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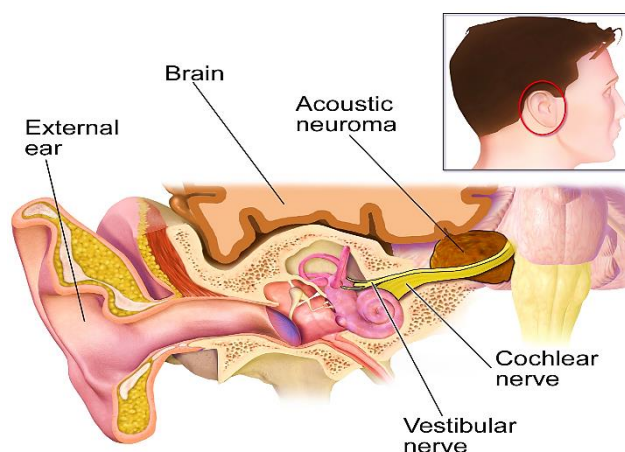
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Association between endolymphatic hydrops and vestibular schwannoma

Introduction: Vestibular schwannoma (VS), a benign tumor of the eighth cranial nerve, and endolymphatic hydrops (EH), an inner ear disorder linked to excessive endolymph buildup, can both lead to symptoms like vertigo and hearing loss.¹ In a study by Roosli C et al. included 32 temporal bone donors with sporadic VS within the internal auditory canal (IAC) and found that 22% showed EH in the cochlea and 12% in the saccule.² However, intra-operative electrocochleography did not support the idea that VS directly causes EH, suggesting that cochlear damage from the tumor might contribute to EH, possibly through factors like fiber disarray, hair cell loss, or nerve degeneration. Further investigation through hydrops MRI in patients with both VS and Meniere's disease (MD) has been conducted to explore the relationship between VS and EH. While MD is commonly associated with EH, some VS patients may also present with EH, complicating diagnosis. The exact association between VS and EH remains unclear, with evidence suggesting that EH could either be a secondary effect of tumor-induced cochlear damage or a coincidental finding. More research is needed to clarify this complex interaction.³ The purpose of this study was to determine the relationship between VS and EH.



Methods: In this prospective study, 80 patients with MD or VS were divided into three groups after undergoing a battery of inner ear tests and a hydrops MRI. There were 58 MD patients (62 ears) in Group A who had positive EH but negative VS. Eighteen VS patients (18 ears) with negative EH were in Group B, and four patients (4 ears) with VS concurrent with EH were in Group C. In this cohort, 14 additional MD patients who had hydrops MRI results negative for EH were initially omitted but subsequently added for comparison. Pure tone audiometry, a bithermal caloric test with electronystagmographic recordings, and cervical and ocular vestibular-evoked myogenic potential (cVEMP and oVEMP) tests were all part of an inner ear test battery. The average hearing threshold derived from four frequencies (500, 1000, 2000, and 3000 Hz) is known as the pure tone average (PTA). The PTA is considered abnormal if it is greater than 25 dB HL. Hydrops MR pictures were analyzed by two neurotologists who were

unaware of the inner ear test results. A one-way ANOVA test and a Bonferroni-adjusted t-test were used to compare the PTA and age of the three groups.

Results: The audiometry anomaly rates in Groups A, B, and C were 86%, 83%, and 100%, respectively; these differences were not statistically significant ($p > 0.05$). However, there was a substantial difference ($p < 0.001$) between the PTAs of Groups A, B, and C, which were 48 ± 18 , 58 ± 29 , and 97 ± 23 dB, respectively. Furthermore, Groups A and B did not substantially differ in PTA ($p > 0.05$), whereas Group C showed considerably worse PTA than Groups A and B ($p < 0.01$). Group A showed a decreasing prevalence of EH at the cochlea, saccule, and utricle in 59 (95%), 42 (68%), and 40 (65%) ears, respectively. This was consistent with a decreasing abnormality rate sequence that ran from audiometry (86%), cervical vestibular-evoked myogenic potential (cVEMP) test (55%), to the ocular (oVEMP) test (53%), as shown in Table 1. However, no similar declining tendency was found in Groups B or C. Four (6%) out of 62 EH patients in Groups C and A combined experienced concurrent VS. In contrast, four (18%) of the 22 VS patients in Groups C and B combined had concurrent EH. Group A showed EH on hydrops MRI in all 58 patients (62 ears), with 24 patients showing EH in the right ear, 30 in the left, and 4 in both.

