%) patients had a score of 0 (no response to intubation) in the study (D) group, compared to 7 (14.3%) in the control group. Forty-four percent of patients in study group had scores of 1–2 (1- grimacing, 2- localizing with one limb at any stage), whereas 57% of patients in the control group had scores of 3–4 (3- localizing with two limbs at any stage, 4- coughing on entering trachea) and 1 patient had score of 5 (prolonged coughing). Better (lower) intubation scores were significantly associated with the study groups with *P* = 0.0005**. One patient required conversion to conventional GA for intubation due to undue coughing Table 6.

Post-intubation condition

There were no statistical or clinically significant changes in the post-intubation condition following awake intubation under conscious sedation. All patients following intubation were cooperative and obeyed commands.

Table 1: Frequency distribution of consciousness (0-4) in the two groups studied

Consciousness (0-4)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
1	3	6.0	20	40.0
2	41	82.0	17	34.0
3	5	10.0	9	18.0
4	1	2.0	4	8.0
Total	50	100.0	50	100

Low conscious score was significantly more associated with the study group with *P*<0.001**

Table 2: Frequency distribution of airway (0-3) in the two groups studied

Airway (0-3)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
0	3	6.0	15	30.0
1	0	0.0	0	0.0
2	16	32.0	18	36.0
3	31	62.0	17	34.0
Total	50	100.0	50	100

Higher airway score was significantly associated with the study group with $P<0.001$**

Table 3: Frequency distribution of activity (0-2) in the two groups studied

Activity (0-2)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
0	2	4.0	7	14.0
1	6	12.0	17	34.0
2	42	84.0	26	52.0
Total	50	100.0	50	100

Higher activity score was significantly associated with the study group with $P=0.003$**

Table 4: Frequency distribution of discomfort score (0-3) in the two groups studied

Discomfort score (0-3)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
0	35	70.0	26	52.0
1	15	30.0	19	38.0
2	0	0.0	4	8.0
3	0	0.0	1	2.0
Total	50	100.0	50	100

Lower discomfort score was significantly associated with the study group with $P=0.050$*

Discussion

The study was conducted to compare the hemodynamics, intubation conditions, and patient comfort effects utilizing either i.v. dexmedetomidine- or propofol-based sedation with airway blocks for awake fiberoptic intubation in patients undergoing cervical discectomy surgeries.

There was statistically significant fall in HR from the baseline values 5 min after i.v. bolus infusion in the dexmedetomidine (study) group (68.60 ± 7.28) compared to the propofol (control) group (77.72 ± 8.69) in our study. There was statistically significant increase in HR during intubation in the control group (86.60 ± 10.84) compared to the study group (71.08 ± 8.33) with a P value < 0.001**. HR remained lower than baseline value at all time intervals in the study group. This was in agreement with the results of a prospective, randomized study carried out by Menda *et al*.,[5] in which dexmedetomidine (DEX) was used to attenuate the hemodynamic response to endotracheal intubation with low-dose fentanyl and etomidate in patients undergoing myocardial revascularization and receiving beta-blocker treatment. After the induction of GA, the drop in HR was higher in the DEX group compared to the placebo (PLA) group. One minute after endotracheal intubation, HR significantly increased in the PLA group, while it decreased in the DEX group.

In the present study, the rise in SBP in response to intubation was significantly higher in the propofol group (141.73 ± 13.35 mmHg) compared to the dexmedetomidine group (126.42 ± 10.41 mmHg) ($P < 0.001$). The SBP remained lower than baseline value after 5 min of bolus infusion till 5 min post-intubation in the dexmedetomidine group as compared with the propofol group ($P < 0.001$). There was significant fall in DBP and MAP in the dexmedetomidine group during intubation and at various points of time after intubation, compared to the propofol group, and statistically significant fall in MAP was seen during intubation (95.02 ± 7.46 vs. 103.22 ± 17.53) (P value - 0.003**). Similar findings were also reported by Yildiz *et al*.[6] who studied 50 patients scheduled for elective minor surgery to evaluate the effect of a single pre-induction intravenous dose of dexmedetomidine 1 μg/kg on cardiovascular response resulting from laryngoscopy and endotracheal intubation. They found that pre-operative administration of a single dose of dexmedetomidine blunted the hemodynamic responses during laryngoscopy and reduced opioid and anesthetic requirements. Furthermore, dexmedetomidine decreased the BP and HR as well as the recovery time after the operation.

