Original Article

Comparative evaluation of propofol and combination of propofol-dexmedetomidine in adjunct with topical airway anesthesia for rigid bronchoscopy: A randomized double-blinded prospective study

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ABSTRACT

Context: Rigid bronchoscopy (RB) procedures require continuous vigilance and monitoring. Such procedures warrant proper ventilation strategy and titration of potent short-acting anesthetics.

Aims: To compare propofol with the propofol-dexmedetomidine in conjunction with topical airway anesthesia in two groups during spontaneous assisted ventilation on peri-procedural hemodynamic stability.

Settings and Design: This prospective, randomized, double-blinded study was done on 40 patients who were randomized in two groups, 20 patients in each group; PS (Propofol+ Normal saline) and PD (Propofol+ Dexmedetomidine) group. All patients in both groups were induced with 1% IV propofol (1–3 mg/kg), IV midazolam (0.05 mg/kg), and IV fentanyl (2 μ/kg). PS group received propofol infusion for maintenance along with saline infusion 10 min before induction, whereas PD group also received propofol infusion for maintenance along with Injection dexmedetomidine infusion 10 min before induction. Outcome measured were heart rate (HR), mean blood pressure (MBP), oxygen saturation (SpO_2), and post-procedure awakening using Modified Observer's Assessment of Alertness/Sedation (MOAAS) scale and complications.

Results: In both the groups, MBP decreased significantly from baseline, however, when MBP were compared at the same time points between the groups there were no significant differences. In PD group, HR remained significantly lower when compared with baseline and at 6, 12, 18, and 24 min time points when compared with PS group. Number of patients who developed hypotension requiring vasoactive drugs, their mean dose and duration of hypotension were more in PD group, and they awoke with significant delay.

Conclusions: Propofol is better than combination of propofol and dexmedetomidine when given in adjunct with topical airway anesthesia for RB in view of early awakening, lesser duration of intra-procedural hypotension, and lesser requirement of vasoactive agents.

Keywords: Airway anesthesia, airway blocks, bronchoscopy, dexmedetomidine, propofol

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INTRODUCTION

Rigid bronchoscopy (RB) is an intervention technique, which is used for different diagnostic and therapeutic procedures including tracheobronchial stenting, bronchoalveolar lavage, tracheal dilatation, coring of neoplastic mass, foreign body

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removal, and cryobiopsy. RB poses a significant challenge owing to sharing of the airway between pulmonologist and anesthesiologist,[1] inadequate delivery of required tidal volume, the fractional inspiration of oxygen (FiO_2), and positive pressure due to significant circuit leak throughout the procedure. The volatile anesthetics cannot be used during these procedures as cuff-less RB leads to significant escape around bronchoscope leading to operating room pollution and unreliable delivery of volatile anesthetics.[2]

Intra-venous anesthetics with or without short-acting muscle relaxants are the anesthetic technique of choice.[2] However, in the absence of neuromuscular blocker (NMB), these procedures warrant deep sedation and high dose analgesic, which might lead to cardiovascular instability.[2] These interventional procedures require an adequate anesthetic plane to prevent cough and jerky movement of the body leading to cervical, tracheobronchial injury, and hemodynamic instability. Five standardized ventilation techniques are described in the literature viz. apnoeic oxygenation (usually applied in very short procedures), spontaneous assisted ventilation, and controlled ventilation; manual jet ventilation and high-frequency oscillatory ventilation (HFOV) each of them have their own pros and cons.[2] Spontaneous assisted ventilation is a safe and effective technique[3] possibly owing to short-acting anesthetic agents such as propofol and dexmedetomidine.

The primary aim of our study was to compare propofol alone with the propofol-dexmedetomidine combination in conjunction with topical airway anesthesia in both groups during spontaneous assisted ventilation, on peri-procedure hemodynamic stability. The secondary aim was to compare the post-procedure awakening by measuring modified observer's assessment of alertness/sedation scale (MOAAS) scale, the requirement of vasoactive agents, and to look for any complication in the peri-procedural period in both the groups.