Groups	N (ears)	Audiometry	cVEMP	oVEMP	Caloric	p value ^a
A (MD)	62	86%	55%	53%	40%	<0.001
B (VS)	18	83%	78%	89%	67%	0.550
p value ^b		>0.05	>0.05	0.011	0.044	
C (EH + VS)	4	100%	100%	100%	50%	

EH: endolymphatic hydrops; MD: Meniere's disease; VS: vestibular schwannoma.
oVEMP: ocular vestibular-evoked myogenic potential.
cVEMP: cervical vestibular-evoked myogenic potential.
^a : Cochran Q test;
^b : Fisher's exact or Chi-square test.

Table 1: Comparison of the three groups' inner ear test battery anomaly rates

Discussion: This study found that the prevalence of EH at the cochlea, saccule, and utricle decreased in 59 (95%), 42 (68%), and 40 (65%) of Group A's ears, respectively. This pattern mirrored a decreasing sequence of abnormality rates that ran from audiometry (86%), cervical vestibular-evoked myogenic potential (cVEMP) test (55%), to the ocular (oVEMP) test (53%).³ Similar to this, Meng LC et al. demonstrated that the abnormality rates of the inner ear test battery in Group A (positive EH) showed a significantly declining sequence from the audiometry (100%), cVEMP test (83%), oVEMP test (67%), to the caloric test (33%). The prevalence of EH decreases in order from the cochlea (83%), saccule (50%), to utricle (50%), which was consistent with this decreasing pattern.⁴

Conclusion: The extremely low (6%) occurrence of VS in EH patients suggests that VS in EH patients might be accidental. However, EH was found in 18% of VS patients, which is similar to the 22% of cochlear EH found in VS donors according to histological research.

Hydrops MRI is an effective tool for distinguishing between patients with vestibular schwannoma (VS) and those without endolymphatic hydrops (EH).

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Comparison of High-Intensity Focused Ultrasound and Diode Laser for the Treatment of Inferior Turbinate Hypertrophy

Introduction: Nasal obstruction, often caused by hypertrophy of the turbinates, is a common complaint in otolaryngology, especially in conditions like vasomotor and allergic rhinitis, and affects up to 20% of people globally. While conservative treatments are first-line, surgery is recommended for cases unresponsive to these treatments.¹ The diode laser has become popular for its effectiveness in reducing turbinate size, offering advantages like portability, low cost, and deep tissue penetration. It works by inducing controlled coagulation and ablation, leading to symptom relief with minimal side effects. A newer alternative, high-intensity focused ultrasound (HIFU) turbinoplasty, uses an ultrasonic probe to reduce turbinate size by creating submucosal tissue damage. This technique is minimally invasive, reduces bleeding risks, and can be done on an outpatient basis, offering a promising approach with no significant scarring or side effects. Both diode laser and HIFU provide effective, less invasive options for treating turbinate hypertrophy, with choices depending on individual patient factors and surgeon

preference.² This study was carried out to assess the safety and side effects of diode laser turbinoplasty versus high-intensity focused ultrasound turbinoplasty in the treatment of hypertrophied inferior turbinate.

Methods: In this prospective randomized comparative study, 74 adult patients who complained of nasal obstruction from bilateral inferior hypertrophy were ultimately and randomly assigned to one of two groups: group (A) included 37 patients who received high-intensity focused ultrasound turbinoplasty, and group (B) included 37 patients who received diode laser treatment. Clinical parameters included postoperative pain score, intra- and postoperative hemorrhage, postoperative crusting and synechiae, and healing speed process were studied and compared between the two groups. The Visual Analog Scale (VAS) and the Nasal Obstruction Symptom Evaluation (NOSE) Scale were used to assess nasal obstruction alleviation in both groups. Patients' responses were graded on a 0–4 scale as follows: 0 (no pain with no need for analgesic), 1 (mild pain; needed simple analgesic), 2 (mild pain; needed strong analgesic), and 3 (severe pain; needed narcotic analgesic). Pain scores were evaluated using a questionnaire method for 5 days from postoperative days 0-5.

