'HEAR' IT LOUD AND CLEAR

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Loss of hearing is one of the largest yet least defined ailments in India. Statistics show that one out of every 12 persons in this country is affected by this problem to some degree. Yet we pay less attention to hearing loss. Perhaps, this is because hearing loss is invisible and painless. In fact, those who are deaf suffer from devastating emotional, social and psychological pain. Hearing loss is India's least understood problem because it is a hurt that does not show. Among the infirm and defective, the deaf mutes are most short - lived as they suffer in silence, are less expressive and the least understood. Today, there are many unsolved problems related to hearing and balance disorders, and there are indications that the size of the problem is growing. Though the opportunities to do something about these problems today are better than ever before, the many unsolved mysteries of hearing and balance disorders still persist. Poor hearing disrupts communication among people. Most important among them is between teachers and students and father or mother and children. It leads to falling grades, isolation and unhappiness among learners. Hearing loss among olds leads to strained tempers and irritability. Aged persons should take degeneration of ears sportingly and get their hearing tested with the help of audiometry tests after which suitable hearing aid can be used. Emotional stress which accompanies hearing loss in children, young ones and elderly can be reduced through awareness, motivation, rehabilitation and planning.

First of all one must have preliminary information of the ear structure and functioning. The master communication organ, the ear has three parts, the external ear, the middle ear and the internal ear. The external ear comprises of pinna and canal which conducts sound waves to tympanic membrane. This membrane separates the external ear from middle ear. The vibrations of this membrane facilitate process of hearing. The middle ear is an air-filled cavity which contains three small ossicles and two muscles. Eustachian tube opens in middle ear, by one end and its other end opens in pharynx. The internal ear or labyrinth consists of Cochlea, vestibule and semicircular canals. Cochlea is a coiled bony tube like shell of a snail. Sense organ of hearing is lodged here. Organs of static balance are present within vestibule and kinetic balance within the semicircular canals.

If you are suffering from deafness, a complete otological examination by a ear specialist is

necessary to find out the type of hearing impairment, its probable cause and recommended treatment. Today, it is possible to detect deafness in infants as old as a day. This is done by a process called Auditory Brain stem Response (ABR), a computerised system whereby the patient doesn't even need to speak or answer. Deafness is mainly of two types, conductive deafness and sensorineural deafness. School-going children mainly suffer from glue ear. In this condition, the middle ear fills up with fluid, which becomes thick like glue, the eardrum cannot move and hearing is reduced. In some cases glue is surgically removed from the ears by putting small ventilation tube in the eardrum. The other common ear problem in children is the entry of an animated or inanimate foreign body in the ear canal/tunnel. Objects such as beads, grains, broken pencils can be intentionally inserted into the ear. Like-wise, small living insects also enter the ear. These foreign bodies are removed with the help of hook or forceps. Childhood memories remind us of mother's protective words 'Don't forget to wash behind your ears'. But have you ever wondered why 'clean behind' and not 'clean your ears'? According to Dr. Morwani, President, All India Association of Oto-Rhiho-Laryngologists, 'Never use cotton buds'. If you must, do so only under medical supervision. It isn't necessary to clean one's ears. The ear has a self-cleaning mechanism. It secretes a solution that lubricates and keeps the inner walls healthy and moist. Ear wax isn't just debris that's piled up in ears, like dirt on a neck or knee or elbow. There are valid reasons for making wax by the ears. The ear canal is a narrow tunnel and about 2000 little glands stud its outer walls. These glands are known as cerumen glands. They secrete yellow wax-like oily secretion. Why do ears make this oil? The skin covering the canal is very thin and dries out easily. Ear wax coats fragile skin thereby offers protection. Furthermore, (i) It also acts as water repellent, helping shower and pool water to run back out the way it came; (ii) It traps in dirt and dust before it makes its way farther into the ear; (iii) It even acts like fly paper, trapping tiny bugs before they can crawl back into ears; and (iv) It has an ingredient that kills germs, helping protect ears from infection. The secretions of cerumen and sebaceous glands on getting mixed form a lump or blackish mass in the external ear. This sometimes causes pain. However, this can be removed. If the wax is hard, it can be softened by ear drops and then removed. Being fragile, skin of the ear canal becomes inflamed if you have scratched your ear or if you have a skin condition such as dermatitis or eczema. Infection of the ear canal skin (otitis external) may lead to conductive deafness.

