

A Study Comparing Post-Extubation Hemodynamic Changes with Two Different Doses of Dexmedetomidine

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Abstract: ***Introduction:** Smokers are one of the at-risk group of patients prone for developing complications during extubation. **Objective:** Evaluation of post-extubation hemodynamic changes with two different doses of dexmedetomidine. **Study design:** Prospective randomized study. **Method:** Sixty patients of ASA physical status I and II were enrolled in the study and divided into 2 groups of 30 each. Group A included 30 patients who received 0.5 µg/kg of dexmedetomidine in normal saline (Total volume 10 ml). Group B included 30 patients who received 0.75 µg/kg of dexmedetomidine in normal saline (Total volume 10 ml). **Results:** The difference in heart rate post extubation between group A and group B was statistically significant immediately post-extubation at 0 min up to 15 min. Thereafter at 30 min up to 120 min post extubation heart rate was comparable between group A and group B. There was statistically significant difference in mean arterial pressure post extubation between group A and group B at 0 minute ($P<0.0001$), 0.5 min ($P<0.0001$), 1 minute ($P<0.0001$), 1.5 min ($P<0.0001$), 2 min ($P<0.0001$), 2.5 min ($P<0.0001$), 3 min ($P<0.0001$), 3.5 min ($P=0.023$), 4 min ($P=0.002$), 4.5 min ($P<0.0001$) up to 60 min ($P=0.000$). From 75 min up to 120 min, the mean arterial pressure was comparable between group A and group B **Conclusion:** Dexmedetomidine with dose of 0.75 µg/kg is the best dose for maintenance of post-extubation hemodynamic changes.*

Keywords: Surgery, dexmedetomidine, extubation

1.Introduction

Tracheal extubation is associated with significant increase in heart rate, mean arterial pressure, cardiac index, systemic vascular resistance, pulmonary artery pressure and unwanted airway reflexes which further persist into the recovery period [1].

An increase of 20% or more in these hemodynamic variables following extubation was demonstrated by Bidwai et al. [2] in normotensive patients. They reported that 60 mg of lidocaine sprayed down the tracheal tube before extubation and 40 mg sprayed down during tracheal tube removal prevents increases in blood pressure and pulse rate during and after extubation. The data suggest that this manoeuvre should be of advantage to patients with coronary artery disease who may not be able to tolerate the increased cardiac dynamics which usually accompany extubation.

Cigarette smoke is known to disrupt the epithelial lining of the lung, causing an increase in pulmonary epithelial permeability. This loss of epithelial integrity allows irritants to Hypoxia occurs more frequently in chronic smokers due to the increased closing volumes, giving rise to higher alveolar arterial oxygen differences and increased carbon monoxide, decreasing the oxygen availability to tissues. [3]

Although dexmedetomidine has been used with varying success to attenuate hypertension and tachycardia during tracheal extubation, yet no study has evaluated effect of different doses of dexmedetomidine on haemodynamic and recovery response during extubation in smokers.

2.Methods

Place of study: After obtaining ethical committee clearance study was conducted at Dr RPGMC Kangra at Tanda.

Study subjects: Smokers undergoing surgery were assessed for the inclusion and exclusion criteria. Study design: Prospective study. Sample size: 60 (30 each).

Sampling method: Simple random sampling.

Statistical tests: SPSS version 21 program were used to enter data and statistical analysis. Continuous data were presented as Mean \pm SD and comparisons between two groups were performed using Student's t-test. A p value <0.05 was considered statistically significant.

Inclusion criteria

Patients (smokers) posted for surgery ASA grade II Hemodynamically stable BMI (18.5-24.5 kg/m²)

Exclusion criteria

Refusal by the patient to participate in the study BMI $>24.5\text{kg/m}^2$ or $<18.5\text{kg/m}^2$

History of severe cardiovascular disease, renal disease, diabetes mellitus and cerebrovascular disease, known hypersensitivity to the study drug, difficult airway

The enrolled patients (current smoker patients) were allocated to one of the two groups by computer generated random number chart. Group A included 30 patients who received 0.5 µg/kg of dexmedetomidine in normal saline (Total volume 10 ml). Group B included 30 patients who

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received 0.75 µg/kg of dexmedetomidine in normal saline (Total volume 10 ml).

