A Survey of Deaf Mutes

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Abstract

Background : Detection of hearing loss at birth or early childhood is difficult. This bears on the rehabilitation of the child as the golden period of learning is lost. Reliable statistics relating the average age for detection of hearing loss and fitting of hearing aids in children are not available in our country. A survey of 52 deaf mutes was therefore conducted to ascertain the probable causes that lead to deafness.

Methods : The study subjects were 42 deaf mutes from the Government run school for deaf mutes and 10 from ASHA School run by the Army Wives Welfare Association. A questionnaire prepared in Hindi was filled by the parents and data analysed.

Results : The average age of detection of hearing loss was 2.8 years and the average age for receiving a hearing aid was 7.6 years. Thus due to the significant reduction of sensory input at the 'golden period of learning' only 50% of those fitted with a hearing aid found it useful. In 42.3% the cause of deafness could not be identified.

Conclusion : Greater emphasis is required on early diagnosis of childhood deafness and fitment of hearing aid.

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Key Words : Deaf mutes; Hearing aid

Introduction

In 1995, the 'Persons with Disability Act' was promulgated and the national policy framed according to which strong emphasis has been laid on prevention and early detection of disability and intervention to help minimize the impact of disability [1].

The term plasticity is used to describe an alteration in the physiological properties of neurons in the peripheral and central auditory system. Since exposure to a normal acoustic environment is required for maturation, it follows that significant reduction of sensory input, induces both anatomical and physiological alteration of the auditory pathways [2]. The incidence of hearing loss at infancy is low (1:1,000) and the disability is not immediately apparent. Therefore many doctors and educationists are not sufficiently familiar with the signs of hearing loss or its educational impact. The search for causes of deafness help in identifying high risk groups and planning programmes for prevention. A survey of 52 deaf mutes in Jabalpur was done to ascertain the age at which hearing loss was detected, age at which a hearing aid was given and the possible causes of deaf mutism in these children.

Material and Methods

The study subjects were 42 deaf mutes from the Government run school for deaf mutes and 10 from ASHA School run by the Army Wives Welfare Association. There

were 41 boys and 11 girls in the age group of 6 to 14 years. A questionnaire was prepared in Hindi using simple terms and the parents were asked to fill it (Table 1). The data was tabulated and analysed.

Results

The monthly income of parents ranged from Rs 1000/- to Rs 5000/- per month. There were three daily wage workers and one officer earning about Rs 15,000/- per month. The mother's age at birth of their child varied from 14 to 37 years. Six were less than 20 years while two more than 35 years (15.5% at extremes of age). Two mothers had antenatal problems, one malaria and the other bronchial asthma (4%). Three underwent lower segment caesarian section (LSCS), one had a forceps delivery and one neonate had bleeding from the ears, though delivery was described to be normal (13.4% perinatal causes). Six developed serious postnatal problems. There was one case of rhesus incompatibility with serum bilirubin levels of 23 mg %. One developed deafness after an attack of gastroenteritis, one after tubercular meningitis, one after brain abscess and meningitis following head injury and another after a drug reaction. One developed sudden deafness (11.5% post natal causes).

Four gave history of deafness afflicting other members of the family and of these, two were products of a consanguineous marriage. One had a father and two younger sisters who were deaf mute. The afflicted children and the family members of the remaining children were all males (7.6% hereditary causes). Three (5.7%) children had eye defects besides deafness (Fig. 1).

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Table 1
QUESTIONNAIRE TO PARENTS OF DEAF MUTES
(Translated from Hindi)

1. Occupation of father
2. Monthly income
3. Was the deafness present at birth or did it occur later?
4. What was the age of the mother at the birth of the deaf mute child?
5. Did the mother suffer from any disease during pregnancy?
6. Was the delivery normal and if not what were the problems encountered?
7. Was the deafness accompanied by any other disability?
8. Was there a family history?
9. At what age was the deafness detected?
10. At what age did the child get a hearing aid?
11. Did the child benefit with the hearing aid?
12. Had any counselling been given regarding the next child?

Fig.. 1 : Probable causes of deafness

The age at diagnosis varied between three months to nine years. Of these, 15 were detected before one year of age, 11 at two years, 12 at three years, six at four years, five at five years, one at six years and two at nine years. One child who became deaf at seven years, as a result of head injury was detected to have deafness within one month of the injury. The average age of detection, excluding the above case of head injury was 2.8 yrs.

Forty six children received hearing aid between 4-14 years of age. The child with head injury received hearing aid 2 years after the injury. Five children were not prescribed a hearing aid. The average age of receiving a hearing aid was 7.6 years. Of these, only 24 (50%) children found the hearing aid useful to some degree and only 10 parents said that they had consulted about the next child.

Discussion

Deaf mutism connotes bilateral profound hearing impairment of early onset to necessitate special or supplementary education for speech. It is impossible to distinguish between congenital deafness and that of onset in the first few weeks or months of life. However with better modalities of screening, like Otoacoustic

Emissions and Brain Evoked Response Audiometry (BERA) it is possible to detect deafness in high risk groups, by the age of six months. In our survey the average age of detection was 2.8 years in a peripheral set up with one centre having BERA and none for recording otoacoustic emissions. Out of the children given a hearing aid only 50% benefited appreciably, even though the gain could not be quantified by recording speech recognition thresholds or aided audiograms.

