COMBINATION OF DEXMEDETOMIDINE PLUS REMIFENTANIL FOR SEDATION DURING AWAKE C-MAC VIDEOLARYNGOSCOPY-ASSISTED NASOTRACHEAL INTUBATION

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Abstract

Aim: Evaluation of the effects of dexmedetomidine plus remifentanil on sedation rate, intubation and hemodynamic changes in patients scheduled for awake intubation using C-MAC videolaryngoscope.

Methods: Sixty patients with anticipated difficult intubation and scheduled for elective maxilla-facial surgery with a plan for awake intubation. Patients were randomly divided in two Groups. Patients in remifentanil Group received 10mcg/kg/hr remifentanil i.v. and in remifentanil-dexmedetomidine Group 1mcg/kg/hr dexmedetomidine i.v. plus 8mcg/kg/hr remifentanil i.v. Awake nasal intubation was performed using C-MAC videolaryngoscope. Ramsay sedation scale, intubation score, adverse events and patient satisfaction score were recorded. Oxygen arterial blood saturation, systolic and diastolic arterial pressure, heart rate and bispectral monitor index were assessed at five-time points: 2min before drug administration (T1), 10min after drug infusion (T2), pre-intubation (T3), at intubation (T4) and 2 min after intubation.

Results: SPO2 was significantly higher in Group RD compared to Group R at T4 ($P<0.05$) and T5 ($P < 0.01$). SAP at T2, T3, T4, T5 ($P<0.01$), DAP at T5 ($P<0.01$) and BIS at T2 ($P<0.001$), T4 ($P<0.05$) and T5 ($P<0.05$) were significantly higher in Group R compared to Group RD. No statistically significant differences were observed in Ramsay sedation scale ($P = 0.319$), vocal cords movement ($P = 0.096$), cough ($P = 0.351$), intubation comfort ($P = 0,318$), adverse events, recall incidences ($P = 0,584$), patient satisfaction score ($P = 0,538$) and heart rate ($P = 0.082$) between Groups.

Conclusion: Combination of dexmedetomidine with remifentanil should be considered to achieve good intubating conditions, without hemodynamic changes and increased risk of desaturation than remifentanil alone for awake C-MAC video-assisted intubation.

Keywords: awake intubation, video-laryngoscope, dexmedetomidine, remifentanil.

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Introduction

Safe airway management is one of the anesthesiologist's responsibilities. Awake intubation is a reliable technique to manage patients with expected difficult airway and it could be performed using either a fiberoptic bronchoscope or a video laryngoscope[1]. Videolaryngoscopy-assisted tracheal intubation has extensively been applied in airway management because of significant advantages, such as improved laryngeal visualization without the need for aligning 3 airway axes, easy identification of airway anatomical structures by high-quality airway images and multi-person visualization feature can facilitate communication and cohesion of a team[2].

Experience with awake intubation is not easily acquired, and success of the procedure is also highly dependent on adequate preparation and sedation techniques[3]. Effective sedation is important during the procedure in order to relief patient's discomfort and provides proper amnesia, without impairing ventilation and depressing cardiovascular function. The goal is to allow the patient to be responsive and co-operative[4].

Different protocols for sedation have been shown to improve the success rate of awake intubation. Several sedative agents have been used successfully for conscious sedation, such as midazolam, fentanyl, remifentanil, propofol and ketamine. However, these agents can be associated with cardiovascular or respiratory adverse effects, due to, application doses, time of administration and patient physical status.

Dexmedetomidine is a selective alpha-2-adrenoceptor agonist that can cause sedation, anxiolysis, amnesia, analgesic sparing, reduced salivary secretion and minimal respiratory depression[5]; this might be valuable for sedation during awake intubation. Moreover, dexmedetomidine has been shown to attenuate cardiovascular responses to laryngoscopy and intubation, thereby reducing the need for perioperative opioid[6].