SUBJECTS AND METHODS

After obtaining institutional ethics committee clearance (IEC Code: 2017-137-IP-99) and Clinical Trial Registry of India (CTRI) registration (CTRI/2018/01/011279), written informed consent was taken from all the patients. A prospective, randomized, double-blinded control trial was conducted from January 2018 to May 2018 in pulmonary intervention room (PIR) of a tertiary care hospital. The inclusion criteria were patients belonging to American Society of Anesthesiologist (ASA) Grade 2–4, 15–65 years of age. Cases undertaken were RB for tracheal stenting, cryobiopsy, foreign body removal, transbronchial needle aspiration, tracheal dilatation, and tracheobronchial coring. Patients having major organ dysfunction including coronary artery disease, congestive heart failure, end-stage renal/liver disease, refusal to give consent, coagulopathy, allergy to local anesthetics, and patients with anterior neck swelling and tracheotomy tube *in situ* were excluded from the study.

Total of 40 patients participated in this study. Standard ASA fasting guidelines were followed. Before shifting to PIR, in the preoperative ward, all patients received intra-muscular glycopyrrolate. Patients were randomized into two groups: "PS group" and "PD group" as per computer-generated randomization table. PD group received dexmedetomidine 1 μ/kg bolus over 10 min before induction followed by continuous infusion (0.5 μ/kg/h). PS group (n = 20) received normal saline infusion over 10 min before induction and then throughout the procedure with infusion rate decided according to the weight of the patient as measured for dexmedetomidine. For blinding, this infusion was prepared by a designated technician in identical-looking 50 ml syringe and labeled as "study" drug. Operating anesthetist, who was responsible for data collection, was unaware of the group allocation. In the PIR, standard ASA monitors were attached, and baseline heart rate (HR), mean blood pressure (MBP), and oxygen hemoglobin saturation (SpO_2) were recorded. For topical airway anesthesia, the trans-tracheal block was given to all patients in either group with 3 ml of 4% xylocaine and a single 10% xylocaine spray over oropharynx. Total local anesthetic dose never exceeded 5 mg/kg for any of the patients. After 15 min of airway topicalization, all patients were induced with 1% IV propofol (1–3 mg/kg), IV midazolam (0.05 mg/kg), and IV fentanyl (2 μ/kg) following induction infusions were started depending upon the group i.e., 1% propofol + normal saline or propofol + dexmedetomidine. After topical airway anesthesia and induction of anesthesia, the pulmonologist was allowed to introduce RB and NMB was not used in any patient in both the group throughout the procedure. After insertion of RB above the level of carina and before proceeding to the desired bronchus, 4% xylocaine 2–3 ml was instilled in the targeted bronchus through suction port and interventionist was asked to wait for 3–5 min before any further intervention in the bronchus. Spontaneous assisted ventilation was maintained by attaching the ventilator circuit at the side port of the bronchoscope with 60–80% fractional inspired oxygen concentration. During induction or in between procedure whenever apnea or desaturation occurred, bronchoscope was used as an endotracheal tube by occluding the main port of bronchoscope and patient was ventilated by providing intermittent positive pressure ventilation.

Primary outcomes were HR, MBP, and SpO_2 at baseline, at the time of bronchoscope insertion and then at 6, 12, 18, 24, 30, 45, and 60 min of the procedure. Secondary outcome was MOAAS scale every 10 min after bronchoscope removal till MOAAS scale achieved was 4 and complication if any were noted. At the end of the procedure, RB was removed, all anesthetic drugs were withdrawn, and patients were put on the facemask or bag-mask ventilation as per respiratory effort. MOAAS scale was recorded every 10 min after bronchoscope removal. Patients were shifted to post anesthesia care unit (PACU) when MOAAS scale was in between 4 and 5. They were observed for 2–3 h in PACU for any complication such as aspiration, hypoxia, arrhythmia, hypotension, and pneumothorax. Any change in HR and MBP >20% from baseline was considered to be clinically significant.

