

REVIEW ON

Age Related Sensori-Neural Deafness (Badhirya) and it's Ayurvedic Approach

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Abstract: *Ayurveda "science of life" is a unique blend of science and philosophy that balances physical, mental, emotional and spiritual components necessary for holistic health. Ayurveda is becoming more and more acceptable globally as it is eco-friendly, cost effective and toxicity free due to its holistic approach. According to Ayurveda Karna is one of the important sense organ and Badhirya is a disease in which difficulty in hearing. Hearing impairment which commonly occurs in old age patients called presbycusis includes inability to interpret speech sounds, often producing a reduced ability to communicate, delay in language acquisition, economic and educational disadvantage, social isolation and stigmatisation. The aim of this conceptual article is to complete and re-evaluate the various principles related to different aspects of Badhirya. (Age related sensory neural deafness). Modern rehabilitation strategies like hearing aid etc. are partly effective but underused. In Ayurveda lots of medicines are suggested to treat hearing loss which is found to be effective for treatment and prevention of hearing loss. And also we have to search new promising technology and strategies that are being investigated to help rehabilitate or healing presbycusis, containing stem cell transplant and gene therapy.*

Keywords: Ayurveda, Karna, Badhirya, Presbycusis

Introduction:

Hearing impairment is the most frequent sensory deficit in human populations, affecting more than 250 million people in the world. Consequences of hearing impairment include inability to interpret speech sounds, often producing a reduced ability to communicate, delay in language acquisition, economic and educational disadvantage, social isolation and stigmatisation (Colin Mathers, Andrew Smith, and Marisol Concha 2000).

Age related hearing loss is defined as mid to late adult age onset, bilateral or unilateral progressive sensori neural hearing loss that can have a serious negative impact in social interaction and often leads to progressive isolation. Factors involving inner ear are differentiated by Dr. Suhuknecht & colleagues.

(1) Sensory – loss of hair cells (& of sustentacular cells) at basal end of organ of corti

(2) Neural – Due to the cochlear ganglionic cell loss the degeneration of neurons of cochlear Nerve occurs (Suhuknecht H. presbycusis, laryngoscope 1995.)

Age related Hearing loss is associated with an audiogram that reveals greatest hearing loss at higher frequencies in majority of the cases. The pure tone hearing level (threshold) increases with age especially in the higher frequencies. Presbycusis patients suffered from high tone hearing loss first, which has a major adverse effect on communication, particularly in noisy and/or reverberant listening situations. Later, the ability to

detect, identify, and to localize the sounds gets Impacted. Once the loss progresses to the 2–4 kHz range, which is significant in understanding the voiceless consonants (t, p, k, f, s, and ch), even vowel identification, speech understanding in any situation is affected. Older adults frequently complains, e.g. "I can hear you, but I can't understand you." For example, people get confused words like, "mash", "math", "map", and "mat" or "Sunday" with "someday". Even such minor misperceptions, left uncorrected, can lead to communication errors.

Health Report 2001-02, adult-onset hearing loss was the 2nd leading cause with of (Years lived disability) YLDs at global level accounting for 4.6% of total global YLDs.

According to *Ayurveda* Badhirya (hearing loss) is mainly related with Vata dosha which is predominant in old age so as the age increases, Badhirya also increases. In Badhirya mainly vitiated vata dosha alone or along with Kapha goes in Shabdavaha sira / strotas because of that margavrodh occurs and leads to Badhirya. (Ravidatta Tripathi Ashthangasangraha Sutrashana Adhya 23/21 page 430)

Epidemiology:

Hearing loss is a major problem related to public health. Overall, 10% of the population has a hearing loss and this rate increases to 40% in the population older than 65 years. 80% of hearing loss cases occurs in elderly people [Gates GA, Mills JH (2005)]. As our society matures, there are more people living into their 60s, 70s, and 80s and

beyond due to factors such as improved nutrition and health care. In Developed countries such as USA, the number of people over 65 years of age in 2004 represents 12.4% of the US Population, and this is expected to grow to 20.0% of the US population by 2030 [Weindruch R, Prolla TA, Tanokura M (2007)]. As well as in developing countries, such as China, people are older than 65 years of age composed 7.69% of Chinese population in 2005 [China NBoSo (2006)], and is expected to increase to 25.0% of Chinese population in 2050 [Katzenschlager R.,

NeurolNeurosurg Psychiatry. (2004)]. Taken together, the number of people suffering from ARHL or presbycusis will continue to increase substantially in developed countries as well as in developing countries.

