Vol 1| Issue 2|2022

Dear Doctor,

Greetings from Micro Labs limited. We are happy to bring you "ENT BB Connection" which contains latest and interesting news.

Inside This Issue:

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Ltd

ENT_BB CONNECTION

Vol 1| Issue 2|2022

The effects of COVID-19 on audiovestibular system with TOAE, DPOAE, vHIT and caloric test.

Hearing loss may be due to the effect of the virus directly on the inner ear, or due to an indirect effect through immune mediated system.[1] Presumed mechanism of virally induced sensorineural hearing loss includes: Direct invasion and damage of inner ear layer, (including the organ of Corti and the vestibulocochlear nerve) immune mediated damage and inflammation and reactivation of latent virus within the inner ear. Viruses can infect the middle ear and typically cause conductive hearing loss due to a middle ear effusion.[2] It has been reported that COVID- 19 may cause vertigo and hearing loss, but the mode of actions are not clear.[1] Since the microcirculation of cochlea is vulnerable to thrombotic events, cochleovestibular symptoms may also be associated with thrombovascular events.

Audio vestibular symptoms may not have been documented in patients with more severe morbidity or in those succumbing to their infection; moreover, there is the possibility that patients with sudden isolated Sensorineural hearing loss or mild vestibular symptoms may have avoided in-person evaluation because of concerns about becoming infected with SARS-CoV-2.[2] Several trials have been performed in order to clarify the relationship between otologic symptoms and SARSCOV-2 infection. However, the lesser severity of these symptoms, the difficulty in performing objective tests during the acute phase of the disease and data collection in a truly representative sample of the population have interfered with their quality. That's why the real prevalence of hearing loss, tinnitus and dizziness in patients with COVID-19 is unknown.[3]

This study aimed to investigate the effects of COVID-19 on cochleovestibular system with audio vestibular tests. This prospective case control study enrolled 24 patients of 18 to 65 years' old with mild to moderate COVID-19 and 24 healthy age and sex-matched controls. No patients had any history of neuro-otologic disorders, ototoxicity, or chronic systemic conditions including diabetes mellitus and Autoimmune disorders. Patients received favipiravir p.o. 1600 mg/day on the first day, then 600 mg bid. for 4 days and enoxaparin 1 mg/day subcutaneously as the standard of care. The patients and the controls were evaluated with audio vestibular and the tests was performed 2 weeks after the positive SARS-CoV-2 PCR. On audiometry, the pure tone averages of the COVID-19 patients were found to be higher than the controls (Fig 1). The amplitudes of TEOAEs were significantly lower in the patients compared to the controls at 4 kHz and 5 kHz ($P < .01$).Except for the amplitudes at 4 kHz and 5 kHz,the Transiently Evoked Distortion Otoacoustic Emissions (TEOAE) amplitudes of the patients and the controls were similar . On vestibular tests,there was no significant difference between the caloric test results of the patients and the controls was identified (Fig 2). On video head impulse testing,

amplitudes of right semi-circular canal were observed to be significantly lower in COVID-19 group compared to the control group.

