

Background

- Unexpected respiratory complications can occur in the early postoperative period despite appropriate anesthetic techniques.
- The oropharynx is susceptible to collapse in the anesthetized patient.
- Hypoxia in the immediate postoperative period may arise from the following common causes:
 - Airway obstruction
 - Excessive intra-operative narcotic administration
 - Residual neuromuscular blockade
 - Laryngospasm
 - Airway edema and secretions
- Prompt recognition of the source of hypoxia can lead the anesthesia provider to the appropriate pulmonary intervention.
- Neurons in the brain are extremely sensitive to oxygen deprivation and can begin to die within five minutes in the presence of hypoxia.



Airway Management. In: Butterworth IV JF, Mackey DC, Wasnick JD. eds. *Morgan & Mikhail's Clinical Anesthesiology*. 6th ed. McGraw-Hill; 2020. <https://accessanesthesiology-mhmedical-com.ezproxy.samford.edu/content.aspx?bookid=2444§ionid=193559024>

Clinical Question

- Does anesthesia provider recognition and rapid identification of potential causes of hypoxia in the early postoperative period reduce the number and severity of adverse respiratory events?

Case Report

- A 52-year-old female weighing 80 kg presented to the operating room for a laparoscopic hysterectomy.
- Relevant patient health history included obstructive sleep apnea (OSA) with non-compliance home CPAP machine.
- Fentanyl 100 mcg was given at induction of general anesthesia, 50 mcg given twice intra-operatively, and 25 mcg given after extubation.
- Rocuronium was titrated to Train-of-Four (TOF) maintaining 1-2 twitches. Rocuronium 50 mg was given at induction, 10 mg given at the 40 minute mark and 90 minute mark.
- Glycopyrrolate 0.4 mg and neostigmine 3 mg was given for reversal of paralytic agent.
- 4/4 twitches on TOF were present after reversal and no evidence of fade upon sustained tetanus.
- After transport to the recovery room, the patient's respiratory status consisted of SpO₂ 79%, cyanotic lips, and decreased air movement.
- 90 mm oral airway was inserted into the oropharynx, a two handed jaw thrust maneuver was initiated and positive pressure ventilation with a CPAP machine was implemented.

Level of Evidence

Maity et al. *Anesth Essays Res*, 2012 – Melnyk & Fineout-Overholt Level I

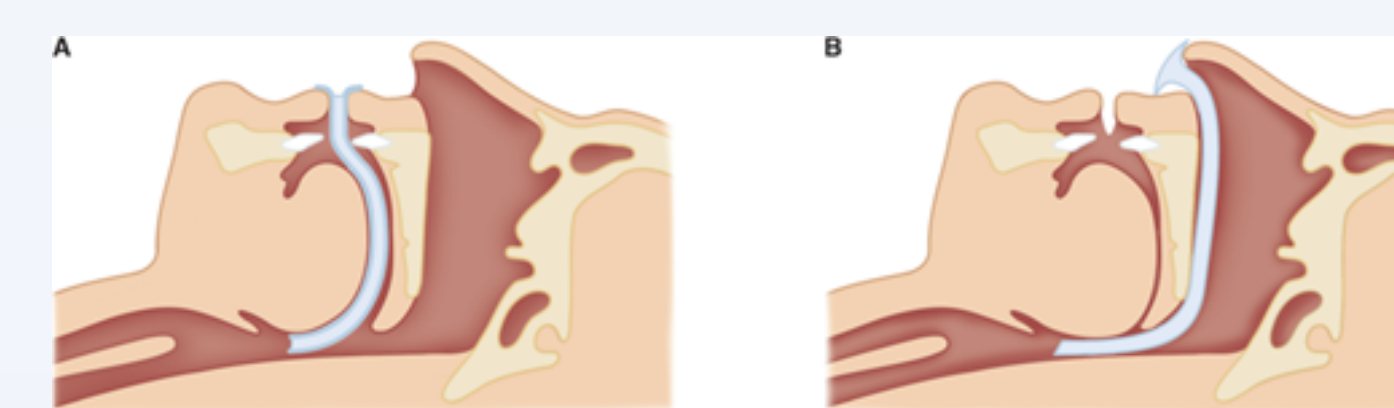
Pereira et al. *Rev Port Pneumol*, 2013 – Level II

Jungquist et al. *Worldviews Evid Based Nurs*, 2019 – Level I

Sasaki et al. *Anesthesiology*, 2013 – Level VII

Evidence Based Discussion

- Provider recognition of the direct cause of hypoxia facilitated the correct respiratory intervention.
- Evidence of airway obstruction was related to airway edema from the steep Trendelenburg position, snoring, and difficult bag mask ventilation.
- Steep Trendelenburg position increases facial and laryngeal edema which can contribute to an airway obstruction.
- An oral airway was shown to reduce obstruction between the tongue and the soft palate of the oropharynx.
- Excessive narcotic administration intra-operatively can lead to respiratory depression.
- Residual neuromuscular blockade can persist postoperatively despite adequate reversal with neostigmine and glycopyrrolate.
- Laryngospasm was prevented with positive pressure on extubation and oral suctioning with the yankauer.



