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Utilization of Low-flow Anesthesia in Conjunction with Sevoflurane for Anesthesia Providers
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Introduction

- Fresh gas flow (FGF), a term used to describe the flow rate of Oxygen or the combination of Oxygen and medical air that circulates through an anesthesia circuit, can dictate various details regarding the delivery of anesthesia

- FGF, set by the anesthesia provider, effects the amount of Sevoflurane, a commonly used inhaled anesthetic, needed to anesthetize a patient

- According to the package insert, Sevoflurane should be run with a gas flow of no more than 1-1.5 L/min. Flows higher than 2 L/min are both costly and unnecessary
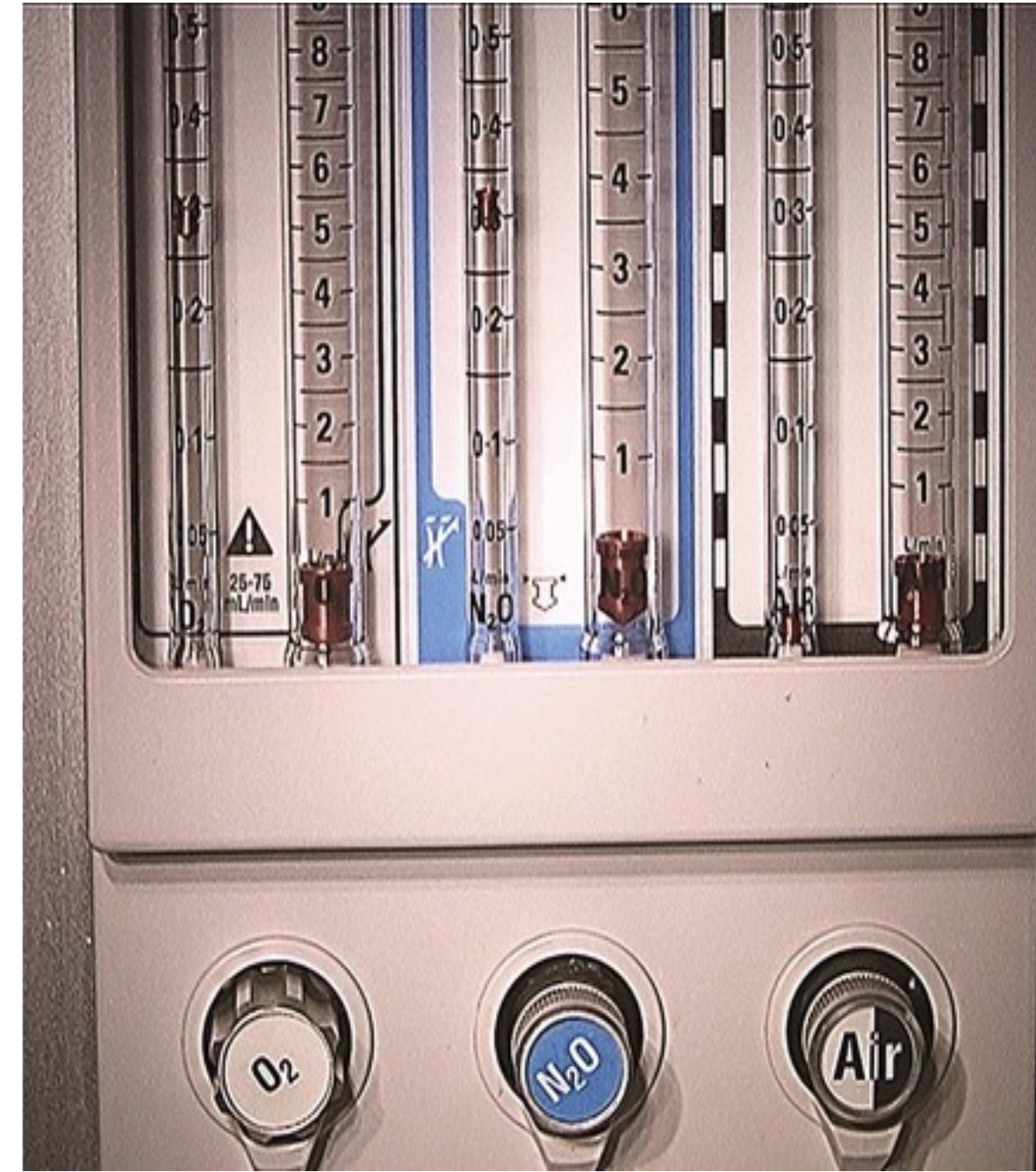
Background and Implications