Sample size estimation

To detect the difference in marginal mean value of the HR at 60 min (after adjusting baseline value) between PS and PD group, where marginal value of the mean ± standard deviation of the PS and PD group was 94.50 and 83.00 (input was taken from a pilot study conducted on 5–5 patients in each group) with equal pooled standard deviation of 10 (observed effect size = 1.13), at minimum two-sided 95% confidence interval and 90% power of the study, sample size came out to be 17 in each of the two-study group's i.e., total 34 patients. Finally, in this study, the sample size was included 20 in each of the two groups (total 40). The sample size was estimated using the software G Power version - 3.1.9.2 (Düsseldorf University, Germany).

Statistical analysis

Normality of the continuous data was tested using the Shapiro–Wilk test. Normally distributed continuous variables were presented using mean ± standard deviation otherwise median (interquartile range) was used. Categorical variables were presented in frequency and percentage. To test the mean difference in each of the clinical variable (HR, mean BP, and SpO_2) between corresponding baseline values with other post values (repeated measures), Linear mixed model "LMM" method was used followed by pair wise comparisons using Bonferroni method. HR, mean BP, and SpO_2 were compared between two study groups (PS and PD) at the same time points by independent sample t test, whereas medians between two groups were compared using the Mann-Whitney U test. To compare the proportions between the groups, the Chi-square test was used. In case expected frequency in any cell was found below 5, Fisher exact test was used. A $P < 0.05$ was considered as statistically significant. Statistical package for social sciences version 23 (SPSS-23, IBM, Chicago, USA) was used for statistical analysis.

RESULTS

Figure 1 shows the study flow diagram, 42 patients who were assessed for eligibility were enrolled at pre-anesthesia outpatient clinic. Out of a total of 42 patients, in one patient in each group NMB was given and was excluded from the study. Finally, there was a total of 20 patients in each group (PS and PD). The groups were comparable as there was no statistically significant difference in demographic parameters. Majority of the patients (total of 25 patients) belonged to ASA grade 3 (12 patients in group 1 and 13 patients in group 2). Duration of the procedure was comparable between both the group's, however, total propofol consumption was higher in the PS group (223.70 ± 11.58) μ/kg/min in comparison to the PD group (114.15 ± 13.91) μ/kg/min, which was statistically significant. Total three procedures were done in our study viz. alveolar cryobiopsy (8 patients in each group), trachea-bronchial coring and stenting (6 patients in each group), and trachea-bronchial dilatation and stenting (6 patients in each group) [Table 1].

Mean HR, MBP, and mean SpO_2 were compared between 2 groups ("PS" group and "PD" group) at specific time points (baseline, at the time of RB insertion, at 6, 12, 18, 24, 30, 45, and 60 min of procedure) [Table 2]. There was no significant difference in MBP and SpO_2 between both the groups at any point in time during the whole procedure.

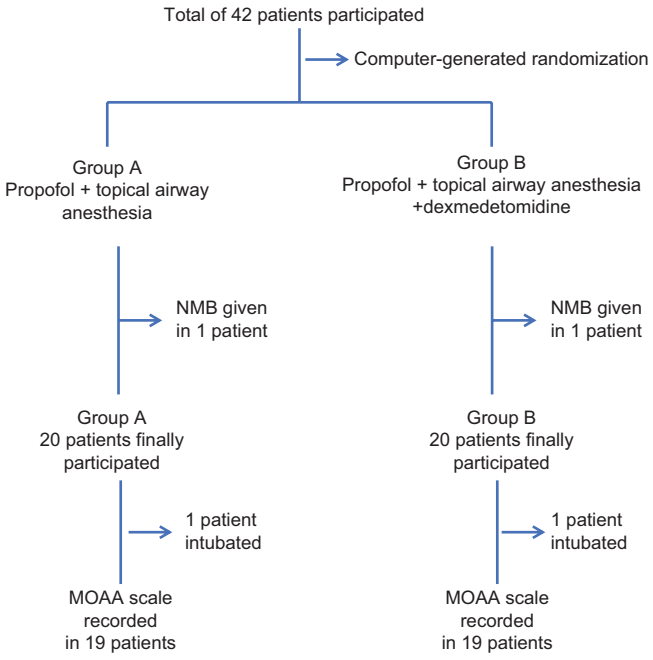

Figure 1: Consort diagram

Regarding HR, from 6 min to 24 min, HR was significantly lower ($P < 0.05$) in the "PD" group in comparison to the "PS" group.

