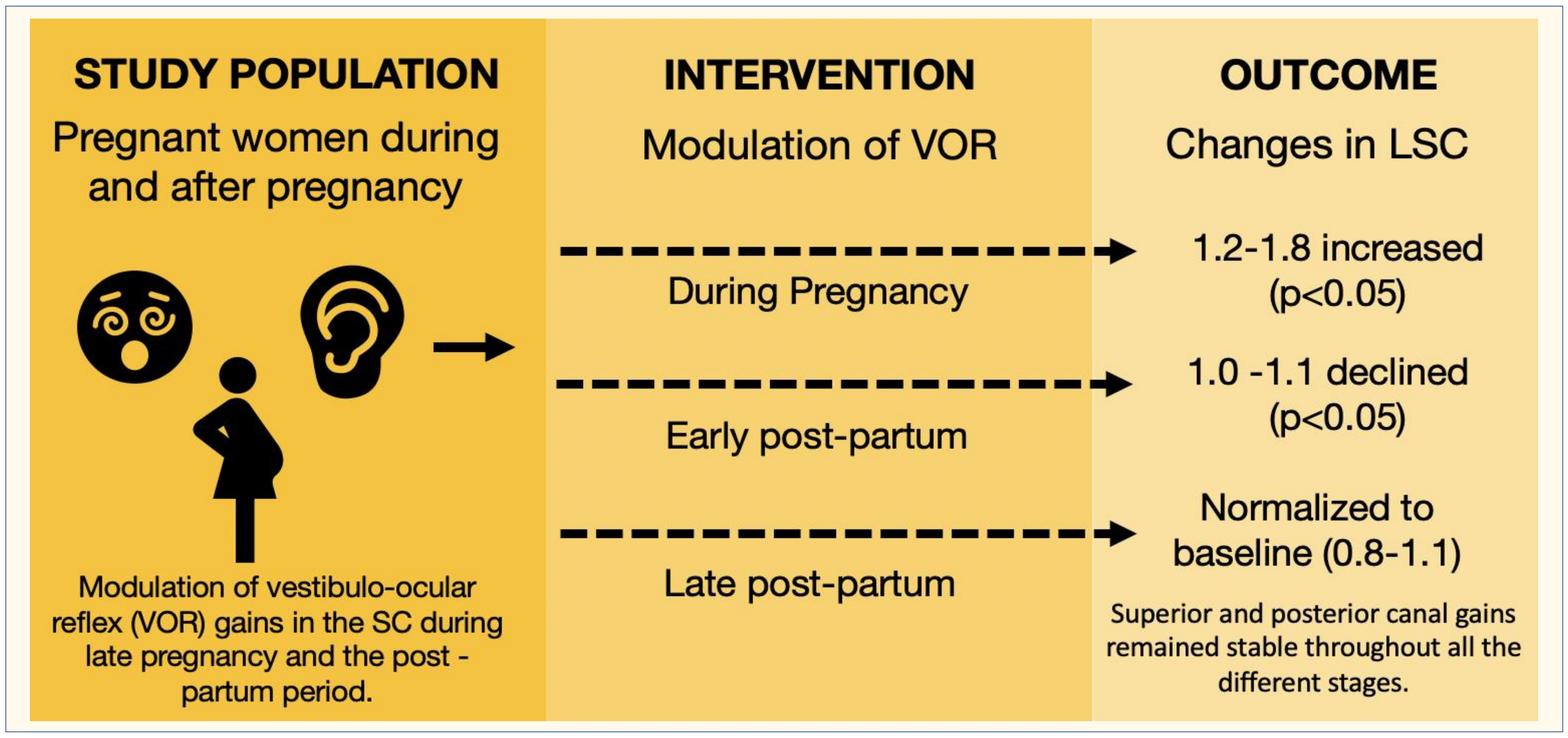
Dynamic Modulation of Semicircular Canal Function During Late Pregnancy and Postpartum Recovery: A Longitudinal Study

Alejandro Garcia, MD[1]; Maria Campo, MD PhD[2]; Johana Vanegas, PhD[2]; Melissa, Castillo-Bustamante, MD[2]
[1]University of Iowa Healthcare. Department of Otolaryngology Head and Neck Surgery. Iowa City, IA. USA
[2] Universidad Pontificia Bolivariana. Clinica Universitaria Bolivariana. Medellin, Colombia

