

The association of CPAP compliance and nocturnal hypoxemia in the perioperative period

Yamini Subramani MD, Jean Wong FRCPC, Frances Chung FRCPC.

Department of Anesthesia, Toronto Western Hospital, University Health Network, University of Toronto, Toronto, Canada.



University Health Network
Toronto General Hospital Toronto Western Hospital Princess Margaret Hospital

Introduction

- Obstructive sleep apnea (OSA) has been associated with increased rates of postoperative adverse events which can be reduced with continuous positive airway pressure (CPAP).
- OSA patients have a low compliance of 45% to CPAP in the perioperative period.¹
- There could be hypoxia despite the use of CPAP due to anesthetic induced hypoventilation, positive fluid balance, and supine position.²
- Objective is to determine the rate and association of CPAP compliance and oxygen desaturation in the perioperative period.

Methods

Study type: Prospective cohort study.

Hypothesis:

- The rate of CPAP non-compliance is high in surgical patients and may be associated with significant postoperative hypoxemia.

Inclusion Criteria

- All adult surgical patients (>18 yrs) with a diagnosis of OSA with or without a CPAP prescription.
- Scheduled for a non-cardiac surgery that is expected to require a postoperative hospital stay of more than one night.

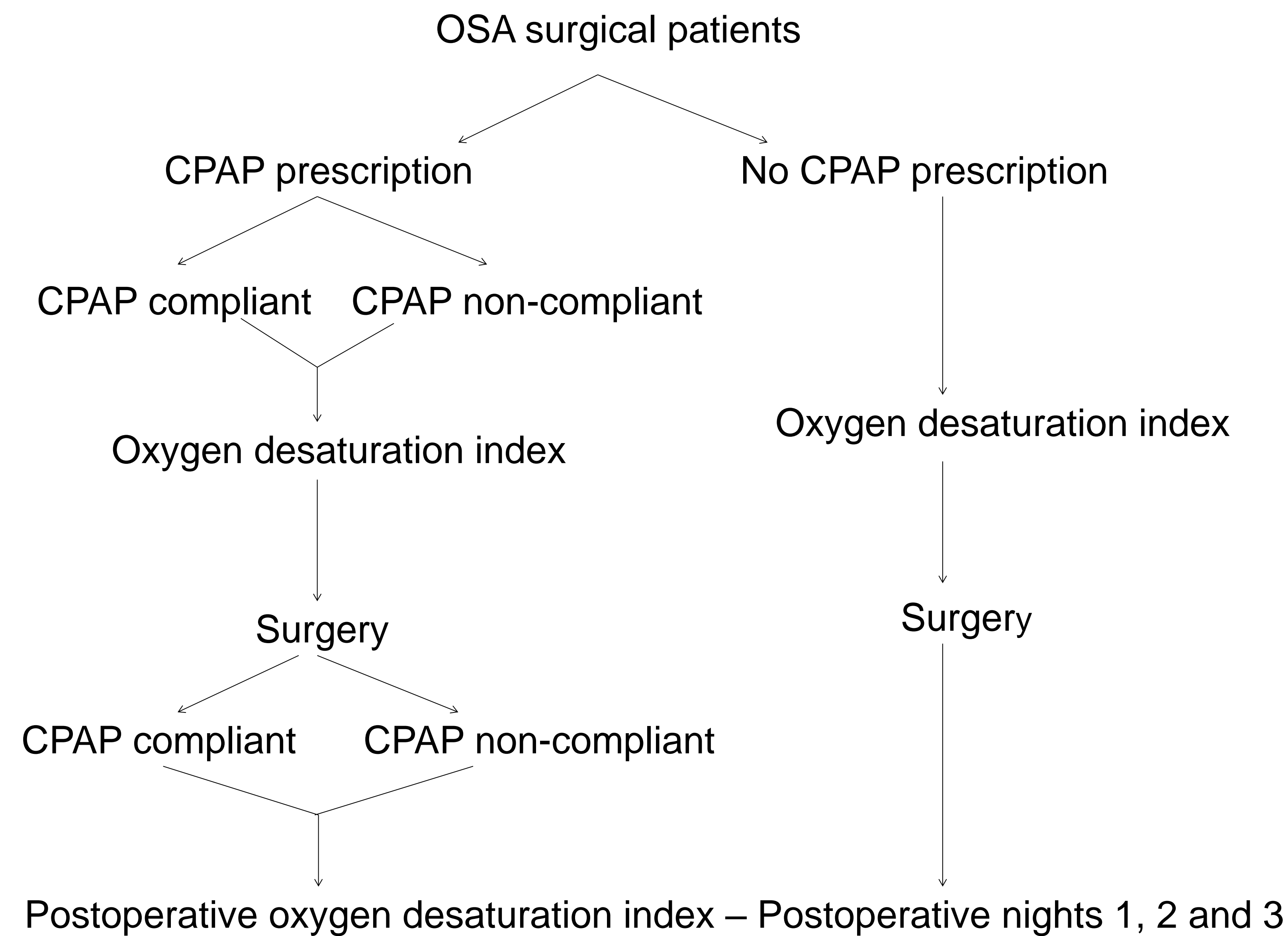
Exclusion Criteria:

- Patients unwilling or unable to give informed consent to the study.
- They are on supplemental oxygen or pregnant
- Surgery included tonsillectomy, septoplasty, uvuloplasty, pharyngoplasty and tracheostomy.

Outcome Measurements:

- CPAP compliance (average CPAP use \geq 4hrs / night).
- Pulse oxygen saturation, Oxygen Desaturation Index, Cumulated time of oxygen desaturation <90%.

Study Implementation



Data Collection

- CPAP usage data
- Pulse watch oximeter:
- SpO₂
- Oxygen desaturation index
- Time spent with SpO₂ <90%
- Lowest SpO₂ and mean SpO₂
- Oximeter data - analyzed with "Profox" software
- Electronic medical record:**
- Demographics
- Co-morbidities
- Anesthesia and Surgery
- Postoperative narcotic and benzodiazepine
- Postoperative complications
- Length of stay

The research work was funded by University Health Network-Department of Anesthesia, Toronto Western Hospital, University of Toronto, Toronto, Ontario, Canada.

Sample Size Calculation

- The estimated sample size would be 90.
- Power of 0.9 and alpha value of 0.05.
- Dropout rate is 20%, we need to recruit 108 patients.
- To enroll at least 72 patients with a CPAP prescription (36 compliant and 36 noncompliant) and 36 patients without a CPAP prescription.

Statistical Analysis

- Statistical analysis will be done using statistical software – Graph Pad Prism-6.
- The statistical tests will be two tailed tests and P < 0.05 will be considered as statistically significant.
- Based on CPAP usage:
- CPAP compliant group (CPAP usage \geq 4 hrs/night).
- CPAP non-compliant group (CPAP usage <4 hrs/night).
- Baseline data, parameters measuring pulse oxygen saturation and postoperative adverse events will be compared between two groups.
- Normal Distribution - Mean \pm SD.
- Skewed Distribution - Median (25th, 75th percentile).
- Categorical data - Frequency and percentage.

References

- Mehta V, Subramanyam R, Shapiro CM, Chung F. Can J Anesth 2012;59:544–55.
- Inderjeet S Brar, Ramakant sharma, Gaurav Khanna, Dennis Auckley. J Sleep Disord Ther 2013;02.