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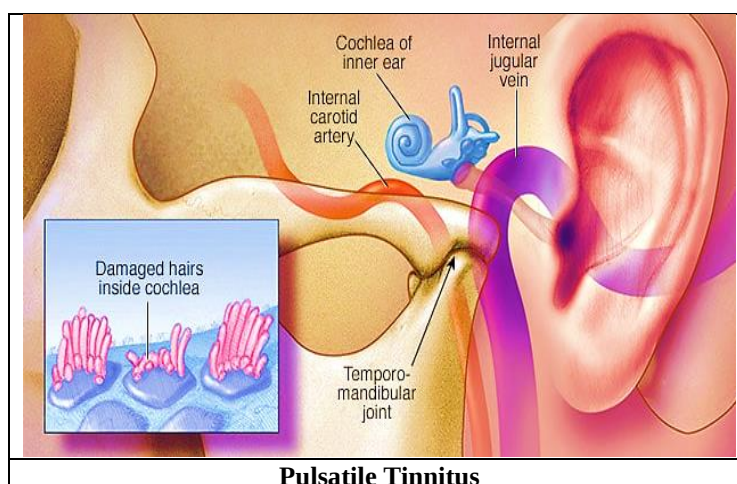
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Clinical outcomes of Sigmoid Sinus Resurfacing (SS-R) and efficacy of the water occlusion test (WOT)

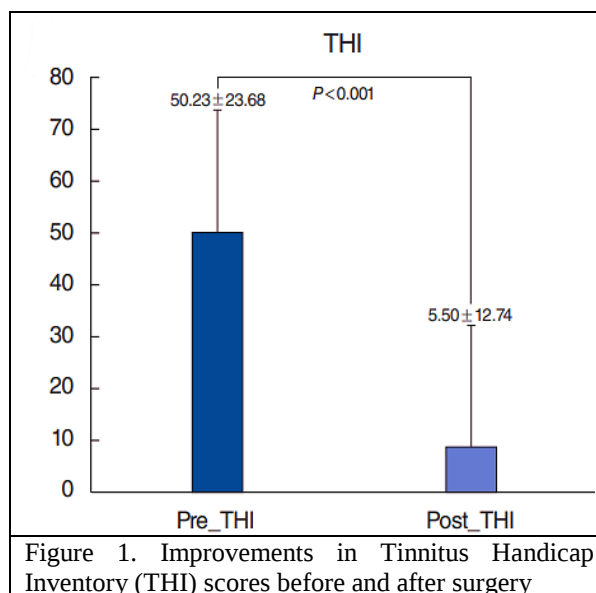
Introduction: Tinnitus is a common auditory condition defined by persistent perceptions of sound inside the ear or head in the absence of external sound or electromagnetic stimulation. Tinnitus affects around 10% to 15% of the world's population, with 10% of those affected experiencing life-threatening symptoms.¹ Tinnitus can be classified into two groups: objective and subjective. According to its source, objective tinnitus is further divided into vascular and non-vascular types.



About 10 percent of cases of tinnitus are caused by vascular tinnitus, commonly known as pulsatile tinnitus (PT). There is a chance for symptom alleviation through surgical therapy in up to 92% of PT cases that have recognized underlying reasons. Significant vascular wall anomalies in the temporal bones are one of the reasons for PT. Prior to undergoing surgery to treat PT, it is important to accurately diagnose the underlying anatomical abnormalities. A combination of history taking, physical examination, laboratory testing, audiology testing, imaging examination, ultrasonography, and the water occlusion test (WOT) can be used for diagnosis.² In order to identify the best surgical approach for vascular wall abnormalities causing PT, this study aimed to evaluate the outcomes of PT surgeries and assess the effectiveness of WOT as a potent supplementary diagnostic tool when combined with temporal bone computed tomography (TBCT).

Methods: A total of 26 patients who had sigmoid sinus resurfacing (SS-R) surgery were included in this retrospective analysis. TBCT and WOT were used for pre-operative evaluation in order to determine suitable surgical techniques and gather information about anatomical variances. Subjective outcomes were compared using the Tinnitus Visual Analog Scale (VAS), loudness (LD), awareness (AW), annoyance (AN), effect on life (EF), and Tinnitus Handicap Inventory (THI) scores from a tinnitus questionnaire; objective pre- and postoperative outcomes were compared using pure tone audiograms. The primary and secondary outcomes were analysed based on the VAS LD score and the THI score, respectively.