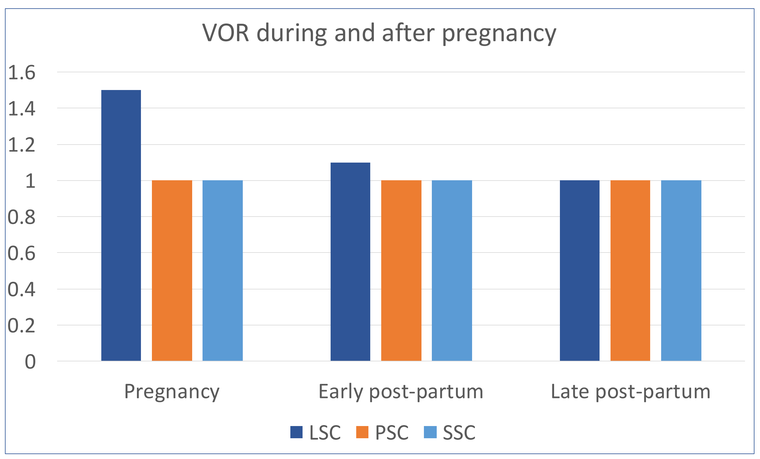


Introduction

- While pregnancy induces significant physiological changes, its specific impact on vestibular function across different semicircular canals (SC) remains unknown.
- Estrogen and progesterone are significantly increased during pregnancy leading to electrolytic imbalance, excessive water and sodium retention that could affect the vestibular system.
- This study explores the modulation of vestibulo-ocular reflex (VOR) gains in the semicircular canals during late pregnancy and the postpartum period.

Methods

- Three pregnant patients (age range: 20-34 years-old) underwent VOR gain assessments of the lateral (LSC), superior (SSC) and posterior semicircular (PSC) canals using video head impulse test (vHIT).
- Measurements were conducted during late pregnancy (>35 weeks) and the postpartum period, which was further divided into early (first 3-weeks) and late phases (1-3 months post-partum)



Results

- During pregnancy, the lateral canal VOR gains showed a consistent increase, peaking 1.2-1.8 above baseline by late gestation.
- In the early post-partum phase, the lateral canal VOR gains (1.0 -1.15) declined significantly (p>0.05) from peak pregnancy levels but remained slightly above baseline.
- In the late postpartum phase, the lateral canal VOR gains continued to decrease and normalized to baseline levels by three months post-partum. Superior and posterior canal gains remained stable throughout all the different stages.

Conclusions

- Lateral semicircular canal function exhibits dynamic modulation during late pregnancy, peaking near term, and progressively settles in the post-partum period.
- In contrast, PSC and SSC function remain unaffected, suggesting a canal-specific response to the physiological demands of pregnancy and post-partum recovery.
- Increased gains are potentially associated with volumetric and functional changes within the LSC.
- Further studies with a larger sample size need to be conducted to validate these findings.

References

1. Castillo-Bustamante M, Campo M, Peña-Tobon D, Briceño O, Vanegas-Munera JM, Madrigal J. Semicircular Canal Functions Throughout Pregnancy: Case series using Video Head Impulse Test (vHIT). Obstetrics and Gynecology Research. 6 (2023): 228-232.
2. Frosolini A, Marioni G, Gallo C, et al. Audio-vestibular disorders and pregnancy: A systematic review. Am J Otolaryngol 42 (2021): 103136.
3. Serna-Hoyos LC, Herrón Arango AF, Ortiz-Mesa S, et al. Vertigo in Pregnancy: A Narrative Review. Cureus 14 (2022): e25386
4. Sennaroglu G, Belgin E. Audiological findings in pregnancy. J Laryngol Otol 115 (2001): 617-621.
5. Wu PH, Cheng PW, Young YH. Inner ear disorders in 68 pregnant women: a 20-year experience. Clin Otolaryngol 42 (2017): 844-846.

Contact

Alejandro Garcia, MD
University of Iowa Healthcare. Department of Otolaryngology Head and Neck Surgery
Email: agarciachavez@uiowa.edu
Address: 200 Hawkin Drive, Iowa City, IA.
Phone: 319-356-1616