International Journal of Otorhinolaryngology and Head and Neck Surgery
Srivastava T et al. Int J Otorhinolaryngol Head Neck Surg. 2024 Dec;10(6):710-714
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20243512

Case Series

Echoes of mumps: exploring sensorineural hearing loss

Trisha Srivastava, Shashidhar Tatavarthy, Dilpreet Bajwa, Indresh Chandra*, Altrin D. S. Benny

Department of ENT and HNS, Artemis Hospitals, Gurugram, Haryana, India

Received: 08 July 2024
Revised: 05 November 2024
Accepted: 13 November 2024

***Correspondence:**
Dr. Indresh Chandra,
E-mail: indresh0609@gmail.com

ABSTRACT

To investigate the role of intratympanic steroids and hyperbaric oxygen therapy in treating sudden sensorineural hearing loss (SSNHL) following acute viral mumps illness. Mumps is commonly associated with fever, headache, muscle aches, and parotid gland swelling but can also lead to severe complications such as SNHL, resulting from inner ear or auditory nerve damage. Eight cases of sudden-onset SSNHL of severe to profound nature presented in our OPD. Two patients were under 15 years old, and the rest were middle-aged. Treatment included oral steroids, antibiotics, and intratympanic steroids (injection methylprednisolone). Despite regular PTA evaluations, none of the patients showed improvement in hearing loss. The actual number of mumps cases is hard to determine, as many may not seek medical attention, and clinical diagnosis can be inaccurate. The incidence of mumps-related deafness is uncertain and often unilateral, which can be overlooked. If deafness develops later, identifying the cause can be challenging. The widespread use of the MMR vaccine has significantly reduced mumps incidence and related health issues, including SSNHL. Vaccination protects individuals and contributes to herd immunity, lowering disease prevalence.

Keywords: Mumps, SSNHL, Intratympanic steroids

INTRODUCTION

Mumps, an acute viral illness caused by the mumps virus, primarily affects the parotid glands, leading to the characteristic swelling and discomfort associated with the disease. The implementation of widespread vaccination programs has significantly reduced the incidence of mumps in many parts of the world. However, mumps remains a significant health concern in regions with lower immunization rates and among populations with vaccine hesitancy or inadequate access to healthcare.

While mumps is commonly known for its symptoms such as fever, headache, muscle aches, and parotid gland swelling, it can lead to several severe complications. One such complication is SNHL, a condition resulting from damage to the inner ear (cochlea) or the auditory nerve pathways leading to the brain. SNHL associated with mumps is relatively rare, but when it occurs, it can have a significant and lasting impact on the affected individual's quality of life.

Epidemiologically, mumps-induced SNHL tends to occur more frequently in children and young adults, although it can affect individuals of any age. The literature reporting infectious viral etiology causing bilateral SNHL represents only 10% of cases of SNHL, including mumps, HIV, HSV, and viral upper respiratory tract infections.[1] The introduction of the mumps vaccine (part of the MMR vaccine) has greatly reduced the overall incidence of mumps and, consequently, mumps-associated SNHL.

Clinically, mumps-induced SNHL typically presents suddenly and without warning. Patients may experience a

sudden decrease in hearing, often accompanied by tinnitus (ringing in ears) and feeling of fullness or pressure in affected ear. Diagnosis is primarily clinical, supported by audiometric testing to confirm degree and nature of hearing loss. Hearing loss may be seen in three different variety. Most common form is sudden unilateral complete loss, next is unilateral partial deafness and rarest variety is bilateral complete deafness.[2] Magnetic resonance imaging and other imaging studies may be utilized to rule out other potential causes of SNHL.

Management of mumps-induced SNHL focuses on early detection and intervention to improve outcomes. Corticosteroids may be prescribed to reduce inflammation and swelling within the inner ear, although their efficacy in treating viral-induced SNHL remains uncertain. In some cases, antiviral medications may be considered, although there is limited evidence supporting their effectiveness specifically for mumps-induced SNHL. Rehabilitation strategies, such as hearing aids and cochlear implants, may be necessary for individuals with significant or permanent hearing loss.