Results: In this study, seven patients (26.9%) showed considerable improvement, five patients (19.2%) stayed stable, and fourteen patients (53.8%) were fully cured. Following SS-R surgery, the mean blindness score on the visual analog scale reduced from 5.26 to 1.34 ($P < 0.001$), and the mean score on the Tinnitus Handicap Inventory likewise increased from 50.23 to 5.5 ($P < 0.001$) (Figure 1). WOT showed a substantial additive effect in predicting surgical outcomes in 10 individuals whose preoperative TBCT and intraoperative findings disagreed. Over the course of the follow-up period, no patient suffered serious problems during or after surgery. Based on two patients' favorable WOT results, SS-R was carried out, and the results showed one complete resolution and one significant improvement.



Discussion: In this research, pure-tone audiograms revealed that 13 patients had pseudo-low frequency hearing loss (LFHS) in the ipsilesional ear (i.e., an ipsilateral hearing threshold above 10 dB HL at both 250 and 500 Hz, or higher than 20 dB HL at either 250 or 500 Hz contrasted with the contralateral side). In 12 patients, the hearing threshold improved. Pulsatile tinnitus can be effectively treated with sigmoid sinus resurfacing in combination with the outcomes of the water occlusion test.¹ Lee SY et al. showed that preoperatively, 6 (30%) of the 20 patients with right-sided PT had ipsilateral pseudo-LFHL. The mean pure-tone threshold in these six individuals at 250 Hz after treatment demonstrated a statistically significant improvement over the mean threshold in the ipsilateral region before therapy. Pre- and postoperative PT did not differ in the other 14 patients. Both objective and subjective measures show that surgical therapy of PT from sigmoid sinus diverticulum (SS-Div) and sigmoid sinus dehiscence (SS-Deh) is effective.³

Conclusion: The current study concludes that patients with sigmoid sinus dehiscence who had a positive WOT and no other sigmoid sinus variants experienced significant symptom reduction after using the SS-R. For better surgical outcomes among patients with PT due to sigmoid sinus variations, a comprehensive diagnostic strategy that includes TBCT, WOT, and intraoperative observations is required.

Pulsatile tinnitus can be effectively treated with sigmoid sinus resurfacing in combination with the outcomes of the water occlusion test. The results of sigmoid sinus diverticulum obliteration and emissary vein ligation improve pulsatile tinnitus surgery.

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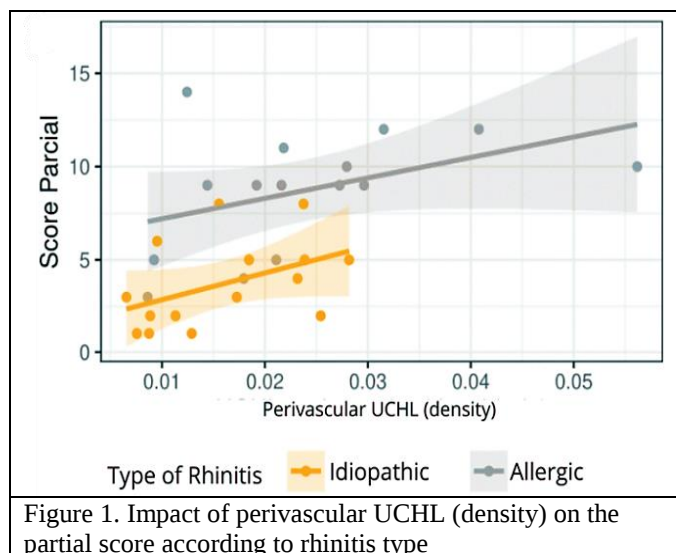
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Evaluation of perivascular innervation and nerve growth factor (NGF) in allergic rhinitis (AR) and idiopathic rhinitis (IR)

Introduction: Allergic rhinitis (AR) is one of the most common chronic respiratory disorders, with a significant financial impact on the adult and pediatric populations. The quality of life significantly worsens for those with severe rhinitis. Allergic rhinitis is a type I hypersensitivity reaction defined by inflammation and the presence of eosinophils, immunoglobulin E (IgE), and inflammatory mediators that cause the symptoms. Nonspecific hyperreactivity (NHR) is associated with many neuronal alterations in the nasal mucosa and is seen in both allergic and nonallergic rhinitis (NAR).¹ NAR is described as a symptomatic inflammation of the nasal mucosa that is accompanied by at least two nasal symptoms, such as nasal obstruction, rhinorrhea, sneezing, and/or an itchy nose, but does not show any signs of endonasal infection or systemic sensitization to inhaled allergens. NAR symptoms can fluctuate in severity and can be persistent or triggered by exposure to unspecific causes, also known as nasal hyperresponsiveness. Patients with NAR who do not have a known cause for their symptoms, referred to as idiopathic rhinitis (IR) patients, can make up as many as 50% of the patient population. The presence of NHR is the primary characteristic of IR patients.² It is still unclear whether neurological mechanisms underlie AR and NAR. According to recent research, neurotrophins, neuropeptides, nerve fibers, and sodium channels all exhibit increased neural activity in the nasal mucosa of AR patients, which is linked to nonspecific hypersensitivity.¹ So, the purpose of the current investigation is to determine if nerve growth factor (NGF) and perivascular innervation are associated with the severity of clinical symptoms in AR and IR.

