AYUSHDHARA
ISSN: 2393-9583 (P)/ 2393-9591 (O)
An International Journal of Research in AYUSH and Allied Systems

Review Article

AN AYURVEDIC APPROACH TO INNER EAR DISEASES

Athira Rosh[1]*, Veena Shekar[2]
*[1]PG Scholar, [2]Professor, Department of Shalakya tantra, Sri Kalabyraveshwaraswamy Ayurvedic Medical College, Hospital and Research centre, Bangalore, Karnataka, India.

Article info
Article History:
Received: 20-08-2022
Revised: 08-09-2022
Accepted: 19-09-2022
KEYWORDS:
Hearing loss, Tinnitus, Vertigo, *Abhyantara karna rogas,* Ayurveda.

ABSTRACT

Ear is one among the sense organs, which keeps one connected to other and with the surroundings. Ear functions the conversion of sound waves into electrochemical impulses and maintains the sense of balance. In the present era, increased technology has resulted in change in lifestyle like increased use of ear phones or headsets, excessive use of mobile phones, exposure to loud noise, and modern pub culture etc which has made the ears more sensitive to many problems. This can be either hearing disorders or tinnitus or vertigo which can have an adverse effect on our lives, which remains the most challenging to treat in contemporary science. Ayurveda gives detailed explanation regarding ear diseases, where in it covers all the diseases pertaining to external as well as internal ear. Therefore, while looking into the classification of these diseases, no such explanation is given separately for *Abhyantara karna rogas*, but a special attention is given for the explanation of ear lobe diseases *(Karna pali rogas*). In this article an effort is made to understand these major inner ear problems with those of ear disorders explained in ayurveda with their specific etiology, clinical features and the management with respect to the contemporary science.

INTRODUCTION

Ayurveda gives a detailed explanation regarding the different diseases of the ear and its management. But there is no special mentioning regarding diseases specific to inner ear. All the ear diseases are explained under one heading '*Karnarogas*' (ear disease) which include both external, middle and internal ear disorders. Classical inner ear disease involves the entire membranous labyrinth and is characterized by the triad of sensorineural hearing loss, tinnitus and vertigo. Underlying pathology may involve inner ear hair cells, supporting hair cells or altered composition of the endolymph and perilymph. A pathology in the auditory pathway can also be a direct cause for inner ear disease.[1]

Access this article online	
Quick Response Code	
	https://doi.org/10.47070/ayushdhara.v10i4.1023

Commonly encountered inner ear diseases in clinical practice include Sensory neural hearing loss, tinnitus and Meniere's disease. Here is an attempt made to understand few ear diseases mentioned in ayurveda, which is specific to inner ear. The signs and symptoms mentioned under the diseases *Badhirya, Karnanada* and *Karnakshweda* have similar clinical features as those of inner ear diseases, thus these can be considered under the broad heading of inner ear diseases.

Inner Ear Problems Commonly Encountered In Clinical Practice

Sensory Neural Hearing Loss (SNHL)

SNHL is the most common type and accounts for the majority of all hearing loss. It occurs when the pathology lies in cochlea or auditory nerve or auditory pathways. In India, approximately 63 million (6.3% of Indian population) people are suffering from significant auditory impairment. [2] Hearing loss has become one among the public health problems in the present era due to the over usage of electronic gadgets, noise pollution etc. WHO estimates over 1 billion young adults at the risk of permanent, avoidable hearing loss due to unsafe listening practices. [3] Main characteristic features of SNHL include difficulty in

hearing in the presence of loud noise and poor speech discrimination, sometimes associated with tinnitus. The etiology of SNHL can be both congenital and acquired. Congenital SNHL is caused as a result of the anomalies of inner ear or damage to the hearing apparatus by prenatal or perinatal factors. Acquired form appears later in life. The most common causes under acquired include infections of labyrinth, trauma to labyrinth, ototoxicity, noise induced hearing loss, acoustic neuroma, sudden hearing loss, familial progressive SNHL and Systemic diseases.[4]