Preventive measures remain the most effective strategy for reducing the incidence of mumps and its complications. Ensuring high vaccination coverage with the MMR vaccine is crucial in preventing outbreaks and protecting individuals from the severe consequences of mumps, including SNHL. There is no specific antiviral therapy for mumps. The effectiveness of vaccination for mumps has been widely confirmed, and WHO recommends immunization coverage of 90% to prevent mumps outbreaks.[3]

CASE SERIES

We at our institute had recently witnessed a sudden spurt in the cases of SSNHL. Majority of the patient were of adult to middle aged with two patients being as young as 10 and 15 years.

These patients presented to our OPD with sudden onset of decreased hearing which started recently with maximum duration being one week.

All the patients were subjected to pure tone audiometry (PTA). All the patient were found to have severe to profound SNHL. After routine ENT checkup including MRI brain to rule out any CP angle anomalies, patient were started on Oral steroids and antibiotics. Also, they were started on intratympanic (IT) steroid injections in the form of injection methylprednisolone (125 mg/2 ml), which was administered in OPD. All the 8 patients received 6 doses of IT injection scheduled at alternate day and were monitored regularly for any side effects.

The following table shows the concise data of the patients received in our OPD with complaints of mumps and SSNHL (Table 1).

Table 1: Data showing various severity of hearing loss and treatment provided and age demographic.

Age (in years)	Sex	Day of presentation	Degree of SNHL	No. of intratympanic injections	HBOT
30	M	4	90 dB	6	No
15	F	5	95 dB	6	Yes
61	M	7	110 dB	6	No
63	M	3	90 dB	6	No
10	F	4	115 dB	6	No
36	M	4	110 dB	6	Yes
40	M	7	90 dB	6	Yes
46	M	7	70 dB	6	Yes

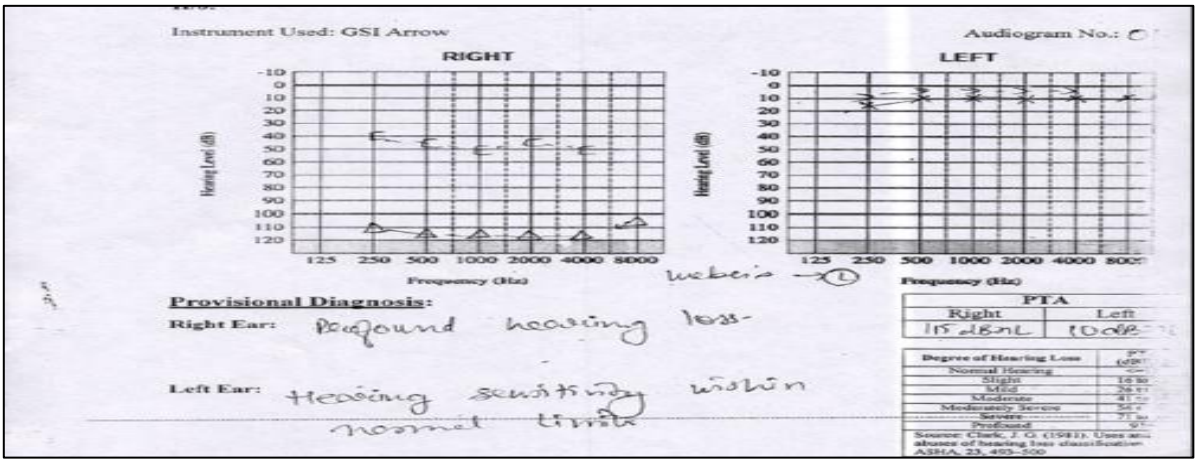

Figure 1: SNHL in patient on 4th day of presentation.