Pathophysiology:

The auditory system acts to channel and transduces sound pressure waves into electrophysiological signals that can then be localized and interpreted by the higher cortical centres.

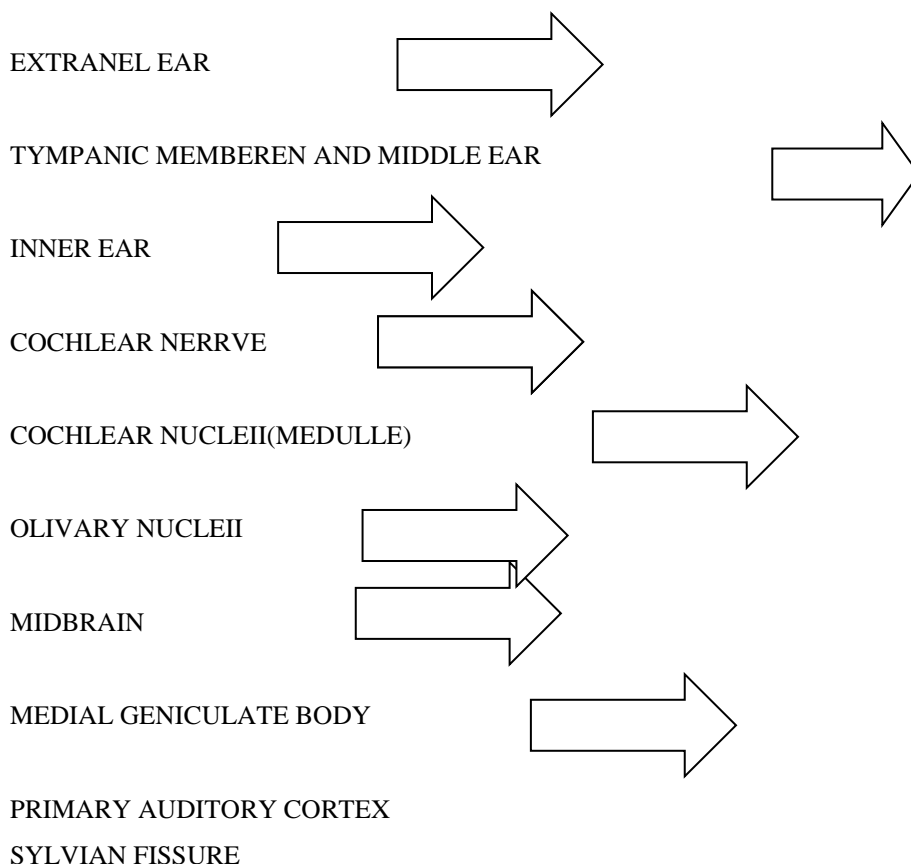


Fig. 1 Stages in the hearing pathway.

There are a number of stages in this process described in Fig. 1 [Howarth A, Shone GR (2006)]. And from the cochlea to the brain, numerous structural and chemical changes coincide with advancing age. These physiological changes alter the way how frequency and timing information is encoded in the peripheral and central auditory systems.

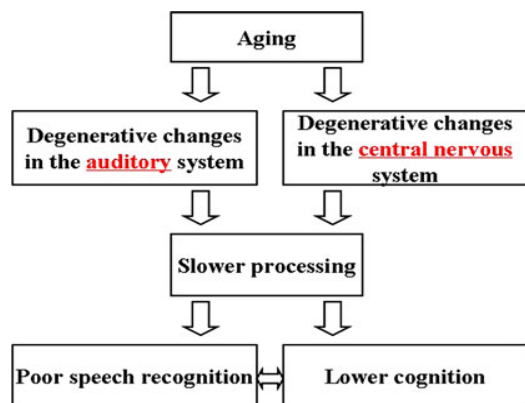


Fig. 3 The hypothesized relationship between slower processing, [Rawool V.W. (2007) The aging auditory system part 2 and 3]

According to Acharya Vagbhata, In the disease development processes of Badhirya mainly vitiated vata dosha alone or along with Kapha goes in Shabdavahasira / Strotas because of that margavrodh occurs and leads to Badhirya.