Uysal *et al*.[7] conducted a study on 60 hypertensive patients scheduled for noncardiac surgery under GA to compare the effects of dexmedetomidine, esmolol, and sufentanil on the hemodynamic response to tracheal intubation. Patients were randomly assigned to receive one of the three drugs before induction of anesthesia. Groups I, II, and III received esmolol (100 mg), dexmedetomidine (1 μg/kg), and sufentanil (0.25 μg/kg), respectively. They concluded that administration of dexmedetomidine before anesthesia induction blunted the hemodynamic response to tracheal intubation and reduced the thiopental dose.

Kunisawa *et al*.[8] conducted a prospective, double-blinded, randomized study on 30 ASA physical status II and III patients with mild-to-moderate cardiovascular disease to evaluate the effect of dexmedetomidine combined with fentanyl on hemodynamics. They concluded that dexmedetomidine combined with fentanyl during anesthetic induction had suppressed the increase in BP due to anesthetic induction and also blunted the cardiovascular response to tracheal intubation.

In our study, there was significant increase in RR in the study group (D) compared to the control group (P), indicating no respiratory depression in the study (D) group. Also, a few patients in the control group had brief apnea episodes requiring frequent awakening.

Takahashi *et al*.[9] conducted a study on anesthesia induction in patients with cervical spinal disease. They performed

Table 5: Frequency distribution of endoscopy score (0-5) in the two groups studied

Endoscopy score (0-5)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
0	27	54.0	17	34.0
1-2	9	18.0	9	18.0
3-4	14	28.0	22	44.0
>4	0	0.0	2	4.0
Total	50	100.0	50	100

Lower endoscopy score was significantly more associated with the study group with *P*=0.098+

Table 6: Frequency distribution of intubation score (0-5) in the two groups studied

Intubation score (0-5)	Study (D) group		Control (P) group	
	No	Percent	No	Percent
0	15	30.0	7	14.3
1-2	22	44.0	13	26.5
3-4	13	26.0	28	57.1
>4	0	0.0	1	2.0
Total	50	100.0	49	100

Lower intubation score was significantly associated with the study group with *P*=0.0005**

an awake induction using AirWay Scope for eight patients with cervical spinal diseases, using midazolam, propofol, or dexmedetomidine as a sedative drug. They found that dexmedetomidine caused no respiratory depression and one would expect cooperation from patients. It provided safe and efficient sedation in awake intubation cases.

Grant *et al*.[10] reported that dexmedetomidine provided a moderate level of sedation without causing respiratory distress during fiberoptic intubation in three patients who underwent cervical spine surgery requiring awake fiberoptic intubation under dexmedetomidine infusion.

In our study also, better conscious score [2 (1–3)] was obtained in the study group compared to the control group (82% vs. 34%). Activity score of 2 (raising arm on command) was found in 42 (84%) patients out of 50 in the study group (D), compared to 26 (52%) patients in the control (propofol) group. Patients were lightly asleep but were easily arousable, and were responding and communicating to oral commands.

Better airway score was seen in the study (dexmedetomidine) group in our study; 31 patients out of 50 (62%) patients of the dexmedetomidine group had an airway score of 3 (opens mouth, coughs on command), in comparison to 17 patients (34%) in the control group (propofol). Airway obstruction needing jaw retraction/oro-pharyngeal airway (airway score 0) was seen in 3 patients out of 50 (6%) in the study group, compared to 15 patients (30%) in the control group. Similar observations were recorded in a study conducted by Tsai *et al*. who compared the effectiveness of dexmedetomidine versus target-controlled propofol infusion in providing sedation during fiberoptic intubation in 40 patients with anticipated difficult airways.[11] They found that dexmedetomidine allowed better tolerance, more stable hemodynamic status, and it would preserve a patent airway.

Activity score of 2 (raising arm on command) was found in 42 (84%) patients out of 50 in the study group (D), compared to 26 (52%) patients in the control (propofol) group in our series.

Avitsian *et al*.[12] Presented a clinical case series of patients who underwent an awake fiberoptic endotracheal intubation (AFOBI) using dexmedetomidine for sedation. Adequate sedation in addition to topicalization of the airway might be the key to minimize patient discomfort and assists in successful intubation. They concluded that dexmedetomidine provided adequate sedation. The patients gave excellent cooperation for post-intubation neurologic examination.