Infections of labyrinth can be bacterial, viral or syphilitic. Familial progressive SNHL is a genetic disorder in which there is a progressive degeneration of cochlea, with bilateral hearing loss but with excellent speech discrimination. Various drugs and chemicals can damage the inner ear affecting cochlea. These are aminoglycoside antibiotics, diuretics, salicylates, quinine etc. Hearing loss associated with exposure to noise has greater significance because of this being an occupational hazard. This can cause damage to hair cells, starting in the basal turn of cochlea. Sudden SNHL is defined as 30dB or more of SNHL over at least three contiguous frequencies occurring within a period of 3days or less. Most often cause remains obscure but three factors considered under etiology are viral, vascular and rupture of cochlear membranes. [4]

SNHL associated with physiological aging process in the ear is called Presbycusis. It usually manifests at the age of 65years but may do so early if there is hereditary predisposition, chronic noise exposure or generalized vascular disease. [4] These are structural abnormality of cochlear components, aberrant metabolic activity, vascular abnormalities, overcrowding of the basilar membrane, and noise trauma. [5]

Diagnosis is made by proper history taking, assessing severity of hearing loss to mild, moderate, moderately severe, severe or profound by audiometry and lab investigations depending on the type of aetiology suspected.

Early detection of SNHL is important as measures can be taken to stop its progress, reverse it or to start an early rehabilitation programme, so essential for communication. About half of the patients of idiopathic SNHL recover spontaneously within 15days. Severe hearing loss and that is associated with vertigo have poor prognosis. [4]

Tinnitus

Tinnitus is classically described as the presence of high pitched ringing or buzzing that is usually only audible to the affected individual. [6] It represents one of the most common and distressing otologic problems, and it causes various somatic and psychological disorders that interferes with the quality of life.[7] Tinnitus has prevalence of >7% in Indian population.[8] Origin of the sound is within the patient which is usually unilateral but may also affect both ears. It is classified into two clinical types:

(a) Subjective, which can be heard only by the patient (b) Objective- which can be even heard by the examiner with the use of a stethoscope.

Subjective tinnitus can have its origin from external ear, middle ear, inner ear, VIIIth nerve, central nervous system and systemic disorders like anaemia, hypertension, arteriosclerosis and certain drugs may act through the inner ear or central auditory pathways. In the absence of conductive hearing loss, the patient may hear abnormal noises in the head during eating, speaking or even inspiration. Objective tinnitus is seen less frequently. It can be because of vascular lesions, patulous eustachian tube, clicking of temporo-mandibular joint etc. Sometimes tinnitus is psychogenic and no cause can be found in the ear or central nervous system. This should be differentiated from auditory hallucinations in psychiatric disorders.[9] Here tinnitus is considered as an inner ear problem so the etiology should be distinguished from external as well as middle ear factors.

According to contemporary science, tinnitus is a symptom and not a disease. Where possible, its cause should be discovered and treated. Sometimes even treating the cause may not alleviate tinnitus.[9]

The condition tinnitus can be correlated to two diseases explained in ayurveda i.e., *Karnakshweda* and *karnanada*.

Meniere's Disease

Meniere's disease, also called endolymphatic hydrops, is a disorder of the inner ear where the endolymphatic system is distended with endolymph. It is a progressive disease, with a prevalence of 2 out of every 1000 people, also known as endolymphatic hydrops, where the endolymphatic system is distended. It is characterized by vertigo, sensory neural hearing loss, tinnitus and aural fullness. Sometimes patients present with emotional upset due to apprehension of the repetition of attacks.[10]

The main pathology is distention of endolymphatic system, mainly affecting the cochlear duct and the saccule and to a lesser extent the utricle and semicircular canals. The dilatation of cochlear duct is such that it may completely fill the Scala vestibule; there is marked bulging of Reissner's membrane. This can either from increased production of endolymph or its faulty absorption or both.