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Level of Evidence (cont.)

Gali et al. *Mayo Clin Proc Innov Qual Outcomes*, 2019 – Level I

Ramachandran et al. *Plos One*, 2017 – Level VI

Chung et al. *Chest*, 2016 – Level VII

Jo et al. *Clin Exp Emerg Med*, 2019 – Level IV

Translation to Practice

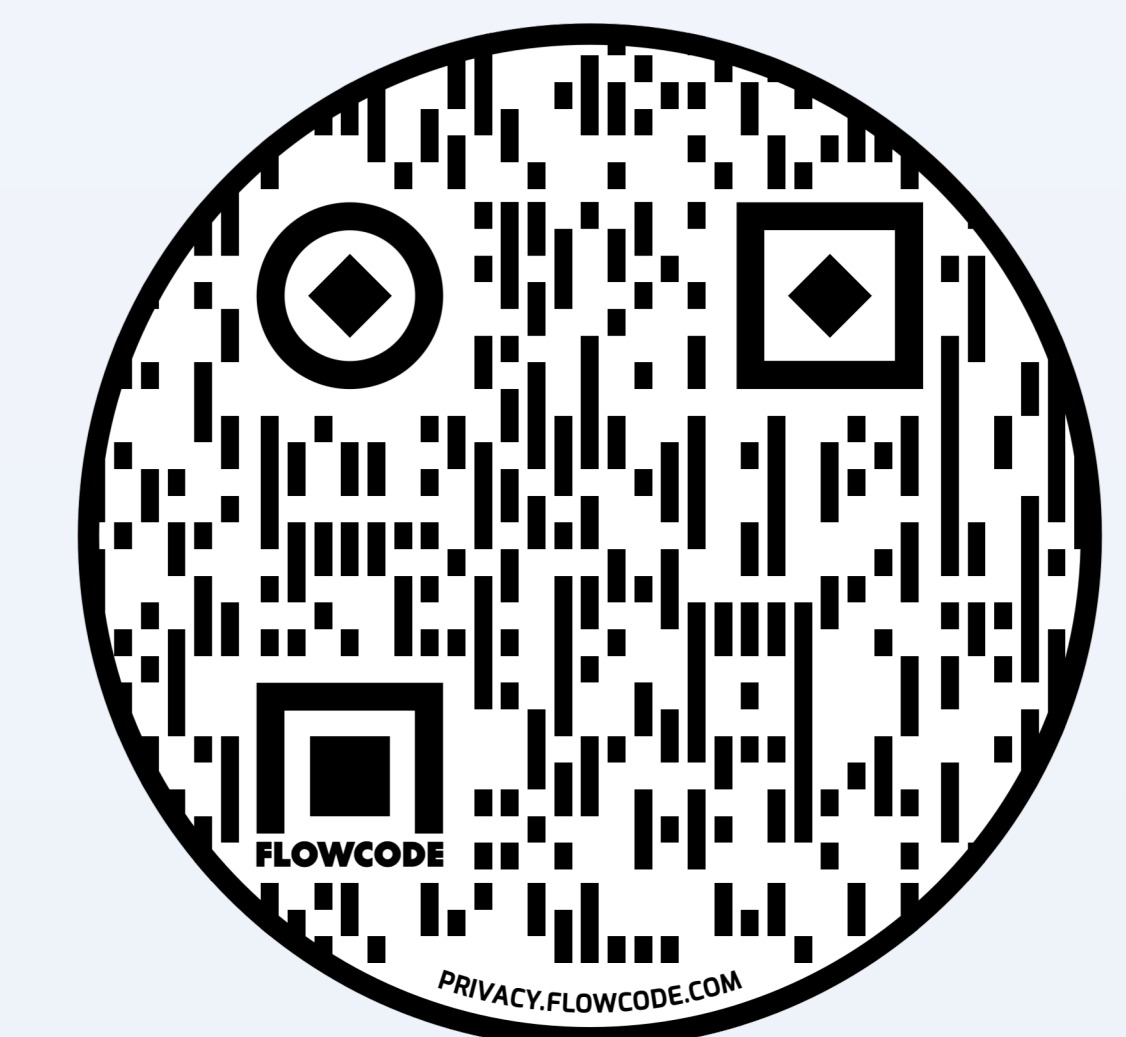
- Anesthesia providers must develop a mental checklist of potential airway complications and interventions prior to the administration of any anesthetic.
- Opioid sparing techniques or timing of opioid administration can reduce the incidence of post operative respiratory depression.
- Ensuring full reversal of NMBA and reducing residual neuromuscular blockade should be integrated for every procedure requiring muscle relaxation in order to maximize respiratory effort.
- Creating a standard protocol for airway management during extubation and immediately after extubation should be further explored in the future.

Recommendations for Future Research:

- Extubating in the reverse Trendelenburg position promoting a more patent airway.
- Utilizing a portable pulse oximeter in transport from the OR to the PACU.
- Advocating for airway optimization practice protocols or a decision algorithm in the immediate postoperative period.

References

Scan this QR code for a complete reference list.



Questions?

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