Risk factors of presbycusis

Heritability and genetic factors

Presbycusis shows a clear familial aggregation. Heritability estimate indicates that 35–55% of the variance of sensory presbycusis attributes to the effects of genes, while greater in the serial phenotypes, and even the aggregations are stronger in women (sister–sister, 53%; mother–daughter, 36%) than in men [Gates GA, Couropmitree NN, Myers RH (1999)].

Non-genetic components

Noise exposure is the best known and most studied environmental factor causing hearing loss. Besides the effect of noise exposure to presbycusis, a lot of other potential environmental and psychosocial risk factors, such as ototoxic substances industrial pollutants or by products such as organic solvents, asphyxiant gases (CO), heavy metals [Fuente A, McPherson B (2006)], drugs amino glycoside [Selimoglu E (2007)], cisplatin [Rybak

LP, Whitworth CA, Mukherjea D, Ramkumar V (2007)], salicylate, life-habits (tobacco smoking [Nomura K, Nakao M, Morimoto T (2005)], alcohol [Helzner EP, Cauley JA, Pratt SR, Wisniewski SR, Talbott EO, Zmuda JM, Harris TB, Rubin SM, TaaVe DR, Tyllavsky FA, Newman AB (2005)], leisure activities like hunting and shooting [Clark WW (1991)], even diets and even socioeconomic status (race and sex, lower social class, no higher education [Poortinga W (2007)], can influence susceptibility to presbycusis.

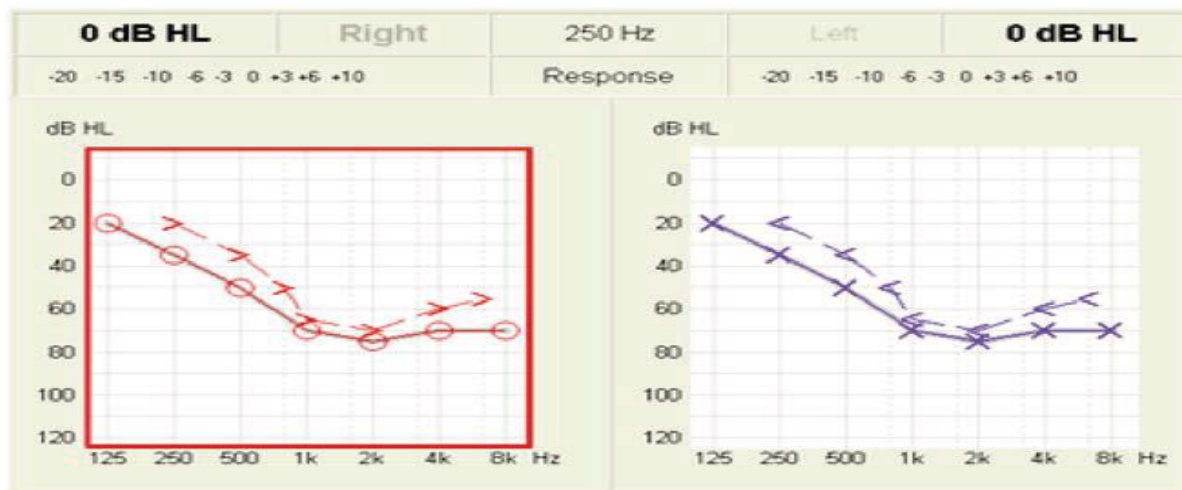
Medical conditions

Several medical conditions can also predispose to hearing loss. Head trauma, cardiovascular disease like hypertension, atherosclerosis, hyperlipidaemia, etc. Plasma hyper viscosity, Diabetes mellitus, Immune function impairment, Metabolic bone disease, Renal failure, Endocrine medical conditions: levels of aldosterone hormone Alzheimer's disease, Bone mineral density, Otolological conditions such as Meniere's disease or otosclerosis [Qi Huang · JianguoTang 13 May 2010© Springer-Verlag 2010]

Diagnosis

The diagnosis includes history, physical examination, screening and central auditory testing.