Fig 1:Pure tone audiometry results of COVID-19 patients and

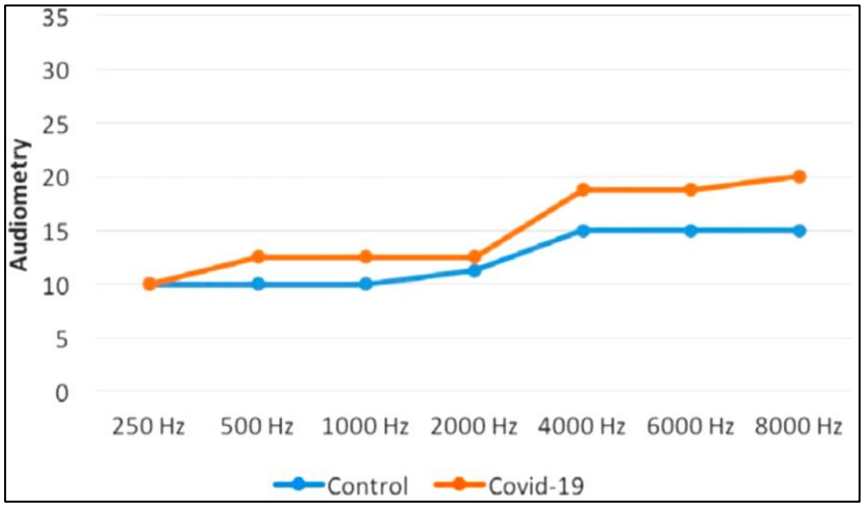
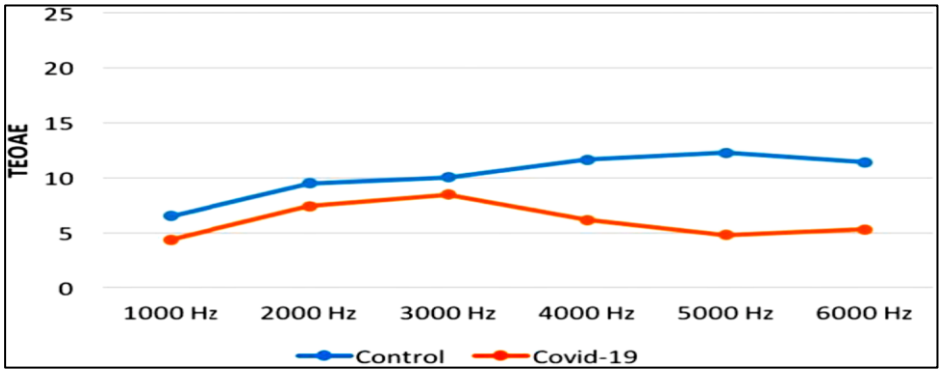


Fig 2: The results of transient evoked otoacoustic emissions in COVID-19 patients and the controls.



COVID-19 can cause multi-organ failure possibly to inflammatory reactions or coagulopathy disorders.[4] It is also known that some viral infections may cause labyrinthitis and vestibular neuritis. The audio vestibular effects of COVID-19 have been observed and Its effect on the cochlea was reviewed by Fancello et al. and Beukes et al. reviewed the audiological symptoms of COVID-19, and reported the tinnitus rate as 8%.[5,6] A study conducted by Mustafa et al.[7] reported that elevated pure tone averages and decreased transient evoked otoacoustic emissions amplitudes. The results of this study are comparable with the results of previous studies, Unlike the studies mentioned above, Dror et al.[8] compared asymptomatic COVID-19 patients with a healthy group using transient evoked otoacoustic emissions, distortion product otoacoustic emissions, and ABR, and did not observe any significant differences between the groups. However, their study group consisted of 12 cases who had asymptomatic SARS-CoV-2 infection. It may be supposed that different results may be obtained due to the inclusion of different patient groups into the study, and few number of patients may also affect the results.

Conclusion: COVID-19 may affect inner ear functions causing a subtle damage in the outer hair cells and lateral semi-circular canals. It must be kept in mind that COVID-19 may cause cochleovestibular problems.

