

ABSTRACT

BACKGROUND

Obesity and obstructive sleep apnea (OSA) are prevalent conditions among patients undergoing endoscopic procedures. Both obesity and OSA are associated with perioperative complications, including airway obstruction, hypoxemic and hypopneic events, and increased time to discharge (Willard et al., 2019). Certified registered nurse anesthetists care for patients undergoing colonoscopy and esophagogastroduodenoscopies (EGDs) with multiple comorbidities, including obesity and OSA.

OBJECTIVE

There is room for improvement in the care of these patients and the use of non-invasive positive pressure ventilation (NIPPV) has been demonstrated to safely deliver oxygen while preventing airway obstruction. The anesthesia department aimed to appraise the effects of NIPPV compared to the use of standard passive oxygen devices.

METHODS

A retrospective quality improvement project was conducted to compare the use of NIPPV with passive oxygen devices, such as nasal cannulas and non-rebreather masks. The patient population included adult patients aged 18-80 years old, with a body mass index (BMI) ≥ 35 kg/m² and/or a diagnosis of obstructive sleep apnea. The procedures evaluated were EGD and/or colonoscopy. Patients were under moderate to deep sedation with anesthesia care. Results evaluated included hypoxemic events, hypopneic events, and time to discharge.

RESULTS

The demographic data showed a statistically significant difference with a higher BMI in the experimental group ($p < .001$). Five patients had at least 1 episode of hypoxia in the control group compared to 4 patients in the experimental group, which was not statistically significant ($p = .542$). There were 11 patients that experienced hypopnea in the control group and 11 patients in the experimental group, which also was not statistically significant ($p = .526$). The mean discharge time in minutes in the control group was 46.5 ± 14.5 and 48.0 ± 15.7 in the experimental group, which was not statistically significant ($p = .640$).

CONCLUSIONS

It can be inferred that the anesthetists were already incorporating NIPPV for patients with higher BMIs. Outcomes between the two groups were similar, suggesting that NIPPV is already lowering the risk of adverse events in patients with a higher BMI. This project may serve as a valuable pilot study for future research in this area.

OBJECTIVES

The purpose of this study was to appraise the effects of NIPPV on patients with obesity and/or OSA that were undergoing EGD and/or colonoscopy.

PRIMARY OUTCOMES

- Hypoxemic events – defined as SPO2 less than or equal to 90%
- Hypopneic events – defined as respiratory rate less than 8 breaths per minute
- Time to discharge

SECONDARY OUTCOMES

- Aspiration events

PICOT QUESTION

In patients aged 18-80 years old with a BMI ≥ 35 kg/m² and/or diagnosis of OSA at a Midwestern hospital undergoing colonoscopy and/or EGD (P), does the implementation of NIPPV (I) compared to no NIPPV utilization (C) result in a decrease in hypoxemic events, a decrease in hypopneic events during the perioperative period, and a decrease in time to discharge (O) from the dates March 1, 2022 to September 1, 2022, or until 88 patients have been analyzed (T)?

METHODS AND MATERIALS

DESIGN & SETTING

- Retrospective quality improvement project at Mayo Clinic Franciscan Healthcare
- March 1, 2022 to September 1, 2022

SAMPLE

- 91 total patients that met inclusion criteria

- Control group: 47 patients who wore nasal cannula or non-rebreather mask

- Intervention group: 44 patients wore NIIPPV

DATA ANALYSIS

- Fischer's exact test
- Independent samples t-test
- Alpha level .05

RESULTS

DEMOGRAPHIC DATA

- Statistically significant differences
 - Age greater in control group
 - BMI greater in NIPPV group
- No statistically significant differences between two groups
 - Gender
 - OSA diagnosis

OUTCOME DATA

- No statistically significant differences
- No episodes of aspiration

TABLE 1: DEMOGRAPHIC DATA

	Control Group (n=47)	Experimental Group (n=44)	p value
Gender	25 M, 22 F	25 M, 19 F	.445
Age in Years (M ± SD)	62.9 ± 11.7	56.0 ± 11.1	.005*
BMI in kg/m ² (M ± SD)	32.3 ± 5.4	45.0 ± 6.5	< .001*
Presence of OSA Diagnosis	32	37	.061

Note. M = male, F = female, M = mean, SD = standard deviation, BMI = body mass index, OSA = obstructive sleep apnea

*Denotes significance at an alpha-level of .05.

TABLE 2: OUTCOME DATA

	Control Group (n = 47)	Experimental Group (n = 44)	p value
Lowest recorded SPO ₂ in percent (M ± SD)	94.9 ± 3.5	95.0 ± 4.3	.874
Presence of Hypoxemia	5	4	.542
Presence of Hypopnea	11	11	.526
Time to Discharge in Minutes (M ± SD)	46.5 ± 14.5	48.0 ± 15.7	.640

Note. M = mean, SD = standard deviation, BMI = body mass index, OSA = obstructive sleep apnea

DISCUSSION

- Intervention group had higher BMI
 - Already incorporating BiPAP to higher risk patients
 - Data matching could be helpful
- No mentions of aspiration
 - Need for a clear/concise way to document suspected or confirmed aspiration
 - Just because it was not mentioned does not mean it did not happen
- No standardized depth of sedation
 - Difficult to measure
 - Possibly affects generalizability and reproducibility
- Variability of charting
 - Electronic charting team added button in chart
 - More accurate and streamlined chart extraction
- Sustainability
 - Valuable pilot study
 - Interest in continuing this project with future SRNAs
 - Potential to standardize practice

CONCLUSIONS

Obesity and OSA are patient factors that can contribute to complications with sedation during endoscopic procedures. NIPPV has previously been found to be associated with decreased length of stay and costs as well as decreased hypoxemia and hypopnea events. While the experimental data from this quality improvement study did not yield statistically significant data, it reveals the necessity to continue this research project. The results from this quality improvement study have the potential to gain traction within the anesthesia department to facilitate a future retrospective study and transform practice at this facility and beyond.

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ACKNOWLEDGEMENTS

We would like to thank Jessica Peterson, Renee Thies, Matt Walker, Dr. Van Der Horst, and Dr. Schams for their guidance and support throughout this project.