Some authors successfully used dexmedetomidine as a single agent for sedation during awake intubation and others combined it with other agents as a trial to improve its sedation criteria. The combination of dexmedetomidine with remifentanil was not used before. The advantages of remifentanil for awake intubation include the following: it is ultra-short acting with a constant half-life, it has antitussive effects which help prevent coughing with tracheal manipulation, it is reversible with an antagonist, and finally, it attenuates cardiovascular responses to airway manipulation. The shortcomings of remifentanil include undesirable side effects, such as bradycardia and respiratory depression[7].

We hypothesized that the addition of remifentanil to dexmedetomidine could improve the sedative criteria of dexmedetomidine, without the need to increase the dose of dexmedetomidine or remifentanil, which may be associated with airway compromise and other side effects. The study was designed to evaluate the effects of combination of dexmedetomidine plus remifentanil on sedation rate, intubation and satisfaction scores, hemodynamic changes and adverse events, in patients scheduled for awake intubation using C-MAC videolaryngoscope.

Methods

The study was approved by the Scientific and Ethics committee of G. Papanikolaou Hospital (protocol number: 24/14-1-2016, date of approval: 3th meeting: 24-2-2016). Patients who required nasal tracheal intubation because of a surgical procedure and presented with an anticipated difficult intubation were included. We informed all the patients about the particular study related risks and written informed consent for participation in the research study was obtained before the procedure.

A thorough preanesthetic evaluation was done and patients with allergy to study drugs, severe cardiopulmonary disease, psychiatric disease, coagulation disorders, baseline heart rate lower than 60bpm or atrio-ventricular block in electrocardiogram, pregnant women, use of an α_2 adrenoreceptor agonist or antagonist within the previous 14 days and patients unable to communicate effectively were excluded from the study. During the preoperative evaluation, an extensive airway examination was performed and the difficulty of the laryngoscopy or intubation procedure was recorded. Intubations were expected to be difficult if the patients fulfilled one of the following criteria: Mallampati score >3; a documented history of

a difficult intubation; jaw fractures; an obstacle for a standard intubation like tumour or swelling and mouth opening less than 3 fingers.

Sixty patients, with American Society of Anesthesiologists (ASA) physical status I-III, between 18 and 80 years scheduled for elective maxilla-facial surgery with a plan for awake nasal videolaryngoscope intubation were enrolled in a prospective randomized double-blinded trial. The randomization was achieved by random number table using a sealed envelope technique. Patients were randomly divided in two Groups. Patients in remifentanil Group (Group R, n = 30) received 10mcg/kg/hr remifentanil (Ultiva®, GlaxoSmithKline, London, United Kingdom) i.v. and patients in remifentanil-dexmedetomidine Group (Group RD, n = 30) received 8mcg/kg/hr remifentanil i.v. and 1mcg/kg/hr dexmedetomidine (Dexdor®, Orion Corporation, Espoo, Finland) i.v.

On the morning of the study, the patients were admitted to the operating room and were monitored with electrocardiogram, invasive blood pressure, pulse oxymetry and bispectral index monitor. Baseline values were recorded. All patients received oxygen by nasal cannula (3 L/min) and gel lidocaine 2% topically in both nasal orifices. All patients were premedicated with 2mg i.v midazolam. The patients were in supine position with their head placed on a headrest. All patients received a continuous infusion of their respective drug via syringe pump system (Perfusor® Space, B.Braun, Melsungen, Germany) 10 minutes before intubation and during intubation.

For airway anesthesia, lidocaine 10% (Xylocaine® SPR 10%, Aspen Pharma Trading Ltd, Dublin, Ireland) metered spray was applied directly on the surface of the tongue. Moreover, the patient gargled 2% lidocaine (Xylocaine® Gel 2%, Aspen Pharma Trading Ltd, Dublin, Ireland) and were asked to keep the lidocaine in their mouth for as long as possible before swallowing. The procedure of airway anesthesia was repeated 3-4 times during the 10min of drug infusion.