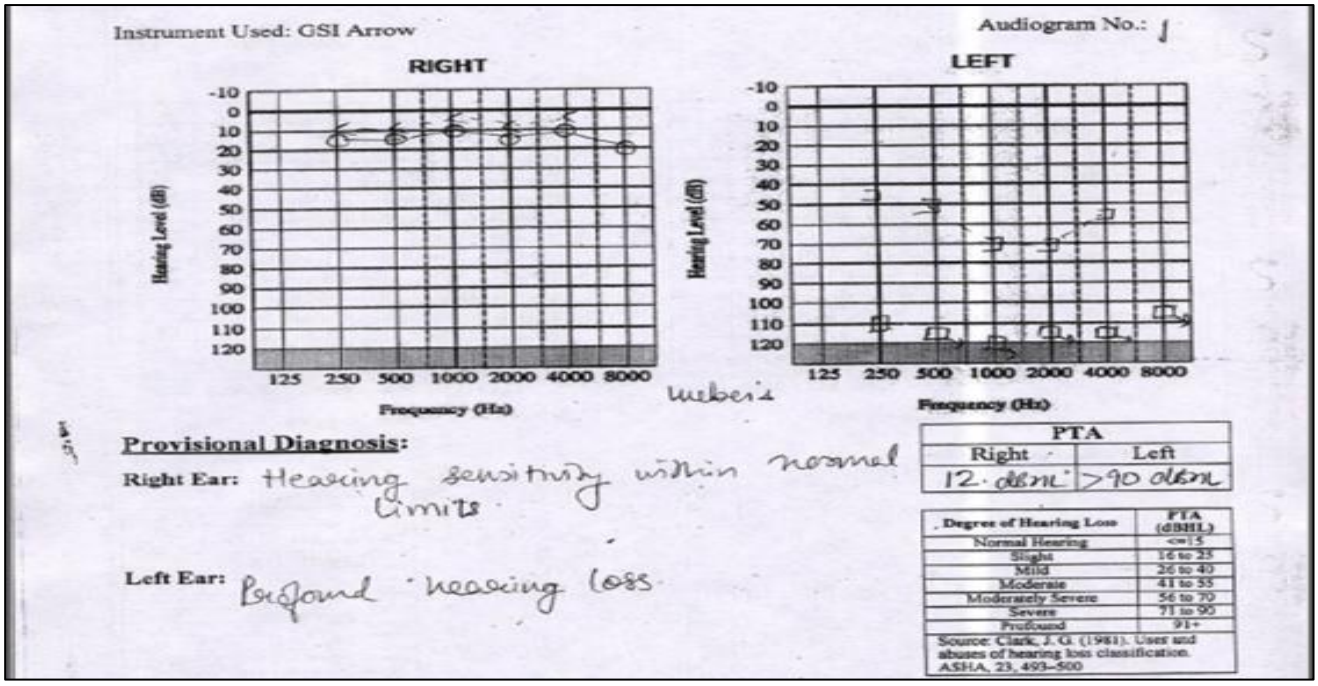

Figure 2: SNHL in patient on 7th day of presentation.

All the patients were referred for hyperbaric oxygen therapy (HBOT). Only half of the patients were able to follow up with HBOT due to financial constraints.

The American academy of otolaryngology-head and neck surgery (AAOHNS) makes the following recommendations for outcomes assessment:[4] Unless a previous asymmetry of hearing was known or suspected, the unaffected ear should be used as the standard against which recovery should be compared; a complete recovery requires return to within 10 dB HL of the unaffected ear and recovery of WRSs to within 5% to 10% of the unaffected ear; partial recovery should be defined in two ways based on whether or not the degree of initial hearing loss after the event of SSNHL rendered the ear non-serviceable (based on the AAO-HNSF definition); and anything less than a 10 dB HL improvement should be classified as no recovery.

DISCUSSION

All the patient were regularly monitored with PTA after 3rd intratympanic injection and 6th intratympanic injections respectively.

Although all our patients had significant improvement in ringing sensation in ear, along with vertigo but almost all patient had no improvement in hearing loss even after 6 doses of intratympanic injections of steroid. The group of patients who underwent HBOT sessions had some minor improvement in hearing levels only perceived on PTA.