References

1. Jeong M, et al. Direct SARS-CoV-2 infection of the human inner ear may underlie COVID-19-associated audiovestibular dysfunction. Communications medicine. 2021 Oct 29;1(1):1-4.
2. Jeong, M., Ocwieja, K.E., Han, D. *et al.* Direct SARS-CoV-2 infection of the human inner ear may underlie COVID-19-associated audiovestibular dysfunction. *Commun Med* **1,** 44 (2021)
3. Bento RF, Campos TV. Hearing Loss, Tinnitus, and Dizziness and their Relation with Covid-19: what is the Current Evidence? International Archives of Otorhinolaryngology. 2022 Jan;26(01): e001-2.
4. Jose RJ, Manuel A. COVID-19 cytokine storm: the interplay between inflammation and coagulation. Lancet Respir Med.2020 Jun;8(6):e46-e47.
5. Fancello V, Hatzopoulos S, Corazzi V, Bianchini C, Skar˙zy´nska MB, Pelucchi S, et al. SARS-CoV-2 (COVID-19) and audiovestibular disorders. Int J Immunopathol Pharmacol. 2021;35:20587384211027373.
6. Beukes E, Ulep AJ, Eubank T, Manchaiah V. The Impact of COVID-19 and the pandemic on tinnitus: A systematic review. JClin Med. 2021;10(13):2763.
7. Mustafa MWM. Audiological profile of asymptomatic Covid-19 PCR-positive cases. Am J Otolaryngol. 2020;41:102483
8. Dror AA, Kassis-Karayanni N, Oved A, et al. Auditory performance in recovered SARS-COV-2 patients. Otol Neurotol.2021;42(5):666.

ENT_BB CONNECTION

Vol 1| Issue 2|2022

The Mechanism of Endolymphatic Sac-Mastoid Shunt Surgery in the treatment of Meniere's disease.

Until Gadolinium enhanced inner ear MRI was introduced, endolymphatic hydrops was diagnosed only by histopathological examination after death. Using intratympanic Gadolinium injection, a 3-T MRI scan showed the first distinct images of endolymphatic hydrops in a patient with Meniere's disease in 2007. Endolymphatic sac surgery (Portmann in 1927) has been used to treat patients with medically refractory Meniere's disease. Technical details of sac surgery can differ and include decompression of the sac, placement of a shunt between the endolymphatic sac and cerebrospinal fluid space, and placement of a shunt between the endolymphatic sac and the mastoid air cells. Endolymphatic sac shunt process became popular, following the success of the House's subarachnoid shunting procedure.[1]

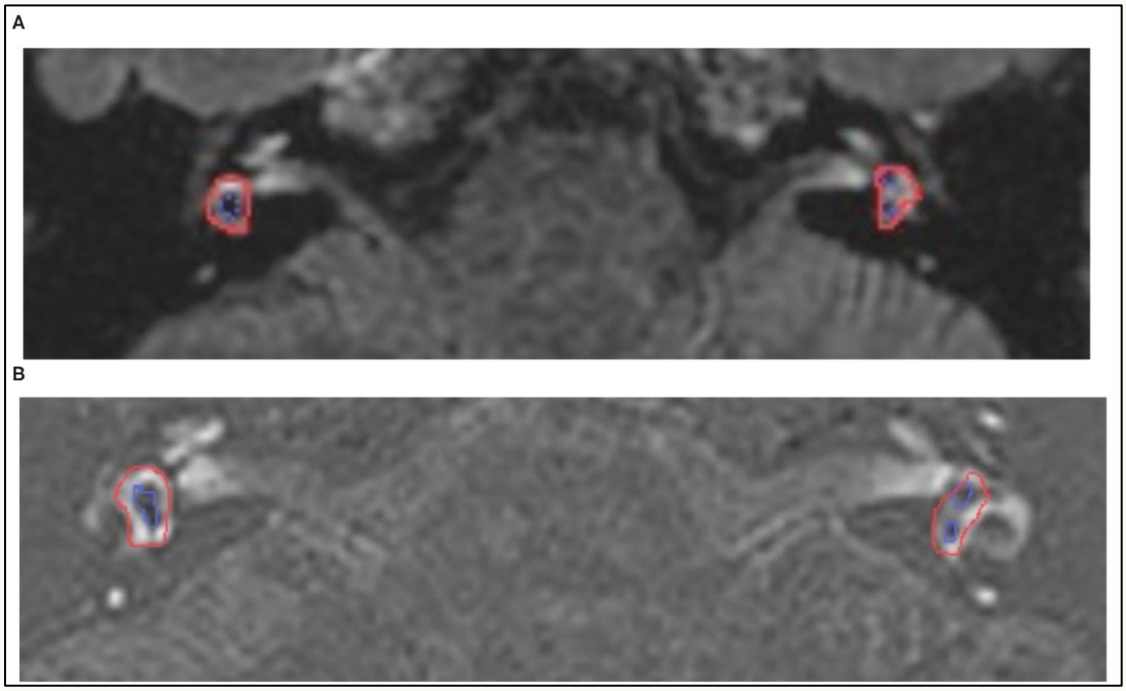
Meniere's disease is the most common causes of otologic dizziness. Symptoms of Meniere's disease include episodic dizzy spells lasting 20 minutes to 24 hrs, tinnitus full sensation in the ears, and sensorineural hearing loss. The complete constellation of symptoms is not seen in every patient. Patients who have frequent major dizzy spells despite medical therapy, a variety of other kinds of interventions are available, including intermittent pressure therapy, intratympanic injections (corticosteroids and gentamicin sulfate), endolymphatic sac procedures, labyrinthectomy, and resection of the vestibular portion of 8th cranial nerve. Endolymphatic sac surgery has been considered as an important treatment modality for many years, although sac surgery is an operative procedure, it is a non-destructive to the patient's hearing and balance organs and can be usually performed on an outpatient basis.[2]