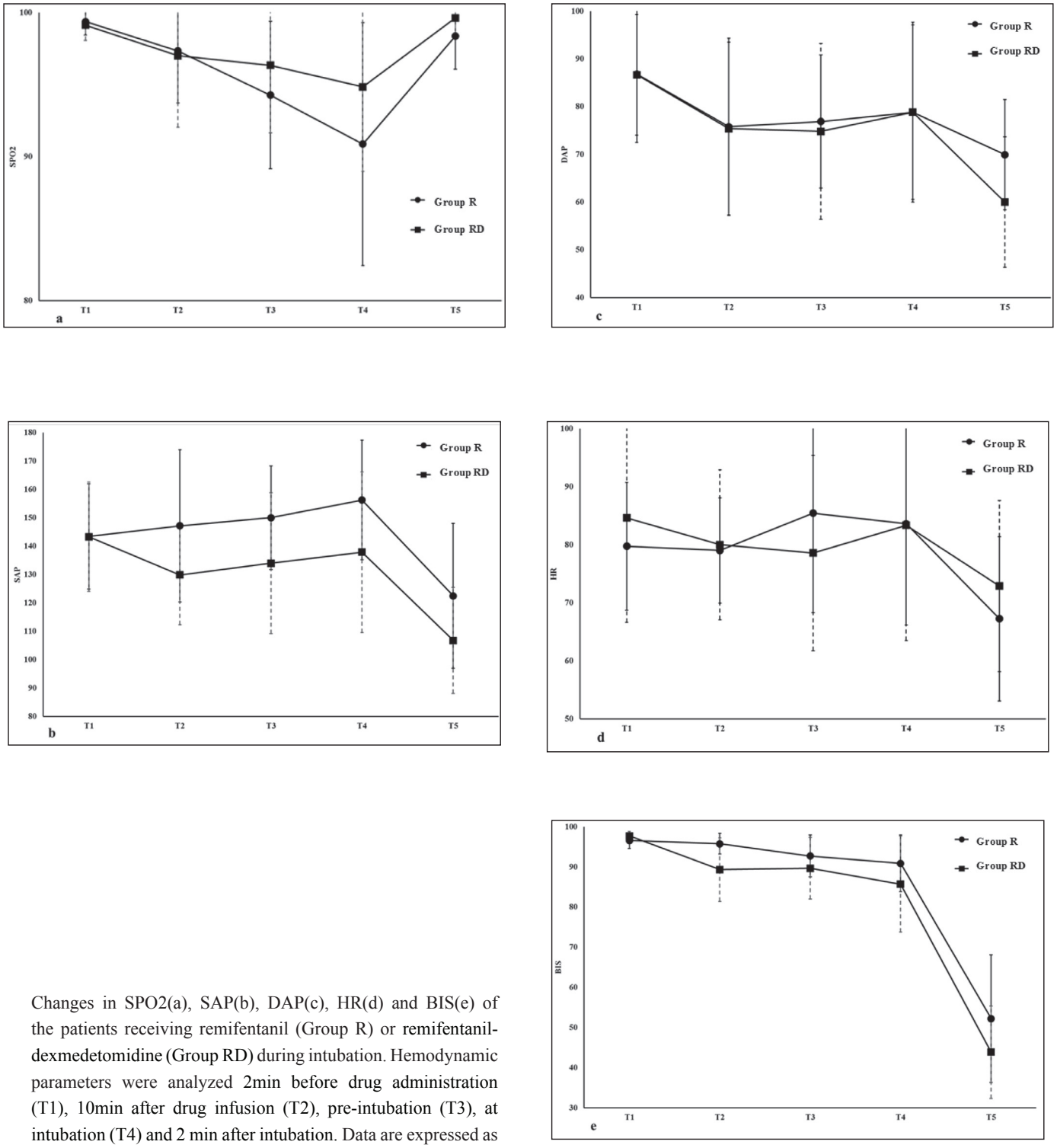
The videolaryngoscope assisted tracheal intubation was performed according to the manufacturer's recommendation. Ten minutes after drug infusion a north facing polar preformed endotracheal tube (Portex, Smiths Medical, Minneapolis, *Minnesota,* USA) was inserted into the lower nasal duct and was advanced into the nasopharynx. Then, the videolaryngoscope with standard Macintosh blade size 4 (C-MAC 8403ZX; Karl Storz GmbH, Tuttlingen, Germany) was introduced in the midline of the patient's oral cavity, and then advanced into the pharynx until an adequate view of the larynx was obtained. The tracheal tube that had been loaded in the nose was advanced through the vocal cords into the trachea and the cuff was inflated. To optimise tracheal intubation, the anesthetists were allowed to use external manipulation of the larynx and/or a Magill forceps, either alone or in combination. After confirmation of the placement of the tracheal tube in the trachea by detection of continual end-tidal carbon dioxide, the intubation was considered successful.