Methods: A total of thirty patients aged 18 to 50, who had been diagnosed with chronic rhinitis for more than three years and had a clinical history and physical examination indicating the need for inferior turbinectomy whether or not it was combined with septoplasty were recruited for this prospective study. Based on their acute hypersensitivity skin test results for inhalants, physical examination results, and nasal cytology, and clinical history, patients were categorized as belonging to either the AR or IR groups. A score was assigned to the patients based on their symptoms and indicators. The factors that served as initial predictors and outcome variables were the following: eosinophils per field, mast cells per field, tissue Ubiquitin C-terminal hydrolase L1 (UCHL) (density), perivascular UCHL (density), NGF (density), gender, age, age at disease beginning, types of rhinitis, and tissue UCHL (density).

Results: The AR group had a higher score for the signs and symptoms. The AR group exhibited a higher concentration of NGF in the cytoplasm of inflammatory cells within the submucosa. There was no variation in the distribution of nerve fibers between the groups; they were primarily found in the subepithelial, glandular, and vascular sections of the tissue. The predictors that remained in the multiple linear regression model to confirm which factors would be linked with disease severity were gender, kind of rhinitis, and perivascular UCHL (density). Figure 1 depicts the impact of rhinitis type and perivascular UCHL predictors on the partial score. A higher score for signs and symptoms was linked to more perivascular innervation.



Discussion: There was no variation in tissue eosinophils in the current investigation. Eosinophils are the primary inflammatory cells implicated in allergic rhinorhinitis (AR), but they can also be found in other forms of rhinitis. The presence of such NAR subtypes that nasal cytology may not have noticed could therefore account for the high number of mast cells in the IR group and the lack of differences in eosinophils.¹ Ramirez GA et al. revealed as effector immune cells oriented to host defense and as modulators of the form of innate and adaptive immunological responses, eosinophils are essential for maintaining immune homeostasis. Moreover, they have a role in the regulation of certain non-immunocompetent tissues functional homeostasis and may even be implicated in tissue regeneration. In order to protect the host from bacterial, viral, fungal, and parasitic infections, an elaborate signalling network centered on eosinophils is triggered by inflammatory stimuli. This network includes Th2 lymphocytes, B cells, mast cells, circulating platelets, and cells that reside at sites of inflammation.³

Conclusion: The current study concludes that NGF produced by inflammatory cells of the submucosa drives the growth of perivascular innervation in rhinitis, resulting in worsening clinical symptoms, particularly in AR.

Allergic rhinitis patients had higher levels of nerve growth factor in the cytoplasm of inflammatory cells in the submucosa.

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Aspects of gastroesophageal reflux disease (GERD) related persistent cough in individuals with laryngopharyngeal reflux

Introduction: Reflux of stomach contents into the esophagus or beyond, into the lung or oral cavity (including the larynx), is known as gastroesophageal reflux disease (GERD). Both esophageal and extraesophageal symptoms are caused by GERD. Laryngopharyngeal reflux (LPR) is the term used to describe the condition in which stomach contents bypass the upper esophageal sphincter (UES). Laryngopharyngeal reflux disease (LPRD) is the term used to describe the symptoms and indicators associated with LPR.¹ A few investigations found that chronic coughing was also caused by LPR. The symptoms of gastric reflux illness that are not related to the esophagus include clearing of the throat, hoarseness, breathing problems, and globus hystericus. The reflux symptom index (RSI) questionnaire is a non-invasive, reliable, and successful method for evaluating LPR. Different symptoms distinguish LPR from gastroesophageal reflux disease (GERD), which is also a unique type of gastroesophageal reflux disease that produces a chronic cough.² This study aimed to enumerate the features of laryngopharyngeal reflux in individuals suffering from GERD-related persistent coughs.