Common ear problems which hinder hearing include: ear discharge, ageing, antibiotics, tennitus and vertigo.

Ear discharge: Most people tend to brush off ear discharge as unimportant. The fact is any discharge from ear signifies an infection which has set in and calls for immediate action. The middle ear is connected to the back of nose through eustachian tube which serve as a pressure equalising value for the ear. Due to this link infection from upper part of the nose can spread to middle ear. During cough and cold, phelgum travels through the eustachian tube and causes an infection in the middle ear. The eardrum of an infected ear may rupture

resulting in perforation. With proper treatment from specialist at this stage, infection of middle ear usually subsides and perforation heals. However, if a child does not get proper treatment at this stage, the infection spreads and perforation fails to heal and hearing loss occurs with intermittent or constant discharge. Untreated infection which often afflict infants and children under the age of ten generally leads to hearing loss and thereby delaying the learning process. Researchers have found that susceptibility of a child to getting infections in the middle ear, depends on genetic make up which he/she has inherited from his/her parents. Being aware of a possible family susceptibility to otitis media (middle ear infection) can help parents and paediatricians to diagnose and protect their children. The following steps should be taken to control ear discharge:

- Keep the ear canal clean by means of a small cotton tipped applicator.
- Use the medication as prescribed by the expert.
- Avoid blowing your nose. This prevent infection in your nose from spreading to the ear.
- If perforation is present, you should not allow water to get into canal. This may be avoided by placing cotton in the external ear canal while taking a shower or washing hair.
- If you desire to swim, use tight fitting swimming cap.

Ageing: Progressive dealing in hearing sensitivity due to ageing process is called presbycusis. Hearing loss affects majority of people above the age of 45 and their hearing gradually gets deteriorated as a part of the ageing process. According to reliable estimates approximately 30 per cent of senior citizens have a significant hearing loss that adversely affects their receptive communicative ability. Presbycusis is more than simple loss of hearing. It is a complex disorder involving loss of speech processing and discrimination as well as perception of sounds of different frequencies. Rehabilitation measures of aged include: (i) Careful explanation of the problem. (ii) Reassurance to the patient that he is not going to be deaf. (iii) Amplification of sound with a suitable hearing aid. Changes in the hearing, due to ageing nerve, causes a decline in hearing sensitivity. Speech is audible but not clearly discernable to the listener. Hearing aid is a boon to such a patient. For finding out 'suitable hearing aid frequency' hearing should be tested with the help of audiometery tests. A thorough hearing aid evaluation sometimes involves more than one session. Clear explanation regarding limitations of hearing aid and strong motivation to encourage the patient to use the aid are mandatory if patient is to receive the full benefits of amplification. Hearing aid user should keep in mind the following facts:

- Using hearing aid requires physical and psyco-acoustic adjustments which take time.
- For every hearing aid user, the role of family friends and co-workers is crucial, especially during initial period of adjustment to the hearing aid.
- Never buy hearing aids off the counter. Specific aids are prescribed for specific causes, depending upon the severity of your ear problem.
- Cheap aids could cause more distortions of sound. Beware especially of Rs 500 hearing aids liberally dispensed over medical counters. Good hearing aids cost from Rs 8000/- upward. Some even cost Rs 70,000. India makes good quality hearing aids.

- If a well tested, good quality hearing aid is of no use to you then look for a Cochlear implant.

Antibiotic-induced hearing loss: Common antibiotic called amino glycosides impair hearing. Many bacterial infections that are resistant to other drugs respond best to this group of antibiotic. It is estimated that ten per cent of all those admitted to hospital receive aminoglycosides. However, recent research suggests that hearing loss associated with this antibiotic can be curtailed by taking aspirin along with this antibiotic. But, before beginning daily aspirin use, check with your physician. Doctors remind us that there can be significant risk for some people in taking the aspirin. By thinning blood, aspirin can retard clotting and cause excessive bleeding. So regular use of aspirin may not be appropriate for people with bleeding disorders.

Tinnitus: It is the perception of sound without any outside auditory stimulus. This sound is often described as a ringing but it can vary in pitch and take the form of buzzing, roaring, clicking or a number of other sounds. It can be constant or intermittent, loud or soft. When it is constant, it is annoying and distracting. Tinnitus is the result of damage to the microscopic endings of the hearing nerve. The cause of tinnitus varies from person to person. Most often tinnitus results from exposure to loud sound. Tinnitus can also accompany thyroid hormone imbalance, whiplash, head injury, Meniere's disease, allergy, high or low blood pressure, diabetes, tumours and vascular diseases. Drugs, that is, certain antibiotics, sedatives and antidepressants trigger this condition. Most people are able to largely ignore tinnitus. But some are not able to filter out these extraneous sounds and are severely bothered by them.

