

# Advantages Of Dexmedetomidine-Based Anesthesia On Postoperative Recovery In Sleep Apnea Patients: Preliminary Observations

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## Abstract

Patients with sleep apnea are susceptible to postoperative airway compromise and respiratory dysfunction, necessitating the restriction of opioids and sedatives during their perioperative care. Dexmedetomidine is a short-acting, potent, selective alpha-2 adrenoceptor agonist with unique analgesic, sedative, and anesthesia-sparing properties; that is void of significant cardio-respiratory depressant activity at recommended clinical doses. This clinical report is an observation of the postoperative recovery benefits of dexmedetomidine-based anesthesia in a series of patients with sleep apnea who underwent major abdominal surgery.

## INTRODUCTION

The prevalence of obstructive sleep apnea (OSA) in the general population is about 5%, with an estimated prevalence in surgical patients of about 9% (<sup>1</sup>). Patients with OSA are prone to postoperative airway dysfunction and respiratory insufficiency, especially after general anesthesia (<sup>2, 3</sup>). Because OSA patients are particularly susceptible to the respiratory depressant and pharyngeal hypotonia effects of opioids and sedatives, the perioperative use of these medications is usually avoided or restricted in affected patients (<sup>4,5,6</sup>). This clinical report is an observation of the postoperative recovery benefits of dexmedetomidine-based anesthesia in a series of ten OSA patients who used nocturnal CPAP ventilation regularly, and underwent major surgery.

## CASE DETAILS

The patients were adults and underwent elective major abdominal surgery as listed below. They were morbidly obese and had other co-morbidities which were well-controlled on appropriate medications. Their airway score was Mallampati 2.

Figure 1

	Age	Sex	BMI(kg m <sup>-2</sup> )	Co-Morbidity	Surgery
1	41	Male	47	Diabetes,Hypertension	Mesenteric resection
2	55	Male	45	Hypertension	Laparoscopic nephrectomy
3	39	Female	52	Diabetes,Arthritis	Laparoscopic cholecystectomy
4	54	Female	51	Hypertension	Bariatric surgery
5	37	Female	92	Diabetes,Arthritis	Panniculectomy
6	41	Male	46	Gastric reflux	Bariatric surgery
7	40	Female	86	Diabetes,Gastric reflux	Panniculectomy
8	57	Female	72	Hypertension	Abdominal hysterectomy
9	48	Female	50	Diabetes,Hypertension	Bariatric surgery
10	50	Female	49	Diabetes,Arthritis	Laparoscopic cholecystectomy

Physiologic monitoring of the patients was initiated with electrocardiography, pulse oximetry and non-invasive blood pressure measurement. Intravenous dexmedetomidine was commenced pre-induction with a loading dose of 1mcg/kg over 10 minutes, followed by 0.4mcg/kg/hr infusion. The patients were sedated but easily rousable, without respiratory compromise. Physiologic parameters were satisfactory during the loading dose infusion and oximetry was 95% on room air. Subsequently, the patients were pre-oxygenated and rapid sequence anesthesia induction was performed using IV propofol 1.5mg/kg and succinylcholine 1mg/kg; followed by endotracheal intubation. General anesthesia was maintained with sevoflurane, atracurium and dexmedetomidine infusion at 0.4-0.7 mcg/kg/hr.

Intraoperative monitoring included electrocardiography,

pulse oximetry, blood pressure measurement, capnography, analysis of inspired and expired gases and temperature measurement. At completion of surgery, sevoflurane was discontinued and neuromuscular blockade reversed. With adequate spontaneous respiration, normal arterial blood gases, satisfactory physiologic parameters and response to voice; the dexmedetomidine infusion was discontinued. The patients were then extubated uneventfully in the sitting position and fully conscious. Supplemental oxygen was administered by facemask or nasal prongs. Postoperatively, the patients were physiologically stable, with normal respiratory rates and oximetry 95%. Their pain scores were 0/10 in the 1st hour and 0/10 to 2/10 in the 2nd and 3rd hours. Their CPAP devices were available for perioperative use, but not required. There was no exacerbation of their comorbidities and no events.

## DISCUSSION

Postoperative airway dysfunction and hypoventilation is common in OSA patients because of pre-anesthetic sleep disruption, residual anesthetic effects, opioid depressant effect and pharyngeal hypotonia. An effective perioperative sedative that is void of significant central and cardio-respiratory depressant activity will reduce the dose of anesthetic required, thus enabling better postoperative emergence, recovery and respiration in OSA patients. Also, an effective analgesic that can be used perioperatively without significant depressant effects will be beneficial in OSA patients by minimizing or avoiding the depressant effects of opioid analgesia. Dexmedetomidine is an agent with these desirable effects that may be beneficial in OSA patients.

Dexmedetomidine is a short-acting, highly potent, selective alpha-2 adrenergic receptor agonist with unique analgesic, sedative, amnestic and anesthesia-sparing properties (7,8). At recommended clinical doses, dexmedetomidine is void of significant cardio-respiratory depressant activity (7). The absence of airway compromise or hypoventilation at recommended doses is advantageous in OSA patients, as demonstrated by the uneventful preoperative infusion, postoperative recovery and emergence of the patients

described. Dexmedetomidine produces significant opioid-sparing analgesia and anesthesia-sparing properties; thus enabling better emergence and minimizing the risk of postoperative hypoventilation (7,8).

The airway score of the patients was Mallampati 2; with grade 2 laryngoscopic views. However, if OSA patients require awake fiberoptic intubation, this could be facilitated by the use of dexmedetomidine; without cardio-respiratory compromise (9). Extubation in OSA patients is potentially problematic and should be performed in a conscious and sitting patient; as was successfully performed in the patients described in this report (4,5,6).

In conclusion, dexmedetomidine is a potentially useful anesthetic adjunct in surgical patients with OSA. It may be useful for outpatient anesthesia, sleep nasendoscopy and sleep studies in these patients. Further research and experience are required.

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