Results: Following surgery, there were no significant differences in the VAS or NOSE scores between the two groups under study. On the second postoperative day, the mean pain score was substantially higher in group (B) than in group (A). Furthermore, a substantial difference between the ultrasound group (A) and the diode group (B) was noted in terms of the reduction in pain score from postoperative day 0 to day 5 (Figure 1). Group (B) had a greater mean intraoperative bleeding score (2.9 ± 0.7) than group (A) (1.3 ± 0.5). However, there was no significant difference in postoperative bleeding between groups (A) and (B) (P value = 0.521). The mean rate of healing and crusting formation was faster in group (B) than in group (A). During the three-month follow-up, neither group showed any synechiae (0%) at all.

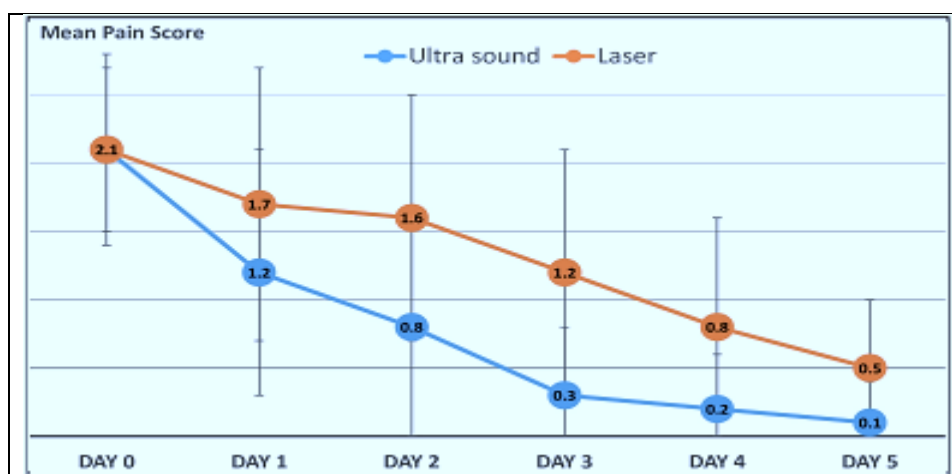


Figure 1. Comparison of the pain scores of the diode laser and ultrasound groups at various treatment intervals from day 0 to day 5 following surgery.

Discussion: In this study, the laser group (B) had a considerably higher mean pain score than the ultrasound group (A). The laser group (B) had a higher mean score for intraoperative bleeding than the ultrasound group (A).² Al-Hilali A et al. conducted a clinical study that used high-intensity ultrasound to treat inferior turbinate hypertrophy and found that 9.3% of patients experienced mild postoperative hemorrhage and 46.5% of patients experienced mild pain. Impaired turbinate hypertrophy-induced short-term nasal blockage can be improved by high-intensity focused ultrasound (HIFU), a dependable and efficient cure.¹ High-intensity focused ultrasound (HIFU) produced benefits comparable to coblation therapy for patients with nasal obstruction caused by inferior turbinate hypertrophy, however, HIFU caused less discomfort during the procedure. For inferior turbinate hypertrophy, HIFU therapy promises to be a good non-invasive substitute for the available surgical techniques.³

Conclusion: High-intensity-focused ultrasound technique was associated with fewer adverse effects than the diode laser technique. However, both methods worked well to relieve nasal blockage brought on by inferior turbinate hypertrophy.

High-intensity focused ultrasonography was found to have fewer side effects and to be an effective treatment for nasal blockage brought on by inferior turbinate hypertrophy.