The main cardinal features include vertigo, hearing loss, tinnitus and sense of fullness or pressure.

Vertigo can be sudden in onset. Attacks come in clusters, with periods of spontaneous remission lasting for weeks, months or years. Hearing loss usually accompanies vertigo or, may precede it. Hearing improves after the attack and may be normal during the periods of remission. This fluctuating nature of the hearing loss is characteristic of the disease. Tinnitus is pow pitched roaring type and is aggravated during acute attacks. Change in intensity and pitch of tinnitus may be the warning symptom of attack. Aural fullness may accompany or precede an attack of vertigo.[10]

Diagnosis can be made with the help of pure tone audiometry, speech audiometry, caloric test, glycerol test etc. with proper history taking. Vertigo mainly influences the physical dimension, while tinnitus and hearing loss influence the psychosocial dimension of patients.[10]

Badhirya

Badhirya means hearing loss, which includes both conductive and SNHL. In this context *Badhirya* is compared to sensory neural hearing loss or deafness.

The pathogenesis is explained as, the vitiated *Vata* or *Vata* and *Kapha* obstructing the sound carrying channels (*Shabdha vaha siras*) causes difficulty in hearing.[11] According to *Vagbhata,* vitiated *Vata* along with *Kapha* causes hearing loss or an untreated tinnitus leads to hearing of loud sounds with difficulty and deafness gradually.[12]

Karnakshweda

In this condition, the person hears the sounds like that of a flute (*Venughoshavat*) with in the ear.

Along with the general etiological factors mentioned for ear diseases in the classics, specific factors like exhaustion (*Srama*), debilitating disorders (*Kshaya*), intake of dry and astringent foods (*Rooksha kashaya bhojanat*), having cold food after errhines (*Sheeta sevana* after *Shirovirechana*) are also considered as causative factor for this condition. These results in the vitiation of *vata* along with other *Doshas* and blood, which when localised in the auditory canal (*Shabdha patha*) give rise to sounds within the ear.[13]

Karnanada

In this condition, the person hears different types of sounds similar to musical instruments (*Bheri & Mrudanga*), conch (*Sankha*), and is caused by *Kapha, Pitta* and *Rakta dosha* enveloping *Vata dosha,* moving in different directions within the ear.).[14]

Both *Karnakshweda* and *Karnanada* can be correlated to tinnitus as the presenting symptom is same as that of tinnitus.

Menier's disease can also be considered here under *Bhadirya, Karnanada* and *Karnakshweda* as it presents with both the symptoms of tinnitus and hearing loss.

Etiology

Specific etiological factors for each ear disease is not available in classics, but general etiological factors like, mist/fog/cold breeze *(Avashyaya)*, aquatic games *(Jalakreeda),* scratching the ears *(Karna kandu)*, improper usage of instruments (*Mithyayogena shastrasya*), exposure to abnormal sounds (*Mithyayogena shabdasya*), rhinitis (*Pratishyaya*) are explained .[15]

According to author charaka, suppression of sneeze (*Kshavathu vegadharana*) causes reduced strength of sense organs (*Indriya dourbalyata*) and suppression of thirst (*Pipasa vegadharana*) causes hearing loss. [16]

Other specific causative factors for *Badhirya* include listening to loud noise during menstrual cycle leading to *badhirya* in progeny (*Atishabda sravana* in *Rithukala*) [17], due to an aural polyp (*Karnarsha*)[18] and injury to vital part (*Vidura marma*)[19].

Management of Inner Diseases Through Ayurveda

Sushruta and Vagbhata have explained few similar treatment protocol for the *Karnanada, Karnakshweda* and *Badhirya* which *include* oral intake of ghee (*Ghritapana),* intake of meat soup *(Rasayana),* oleation therapy (*Snehana*), sudation therapy (*Nadi sweda* or *pinda sweda*), therapeutic purgation *(Sneha virechana*)[20].

