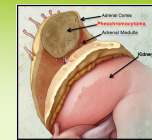


# Anesthesia Care Implications of Paragangliomas and Pheochromocytomas

**Mignon Nielsen BSN, RN, SRNA & Soomee Pak, BSN, RN, SRNA**  
**Project Mentor: Jessica Pena, CRNA, MSNA: JLR Medical Group**  
**Project Chair: Steve Fowler, CRNA, DNP**  
**Nurse Anesthesia Program, Adventist University of Health Sciences**



## Abstract

Pheochromocytomas (PHEO) and paragangliomas (PGL) are rare conditions that anesthesia providers may or may not encounter in their career. Due to the life-threatening and critical anesthetic implications in the perioperative period, the researchers deemed it prudent to present a lecture to the group of student registered nurse anesthetists (SRNAs) at Adventist University of Health Sciences. The educational lecture was provided with the goal of bridging the SRNAs' knowledge gaps regarding PHEO and PGL in general, and of helping them to be more familiar with PGL in particular.

## Objectives

Educational presentation on PHEO and PGL:

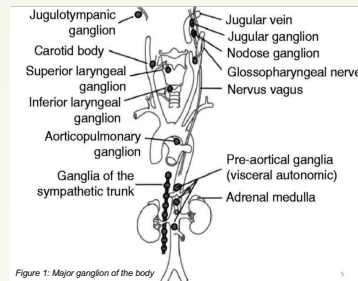
- Tell the similarities and the differences between Paraganglioma (PGL) and Pheochromocytoma (PHEO).
- Verbalize the anatomy and physiology of PGL and PHEO.
- Recognize the major genetic mutations associated with PGL and PHEO.
- Name the classic triad symptoms of PGL and PHEO.
- Tell the diagnostic tools for PGL and PHEO.
- Develop an anesthetic plan.

## Methods

- Independent variable: PowerPoint Presentation
- When: Fall of 2016
- Subjects: 34 SRNAs in MSNA 501 and 504
- Dependent variable: pre- and post-test scores
- Measures: the difference between scores

## Literature Review

Paraganglioma, umbrella term for rare tumors arising from the neural crest chromaffin tissues of the sympathetic and parasympathetic nervous systems. PGL are found anywhere along the ganglia, carotid body to the epididymis. A type of paraganglioma is PHEO, the term is designated exclusively for the tumors of the adrenal medulla. About 90% of PGLs are found in the abdomen and abdominal PHEO and PGL are usually catecholamine secreting.



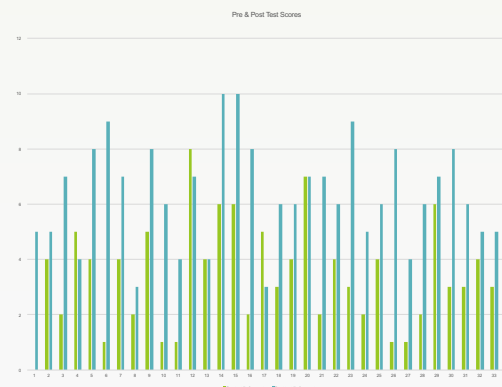
Current literature review revealed well-established data on PHEO in terms of pathophysiology, hereditary factors and connection to other gene mutations and neuroendocrine conditions, diagnostic tools, perioperative medical/anesthetic management, and surgical approaches. There are limited amounts of information on PGL due to rare incidences and lack of consistency in presentation. Functioning paragangliomas have similar management approaches to PHEO. Therefore, it is pertinent for anesthesia providers to be aware of potential life threatening hemodynamic instability when PGL is a diagnosis.

## Results

For the purpose of analyzing the effectiveness of the PowerPoint lecture, the pre-test and post-test scores were compared. A paired t test revealed  $p$  value of  $< 0.05$ , affirming the statistical significance. The pre-test scores had shown the lack of knowledge in general, as evidenced by the low average test scores (3.47/11). The mean post-test scores (6.32/11) were definitely improved after the lecture, meeting the goal.

	Paired Samples Test					
	Paired Differences				t	df
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		
				Lower	Upper	
Pair 1 Pre-Test - Post-Test	-2.85294	2.37579	.40744	-3.68785	-2.02299	-7.002
						33
						.000

Paired Samples Statistics				
		Mean	N	Std. Deviation
Pair 1	Pre-Test	3.4706	34	1.94212
	Post-Test	6.3235	34	1.83766
				Std. Error Mean
				.33307
				.31516



## Discussion

Scores were low in the pre-test, showing lack of knowledge. The convenience sample group was made up of both first year and second year nurse anesthesia students. There is a possibility that there were more first year students than second year students and most likely the first year students would not have been introduced to PHEO or PGL, causing lower scores. Furthermore, the post-test mean score (6.32/11) is low as well leading the researchers to believe the test might need to be reworded or better reflect the lecture.

### Project Weaknesses

- Convenience sample
- Single site study
- Combined 1<sup>st</sup> and 2<sup>nd</sup> year SRNAs

## Conclusion

The clinical implications are to present the education to nurse anesthesia students, so they may gain knowledge of PHEO and PGL. Allowing the student nurse anesthetist to be better prepared for the possibility of caring for a rare yet potentially life threatening event in the operating room. Since the education has shown statistical significance in increasing PHEO and PGL knowledge in those exposed, using this education will be helpful for current certified registered nurse anesthetists as a continuing education module or presentation.

## References

1. References provided upon request