Retrospectively, on further evaluation we found that six of our patients had missed their adult dosage of MMR vaccination scheduled in universal immunisation programme.

Mumps is a disease of children and young adults caused by of an enveloped, single-stranded RNA virus of the paramyxoviridae family. It is an acute self-limiting systemic disease that can potentially cause serious complications. Mumps can attack multiple organs including the salivary glands, pancreas, testes, meninges, and inner ear. One of its well-known complications is SNHL.[1]

The pathophysiology of hearing loss due to mumps is thought to be by direct invasion of the cochlea damaging the organ of Corti, the cochlear nerve myelin sheath, and degenerating the stria vascularis, tectorial and Reissner's membrane.[5]

Tanaka et al experimentally confirmed that mumps-related deafness is caused by the degeneration of the organ of Corti.[6]

It is difficult to know the actual number of mumps cases. Many subjects may not have symptoms severe enough to warrant medical attention and the clinical diagnosis of mumps infection may not be accurate. The number of cases of deafness is also uncertain. Because mumps-related deafness is mainly unilateral, it can be overlooked by parents and children. If a patient develops deafness at a later time, the pathogenesis of deafness would be difficult to ascertain. This can lead to cases of mumps-related deafness being overlooked.

Mizushima et al presented their series of mumps deafness and suggests that the primary route of invasion of the

virus is hematogenous and proposes the term 'viral endolymphatic labyrinthitis' as the possible pathogenesis of the deafness. According to this study, both tympanogenic and meningogenic routes of viral invasion to the labyrinth are excluded on the basis of the clinical and cerebrospinal fluid studies.[3]

SNHL tends to occur suddenly 4 to 5 days after the onset of flu-like symptoms and parotitis. Typically, hearing loss is unilateral and reversible but can be severe and permanent. The virus has been detected in both endolymph and perilymph. The risk of SNHL following mumps infection is not correlated with severity of the infection or presence of parotitis.[7] Asymptomatic cases of mumps can result in sudden SNHL, as demonstrated by positive antimumps IgM antibodies.[8]

Characteristics of mumps-induced hearing loss: Typically unilateral: Hearing loss from mumps is usually in one ear. Sudden Onset: The hearing loss can occur suddenly, often without warning. Severity: It can range from mild to profound and is sometimes permanent.

Role of MMR vaccination in mumps related hearing loss

Today, three doses of MMR vaccine are recommended for mumps prevention-the first at one dose at age 12 to 15 months, the second at 4 to 6 years of age, and the third dose in the late teens/early twenties. Because mumps vaccine contains live, attenuated virus, it is not recommended for severely immunocompromised patients, although current guidelines recommend MMR vaccination for patients with HIV as long as they do not fall into the severely immunocompromised category.

The first phase of measles-rubella vaccination campaign has been successfully completed during February 2017 in five states, namely, Tamil Nadu, Karnataka, Goa, Lakshadweep and Puducherry. More than 3.3 crore children were vaccinated, reaching out to 97% of the intended age group. The campaign was carried out in schools, community centers and health facilities. The next round was taken up in 8 states/UTs (Andhra Pradesh, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Himachal Pradesh, Kerala, Telangana and Uttarakhand) during August 2017, aiming to cover 3.4 crore children. Since the launch in 2017, the MRV campaign has covered nearly 20 crore children in 30 states and union territories.

There are numerous factors involved in the recent rise of mumps cases in India despite not including mumps vaccine in the routine vaccination program under the universal immunisation programme (UIP) suggested by the world health organisation. In India, the MR vaccine is recommended in a two-dose strength for children age group between 9 to 15 months mainly to cover rubella and measles but not mumps. On the other hand, the MMR vaccine in India is only available in the private sector, and over 80% of the children population is deprived of it.