By comparing the imaging results before and after endolymphatic sac-mastoid shunt surgery, this study aimed to find out the mechanism by which it shows its effectiveness in vertigo control.
This experiment study enrolled 19 patients with intractable Meniere's disease who underwent 3D fluid attenuated inversion recovery MRI with a 3-Tesla unit 6 hours after IV administration of gadolinium, before Endolymphatic sac-mastoid shunt, and 2 years after the surgery. The enhanced perilymphatic space in the bilateral cochlea, vestibule, and canals was observed and compared with that in the endolymphatic space by scoring the scala vestibule of the cochlea and by finding out the developing area of the vestibules quantitatively. Gadolinium was found in every patient's perilymph of the inner ear in the cochlea, vestibules, and canals. Around, 14 patients had vertigo control, at the 2-year follow-up. Before surgery and 2 years after surgery, significant differences were observed in the scala vestibuli scores and the area of vestibular perilymph between the affected and healthy sides. The scala vestibuli scores and the area of vestibular perilymph, did not show any difference when comparing them before and after surgery. The 3D-fluid-attenuated inversion recovery MRI of a 50-year-old woman with Meniere's disease before and after surgery is shown in the fig:3

ENT_BB CONNECTION

Vol 1| Issue 2|2022

Fig:3 The 3D-fluid-attenuated inversion recovery (FLAIR) MRI views of a 50-year-old woman with Meniere's disease (MD) on the right side before and after surgery



Meniere's disease is a complicated inner ear disease, and Endolymphatic hydrops is thought to be the pathological basis for this condition. Both 3D-FLAIR and 3D-real IR MRI can help in differentiating the endolymphatic space and perilymphatic space, but the perilymphatic space is not as sensitive as the endolymphatic space to the low density of Gadolinium.[3,4] A study conducted by Liu applied 2,350ms as the inversion time to observe the condition of hydrops in patients with endolymphatic shunt surgery, while in this study, it was found that patients who underwent shunt surgery continued to have endolymphatic hydrops.[5]A study conducted by Gibson reported that an abnormal fluid in the inner ear can cause the endolymphatic sac to secrete glycoproteins leading to drainage of the endolymph toward the sac by which vertigo is seen.[6]

According to our results, endolymphatic hydrops was not significantly reduced by surgery. The mechanism by which EMS controls vertigo might be unrelated to the improvement in hydrops.

Reference

1. Li Y,et al. Imaging analysis of patients with Meniere's disease treated with endolymphatic sac-mastoid shunt surgery. Frontiers in Surgery. 2022 Jan 12:699.