Audiogram of S.N. loss



The audiogram displays a sloping hearing loss from 20 dB HL in the low frequencies up to 75 dB HL in the higher frequencies and (nearly) equal in both ears. Such a hearing loss can usually be amplified sufficiently by using conventional hearing instruments. If sensory hearing loss in speech relevant frequencies exceeds values of about 80 to 90 dB HL, it might become difficult to make speech adequately audible. The reason here is that even though the person suffers from profound hearing loss, he/she never the less regards extremely loud sounds as uncomfortable as a normal hearing person would.

The challenge here is to fit the complete speech spectrum into the individual's residual dynamic range. If this range is reduced to 10–20 dB, conventional hearing instruments cannot provide sufficient amplification anymore.

ASSESSMENT CRITERIA

WHO grades of hearing impairment		
Grade of Impairment	Audiometric ISO value (average of 500, 1000, 2000, 4000 Hz)	Impairment description
0 (no impairment)	25 dBHL or less (better ear)	No or very slight hearing problems. Able to hear whispers
1 (Slight impairment)	26-40 dBHL (better ear)	Able to hear and repeat words spoken in normal voice at 1 metre
2 (Moderate impairment)	41-60 dBHL (better ear)	Able to hear and repeat words using raised voice at 1 metre
3 (severe impairment)	61-80 dBHL (better ear)	Able to hear some words when shouted into better ear
4 (Profound impairment including deafness)	81 dBHL or greater (better ear)	Unable to hear and understand even a shouted voice

Treatment

Self-assessment in help-seeking for presbycusis Hearing loss of all types affects not only communication but also quality of life. Thus, regardless, presbycusis should be prevented and treated positively and effectively. But what disappoints us is that according to Carson, consistent with Brooks and Kyle, there is a lag of 8 to more than 20 years between the time one is aware of hearing difficulties and when professional hearing help is sought. So to establish and implement a self-assessment mechanism or model in help-seeking for presbycusis should be prioritized.

Prevention

We have known that presbycusis as a complex disease is influenced by genetic, environmental and psychosocial factors, as well as medical conditions. It prompts us that the strategies for preventing presbycusis can mainly focus on these risk factors. We can keep noise away by inserting ear plugs when exposed to noise, reducing gun shooting and chances of loud music exposure.

Rehabilitation

To improve communication process the degree of the effects of presbycusis is affected by both communication partners. Therefore, auditory rehabilitation needs to teach the hearing impaired and those around them techniques to improve communication despite the disability. This means that both of communication partners should work at improving the communication process when one or both of them have a hearing problem.

Hearing aids

For presbycusis generally the prescribed "treatment" is a hearing aid. A hearing aid is small electronic device that you wear in or behind your ear, selectively amplifies sound vibrations at which range of frequency the hearing loss occurs so that a person with hearing loss can listen, communicate, and participate more fully in daily activities.

Hearing aids may have analogue or digital circuitry, may be adjusted manually or automatically, and may have sophisticated directional microphones, noise suppression technology, telephone coils, and multiple programme modes. The hearing aid that will work best for you depends on the kind and severity of your hearing loss, you and your audiologist should select a hearing aid that best suits your needs and lifestyle, also considering your finance.

Cochlear implants

Cochlear implants are small, complex electronic devices that can help to provide a sense of sound to a person who is profoundly deaf or severely hard-of-hearing, even with appropriately fitted hearing aids through directly stimulating the cochlear nerve.

Stem cells transplant therapy.

Ayurvedic treatment

In Ayurveda lots of medicines are suggested to treat deafness which is found to be effective for treatment and prevention of hearing loss.

Conclusion

Presbycusis is an increasingly important public health problem which leads presbycusis sufferers to reduced quality of life, isolation, dependence and frustration in both developing countries. And it is a complex disease manifesting controversial in pathology and physiology and influenced by genetic, environmental, socioeconomic and medical factors. However, there are still a number of steps to take to find more risk factors of it. Modern rehabilitation strategies are partly effective but underused. In Ayurveda lots of medicines are suggested to treat deafness which is found to be effective for treatment and prevention of hearing loss. And also we have to search new promising technology and strategies that are being investigated to help rehabilitate or healing presbycusis, containing stem cell transplant and gene therapy.

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