- There is a common misconception amongst anesthesia providers that the technique of low flow anesthesia used in combination with Sevoflurane can contribute to the accumulation of Compound A in the body

- Compound A has only been found to have nephrotoxic properties in rats. This has never been proven to cause adverse effects in humans under the concept of low fresh gas flow during the first two hours of Sevoflurane administration

- Excessively high fresh gas flows are associated with a large increase in cost amongst other negative outcomes

- Facilities across the country have begun to encourage the implementation of low flow anesthesia amongst providers

Problem: A common misconception among anesthesia providers is that Sevoflurane is best ran in conjunction with a fresh gas flow of at least 2 L/min

Result in this practice: Excessive use of sevoflurane with a great deal of economic impact

Goal: Educate providers of current recommendations when administering Sevoflurane and encourage a change in practice to reduce overall cost and waste of Sevoflurane

Methodology

Study Design: Quasi-experimental
- Pre-intervention data collection period: Observe fresh gas flow rate, device utilized and title of the administering provider during the maintenance phase of general anesthesia with Sevoflurane
    - Duration: 4 weeks
    - Target population: 25 procedures
- Intervention: Anesthesia providers were offered a PowerPoint presentation during their monthly meeting regarding the low flow anesthesia technique
    - A small reminder card was placed on each anesthesia machine
- Post-Intervention observational data collection period
    - Completed at 1- and 4-weeks following intervention
    - Duration: 1 week
    - Target population: 25 procedures
- Reinforcement educational PowerPoint
    - Completed at 6 weeks following intervention
- Repeat Post-Intervention observational data collection period
    - 2 weeks following reinforcement education
    - Duration: 1 week
    - Target population: 25 procedures

Results

Pre-Intervention
Data points included: 49
Average FGF: 3.5 L/min
Min: 2 L/min Max: 5.8 L/min

One week Post-Intervention
Data points included: 17
Average FGF: 2.2 L/min
Min: 1.4 L/min Max: 5 L/min

Four week Post-Intervention
Data points included: 8
Average FGF: 1.6 L/min
Min: 1 L/min Max: 2 L/min

Eight week Post-Intervention
Data points included: 22
Average FGF: 2.3 L/min
Min: 1 L/min Max: 4 L/min
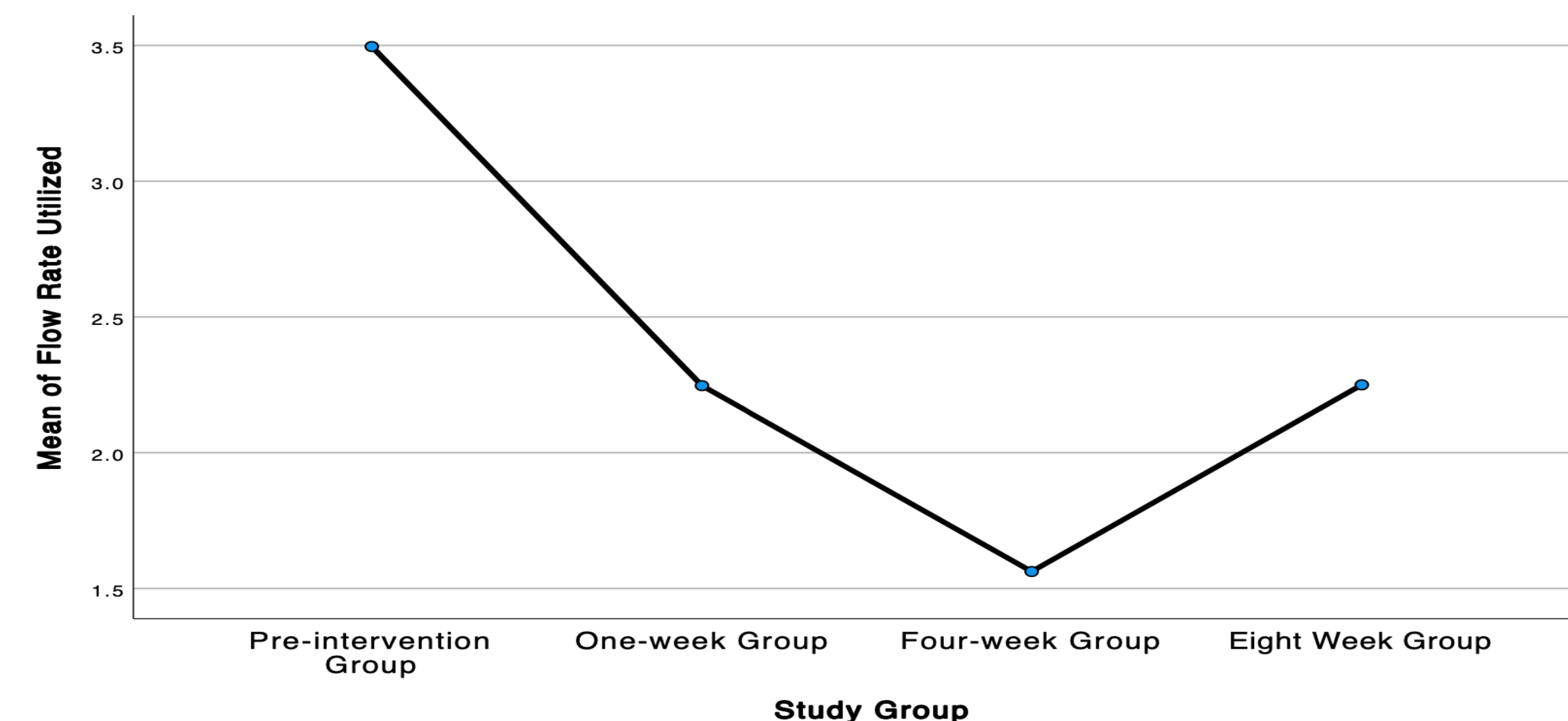
Statistical Analysis