Methods: A total of 44 individuals with cough durations ranging from two months to ten years were included in this retrospective analysis. There were then twenty-one men and twenty-three women. The RSI was used to assess each patient's symptoms. Reflux finding scores (RFSs) were calculated for each patient after a transnasal rhino-laryngo video scope examination. In addition, oropharyngeal pH monitoring (also known as Dx-pH monitoring) was performed on each patient. The monitor system gathered all LPR occurrences and determined the final Ryan score at the end of the 24-hour monitoring period. The Ryan score appeared to be abnormal and signified serious acid reflux when it was ≥ 9.41 for the upright score and ≥ 6.80 for the supine score. Subsequently, oropharyngeal pH values below 6.5 were computed after the monitor's baseline was adjusted to 6.5.

Results: The mean duration of a persistent cough was 29.60 (29.60 $\pm$ 37.60) months. Every patient reported at least two symptoms of laryngopharyngeal reflux disease (LPRD) in addition to coughing, and their RSI averaged 15.66 (15.66 $\pm$ 6.33). The most common symptoms were postnasal drip, increased phlegm, coughing, and throat clearing. Upon examination with the rhino-laryngo videoscope, every patient had indications of LPRD. Their RFSs varied from 5.5 to 17, with an average of 10.89 (10.89 $\pm$ 2.81). Diffuse laryngeal edema, posterior commissure hypertrophy, and erythema or hyperemia/vocal cord edema were the most common symptoms (Table 1). RFS and/or RSI abnormalities were present in 42 individuals (42/44, 95.45%). Oropharyngeal pH monitoring revealed 10 individuals (10/44, 22.72%) with abnormal Ryan scores.

Signs	Subglottic edema	Ventricular obliteration	Erythema/hyperemia	Vocal cord edema	Diffuse laryngeal edema	Posterior commissure hypertrophy	Granuloma	Thick endolaryngeal mucus
Number of patients	38	32	43	43	40	41	3	11
Percentage of patients (%)	86.36	72.73	97.73	97.73	90.91	93.18	6.82	25.00

Table 1. The percentage of patients with each LPRD sign

Discussion: There were only six patients with reports of a gastroscopy in this investigation. Three patients suffered from superficial gastritis, two from non-atrophic gastritis, and one from atrophic gastritis. There were two cases of reflux esophagitis. Most patients had a reduction in both their LPRD symptoms and chronic cough following treatment with proton pump inhibitors (PPIs).¹ Yu Y et al. revealed that individuals with GERD who had higher RSI scores would exhibit greater gas reflux, non-acid reflux, and proximal reflux. The PPI group with RSI <19 had greater efficacy at a routine dosage when combined with prokinetic drugs than the RSI $\geq$ 19 group.² According to Li X et al., proximal acid reflux (reflux theory) and distal reflux-reflex (reflex theory) may function in coordination when persistent coughs caused by GERD, with the latter playing a larger role. GERD-related cough can also result in reflux, and vice versa,

creating a vicious cycle of reflux, cough, and reflux. This ultimately exacerbates reflux and coughing, leading to an uncontrollable cough.³

Conclusion: The current investigation concludes that all of the patients with GERD-induced chronic coughs also exhibited LPRD symptoms and signs. The majority of them might be identified as having suspicious LPRD because they had abnormal RSI and/or RFS. Dx-pH monitoring revealed that some patients experienced LPR episodes, the majority of which happened while the patient was in upright position. The majority of patients with GERD-induced chronic cough may have simultaneously suspected LPRD, and cough was one of their LPRD symptoms.

Regular laryngoscopy examination of the pharynx and larynx were recommended for individuals with chronic coughs, particularly those who do not exhibit symptoms of GERD.

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Case report on primary laryngeal histoplasmosis

Introduction: Histoplasma capsulatum (*H. capsulatum*) is an intracellular fungus that causes primary laryngeal histoplasmosis, an extremely rare infection. The organism is often spread through the pulmonary system and is strongly linked to the involvement of other organs.¹ Granulomatous inflammation is the result of histoplasmosis, which is contracted by breathing in soil contaminated with bat or bird droppings. There is a wide range in the clinical presentation of histoplasmosis. Patients may exhibit life-threatening disorders, chronic diseases, or subclinical diseases, or they may be asymptomatic.² Many clinicians find it difficult to diagnose this condition because of its characteristics, which closely resemble laryngitis or laryngectomy. Histoplasmosis typically affects immunocompromised patients and is typically transmitted by inhaling fungal spores.¹ This case report aimed to provide information on the uncommon occurrence of primary laryngeal histoplasmosis that primarily affects the lungs, along with the diagnostic challenge and the antifungal treatment used in the current case.