Mean HR, BP, and SpO_2 were compared at different time points (at the time of RB insertion, at 6, 12, 18, 24, 30, 45, and 60 min) in each group with their corresponding baseline values to find the changes with time [Table 2]. Regarding HR, in "PS" group, HR remained increased from baseline at all-time points, which is neither clinically (rise of HR was <20% of baseline) nor statistically ($P > 0.05$) significant, whereas in the "PD" group, there was significant ($P < 0.05$) decrease in HR at 6, 12, 18, 24, and 30 min in comparison to baseline value. This fall in HR in the "PD" group was >20% of baseline at 6, 12, 18, and 30 min after RB insertion. Regarding MBP, it was observed that MBP remained significantly ($P < 0.05$) low from RB insertion up to 45 min in PS and PD group in comparison to baseline in both the groups. In "PS" group, >20% fall in MBP in comparison to baseline were observed from 12 to 30 min after RB insertion, whereas in "PD" group, >20% fall of MBP from baseline were observed from 6 min to 45 min after bronchoscope insertion. Although there was a statistically significant fall in mean SpO_2 from baseline at 18 and 24 min in PS group, whereas in the "PD" group, falls in SpO_2 were not statistically significant overall.

In the "PD" group, six patients had hypotension requiring injection mephentermine bolus and one patient required noradrenaline infusion (104 μ in 1 h) because of persistent hypotension, whereas in "PS" group 1 patient had hypotension, which was managed with injection mephentermine bolus.

One patient developed pneumothorax in "PD" group who was managed with immediate chest drain insertion. In the "PS" group, there was no event of pneumothorax in any patient. SpO_2 dipped to <90% in 3 patients and 5 patients in group PS and group PD, respectively. One patient in each group required tracheal intubation, which was done at the end of the procedure (in "PS" group endotracheal intubation was owing to significant hypercapnia with stridor revealed by arterial blood gas study, and in "PD" group, endotracheal intubation was owing to desaturation in spite adequate oxygen therapy). There was no arrhythmia reported in any case [Table 3].

There was a significant difference in the proportion of the MOAAS grades at 10, 20, and 30 min between "PS" and "PD" groups ($P < 0.001$). At 10 min, 25% of patients in

Table 1: Distribution of demographic and clinical values (minimum Spo_2 and total propofol requirement) of the study patients

Data	PS group (Group 1), *n*=20	PD Group (Group 2), *n*=20	*P*
#Age (Years)	42.50±14.31	48.00±12.48	0.203
#Weight (Kg)	59.90±13.50	60.05±12.51	0.971
Gender (Male)	11 (55%)	13 (65%)	0.519
#$ASA Grade (2/3/4)	3/12/5	1/13/6	0.791
$Duration of procedure (minutes)	25 (20-45)	23.5 (20-50.25)	0.813
#Minimum SpO_2	93.60±4.76	91.85±13.29	0.585
#Total propofol (m/kg/min)	223.70±11.58	114.15±13.91	<0.001
Procedure			
Stenting and coring of trachea-bronchial tree	6	6	>0.05
Alveolar cryobiopsy	8	8	
Trachea-bronchial dilatation and stenting	6	6	

Data presented in mean±standard deviation/median (interquartile range) or frequency (%). #Independent samples *t*-test/$ Mann-Whitney U test/ Chi-square test/#$fisher exact test used. $P<0.05$ significant

Table 2: Intra groups and inter groups comparison of heart rate (HR), mean blood pressure (MBP), and SpO_2