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Clinical benefit of hyperbaric oxygen therapy in Laryngeal Chondroradionecrosis

Introduction: Laryngeal chondroradionecrosis (LCRN) is a rare but serious complication of radiation therapy for laryngeal cancer, occurring months to years after treatment. It leads to severe morbidity, including aspiration and airway collapse, and can be fatal.¹ Diagnosing LCRN is challenging due to its symptoms such as discomfort, dysphagia, dyspnea, and hoarseness overlapping with those of recurrent malignancy. Radiological imaging and biopsies to exclude cancer are key for diagnosis, though no standardized diagnostic algorithm exists. LCRN severity is categorized using Chandler's classification: Grades I–II: Mild to moderate cases treated conservatively. Grades III–IV: Severe cases requiring intravenous antibiotics, steroids, and potentially a tracheostomy. Although studies on hyperbaric oxygen therapy (HBOT) for LCRN are limited, they may offer benefits in improving tissue oxygenation and healing, warranting further study. Early diagnosis and appropriate management are essential to reduce complications and improve outcomes.² This study was conducted to assess the management of LCRN, including HBOT as a secondary modality, using the experience of a tertiary cancer care facility and relevant literature.

Methods: A total of 678 individuals with irradiated laryngeal carcinoma who were diagnosed with LCRN were included in this retrospective analysis. Every patient with a clinical diagnosis of LCRN had a laryngoscopy every three months and a follow-up PET-CT every 3 to 6 months until their symptoms subsided, and their imaging improved. Information on demographics, clinical characteristics, endoscopic examination results of the larynx, imaging studies, histological reports, original tumor characteristics, radiation doses, management, and LCRN outcomes were collected. Comorbidity was assessed using the Charlson Comorbidity Index (CCI), which generates a summary score by compiling the patient's most serious conditions. The improvement in the final Chandler's grade with HBOT as compared to the initial Chandler's grade upon diagnosis served as the study's main outcome measure.

Results: In this investigation, 29 patients (4.3%) were identified with LCRN. Tracheostomy combined with intravenous steroids and antibiotics was the most often used primary care (59%). Laryngeal examination revealed vocal cord fixation in 14 patients (48%), laryngeal ulceration in 6 patients (21%), laryngeal blockage in 17 patients (59%), and substantial laryngeal edema in 22 patients (76%). There was no sign of recurrence or residual cancer in any of the pathology findings, which only showed laryngeal necrosis, ulceration, subepithelial fibrosis, inflammatory alterations, and edema. Six patients had total laryngectomy (21%), while 10 patients received HBOT (34.5%). Patients receiving HBOT were more likely than those not receiving HBOT to see an improvement in Chandler's grade (90% vs. 29%; $p = 0.005$). Figure 1 displays the improvement in Chandler's grade for patients with and without HBOT. Chandler's grade improved considerably from a median of 4 (range 2–4) to 2.5 (range 1–4; $p = 0.005$) in patients treated with HBOT.

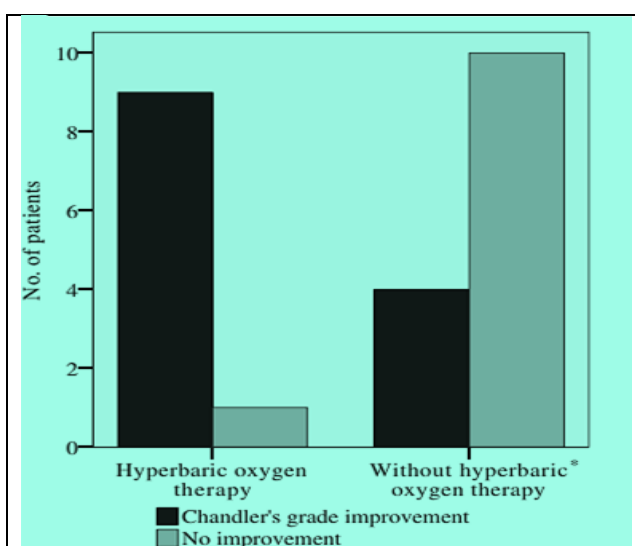


Figure 1. Improvement in Chandler's grade for patients with and without HBOT. (*) Prior to surgery, patients who had a total laryngectomy without HBOT were excluded.