The following parameters (primary outcomes) were assessed for evaluating intubation: degree of vocal cords movement (1 = open, 2 = moving, 3 = closing, 4 = closed), degree of cough (1 = none, 2 = slight, 3 = moderate, 4 = severe) and degree of patient intubation comfort (1 = no reaction, 2 = slight grimacing, 3 = moderate grimacing, 4 = severe grimacing, 5 = defensive movement of head and hands). In addition, patient's conscious level was assessed by Ramsay sedation scale (RASS) 10min after drug infusion.

Secondary outcome measurements included: oxygen saturation, systolic blood pressure, diastolic blood pressure, heart rate and bispectral index. These measurements took place at five-time points: 2min before drug administration (T1), 10min after drug infusion (T2), pre-intubation (T3), at intubation (T4) and 2 min after intubation. In addition, any episode of hypertension (SBP>180mmHg), hypotension (SBP<90mmHg), oxygen desaturation (<90%), bradycardia (HR<60bpm) and tachycardia (HR>100bpm) were recorded. Furthermore, at postoperative follow-up visit patients satisfaction score (1: excellent, 2: good, 3: fair, 4: poor), recall incidences and incidence of hoarseness and sore throat were recorded 8 hours after surgery.

For blinding the procedure, the study drug was prepared and provided to the team by another anesthesiologist and the one who intubate the patient was different than the one who assessed the mentioned outcomes.

Fig. 1
Hemodynamic and BIS comparison between Groups



Changes in SPO2(a), SAP(b), DAP(c), HR(d) and BIS(e) of the patients receiving remifentanil (Group R) or remifentanil-dexmedetomidine (Group RD) during intubation. Hemodynamic parameters were analyzed 2min before drug administration (T1), 10min after drug infusion (T2), pre-intubation (T3), at intubation (T4) and 2 min after intubation. Data are expressed as mean ± standard deviation. SPO2: *Saturation* of Peripheral Oxygen, *SAP:* systolic blood pressure (mmHg), *DAP:* diastolic blood pressure (mmHg), *HR:* heart rate (b/min), BIS: bispectral index

Table 1

Demographic and clinical characteristics of study patients

		Group R (n = 30)	Group RD (n = 30)	P-value
Age (years)		53,3 ± 14,22	52,8 ± 14,07	0.892
Height (cm)		166,8 ± 7,44	166,03 ± 8,1	0.325
Weight (kg)		82,3 ± 33,07	75,67 ± 22,88	0.370
BMI (kg/m^2)		29,57 ± 8,74	27,27 ± 7,56	0.280
Gender (Male)		17 (56,7%)	13 (43,3%)	0.302
(Female)		13 (43,3%)	17 (56,7%)	
ASA (n, %)	1	3 (10%)	6 (20%)	0.095
	2	16 (53,3%)	20 (66,7%)	
	3	11 (36,7%)	4 (13,3%)	
Mallampatti grade (n, %)	1	6 (20%)	5 (16,7%)	0.360
	2	17 (56,7%)	15 (50%)	
	3	0	3 (10%)	
	4	7 (23,3%)	7 (23,3%)	
Mouth opening (n, %)	2	7 (23,3%)	11 (36,7%)	0.114
	3	17 (56,7%)	9 (30%)	
	4	6 (20%)	10 (33,3%)	
Premedication (n, %)	No	12 (40%)	12 (40%)	1.000
	Yes	18 (60%)	18 (60%)	