In our study, discomfort score of 0 (no discomfort) was obtained in 35 patients out of 50 (70%) in the study (D) group, compared to 26 out of 50 (52%) in the control (P) group. Thus, better scores were significantly associated with the study group with $P = 0.050$*. Endoscopic score of 0, i.e. no response to endoscopy (fiberoptic bronchoscopy), was seen in 27 (54%) patients out of 50 in the study (D) group, compared to 17 (34%) in the control group. Two patients had a score of 5, i.e. prolonged coughing to endoscopy, in the study group, of which one patient had to receive GA. Thus, the study group showed significantly lower endoscopy scores with $P = 0.098$+. Intubation score of 0 (no response to intubation) was obtained in 15 (30%) patients in the study (D) group, compared to 7 (14.3%) in the control (P) group. Also, 44% patients in the study group had scores of 1–2 (1- grimacing, 2- localizing with one limb at any stage), whereas 57% of patients in the control group had scores of 3–4 (3- localizing with two limbs at any stage, 4- coughing on entering trachea). Better (lower) intubation score was significantly associated with the study group with $P = 0.0005$**. There were no statistical or clinically significant changes in post-intubation condition following awake intubation under conscious sedation; all patients post-intubation were cooperative and obeyed commands (score 1).

Hu *et al*.[13] conducted a double-blinded, randomized controlled trial comparing dexmedetomidine versus remifentanil sedation during awake fiberoptic nasotracheal intubation in 40 patients. Compared with remifentanil, dexmedetomidine offered better endoscopy scores, lower recall of intubation, and greater patient satisfaction, with minor hemodynamic side effects.

Conclusion

In conclusion, the dexmedetomidine and propofol infusions utilized in our study provided satisfactory sedation and intubating conditions in the majority of patients undergoing fiberoptic oral intubation. Dexmedetomidine appeared to offer better patient

tolerance, better preservation of a patent airway, spontaneous ventilation, and a reduced hemodynamic response to intubation, in comparison to propofol. These properties make it a useful drug for providing conscious sedation, and combination of dexmedetomidine sedation with topical anesthesia provides significant benefit for awake fiberoptic intubation.

References

1. Avitsian R, Manlapaz M, Doyle DJ. Dexmedetomidine as a Sedative for awake fiberoptic intubation. Trauma Care J 2007;17:19-23.
2. Chelly JE. Pheripheral Nerve Blocks. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2004. p. 177-84.
3. Irwin MG, Thompson N, Kenny GN. Patient-maintained propofol sedation. Assessment of a target-controlled infusion system. Anaesthesia 1997;52:525-30.
4. Oczenski W, Krenn H, Dahaba AA, Binder M, El-Schahawi-Kienzl I, Jellinek H, *et al*. Hemodynamic and catecholamine stress responses to insertion of the combitube laryngeal mask airway or tracheal intubation. Anaesth Analg 1999;88:1398-94.
5. Menda F, Köner O, Sayin M, Türe H, Imer P, Aykaç B. Dexmedetomidine as an adjunct to anesthetic induction to attenuate hemodynamic response to endotracheal intubation in patients undergoing fast-track CABG. Ann Card Anaesth 2010;13:16-21.
6. Yildiz M, Tavlan A, Tuncer S, Reisli R, Yosunkaya A, Otelcioglu S. Effect of dexmedetomidine on haemodynamic responses to laryngoscopy and intubation: Perioperative haemodynamics and anaesthetic requirements. Drugs R D 2006;7:43-52.
7. Uysal HY, Tezer E, Türkoğlu M, Aslanargun P, Başar H. The effects of dexmedetomidine on hemodynamic responses to tracheal ntubation in hypertensive patients: A comparison with esmolol and sufentanyl. J Res Med Sci 2012;17:22-31.
8. Kunisawa T, Nagata O, Nagashima M, Mitamura S, Ueno M, Suzuki A, *et al*. Dexmedetomidine suppresses the decrease in blood pressure during anesthetic induction and blunts the cardiovascular response to tracheal intubation. J Clin Anesth 2009;21:194-9.
9. Takahashi H, Suzuki T, Onisi T, Senda M, Takada T, Ainoda K, *et al*. Anesthesia induction for patients with cervical spinal disease. Masui 2009;58:337-41.
10. Grant SA, Breslin DS, MacLeod DB, Gleason D, Martin G. Dexmedetomidine infusion for sedation during fiberoptic intubation: A report of three cases. J Clin Anesth 2004;16:124-6.
11. Tsai CJ, Chu KS, Chen TI, Lu DV, Wang HM, Lu IC. A comparison of the effectiveness of dexmedetomidine versus propofol target-controlled infusion for sedation during fibreoptic nasotracheal intubation. Anaesthesia 2010;65:254-9.
12. Avitsian R, Lin J, Lotto M, Ebrahim Z. Dexmedetomidine and awake fiberoptic intubation for possible cervical spine myelopathy: A clinical series. J Neurosurg Anesthesiol 2005;17:97-9.
13. Hu R, Liu JX, Jiang H. Dexmedetomidine versus remifentanil sedation during awake fiberoptic nasotracheal intubation: A double-blinded randomized controlled trial. J Anesth 2013;27:211-7.

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