2.Wetmore SJ. Endolymphatic sac surgery for Ménière's disease: long-term results after primary and revision surgery. Archives of Otolaryngology–Head & Neck Surgery. 2008 Nov 17;134(11):1144-8.

3. Nakashima T, Naganawa S, Katayama N, Teranishi M, Nakata S, Sugiura M, et al. Clinical significance of endolymphatic imaging after intratympanic gadoliniuminjection. Acta Otolaryngol Suppl. (2009) 560:9–14.

4.Naganawa S, Yamazaki M, Kawai H, Bokura K, Sone M, Nakashima T. Estimation of perilymph enhancement after intratympanic administration of Gd-DTPA by fast T1-mapping with a dual flip angle 3D spoiled gradient echo sequence. Magn Reson Med Sci. (2013) 12:223–8.

5.Liu IY, Sepahdari AR, Ishiyama G, Ishiyama A. High resolution MRI shows presence of endolymphatic hydrops in patients still symptomatic after endolymphatic shunt surgery. Otol Neurotol. (2016) 37:1128–30.

Vol 1| Issue 2|2022

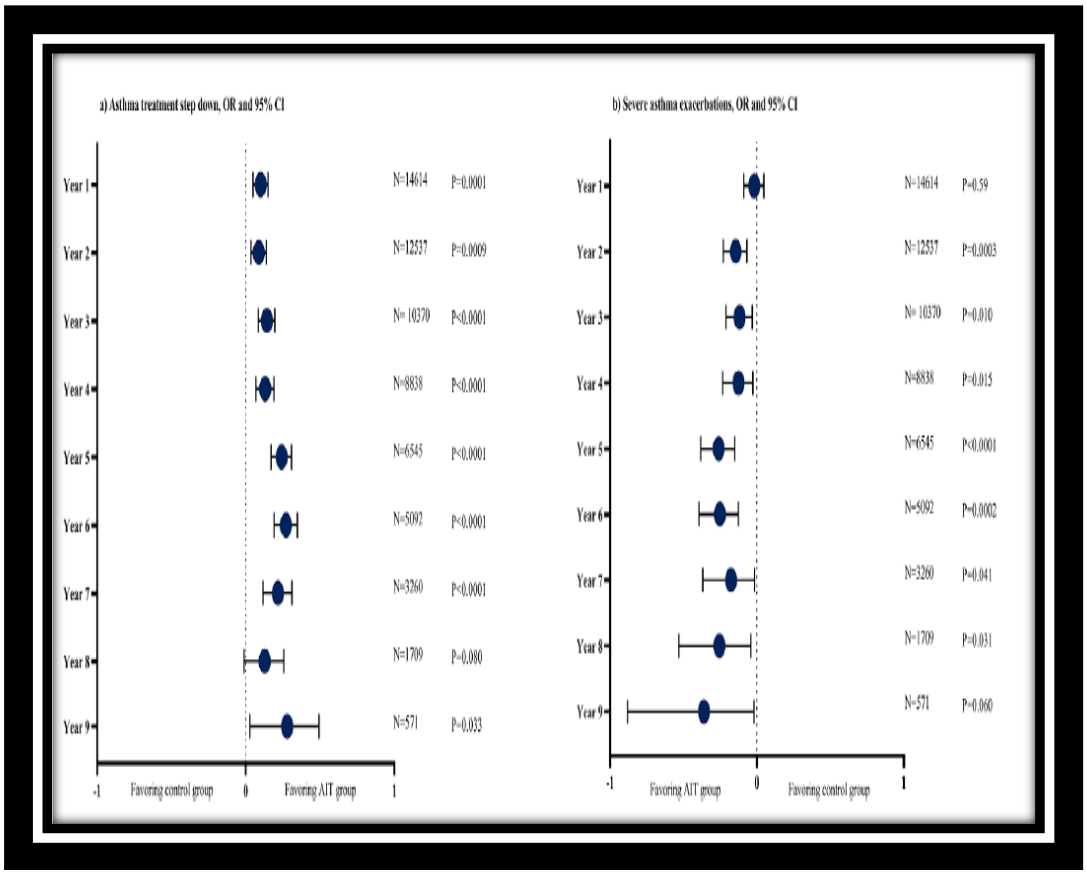
Real world evidence of long-term benefits from allergen-specific immunotherapy in Patients with Allergic Rhinitis and Asthma