Data are presented as mean ± standard deviation or number (proportion, %), *BMI:* body mass index, *ASA:* American Society of Anesthesiologists.

Table 2

Hemodynamic and BIS changes during intubation

Index	Group	T1	T2	T3	T4	T5	
SPO_2 (%)	R	99.37 ± 0.93	97.33 ± 3.62	94.27 ± 5.11	90.87 ± 8.44	98.37 ± 2.3	0.022
	RD	99.13 ± 1.07	97 ± 4.95	96.33 ± 4.69	94.83 ± 5.87	99.63 ± 1.22	
SAP (mmHg)	R	143.37 ± 18.54	147.13 ± 26.76	150 ± 18.28	156.23 ± 21.01	122.47 ± 25.5	0.005
	RD	143.27 ± 19.23	129.83 ± 17.59	133.93 ± 24.83	137.83 ± 28.35	106.77 ± 18.67	
DAP (mmHg)	R	86.8 ± 14.32	75.8 ± 18.53	76.87 ± 13.94	78.83 ± 18.82	69.93 ± 11.54	0.043
	RD	86.67 ± 12.65	75.37 ± 18.13	74.8 ± 18.41	78.83 ± 18.26	60 ± 13.68	
HR (b/min)	R	79.73 ± 11.01	79 ±9.06	85.43 ± 17.13	83.6 ± 17.45	67.23 ± 14.14	0.082
	RD	84.63 ± 18.03	80 ± 12.89	78.57 ± 16.85	83.33 ± 19.88	72.87 ± 14.72	
BIS	R	96.57 ± 1.94	95.77 ± 2.56	92.73 ± 5.19	90.9 ± 7.06	52.23 ± 15.88	0.049
	RD	97.73 ± 1.14	89.33 ± 7.9	89.67 ± 7.68	85.73 ± 11.97	43.87 ± 11.53	

Data are presented as mean ± standard deviation. T1:2min before drug administration, T2: 10min after drug infusion, T3: pre-intubation T4: at intubation and T5: 2min after intubation. SPO2: *Saturation* of Peripheral Oxygen *SAP:* systolic blood pressure (mmHg), *DAP:* diastolic blood pressure (mmHg), *HR:* heart rate (b/min), BIS: bispectral index

Table 3
Anesthetic data and Intubation scoring

		Group R (n = 30)	Group RD (n = 30)	*p*-value
RASS after 10 min sedation (n, %)	1	0	0	0.319
	2	3 (10)	0	
	3	2 (6.7)	3 (10)	
	4	9 (30)	8 (26.7)	
	5	16(53.3)	19(63.3)	
Degree of Vocal cords movement (n, %)	1	18 (60)	20(66,7)	0.096
	2	9 (30)	7 (23.3)	
	3	3 (10)	0	
	4	0	3 (10)	
Degree of cough (n, %)	1	15 (50)	18 (60)	0.351
	2	7 (23.3)	7 (23.3)	
	3	5 (16.7)	5 (16,7)	
	4	3 (10)	0	
Degree of intubation comfort (n, %)	1	12 (40)	13(43.3)	0.318
	2	8 (26.7)	9 (30)	
	3	4 (13.3)	7 (23,3)	
	4	4 (13.3)	1 (3.3)	
	5	2 (6.7)	0	

Data are presented as number (proportion, %), RASS: Ramsey sedation score.

