

Beaumont Health

## Beaumont Health Scholarly Works and Archives

---

Conference Presentation Abstracts

Otolaryngology

---

9-2022

### Novel Mathematical Model for Diagnosis of Superior Semicircular Canal Dehiscence

Garrett G. Casale

Christian G. Fritz

Lulia Kana

Robert S. Hong

Follow this and additional works at: [https://scholarlyworks.beaumont.org/otolaryngology\\_confabstract](https://scholarlyworks.beaumont.org/otolaryngology_confabstract)



Part of the [Otolaryngology Commons](#)

---

## Novel Mathematical Model for Diagnosis of Superior Semicircular Canal Dehiscence

Garrett G. Casale, MD, Christian G. Fritz, Lulia Kana, MD, Robert S. Hong, MD, PhD

**Introduction:** Superior semicircular canal dehiscence (SSCD) often represents a diagnostic dilemma, with patients presenting with symptoms that are, in isolation, nonspecific for the presence of SSCD on imaging. This results in a large number of ultimately negative computed tomography scans. We propose a mathematical model that provides an estimate of the probability of the presence of SSCD based on a patient symptom inventory: the SSCD Symptom Index Assessment Tool (SSCD-SIAT).

**Method:** A retrospective chart review was conducted to collect data on patients presenting with a concern for SSCD ( $n=168$ ). Data were collected on patient symptoms at presentation, audiometric results, and vestibular evoked myogenic potential testing when available. Patients were divided into those with confirmed SSCD on imaging ( $n=118$ ) and those who ultimately did not have SSCD on imaging ( $n=50$ ). A logistic regression was performed to identify symptoms that were associated with the presence of SSCD. The SSCD-SIAT was then constructed by converting the odds ratio for each symptom into an integer and combining them to generate a composite symptom score (maximum score=14).

**Results:** Several patient symptoms were noted to be significantly correlated with the presence of SSCD on logistic regression ( $P<.1$ ). These symptoms included disequilibrium, autophony, pressure-induced vertigo, subjective hearing loss, and hyperacusis. The SSCD-SIAT was constructed based on the odds ratios associated with patient symptoms calculated via logistic regression. The resultant predictive model demonstrated excellent sensitivity for the detection of SSCD (area under the ROC curve=0.814, specificity=0.820). An SSCD-SIAT score  $>6$  was associated with a  $>70\%$  likelihood of the radiologic presence of SSCD (model line of best fit,  $R^2=0.853$ ).

**Conclusion:** The SSCD-SIAT represents a simple, accessible mathematical model that predicts the likelihood of radiologic SSCD with a high degree of sensitivity. This model can be used to guide responsible ordering of high-resolution imaging in the setting of clinical concern for SSCD.

## Options and Outcomes of the Sigmoid Sinus Variants Surgery in the Patients With Pulsatile Tinnitus

Aynur Aliyeva, MD, Jae Sang Han, Yeonji Kim, Ji Hyung Lim, Shi Nae Park, MD

**Introduction:** Pulsatile tinnitus (PT), originating from the anatomical abnormalities or variants of sigmoid sinus (SS), is relatively common and a potentially incapacitating condition. The aim of this study is to analyze the surgical options and their outcomes for of the sigmoid sinus variants causing pulsatile tinnitus.

**Method:** Patients with PT who underwent surgeries for SS variants by 1 surgeon between April 2018 and December 2021 were enrolled. Their medical records including tinnitus questionnaires, temporal bone computed tomography (TBCT) scans, and audiologic tests, and preoperative water occlusion test (WOT), as well as the surgical outcomes, were retrospectively reviewed.

**Results:** A total of 26 patients were enrolled in this study. Nineteen were female, 7 were male, and the average age was 44.0 years (a range of 18-75 years). The right side was dominant (21 patients, 80.8%), and the mean symptom duration before surgery was 43.5 months (a range of 8-140 months). On preoperative TBCT, there were 16 SS-dehiscence patients, 7 SS-diverticulum patients, and 3 large emissary veins. All patients underwent SS resurfacing (SSR) surgery using bone pate and bone cement after simple mastoidectomy. Among them, 3 patients underwent exposed jugular bulb repair, 4 patients underwent diverticulum plugging using periosteal flap, and 1 patient underwent ligation of large emissary vein, simultaneously. Fifteen patients (57.5%) were completely cured, 6 (23.1%) were significantly improved, and 5 (19.2%) were stationary after surgery. The predictive value of WOT with TBCT for the cure of PT was 87.59% (14/16). There were no severe surgical complications during the follow-up period in all cases.

**Conclusion:** SSR seems to be an effective surgical treatment modality for the SS variants causing PT. We propose that preoperative evaluation with both WOT and TBCT can predict surgical outcomes of SSR.

## Otologic Adverse Events due to Teprotumumab: A Prospective Assessment of 35 Patients

Emily Kay-Rivest, MD, Daniel Jethanamest, MD, Irina Belinsky, MD, Sean O. McMenemy, MD, Anna Kozlova, MD

**Introduction:** Teprotumumab targets the insulin-like growth factor-1 receptor and has been recently approved for the treatment of moderate to severe thyroid eye disease. It acts by reducing the volume of orbital fat and muscle. Although this drug has demonstrated promising results, in a large clinical trial, subjective hearing changes were reported in 7% to 12% of participants. The current study aimed to prospectively quantify the rates of otologic adverse events in patients receiving teprotumumab.

**Method:** A prospective analysis of patients receiving teprotumumab was performed in a tertiary care centre. Prior to and after treatment, an ototoxicity-specific audiometric battery was completed and included conventional audiometry (frequencies 250–8000 Hz), ultra-high-frequency audiometry (8000 Hz to 20,000 Hz), tympanometry, and distortion product otoacoustic emissions. Patients were monitored throughout for new onset hearing loss, tinnitus, vertigo, and ear fullness.

**Results:** A total of 35 patients were assessed, with a mean age of 48.4 years and 86.5% of patients being female. Otologic adverse events were reported in 31.4% ( $n=11$ ) of patients. The