Whereas vagbhata explains to administer emesis (*Vamana*), errhines (*Nasya*) and (medicated fume inhalation (*Teekshna dhuma*) if it is associated with *Kapha*. Other procedures including bloodletting *(Raktamokshana*) around the ears, enema (*Basti karma*), oleation procedures of head (*Murdhni taila*), *Nasya, Dhumapana* are also explained. [21]

Specific Treatment

For *Karnanada*[20] and *Karnakshweda* [22], *Karnapurana* with *Sarshapa taila* is indicated. *Acharya sarangadhara* mentioned, *Bruhmana nasya* with *Anutaila, Narayana taila*, *Masha taila, Vatahara dravya sidhayukta ghritas*.

For *Badhirya, Karnapurana* is the *visesha chikitsa*, specifically with *Bilwa taila*.[20] The different treatment modalities mentioned for *pratishyaya* can also be adopted if it is associated with *Kapha*. Also *Vata vyadhi chikitsa* can be followed.

Prognosis

Badhirya in young age, old age, emaciated, weak or with debilitating disorders and which is chronic in nature are said to be incurable or should not be treated.[21]

Whereas *Karnanada* and *Kshweda* are considered as curable.

Do's and Don'ts

The general regimen to be followed by a person with ear diseases are intake of ghee, meat soup, avoidance of exercise or physical exertion, head bath, following celibacy, avoiding talking.[20]

DISCUSSION

The diagnosis of inner ear diseases are made by proper history taking, careful examination with the aid of modern equipments and investigations. Patient who seek early medical attention and engage with their treatment are likely to have better outcomes.

The etiological factors mentioned for *Badhirya* in classics when analysed, provide a way for proper diagnosis and treatment. Exposure to abnormal sounds can be understood in the present era, as exposure to loud sounds either occupational or recreational, which have detrimental effect on ears. The threshold above 85 dB with prolonged exposure of 8hours or more may cause a permanent hearing loss or tinnitus.[23]

An explanation regarding suppression of sneeze as a causative factor for reduced strength of sense organs is available in classics. To support this fact a study has been reported about the inner ear injury caused by suppression of sneeze. It is proposed that increased aerodynamic pressure associated with suppressed sneezing is transmitted via the eustachian tube to cause an implosive fistula of either the round or oval window with injury to membranous labyrinth [24].Hence suppression of sneeze or other natural urges should be avoided.

Suppression of thirst is mentioned as a direct cause for hearing loss in the classical textbooks. Reduced intake of fluids leads to dehydration. Excessive dehydration can result in osmotic disturbances in inner ear fluid. It is estimated to contribute approximately one third of the electrolyte increase during dehydration.[25] A fluid imbalance in the inner ear fluids can result in vertigo.

According to Ayurveda, the vital part should always be protected, as they give abode to vital structures like vital organs, arteries, veins or nerves. *Vidura marma* is a *Dhamani marma*, comprises of arterial supply pertaining to the specific part. It is located just behind and below the auricle of the ear at the mastoid process. An injury to this vital part, can cause deafness more likely when considered the underlying structures i.e., stylomastoid artery, facial nerve and mastoid air cells. So the possibility of deafness is due to the injury to stylomastoid artery.[26]

It has been hypothesized that estrogen may act as an auditory protectant, and there is no considerable evidence linking estrogen signalling, the estrogen receptors (ER), and estrogen related receptors (ESRR) and auditory protection. Mutations in the estrogen receptors underlie autosomal recessive, non–syndromic hearing loss in humans. But to establish the relation with ovulation and deafness in the progeny furthur work is required. [27] Hence a woman should avoid hearing loudness during menstruation.

For the proper management of these inner ear diseases, the underlying cause should be identified which is essential and treatment should be given accordingly. The principles of management mentioned for *Bhadirya, Nada* and *Kshweda* should be considered for the management of inner ear diseases i.e., SNHL, Tinnitus and Meniere's disease.