	HR (per minute)			MBP			SpO_2		
	PS	PD	*P*	PS	PD	*P*	PS	PD	*P*
Baseline (*n*=20)	93.45±15.44	104.90±22.23	0.066	102.80±10.59	107.70±8.27	0.11	99.15±1.46	99.15±1.81	1.00
On RB insertion (*n*=20)	97.30±14.04	90.65±19.21	0.22	**89.40±12.63**	**88.60±16.37**	0.86	98.35±1.98	99.00±2.05	0.32
6 min (*n*=20)	97.35±16.07	**83.00±17.83**	**0.011***	**82.55±12.86**	**77.50±18.49**	0.32	96.85±3.57	96.15±6.69	0.68
12 min (*n*=20)	96.35±15.98	**80.20±17.91**	**0.005***	**78.50±10.48**	**75.00±19.77**	0.49	96.55±3.55	97.45±4.68	0.50
18 min (*n*=20)	97.55±14.46	**79.25±17.74**	**0.001***	**79.15 ±(9.27**	**71.75±17.71**	0.11	**96.00±4.40**	96.95±4.12	0.48
24 min (*n*=11)	102.36±16.07	**86.10 16.26**	**0.03***	**81.27±8.19**	**73.80±19.42**	0.28	**94.82±4.22**	95.10±6.98	0.91
30 min (*n*=9)	96.14±12.32	**82.22±13.45**	0.052	**75.57±6.40**	**76.22±18.68**	0.92	95.86±4.67	95.67±6.74	0.95
45 min (*n*=6)	91.70±10.97	83.17±9.00	0.17	**84.00±7.82**	**70.17±13.83**	0.06			
60 min (*n*=3)	96.67±7.57	83.00±10.44	0.14	84.33±8.39	86.00±33.87	0.83	96.00±1.73	94.50±7.78	0.77
$*P*	0.886	**<0.001**		**<0.001**	**<0.001**		**0.007**	0.102	

$Repeated measures (Linear mixed model) was used to test the change in mean difference over the time. Pair wise comparisons were done using Bonferroni method (significant mean difference with baseline given in bold letter). Independent samples *t*-test used, $P<0.05$ significant

the "PS" group achieved MOAAS scale ≥4, whereas in the "PD" group no patient achieved grade 4. At 20 min, 70% of patients in the "PS" group achieved MOAAS scale ≥4, whereas 5% of patients in the "PD" group achieved MOAAS scale ≥4. At 30 min, 95% of patients in the "PS" group achieved MOAAS scale ≥4, whereas 25% of patients in the "PD" group achieved MOAAS scale ≥4. MOAAS scale was not recorded in two patients who were intubated [Figure 2].

DISCUSSION

In this study, we observed that in both the groups MBP decreased significantly from the baseline and remained decreased between 30 and 45 min in PS and PD group, respectively. In PS group, >20% fall in MBP was observed from 12–30 min after bronchoscope insertion, whereas in "PD" group, >20% fall of MBP from baseline were observed from 6 to 45 min after bronchoscope insertion. Six patients in the PD group required mephentermine (average 26 mg) and one patient further required noradrenaline infusion (total 104 μ for 1 h) to maintain MBP >65 mmHg during the procedure. This can be explained by central sympatholytic action of dexmedetomidine resulting in lower HR-induced lower cardiac output[4] and hypotension in addition to propofol-induced vasodilatation and myocardial depressant effects. Pagel PS, *et al*. studied on both conscious and anesthetized dogs with different concentration and different duration of infusion of propofol and observed that more the concentration of blood in propofol more the vasodilatation and myocardial depression.[5]

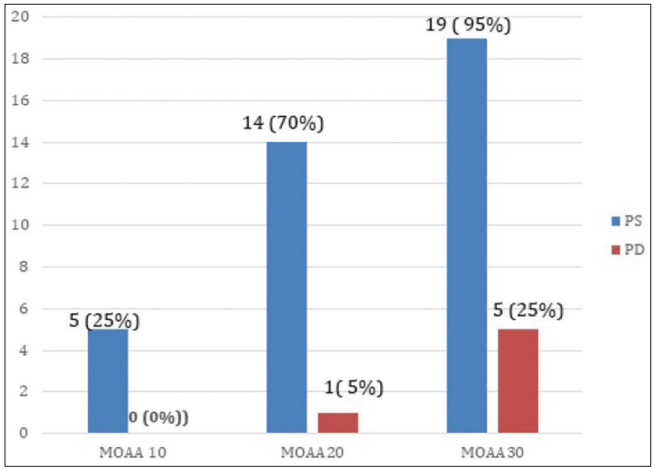

Figure 2: Frequency distribution of patients showing MOAA score at different time points