If your ENT specialist finds a specific cause of your tinnitus, he may be able to eliminate the noise. But this determination may require extensive testing, including X-rays, balance tests and laboratory work. The treatment of tinnitus includes:

- The most common treatment to address tinnitus directly is referred to as a sound therapy. This approach uses some form of externally generated sound to mask or distract the sufferer phantom tinnitus sounds.
- Tinnitus retraining therapy: In this treatment, the patient is trained to perceive tinnitus sounds as insignificant and filter them out of conscious thought, much as routinely filter out repetitive environmental background noises. This therapy requires lengthy training sessions conducted over a period of 12-18 months.
- A drug that reduces tinnitus significantly is lidocaine. But it has to be given intravenously. Furthermore, it can trigger disturbances in heart rhythm. Due to these reasons, despite lidocaine's anti-tinnitus potentials, it has not become practical option for managing this condition.

Vertigo: The inability to orient the body in relation to surrounding objects is medically called vertigo. Knowledge of the position of one's body in space and its relationship to surrounding objects is achieved by a process of continuous and largely unconscious sensory perception. Orientation of body in space is controlled by a complicated system which includes, eyes and eye muscles, inner ear, central coordination system

and different fibres from joint muscles. Five sensory modalities which control our bodily position and motions include: vision, vestibular sensation, joint position sense, touch-pressure sensation and hearing. This multichannel input is rapidly integrated by central nervous system. Organs of equilibrium present in inner ear are vital in detecting changes in the position of head. Vertigo which is a disturbance in the orient detecting system of a subject manifest itself as intermittent dizziness, fluctuating hearing loss, aural pressure, whirling sensation. Spell of vertigo may lead to momentary loss of consciousness and falling of patient to ground who tries to regain his position by holding nearby subjects. After the spell of vertigo is over sense of unsteadiness makes the patient afraid to move. Common cause of vertigo include dilation of vestibular apparatus in inner ear due to accumulation of endolymph, head injury, organic brain damage involving vestibular nerve, its end organ or connections of cerebellum and drug toxicity. Doctors recommend Chair test, Cochleaography and Electro nystagmo graphy for the evaluation of vertigo. However, vertigo remains an etiological and therapeutic enigma. Various ways to contain its symptoms include a low salt diet, cessation of smoking and calcium blockers. Surgery is an option but surgical procedures involve the risk of hearing loss and facial nerve paralysis. Vestibula-sedative drugs, e.g., medicine or diazepam and antiemetic drugs can be taken on the advice of doctor.

If the deafness is due to the problem in the internal ear, it is called cochlear/sensory or inner ear deafness. When deafness becomes sensorineural you need Cochlear implant. This implant produces hearing in a deaf child or adult who cannot use a hearing aid. Vast majority of candidates for this implant are congenitally deaf. In these patients, hearing aids are ineffective because the mechanism by which sound is converted into electrical signals in cochlea is absent. Deafness during childhood can be devastating as it hinders speech development. Inadequate sensory inputs during this period can lead to life-long communication defects. That's why cochlear implant is a must for children. Electrical impulses produced by ear implant could stimulate brain regions in children born deaf and help them to hear and speak, provided that implant is placed in inner ear within few years of child's birth. Age seems to be the most important determinant for successful outcome of these implants. Ideally, a decision to implant should be made before the age of two, but this requires most efficient nonmetal hearing screening programmes. No child should be considered too young or two disabled for Cochlear implant. In some cases Cochlear implant can be carried out even in elderly persons. The biological safety of this implant has been established but is a costly procedure. The assessment, surgery, implant and spare parts, medication, hospital expenses, therapy plus one year post-operative care costs about 2-3 lakh rupees.

Epic Biosonics, the Canadian Company has developed the first totally implantable bionic ear, which promises to revolutionise life for the deaf. The device, operated by a battery with one millionth power of domestic light bulb, is small enough to go inside the ear of a newborn baby, allowing the hearing part of the brain to develop. At the heart of bionic ear is a speech processing chip, which orchestrates sounds and sends them to the brain. It is water resistant and requires minimal surgery to install.