The anaesthetic procedure was explained to the patients enrolled for study and thereafter written consent was taken in the pre anaesthetic check-up clinic 24 hours before surgery. Before commencing the surgery, a case record form was filled for each patient in the preoperative room. All patients were kept nil orally for at least eight hours before the procedure. They were given premedication in the form of tablet alprazolam 0.5 mg and tablet ranitidine 150 mg at night before surgery and at 6: 00 am on the day of surgery.

Statistical analysis

Data were entered into Microsoft spreadsheet and analysed using SPSS v21.0 (IBM, USA). Chi square test was used to compare categorical variables. Quantitative variables between 2 groups were compared using independent t-test. P value<0.05 was considered significant.

3.Results

General characteristics

Table 1 shows general characteristics of the patients in both groups. Both groups were comparable in terms of age, sex, ASA grade, smoking index, and duration of surgery (P>0.05).

Table 1: General characteristics

	Group A (n=30)	Group B (n=30)	P Value
Age (Years)	50.57±6.36	48.13±5.43	0.117
BMI (Kg/m ²)	20.27±1.5	21.09±1.6	0.051
ASA Grade, n II	30	30	-
Smoking Index, n M Id: S100 Moderate (101-300) Heavy (>300)	0 30 0	0 30 0	-
Duration of surgery (min)	61.67±8.74	61.71±7.47	1.000

Heart rate

In the present study, the difference in heart rate post extubation between group A and group B was statistically significant immediately post-extubation at 0 min up to 15 min. Thereafter at 30 min up to 120 min post extubation heart rate was comparable between group A and group B.

Table 2: Comparison of post-extubation heart rate

	Group A (n=30)	Group B (n=30)	P Value
0 Min	87.2±6.1	76.4±9.3	<0.0001
0.5 Min	85.5±5.2	74.6±9.8	<0.0001
1 Min	85.5±8.1	74.6±10.6	<0.0001
1.5 Min	85.7±12.1	74.9±10	<0.0001
2 Min	85.5±16.2	74.5±10.2	<0.0001
2.5 Min	85.6±13.3	74.7±9.7	<0.0001
3 Min	85.3±10.4	74.4±8.9	<0.0001
3.5 Min	85.6±11.4	75±10.1	<0.0001
4 Min	85.8±14.2	74.4±10	<0.0001
4.5 Min	85.6±13.1	74.8±10.3	<0.0001
5 Min	85.7±12.5	74.4±9.9	<0.0001

Values expressed as mean±SD

Mean Arterial Pressure

In the present study, there was statistically significant difference in mean arterial pressure post extubation between group A and group B at 0 minute (P<0.0001), 0.5 min (P<0.0001), 1 minute (P<0.00001), 1.5 min (P<0.0001), 2 min (P<0.0001), 2.5 min (P<0.0001), 3 min (P<0.0001), 3.5 min (P=0.023), 4 min (P=0.002), 4.5 min (P<0.0001) up to 60 min (P=0.000). From 75 min up to 120 min, the mean arterial pressure was comparable between group A and group B.

Sedation score

In the present study, there was statistically significant difference in post extubation sedation score between group A and group B at 0 min (P=0.007), 5min (P=0.006), 10 min (P=0.010), 15 min (P=0.003) and 20 min (P=0.020). Thereafter the sedation score values were comparable.

Table 3: Comparison of post-extubation MAP

	Group A	Group B	P Value
0 Min	97.44±4.33	83.28±5.05	<0.0001
0.5 Min	97.58±5.15	83.61±4.6	<0.0001
1 Min	98.4±5.32	83.27±5.44	<0.0001
1.5 Min	97.63±5.1	83.46±5.28	<0.0001
2 Min	97.38±4.91	84.22±5.67	<0.0001
2.5 Min	96.9±4.63	84.99±5.36	<0.0001
3 Min	96.51±4.38	85.34±5.42	<0.0001
3.5 Min	96.86±4.01	85.37±4.88	<0.0001
4 Min	96.05±3.85	85.31±5.61	<0.0001
4.5 Min	95.23±3.93	85.93±5.85	<0.0001

4.Discussion

Our study confirms the fact that critical incidences like laryngoscopy and intubation, and extubation do cause significantly high fluctuations in the HR and MAP in smoker patients undergoing major surgery. Dexmedetomidine attenuates this sympathoadrenal response and provides haemodynamic stability in these cases. [4] Guler et al. [5] and found that the increase in blood pressure and heart rate during the extubation is decreased and the quality of extubation is better with dexmedetomidine.

5. Conclusion

0.75 µg/kg of dexmedetomidine is better than lower dose in maintaining post-extubation hemodynamic changes.

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