Sample size was calculated based on Type I error of α = 5% and power = 80% and minimum difference d = 30%, which was clinically significant in the pilot study. All quantitative variables are reported as mean and standard deviation, and qualitative variables are listed as number (percentage). Age and height data were compared between the two Groups by Student's t-test (2-tailed). Weight and BMI were compared using the Mann-Whitney test. Gender, ASA physical status Mallampati scale, mouth opening and premedication, sedation scale, intubation conditions, adverse events and postoperative data were compared by Chi-square test. Linear mixed model was used to evaluate the difference of oxygen saturation, blood pressure, heart rare and bispectral index at different time points between the Groups throughout the study. In all these evaluations, multiple comparisons were corrected by Bonferroni method. Statistical Package for Social Sciences (SPSS, version 19.0; SPSS Inc., Chicago, IL, USA) was used for all calculations. *p* values less than .05 were considered statistically significant.

Results

There were no significant differences between the two Groups in demographic data and clinical characteristics (Table 1). Evaluation of SPO_2, SAP, DAP and BIS showed that there is a significant difference between the Groups during the study ($p < .05$). However, HR assessment didn't revealed a significant difference between the Groups during the study ($p = .082$) [Figure 1d].

SPO_2 was significantly higher in Group RD compared to Group R at T4 and T5 (difference = 3.967, 95% [CI]: .209-7.724, $p < .05$ and difference = 1.267, 95%, [CI]: .317-2.217, $p < .01$ respectively). However, the difference of SPO_2 between R and RD Groups was not significant at T1, T2 and T3 (difference = .233, 95% [CI]: -.285-.752, $p = .372$, difference = .333, 95% [CI]: -1.908-2.575, $p = .767$ and difference = -2.067, 95% [CI]: -4.603-.469, $p = .108$ respectively) [Figure 1a]. SAP was significantly higher in Group

Table 4
Adverse events and postoperative follow up data

	Group R (n = 30)	**Group RD (n = 30)**	***P-value***
Hypertension (n, %)	8 (26.7)	5 (16.7)	0.347
Tachycardia (n, %)	5 (16.7)	10 (33.3)	0.136
Hypoxia (n, %)	7(23.3)	5 (16.7)	0.519
Hoarseness (n, %)	2 (6.7)	0	0.150
Postoperative sore throat (n, %)	5 (16.7)	2 (6.7)	0.228
Recall of intubation (n, %)	11 (36.7)	9 (30)	0.584
Satisfaction score 1/2/3/4 (n, %)	12(40)/13(43.3) /5(16.7)/0	16(53.3)/11(36.7) /3(10)/0	0.538

[a] based on Chi-Square test. Data are presented as number (proportion, %).

R compared to Group RD at T2, T3, T4 and T5 (difference = 17.300, 95% [CI]: 5.597-29.003, $p < .01$, difference = 16.067, 95% [CI]: 4.799-27.334, $p < .01$, difference = 18.400, 95% [CI]: 5.504-31.296, $p < .01$, difference = 15.700, 95% [CI]: 4.150-27.250, $p < .01$ respectively). However, the difference between R and RD Groups was not significant at T1 (difference = .100, 95% [CI]: -9.664-9.864, $p = .984$) [Figure 1b]. DAP was significantly higher in Group R compared to Group RD for T5 (difference = 9.933, 95% [CI]: 3.392-16.474, $p < .01$). However, the difference between R and RD Groups was not significant for T1,T2,T3 and T4 (difference = .133, 95% [CI]: -6.850-7.117, $p = .970$,difference = .433, 95% [CI]: -9.043-9.910, $p = .927$, difference = 2.067, 95% [CI]: -6.374-10.508, $p = .626$ and difference = .000, 95% [CI]: -9.584-9.584, $p = 1.000$ respectively) [Figure 1c]. BIS was significantly higher in Group R compared to Group RD at T2, T4 and T5 (difference = 6.433, 95% [CI]: 3.400-9.467, $p < .001$, difference = 5.167, 95% [CI]: .089-10.245, $p < .05$, difference = 8.367, 95% [CI]: 1.196-15.537, $p < .05$ respectively). However, the difference between R and RD Groups was not significant for T1 and T3 (difference = -1.167, 95% [CI]: -1.313-1.007, $p = .069$, difference = 3.067, 95% [CI]: -.319-6.452, $p = .075$ respectively) [Figure 1e].