Another one of the most important factors for the mumps resurgence in India is the population of naive children and the absence of the mumps vaccine in UIP.[9]

There is no specific treatment against mumps virus, so interventions are mostly supportive. For treatment of SNHL related to mumps, hearing aids can be utilized for mild to severe cases. In severe bilateral cases of SNHL, cochlear implantation has been shown to be efficacious.

CONCLUSION

SSNHL is a serious and potentially permanent complication of mumps, a viral infection that can be effectively prevented by the MMR (measles, mumps, rubella) vaccine. The mumps virus can damage the inner ear structures through direct viral invasion, inflammation, and the body's immune response, typically resulting in unilateral (one-sided) hearing loss. This form of hearing loss can develop suddenly and without warning, ranging from mild to profound in severity.

When SSNHL occurs, immediate medical evaluation and intervention are crucial. Diagnostic procedures may include audiometric tests to assess the extent of hearing loss and medical imaging to rule out other causes. Treatment often involves high-dose steroids to reduce inflammation and improve the chances of hearing recovery. While there is no specific antiviral treatment for mumps-induced hearing loss, managing the primary mumps infection and associated symptoms is vital.

Prevention remains the most effective strategy in combating mumps and its complications. The widespread use of the MMR vaccine has significantly reduced the incidence of mumps and related health issues, including SSNHL. Vaccination not only protects individuals from the mumps virus but also contributes to community herd immunity, reducing the overall prevalence of the disease.

CONCLUSION

In conclusion, the MMR vaccine is essential in preventing mumps and its severe complications, such as SSNHL. Immediate medical attention for SSNHL can improve outcomes, but the best defence is widespread vaccination to prevent mumps infections from occurring in the first place. By ensuring high vaccination rates, we can protect individual and public health, preserving hearing and preventing other serious complications of mumps.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Al-Balasi A, Omer D. Catastrophic Bilateral Sudden Sensorineural Hearing Loss Due to Mumps: Report

of Two Cases. Turk J Ear Nose Throat. 2023;33(4):128-30.
2. Unal M, Katircioglu S, Can Karatay M, Suoglu Y, Erdamar B, Aslan I. Sudden total bilateral deafness due to asymptomatic mumps infection. Int J Pediatr Otorhinolaryngol. 1998;45(2):167-9.
3. Morita S, Fujiwara K, Fukuda A, Fukuda S, Nishio SY, Kitoh R, et al. The clinical features and prognosis of mumps-associated hearing loss: a retrospective, multi-institutional investigation in Japan. Acta Otolaryngol. 2017;137:S44-7.
4. Chandrasekhar SS, Tsai Do BS, Schwartz SR, Bontempo LJ, Faucett EA, Finestone SA, et al. Clinical Practice Guideline: Sudden Hearing Loss (Update). Otolaryngol Head Neck Surg. 2019;161(1):S1-45.
5. Mizushima N, Murakami Y. Deafness following mumps: the possible pathogenesis and incidence of deafness. Auris Nasus Laryn. 1986;13:S55-7.
6. Tanaka K, Fukuda S, Suenaga T, Terayama Y. Experimental mumps virus-induced labyrinthitis: Immunohistochemical and ultrastructural studies. Acta Otolaryngol. 1988;105(S456):98-105.
7. Hall R, Richards H. Hearing loss due to mumps. Arch Dis Child. 1987;62:189-91.
8. Hashimoto H, Fujioka M, Kinumaki H. An office-based prospective study of deafness in mumps. Pediatr Infect Dis J. 2009;28(3):173-5.
9. Khan SR, Srivastava S, Kumar S, Mehta R, Satapathy P, Mohanty A, et al. Recent mumps resurgence in India: general childhood vaccination is needed. Infectious Diseases. Taylor and Francis Ltd. 2024;56:586-8.

Cite this article as: Srivastava T, Tatavarthy S, Bajwa D, Chandra I, Benny ADS. Echoes of mumps: exploring sensorineural hearing loss. Int J Otorhinolaryngol Head Neck Surg 2024;10:710-4.