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Flow Rate Utilized	Based on Mean	2.463	3	92	.067
	Based on Median	2.692	3	92	.051
	Based on Median and with adjusted df	2.692	3	77.167	.052
	Based on trimmed mean	2.480	3	92	.066

- Levene's Test: Utilized to compare the degree of variation within each group
    - Assumes a null hypothesis that there is no significant degree of variation between each group
- With a significance value >0.05, there is no statistically significant degree of variation between each group

ANOVA

Flow Rate Utilized

|	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	47.759	3	15.920	16.032	<.001
Within Groups	91.355	92	.993		
Total	139.114	95			

- A one-way ANOVA test was conducted yielding a significance value of <.001
- The Welch and Brown-Forsythe tests of equality of means were also conducted yielding a significance value of <.001
    - All three tests support the concept of statistical significance within means of each group

Discussion

- Results determined that education in the utilization of low flow anesthesia in conjunction with Sevoflurane was helpful in decreasing flow rates utilized by providers
- Some providers may have regressed to previously formed practice techniques, whether conscious or subconscious, which could explain the results of this project
- With reinforcement and the continuous presence of a reminder sign, an overall change in practice was displayed amongst providers
- One may assume that with a continuation of prompts and reinforcement education, this practice change has the potential to become the new standard amongst providers

References

Contact Information
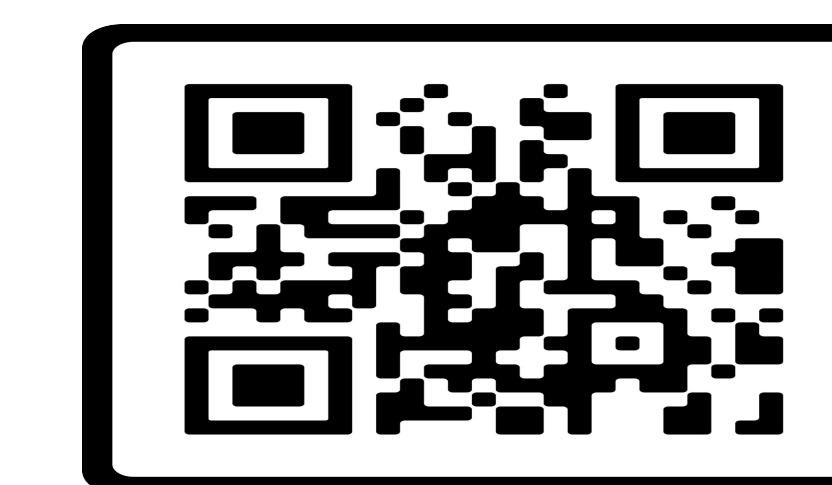
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