Round and Oval Window Reinforcement in Superior Semicircular Canal Dehiscence

Herbert Silverstein, MD, FACS, Jack M. Kartush, MD, Lorne S. Parnes MD, Dennis S. Poe, MD, Seilesh C. Babu, MD, Mark J. Levenson, MD, Ryan W. Ridley, MD
Introduction/Background

- Superior semicircular canal dehiscence (SCD) syndrome
  - Recently recognized condition
    - Lloyd Minor, 1998
  - Characterized by various degrees of sound and/or pressure-induced vestibular or auditory symptoms.
    - Tullio’s phenomenon
    - Hennebert’s sign
    - Oscillopsia

- Presenting symptoms
  - Chronic dizziness
  - Imbalance
  - Hearing loss
  - Pulsatile tinnitus
  - Aural fullness
  - Autophony
  - Hear one’s eye movement or footsteps
Current Treatment Options

- **No symptoms/minimal symptoms:**
  - Continued observation, avoidance of provocative stimuli, and supportive measures such as vestibular rehabilitation or vestibular suppressants.

- **Disabling symptoms:**
  - Transmastoid approach
  - Middle cranial fossa approach
Surgical Approaches...

- Round/Oval window reinforcement
  - Performed transcanal
  - Avoids morbidity associated with traditional approaches
  - Reversible
  - Option for patients who are not candidates for a major procedure
Drs. Kartush (emedicine, 2009) and Poe initially suggested fascia reinforcement of the round and oval windows – similar to perilymphatic fistula repair.

- This may dampen the hypercompliance of the round and oval windows decreasing the sensitivity of the inner ear to sudden fluctuations in sound or pressure.

Dr. Silverstein later published case report (Ear, Nose & Throat Journal, 2009) describes complete closure of the round window niche.
Study Overview

• **Objective:** To evaluate the outcome of round window (RW) with or without oval window (OW) tissue reinforcement in the management of superior canal dehiscence (SCD).

• **Study Design:** Multi-center retrospective chart review and patient survey.
Methods

• A multicenter chart review was conducted involving 5 institutions evaluating patients treated with round and/or oval window reinforcement.

• Patients asked to answer a “Superior Semicircular Canal Dehiscence Questionnaire”

• Patient charts were analyzed for data such as most prevalent chief complaints/symptoms as well as standard audiometric test results
Survey Details

Symptoms Assessed

- Autophony
- Sensitivity to bone conduction
- Pulsatile tinnitus
- Sensitivity to loud sound
- Sensitivity to increased middle ear pressure
- Hearing loss
- Aural fullness
- Imbalance

Symptom grading Scale
1- Not bothered at all
7- Completely disabled
Surgical Technique

• Transcanal stapes approach under general anesthesia.
• Optimal visualization of the round window membrane
• The round window is then reinforced by a variety of techniques
• Temporalis fascia, tragal cartilage, perichondrium, fat.
• Three cases of complete RW obliteration were not included in the results
• Two of three patients needed revision and removal of the obstructing tissue
Results

- 21 patient responses to the questionnaire
  Outcome measures (6 out of 7) showed statistically significant improvement after round and/or oval window reinforcement
  - Hearing loss did not show statistical significance in improvement
  - The majority of patients were pleased with the post operative outcome.
Recommendations

- Tissue reinforcement of the RW
- Reinforcement of oval window not needed
- Complete blockage of the RW not recommended
Suggested Algorithm for SCSD

SCDS identified

Minimal symptoms
- Observation
- Avoid provocative stimuli
- Vestibular rehab
- Vestibular suppressants
  - controlled
  - uncontrolled
  - No further treatment

Debilitating symptoms
- Patient’s choice
  - Round window reinforcement
  - MCF vs transmastoid approach
    - success
      - yes
      - no
        - No further treatment
Conclusion

- No patient with RW tissue reinforcement procedure required further surgery
- The weakness of this study it was not prospective and the patients answered the pre op questionnaire after the surgery
Conclusion

- RW reinforcement should be considered in symptomatic patients with SCDS
Future Research

- Recruit more patients
- Develop a uniform surgical technique that produces consistent positive results
- Do a prospective study
THANK YOU