All patients underwent successful intubations. No statistically significant differences were observed in the sedation scale ($p = .319$), degree of vocal cords movement ($p = .096$), cough ($p = .351$) and intubation comfort ($p = .318$) when comparing Group R and Group RD (Table 3).

The occurrence of postoperative adverse events did not differ significantly between the two Groups (Table 4). No events of hypotension and bradycardia were reported in this study. Moreover, there were no significant differences in recall incidences ($p = .584$) or patient satisfaction score ($p = .538$) between the two Groups (Table 4).

Discussion

Our study indicated that the use of dexmedetomidine (1mcg/kg/hr) plus remifentanil (8mcg/kg/min) provides better hemodynamic stability, bis-assessment sedation and oxygenation than remifentanil (10mcg/kg/min) alone; however, this combination achieves intubation scores, recall incidences, patient satisfaction and adverse effects similar to that achieved by the use of remifentanil alone.

Many providers are uncomfortable with performing awake intubations. There are a variety of reasons for this discomfort, including lack of experience and fear that the patient will remember the intubation and think poorly of their care. Although, awake intubation can be achieved using local anesthesia alone, sedation is often required to enable smooth patient tolerance[3]. The ideal sedation should blunt

airway reflexes, attenuate hemodynamic sympathetic response to intubation and retain spontaneous breathing through a safe patent airway.

Dexmedetomidine and remifentanil are two sedatives well studied for sedation for awake fiberoptic intubation (AFOI). Data relative to effectiveness and side effects of these sedatives for AFOI are contradictory and the answer if dexmedetomidine or remifentanil alone is an optimal sedation scheme for awake intubation is not clear. Coadministration of dexmedetomidine plus remifentanil, minimizing their doses and consequently their side effects, while still providing adequate sedation is an option for awake intubation.

The optimum sedation dose for dexmedetomidine for awake intubation has not been established. The ideal dose of dexmedetomidine should be high enough to blunt airway reflexes and achieve good sedation but not to the extent that results in airway relaxation and collaps[8]. A high dose of dexmedetomidine may cause hypertension, while a lower one may not achieve adequate sedation. The loading dose of 1 mcg/ kg over 10 min followed by a continuous infusion at 0.5-0.7 mcg/kg/hr is a standard regime for intraoperative use of dexmedetomidine and is most widely reported in use for sedation for AFOI[9-10]. In our study, we did not administer a loading dose of dexmedetomidine to avoid respiratory depression and hemodynamic adverse events associated loading doses of dexmedetomidine.

It is difficult to compare our study protocol and results with other published studies. One reason is that there is no trial where dexmedetomidine was combined with remifentanil. Other combinations options, with dexmedetomidine and another sedative or analgesic, in the literature, is fentanyl or ketamine. Hassan et al.[11] study revealed that the addition of a small dose of fentanyl (1 mcg/kg) to a small dose of dexmedetomidine (1 mcg/kg) resulted in improvement of limb movement scores during AFOI at an extent similar to a high dose of dexmedetomidine (2 mcg/ kg). Increasing the dose of dexmedetomidine (2mcg/ kg) was associated with increased risk of airway obstruction more than a small dose of dexmedetomidine or the combination of small doses of both fentanyl and dexmedetomidine. Moreover, Sinha et al.[12] showed that the use of dexmedetomidine plus ketamine for AFOI provided better hemodynamic stability and sedation than dexmedetomidine alone.

Another difficulty to compare our findings with other trials is that, in the majority, the authors use fiberscopes for awake intubation. Videolaryngoscope is more rigid than a flexible fiberscope and does not have a working channel though which local anesthetic can be administered in a 'spray-as-you-go' manner. These differences make manipulations with videolaryngoscope more stimulating.