There was a rise in HR (not significant) during the procedure in PS group in comparison to baseline, whereas HR decreased significantly from baseline (>20% fall in HR from 6 to 30 min after bronchoscope insertion) during the procedure in PD group and remained decreased up to 30 min. The decrease in HR can be owing to central sympatholytic and analgesic effect of dexmedetomidine. There was a statistically significant difference in HR between the two groups from 6 to 30 min after bronchoscope insertion. These results in our study were in congruency with the literature depicting better HR stability with dexmedetomidine.[4,6,7]

Three patients in the PS group and five patients in the PD group developed recurrent transient hypoxia with SpO_2 below 90% in spite high FiO_2 administration. Desaturation during the procedure was corrected by giving positive pressure ventilation through the side port of RB and transient cessation of intervention procedure by closing the main entry port of RB during the procedure. Among these patients, one patient from PS group (dilatation stenting) was intubated because of persistent hypercapnia and another patient from PD group (stenting-coring) was intubated because of persistent hypoxia in spite adequate oxygen therapy post-procedure. One patient in the propofol-dexmedetomidine group developed a pneumothorax, which was immediately diagnosed by clinical assessment, confirmed immediately using ultrasonography and treated with ultrasound-guided intercostal chest-drain insertion. MOAAS scale was utilized to judge for the level of awareness post procedure to prevent airway aspiration as general anesthesia along with topical anesthesia of airway both reduces the tracheobronchial reflexes. In all subjects attaining MOAAS, scale of 4 (lethargic response to name spoken normally) was taken as criteria for shifting the patients from PIR to the post-operative observation room. In propofol group, 25% patients at 10 min, 70% patients at 20 min, and 95% patients at 30 min achieved MOAAS scale ≥4, whereas in

Table 3: Complications seen during pulmonary intervention procedures

Complications	PS group	PD group	*P*
Hypotension requiring Injection mephentermine (average) + noradrenaline infusion	1 (12 mg) + 0	6 (26 mg) + 1 (104 m for 1 h)	0.044*
Desaturation (<90%)	3	5	0.695
Pneumothorax	0	1	-
Post-procedure intubation	1 (hypercapnia)	1 (hypoxia)	-
Arrhythmia	0	0	-

Fisher exact test used, $P<0.05$ significant

propofol-dexmedetomidine group, no patients at 10 min, 5% patients at 20 min, and 25% patients at 30 min achieved MOAAS scale ≥4. Techanivate A, *et al*. compared propofol with the combination of propofol-dexmedetomidine on patients undergoing a colonoscopy and inferred that significantly more hypotension with more requirements of average ephedrine dose, significantly higher HR, slower recovery from sedation, and lesser patient satisfaction occurred in propofol group in comparison to the propofol-dexmedetomidine group.[8] However, Koroglu A, *et al*. compared propofol with dexmedetomidine for sedation on children undergoing magnetic resonance imaging and concluded that although there is faster induction, faster recovery, and earlier discharge in propofol group in comparison to dexmedetomidine group, there are incidences of more hypotension, lesser respiratory rate, and more oxygen desaturation in propofol group, which could be owing to physiology of pediatric patients differ from adult population.[9]

In the majority of the studies on RB, controlled ventilation was achieved with the use of NMBs as jerky respiration; bucking-coughing may lead to tracheobronchial and cervical injury in such procedures. However, controlled ventilation with use of NMBs was associated with more frequent fall in SpO_2 necessitating frequent interruption of procedure, as positive pressure ventilation was ineffective because of an open circuit.

When the airways are obstructed, hypoxemia is common during interventional procedures. The genesis of this hypoxemia was reviewed by McCaughan *et al*. and Hanowell *et al*., and they described total 21 episodes of oxygen desaturation among 87 interventional procedures under general anesthesia with NMB.[10,11] They have studied that a total of 10% patients reintubation was required in the post-operative period because of neuromuscular weakness in the post-operative state. In addition, 47% patients were extubated in the recovery rooms or post anesthesia recovery units.