Basic principle to be followed while treating these diseases includes drugs and procedures which mitigate *Vata*, as in all these three diseases vitiated *Vata* is the prime factor. The procedures like oleation, sudation, therapeutic purgation etc are vatahara in nature. The *Vata* alleviating property of these procedures in ear diseases can be understood as pacification of pain, ringing sound, preventing degenerative changes and rejuvenating the inner ear

Nasya is considered as one such treatment which is considered best for the diseases pertaining to head and neck. For inner ear diseases nourishing (*Bruhmana*) type of *Nasya* is beneficial, for which formulations like *Anutaila, Narayana taila, Ksheerabala taila* or *Maashadi* taila etc can be used. The medicine gets easily spread to head where it gets absorbed and mitigates the doshas present in supraclavicular region *(Urdhwajatru)*, thereby removing the obstruction in the minute channels (*Srotorodha)* and furthur improving the function of all sense organs including ears.[28] The nasal administration of oil which is *vatahara* in nature mitigates the vitiated vata dosha that is responsible for the normal functioning of central nervous system when it is in the normal form. A vital point called *Srungataka marma* is considered as the junction of all the sense organs. Any drug reaching this area targets the vitiated doshas related to all sense organs and helps in nourishment of structures connected to these areas and promotes the normal functioning of these sense organs. Intra nasal lipid nanoparticles or liposome administration is a recently developed drug delivery system potent enough to result in an enhanced bio availability of therapeutically active molecules that demonstrate an easy access to systemic circulation with special mention to CNS.[29]

Karnapurana is one of the most important local treatments adopted in these ear diseases. *Vatahara* property of the *Taila* and the drugs strengthens and nourishes the nerves in the ear, thus protecting from furthur damage or degeneration. It is mentioned in

classsics as one of the daily regimens that should be followed by a healthy person to prevent ear and head diseases.

While treating Meniere's disease, *Pittahara chikitsa* should also be adopted along with general treatment principle. As vertigo is a presenting symptom in this condition, which has its nearest correlation to *Bhrama* in Ayurvedic classics. Bhrama is not mentioned as a symptom in any of the ear diseases but explained under diseases due to *Vata dosha* (*Vataja nanantmaja vyadhis*) [30] but there is another reference showing that it is due to *Raja, Vata* and *Pitta doshas*[31] *Bhrama* is also mentioned as one among of the symptoms in many *Pittaja vyadhis*. So the treatment protocol can be selected according to this.

Oral intake of ghee, meat soup, hot water is all said as wholesome to the body for a person with ear disease. All these measures can be adopted wisely by a physician to treat these inner ear diseases.

CONCLUSION

In the present era, excessive use of mobile phones, head phones, noise pollution produces detrimental effects on the functioning of ear which has increased the incidence of inner ear diseases. Special importance should be given to Presbycusis by conducting massive awareness program to encourage middle aged people to go for periodic check-up as the incidence is on the rise due to environmental causes. Ayurveda offers simple, safe and effective treatment for these inner ear diseases.

Treatment procedures like *Karnapurana*, *Pratimarsha nasya*, *Karna abhyanga, Shiro abhyanga* etc which are explained as a part of daily regimen shall be incorporated in our daily life for the prevention of the diseases of inner ear.

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Cite this article as:
Athira Rosh, Veena Shekar. An Ayurvedic Approach to Inner Ear Diseases. AYUSHDHARA, 2022;9(4):106-111.
https://doi.org/10.47070/ayushdhara.v10i4.1023
Source of support: Nil, Conflict of interest: None Declared

***Address for correspondence**
Dr. Athira Rosh
Post graduate Scholar,
Department of Shalakya tantra,
Sri Kalabyraveshwaraswamy Ayurvedic Medical College,
Hospital and Research centre,
Bangalore, Karnataka, India.
Email: athirarosh@gmail.com
Ph: 9740863813