Allergy is an abnormal reaction of the immune system to harmless allergens and affects 10-40% of populations. Respiratory allergy is a heterogeneous disease leading to allergic rhinitis and asthma. Around 10−40% of patients with Allergic rhinitis have allergic asthma and 60−80% proportion of asthmatic patients experience chronic symptoms of Allergic rhinitis. Allergic rhinitis is a common risk factor for poor asthma control as patients with asthma and severe Allergic rhinitis are up to 4−5 times more likely to have poor asthma control than those without Allergic rhinitis. Allergy immunotherapy is the only causal treatment for allergy. Increased tolerance towards a causal allergen is obtained by repeated administrations of allergen, resulting in modulation of the immunological response. Allergy immunotherapy can be used sublingually as tablets/drops or subcutaneously for a minimum period of 3 years. [1]

As Allergy immunotherapy requires repeated administration of the vaccine for at least 3 years in order to show effectiveness, adherence is a major problem, from the perspective of both patients and providers. However, adherence to Allergy immunotherapy is characterized by widely varying discontinuation rates. Based on different studies that have provided adherence information with regard to different treatment times, overall discontinuation rates were approximated from treatment year one to treatment year three for subcutaneous immunotherapy and sublingual immunotherapy.[2]

Recently, scientific societies and regulatory authorities have stressed the need for more robust real-world evidence in allergic respiratory disease.1-4 Despite the importance of complementing randomized clinical trials with high-quality Real world effectiveness, and although a relative increase in the numbers of Real world effectiveness studies in allergy immunotherapy has been seen in recent years, the number of real world evidence conducted in Allergy immunotherapy is still limited.[3]

Fig: 4 Odds ratio for stepping down asthma treatment (a) and severe asthma exacerbations (b) in pre-existing asthma cohort.



This Real world effectiveness in allergy immunotherapy is a retrospective cohort study using claims data between 2007 and 2017 and enrolled patients with confirmed diagnosis of allergic rhinitis with or without asthma, and Allergy immunotherapy. To ensure comparable groups, Allergy immunotherapy -treated subjects were propensity score matched 1:1 with control subjects, using characteristic and potential confounding variables. Outcomes were analysed as within and between group differences across 9 years of follow-up.

Around 46,024 Allergy immunotherapy -treated subjects were matched with control subjects and 14,614 were included in the pre-existing asthma cohort. Allergy immunotherapy treated subjects were 29.5 years and 53% were male patients. Allergy immunotherapy was consistently associated with greater reductions compared to control subjects in Allergic rhinitis and asthma prescriptions, including both asthma controller and reliever prescriptions. Additionally, the

Allergy immunotherapy group had significantly greater likelihood of stepping down asthma treatment.Concurrent lower odds of experiencing a severe asthma exacerbation was seen in subjects treated with Allergy immunotherapy (Fig 4). A greater reduction in severe asthma exacerbations was demonstrated in Allergy immunotherapy group. Decrease in pneumonia with antibiotic prescriptions, hospitalisations, and duration of inpatients stays were all in favour of Allergy immunotherapy group.

This study highlighted the evidence for Allergy immunotherapy by demonstrating longer-term and sustained effectiveness in the real world. Additionally, in patients with concurrent asthma, Allergy immunotherapy was associated with reduced likelihood of asthma exacerbations and pneumonia.