Discussion: Gessert TG et al. identified that LCRN is a rare complication of radiation to the larynx, although it can have serious implications. The diagnosis is complicated and should involve a combination of clinical examination, PET imaging, and pathologic diagnosis. Patients with persistent alcohol or tobacco use or those whose original tumor has invaded cartilage should raise suspicions of LCRN. It is important to get the diagnosis as soon as feasible and to use treatment and constant monitoring to assist in maintaining laryngeal function.¹ According to this study, patients with LCRN who do not respond to steroids and antibiotics may benefit from HBOT, which may also enable decannulation in tracheostomy-dependent patients.² According to Ahmadi A et al., chondroradionecrosis is a consequence of chemoradiation therapy that might be difficult for ENT surgeons to address in patients with laryngeal cancer. Myocutaneous flap transposition combined with a cartilage graft from the nasal septum may be regarded as an appropriate surgical treatment for thyroid cartilage defects.³

Conclusion: LCRN is a rare radiation consequence that presents difficulty for both diagnosis and treatment. Initial Chandler's grade IV is more likely to occur in patients whose laryngeal tumor has invaded their cartilage. HBOT can be a helpful treatment for LCRN patients who do not react to antibiotics or steroids, and it may enable decannulation in tracheostomy-dependent patients.

Hyperbaric oxygen therapy (HBOT) can be recommended to laryngeal chondroradionecrosis (LCRN) patients as a second line of treatment that could enhance their quality of life.

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Salmonella Enteritidis Sinusitis: An uncommon case

Introduction: Salmonella is a class of gram-negative bacteria with several serotypes that mostly cause diarrheal sickness in humans by the consumption of infected food products, particularly poultry and eggs. The pathogens cause a wide range of diseases and contribute significantly to morbidity and mortality on a global scale.¹ Nontyphoidal salmonella is a common cause of gastroenteritis, but it can also cause bacteremia and extraintestinal infections, such as meningitis (more common in children and infants), urinary tract infections, endovascular infections (like endocarditis and infected aneurysms), and infections of the bones or bone marrow (like osteomyelitis and septic arthritis). However, ENT problems are rare. There have only been three documented occurrences of Salmonella sinusitis in humans in the literature. This case is the first documented case of Salmonella Enteritidis sinusitis and offers an in-depth examination of a rare and unusual occurrence. Furthermore, it investigates the possible causal link between her kombucha use and sinusitis, providing information on the potential pathway of transmission. This instance emphasizes the necessity for more study into uncommon transmission pathways and the significance of taking atypical infections like Salmonella into account when treating sinusitis, especially in immunocompromised persons.²

Case presentation: A 77-year-old female patient admitted to the hospital with a history of dyslipidemia complained of increased right facial puffiness and pain one month after a dental operation. Upon examination, the right cheek was swollen, and the infraorbital area was also heated, red, and indurated. There was no visible intraoral swelling or discharge observed, and facial feeling, vision, or extraocular motions were all unaffected. A CT scan of the face revealed a heterogeneous tumor in the right maxillary sinus, which had destroyed the right lateral maxillary wall and extended into the right orbital floor, pre-antral fat, buccal, and masticator regions (Figure 1). A right frontal sinus mucocele and an abscess were also discovered in the right buccal area. Mucopus was seen in the right middle meatus during nasoendoscopy. The patient underwent a biopsy of the lesion in her right maxillary sinus and had endoscopic sinus surgery on her right



Figure 1: CT scan of the face

side. Following surgery, pink frond-like tissue filled the right maxillary sinus, and white-grey concretions with mucopus were observed (Figure 2).

The empirical initiation of ciprofloxacin was followed by the examination of tissue samples and swab cultures. Histology showed regions of invasive squamous cell carcinoma (SCC) together with squamous dysplasia. MRI revealed a $4.4 \times 3.5 \times 3.1$ cm hypointense mass in the right maxillary sinus, destroying the anterior and lateral maxillary walls and extending into the pre-antral fat, buccal, and masticator spaces (Figure 3). Laterally, erosions of the inner aspect of the right zygomatic arch and involvement of the right temporalis muscle are observed. The infraorbital canal is involved in the erosion of the right orbital floor on the superior side, and the right inferior rectus muscle is extended into the right orbit without being visibly involved. Additionally, the right pterygopalatine fossa is involved posteriorly. After receiving a diagnosis of stage IVA cT3N2bM0 right maxillary sinus SCC, she had a total maxillectomy, neck dissection, reconstruction using a free anterolateral thigh flap, and adjuvant radiation therapy; as of right now, there has been no recurrence. There were both anaerobic and aerobic cultures of intraoperative tissue taken from the patient's right maxillary sinus.