Dexmedetomidine alone was reported by Abdelmalek et al. in 2007[13], to be used successfully for sedation during a series of AFOI in patients with a difficult airway. In a review, by He et al.[14], the authors concluded that small, limited trials provide weak evidence to support dexmedetomidine as an option for AFOI. Counter to this review, two years later, in 2016, a meta-analysis showed that dexmedetomidine appears to be an effective and well-tolerated agent for performing awake intubation[15]. Its use was associated with better intubation conditions, preservation of airway patency, and reduced recall of intubation, as compared with the traditional sedative agents[15]. However, the risk of bradycardia and hypotension was significantly higher with dexmedetomidine as compared with that with other sedatives[15]. More recent, Sharma et al.[16] demonstrated that 0.5 μg/kg dose of dexmedetomidine was optimal and effective in combination with topical spray and airway blocks for AFOI for patients undergoing elective cervical spine surgery.

Dexmedetomidine was compared with remifentanil for sedation during awake intubation in several previous clinical trials. In 2012, remifentanil (0.75mcg/kg for 10minutes followed by 0.075mcg/kg/ min) was compared with dexmedetomidine (0.4mcg/ kg for 10minutes followed by 0.7mcg/kg/hr) by Cattano et al.[17]. In this study, patients in both Groups were sufficiently sedated with similar hemodynamic profiles. Nonetheless, they found that the patients in the dexmedetomidine Group had an increased number of intubation attempts, delayed intubation start time and poorer post-loading dose verbal recall. On the other hand, Hu et al.[18] demonstrated that dexmedetomidine offered better endoscopy scores, lower recall of

intubation, and greater patient satisfaction, with minor hemodynamic side effects compared to remifentanil for AFOI.

One of the studies of awake intubation using alternative devices rather than fiberscope was by Xu et al[19]. They studied dexmedetomidine (1mcg/kg over 10minutes followed by 0.7mcg/kg/hr) versus remifentanil (target 2.5-3ng/ml) using a Shikani optical stylet. The majority of their results were against our findings. Patients in remifentanil Group were significantly more tolerant of the tracheal tube, despite that RSS score was significantly higher in dexmedetomidine Group. Hypoxia and recall of airway instrumentation were significantly higher in remifentanil Group and in contrast with our findings the hemodynamic responses of the two Groups were similar. We used different doses of sedative drugs. Moreover, as the authors note at the end of their manuscript, their results cannot be extrapolated to settings where target-controlled infusion of remifentanil is not available, like our settings. Furthermore, there are differences between Shikani optical stylet and videolaryngoscope devices and manipulations for intubation[20].

Lower systolic and diastolic pressures in the remifentanil-dexmedetomidine Group maybe is due to the fact that dexmedetomidine has been shown to attenuate cardiovascular responses to laryngoscopy and intubation[6]. Furthermore, as a result of not using a loading dose of dexmedetomidine, no appreciable changes in hemodynamics occurred in the remifentanil-dexmedetomidine Group in our study. Differences between our study and others with similar experimental setting relative to adverse effects or sedation status may be due to different way of dexmedetomidine administration.

Our study had some limitations. First, in the experimental setting we should study a third Group, whose patients received dexmedetomidine without loading dose and at infusion of 1mcg/kg/hr. However, this could be the subject of an ongoing study in our hospital. Second, there was also a relatively high chance that our sample size was inadequate to detect interGroup differences for uncommon adverse events. Finally, our results cannot be extrapolated to settings where bolus dexmedetomidine before infusion is administered.

Our study findings suggest that for awake video-assisted intubation a combination of dexmedetomidine (1mcg/kg/hr) with an analgesic drug like remifentanil (8mcg/kg/hr) should be considered to achieve good intubating conditions, without hemodynamic changes and increased risk of desaturation.

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