Case presentation:

A 47-year-old male individual complained of hoarseness for 5 months. Along with these symptoms, he also has a persistent dry cough, odynophagia, and an occasional fever. Over the past five months, he had lost over 20 kg of weight and experienced a loss of appetite. After taking more history, it was discovered that the patient had recently been diagnosed with diabetes mellitus, but he was not taking his medicine as prescribed. Due to his pigeon breeding, the patient has been exposed to bird droppings for an extended period and also has a history of smoking. There was no stridor, and he does not appear to be in clinical respiratory distress. Patient voices appear to be hoarse. A palpable lymph node measuring 1x1 cm, firm, non-tender, mobile, and well bordered was found over the right level II region during a neck examination. Flexible nasopharyngolaryngoscopy revealed an inflammatory lesion on the laryngeal surface of the epiglottis, bilateral false cords, and edematous arytenoids.



Figure 1. Direct laryngoscopy image of an irregular exophytic lesion on the lingual and laryngeal surfaces of the epiglottis, as well as bilateral false cords and arytenoids.

After performing a computed tomography (CT) scan of the neck, thorax, and pelvis, the results revealed an enlarged cervical lymph node at right cervical level II, an enhanced and slightly irregular laryngeal wall, bilateral lung cavities with centrilobular nodules, and a hypodense area inside the spleen that might be a local infarct. Under general anesthesia, direct laryngoscopy revealed an irregular exophytic lesion throughout the lingual and laryngeal surfaces of the epiglottis, as well as bilateral false cords and arytenoids (Figure 1). From the exophytic lesions, a biopsy was collected. Histopathological analysis revealed patches of inflammatory fibrocollagenous tissue with stratified squamous epithelium that was focally ulcerated. No patches of caseous necrosis are observed. There was no cancer present. Histoplasmosis was recovered from culture, and budding yeasts were identified using Grocott's methenamine silver and periodic acid-Schiff stains (Figure 2).

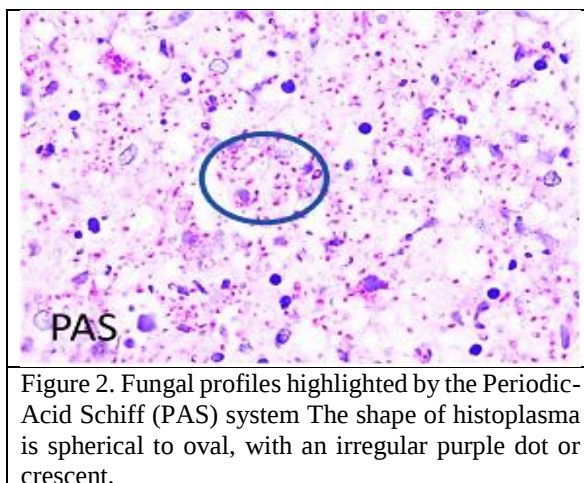


Figure 2. Fungal profiles highlighted by the Periodic-Acid Schiff (PAS) system. The shape of histoplasma is spherical to oval, with an irregular purple dot or crescent.

The patient received oral itraconazole 200 mg three times a day for two months after starting intravenous (IV) amphotericin B at 0.5 mg/kg/day for two weeks, as advised by an infectious disease specialist. Repeated flexible nasopharyngolaryngoscopy revealed the laryngeal lesions were healing, and the patient's clinical complaints were improving by the time of follow-up.

Discussion: Histopathological analysis in the present case revealed patchy foci of ulcerated stratified squamous epithelium overlying inflammatory fibrous collagenous tissue. Histoplasmosis was isolated from culture, and budding yeasts were identified using Grocott's methenamine silver and periodic acid-Schiff staining. The patient was treated with IV amphotericin B and oral itraconazole.¹ The evaluated pathologist described a severe, diffuse, persistent granulomatous inflammation linked to histoplasmosis in the biopsy sample. It was discovered that the material included tiny bacteria that were compatible with *H. capsulatum*. Strong positive results were obtained for Gomori methenamine silver (GMS) and periodic acid-Schiff (PAS) staining. After receiving oral itraconazole treatment, the patient's oral lesions disappeared.³

Conclusion: Primary histoplasmosis of the larynx was thought to be a very uncommon event. The laryngeal lesion may resemble illnesses such as laryngeal cancer and laryngeal tuberculosis. Antifungal therapy is the preferred course of treatment, and histopathology testing is still the gold standard for identifying histoplasmosis.

Laryngeal histoplasmosis is treated with antifungal medication, with histopathology testing being considered the gold standard. Regarding laryngeal masses, the otolaryngologist should be aware of this condition's occurrence and treat it as a differential diagnosis.

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