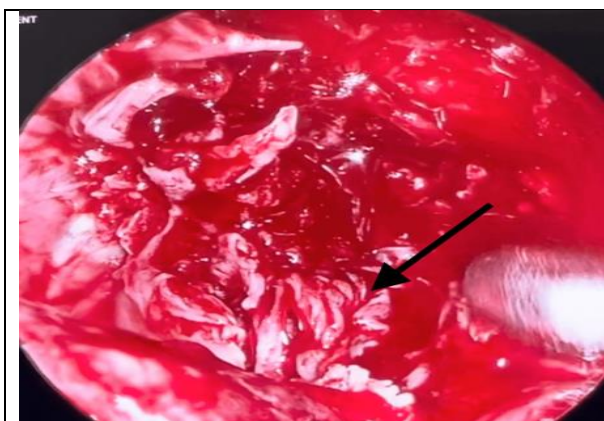


Figure 2: Endoscopic image of the right maxillary sinus

Using matrix-assisted laser desorption/ionization-time of flight mass spectrometry, the bacterium was determined to be *Salmonella* species. The organism was determined to be *Salmonella enterica* serovar Enteritidis by serotyping using *Salmonella* antisera. Eight days of empirical intravenous amoxicillin/clavulanic acid treatment were followed by six weeks of ciprofloxacin. Ciprofloxacin was chosen due to its superior penetration into the sinus region and smaller spectrum. Because inflammatory markers continued to be raised and the patient was receiving therapy for sinusitis with abscess formation while awaiting additional resection for final source control, it was determined that prolonged antibiotic treatment was required. Because of the increased swelling of the cheeks, metronidazole was added at the end of the six-week period to empirically cover anaerobic bacteria, which are common pathogens that originate from the oral cavity.

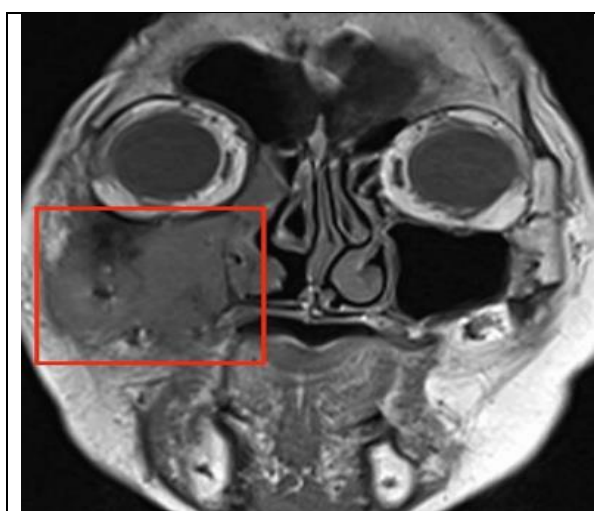


Figure 3: T1-weighted coronal MRI

Discussion: Only three previous cases of Salmonella sinusitis have been documented in the literature, making it a very uncommon condition. Because of the close anatomical proximity between the sinuses and the oral cavity, the prior dental operation is probably the risk factor for odontogenic sinusitis. However, the common pathogen is typically found in the oral flora, which includes anaerobes such as Peptostreptococcus species, Fusobacterium nucleatum, and Propionibacterium acne, as well as alpha-hemolytic Streptococcus, microaerophilic streptococci, Staphylococcus aureus, and Streptococcus pyogenes.² S. enteritidis was discovered in the blood culture, which confirmed the diagnosis, which was based on elevated cardiac enzymes and inflammatory markers, the ECG results, and the echocardiography. Because S. enteritidis bacteremia is more common in immunocompromised patients, screening for immune dysfunction appears to be appropriate.³

Conclusion: This is an uncommon instance of Salmonella Enteritidis sinusitis associated with right maxillary sinus squamous cell cancer. These findings highlight the significance of addressing atypical presentations in clinical practice. There are extremely few documented examples of salmonella causing sinusitis, making it a highly uncommon and poorly understood cause.

Salmonella Enteritidis sinusitis is an extremely rare and atypical cause of sinusitis, often associated with traditional risk factors like contaminated food, water, or animals.

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