Natalini *et al*. studied the use of remifentanil and fentanyl with propofol in RB procedures with spontaneous assisted ventilation. They studied RBs in 90 high-risk patients and concluded that with the use of remifentanil during RB procedures under general anesthesia with spontaneous ventilation is safe and assured good operating conditions.[12]

We have avoided the use of NMB agents in our study and only two patient required endotracheal intubation in the post procedural period and they were excluded from the study as described earlier. Rest of all patients were on spontaneous ventilation in the immediate post procedural period so avoidance of muscle relaxants has enhanced early recovery of the patients in post procedural period and reduced post procedural complications.

Perrin *et al*. did not observed this complication in their study when they have used anesthetic technique without muscle relaxants. Perrin G, *et al*. observed in their study on 124 patients undergoing RB under spontaneous assisted ventilation with total intravenous anesthesia (propofol, midazolam, and opioid) along with xylocaine infiltration of vocal cord before bronchoscope insertion is safe, though it was not without complications (18% developed complications among which 15% had significant hypoxia, others had bronchospasm and pneumothorax).[3]

Ramaswamy AH, *et al*. and I.D. Conacher, *et al*. reported cases where topical airway anesthesia with transtracheal with or without superior laryngeal block along with sedation with propofol and midazolam were successfully used to manage the emergency cases of interventional RB.[13,14]

In our study, we did not use NMB and tried to maintain the spontaneous assisted ventilation throughout the procedure. To abate airway reflexes, we gave topical airway anesthesia in all the patients in both the groups. Topical airway anesthesia helped us to achieve smooth respiration without significant bucking-coughing and bronchospasm avoiding tracheobronchial injury in our patients.

Chadha M, *et al*. has suggested that dexmedetomidine can be used safely in RB, but with delayed recovery and less bronchoscopist satisfaction.[1] We were unable to find any study in which dexmedetomidine was used for interventional RB procedures. According to literature, we hypothesized that combination of propofol and dexmedetomidine would result in a lesser fluctuation in hemodynamic parameters,[7,15] less fall in SpO_2 with less hypercapnia,[4,16] and smoother and earlier awakening[8,9] by decreasing the propofol dose.

In this study, although in "PD" group HR remained relatively stable throughout the procedure without bradycardia, significant hypotension (>20% from baseline) was more prolonged in comparison to PS group. At the same time, significant hypotension (>20% from baseline) was also noticed in "PS" group, but MBP started improving after 30 min duration of the procedure. Requirements for vasoactive drugs were also more in the "PD" group. SpO_2 was more or less stable in both groups. The incidence of transient desaturation (<90%) was also comparable in both

the groups, and these events of desaturation were easily managed in both the groups. Patients took significantly more time to become awake in the PD group. In this study, we tried to make model for conducting RB procedures with topical airway anesthesia along with short acting anesthetic agents. Under spontaneous assisted ventilation, there by preserving respiration. Flexible bronchoscopes are introduced into airway without anesthetic induction regularly but rigid ones require induction of anesthesia. Once RB is inside, we can easily give topical anesthesia by spraying 4% xylocaine at the desired bronchus, but intravenous anesthetic agents are required for the tolerance of RB by the patient in the oral cavity and airway during the intervention procedure.

Limitations

We have provided topical airway anesthesia in both the groups along with intravenous agents. Hence, the role of topical anesthesia in maintaining smooth spontaneous respiration could not be assessed in our study owing to use of intravenous agents. We could not control the duration of the procedure, which may have led to bias in our study, but this could have been avoided if the sample size was bigger. It would have been better if we have used target-controlled infusion as they give better control over the depth of anesthesia.

CONCLUSION

Propofol in conjunction with topical airway anesthesia can be used for RB procedures. With propofol-dexmedetomidine more patients required vasopressor in comparison to patients receiving propofol alone and patients awoke with a significant delay.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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