Reference:

1. Fritzsching B, Contoli M, Porsbjerg C, Buchs S, Larsen JR, Elliott L, Rodriguez MR, Freemantle N. Long-term real-world effectiveness of allergy immunotherapy in patients with allergic rhinitis and asthma: Results from the REACT study, a retrospective cohort study. The Lancet Regional Health-Europe. 2022 Feb 1;13:100275
2. Vogelberg C, Brüggenjürgen B, Richter H, Jutel M. Real-world adherence and evidence of subcutaneous and sublingual immunotherapy in grass and tree pollen-induced allergic rhinitis and asthma. Patient preference and adherence. 2020;14:817.
3. .Fritzsching B, Contoli M, Porsbjerg C, Buchs S, Larsen JR, Freemantle N. Real-world evidence: Methods for assessing long-term health and effectiveness of allergy immunotherapy. Journal of Allergy and Clinical Immunology. 2021 Dec 30.

ENT_BB CONNECTION

Vol 1| Issue 2|2022

Secondary otalgia caused by a foreign body hidden deeply in the lateral surface of the tongue: A Case Report

Ear complaints are commonly observed complaint in primary care. Otalgia divides into primary and secondary causes[1,2]. Primary otalgia is an ear pain that arises directly from pathology within the inner, middle, or external ear. Secondary otalgia is defined as a pain in the ear although originating from a non-otologic sources and occurs as a result of the complex network of cranial nerve that innervates the ear.[1,2] These cranial nerves have a shared connection between the ear and organs outside of the ear.[2] Theoretical mechanisms behind Secondary otalgia is the convergence-projection theory, which explains that these nerves converge into a shared neural pathway. Complex innervation of the ear structures makes the identification of the responsible region a challenging process.[1] Primary otalgia is related to clinical entities affecting the outer, middle, and inner parts of the ear. The most common etiologic factors include: acute or chronic media otitis, external otitis, mastoiditis, myringitis, folliculitis, and constitute. At the same time, Cerumen obstruction, trauma and ear neoplasms may also be responsible for primary otalgia. While, if the cause of pain cannot be localized to the affected ear, it is known as secondary otalgia. The most common causes of secondary otalgia are: Temporomandibular joint dysfunction and dental infections. Other potential causes of otalgia are salivary gland disorders, Bell's palsy, tonsillitis, pharyngitis, oral disorders, and cervical osteoarthritis.

Fig:5 Oral cavity inspection. Recognition of the painful area on the left lateral surface of the tongue.

Fig: 6 The extracted foreign body, a metallic iron bar.

A 65-year-old male patient was presented to the emergency ENT department with the chief complain of left otalgia followed by difficulty in swallowing since a week. His past medical history revealed of having a 5-day course of antibiotics with ciprofloxacin ear drops combined with painkillers. Clinical examination along with otomicroscopy was unremarkable for any ear pathology. Fiberoptic nasolaryngoscopy and laboratory tests were found to be within the range. Inspection of the oral cavity showed a tender area on the left lateral surface of the tongue and a tiny hole was recognized in the same area (Fig 5). An exploration of the area under local anaesthesia was conducted and a metallic iron bar of approx. 1.5 cm in length was removed (Fig:6). Symptoms got subsided and the patient remained pain free at next 7 days' follow-up. Otalgia could be the primary symptom of a head & neck malignancy therefore, a thorough clinical examination of the head and neck is imperative to exclude neoplasms

Conclusion: If thorough clinical investigation fails to identify the source of otalgia, a CT Scan or MRI studies should be considered to define the diagnosis.

References

1. Forozidou E, et al. A Rare Cause of Secondary Otalgia. Ear, Nose & Throat Journal. 2022 Jan 17:01455613221075226.
2. Coulter J, Kwon E. Otalgia. [Updated 2021 Aug 3]. In: Stat Pearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan.

Vol 1| Issue 2|2022