Truy et al [3], have discussed the influence of deprivation duration in cochlear implant subjects while, Ponton et al [4], compared cortical evoked potentials in cochlear implanted and normal-hearing children. Their results indicate that central auditory system did not mature without acoustical stimulation. They found that the P1 component latency maturation was delayed as a function of the duration of the auditory deprivation. Thus, the deprivation duration influenced the level of auditory performance just after implantation and the time required for rehabilitation. In the same context, Eggermont et al [5], used the P1 latency as the indicator of auditory system maturation. They observed that the rate of maturation of cochlear implanted children was similar to that of normal hearing children but delayed by an amount equal to the duration of auditory deprivation. Burkey and Arkis[6] tested binaurally impaired subjects who had been monaurally aided and found a significant decrease in the performance of the unaided ear which improved, after one year of binaural fitting.

Hattori [7], studied the speech recognition thresholds in children with moderately severe to profound hearing loss and found that speech recognition thresholds in children showed an increase of performance over time in both ears of binaurally aided and monaurally aided children. Nevertheless, the aided ear of monaurally fitted children showed a greater improvement in performance relative to that measured for the unaided ear. It was concluded that, in the aided ear, the benefit from amplification is added to natural maturation effect.

In this study all the children except one belonged to the lower socioeconomic strata with families earning less than Rs 5000/- per month. Jabalpur has only one school for the deaf mutes. The ASHA school is only for the dependents of army personnel. It is therefore expected that even children belonging to the higher strata will flock to these schools, which was not seen in this study. Possibly in the richer class who are also likely to be more educated the deafness is discovered early and with the help of hearing aids many can be incorporated in the main stream. They are less likely to suffer from severe childhood infections and therefore incidence of deafness may be less in this group.

Age of the mother at the time of child birth has been

conclusively proved to have a bearing on the incidence of congenital disorders like Down's syndrome[8]. In this study six mothers were below the age of 20 years and two were more than 35 years of age. However there was no case of Down's syndrome in our survey group. One mother suffered from malaria while another had repeated attacks of bronchial asthma. Malaria in pregnancy is known to be associated with still birth, miscarriage, low birth weight and defects [9].

Uncontrolled asthma is associated with complications such as – premature birth, low birth weight and pre-eclampsia. Acute episodes endanger the foetus by reducing the oxygen it receives. Among the perinatal causes encountered in this study were problems in delivery which lead to LSCS, use of forceps and bleeding from the ears. In children, the deafness may not be noticed for some time after the injury.

In the post natal period one child suffered from Rhesus incompatibility with serum bilirubin rising up to 23 mg%. Schuknecht[10], believed the lesion in such cases to be in the cochlear apparatus. This child had not been given exchange transfusion. The most common cause of acquired deafness in childhood was meningitis in the pre antibiotic era. In our survey only two children suffered from meningitis. In this study one child had become deaf after a drug reaction. The exact drug was not known. Children rarely complain of sudden hearing loss but in our survey there was only one such child. The cause could be viral, trauma or vascular. Consanguineous marriages are common in certain parts of India. The clinical spectrum of inherited deafness is broad and ranges from simple deafness without other clinical abnormalities to genetically determined syndromes. One child of a consanguineous marriage had lentigines and LEOPARD syndrome was considered. This child's cousin also was deaf mute and had lentigines. The other abnormalities of this syndrome were not present. The diagnosis of syndromic deafness may appear uncomplicated but the variability in phenotype from one affected individual to the next can be confusing. Eye defects with profound deafness are known to be associated with intrauterine infections like Rubella and Toxoplasmosis. The maternal infection may be sub clinical in about 40% of the cases. It must be emphasized that the earlier the hearing loss is diagnosed, greater the likelihood of concluding that the hearing loss is due to congenital infection.

The large time gap between the diagnosis of deafness and the fitting of the hearing aid could be due to the cost factor (the cheapest hearing aid in the market costs Rs 700-1,000). As per the 'Persons with Disabilities Act' (PDA) hearing aids are to be provided by Government aided institutions. However 'within limits of economic

capacity' (section 44 of PDA) has become a lame defense to negate facilities at an early stage. In addition ignorance of health care providers regarding the importance of early fitting of hearing aid and prejudices-like the hearing aid will destroy any residual hearing could be other contributors.

Thus there is a clear need for improved awareness and better education of both parents and professionals, if deafness is to be detected and managed early. Hearing assessment is only one aspect in the overall care of children with hearing problems.

The targets listed below have been achieved in centres in UK [11]. There is no reason why they can not be adopted by us:-

1. To detect 80% of bilateral congenital hearing impairment in excess of 50 db within the first year of life and 40% by the age of six months.
2. To fit hearing aids within four weeks of confirmation of hearing loss in appropriate cases.
3. To provide audiological assessment within four weeks of referral, to test children at high risk of acquired hearing loss (e.g. following meningitis).
4. To include this aspect in primary health care.

In the preventive aspect, the actions could be immunization of all expectant mothers and children, public health and sanitation to ensure prevention of outbreak of diseases, training of medical and paramedical personnel in the detection of early hearing loss and follow up with suitable intervention and law to ban consanguineous marriages. Awareness programmes for prevention could be built in at the school level and at the level of teacher's training courses. It is rare for any child to be totally deaf and every attempt should be made to use the residual hearing.

Conflicts of Interest

None identified

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Quiz

Radiological Quiz

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A 42 year female patient with an anxious predisposition, underwent the first stage, of a staged delayed reconstruction for her left breast following mastectomy for cancer. Postoperatively, she complained of breathing difficulty and pain chest in the evening. A plain radiograph of the chest was taken by the surgical resident (Fig. 1). He consulted his medicine resident, who in turn showed the radiograph to the physician on call who advised ultrasound guided aspiration of the chest. The operating surgeon fortunately reached the radiology department in time to save the patient from the procedure. The surgeon had to give an analgesic and sedative to the patient for complete relief and recovery.

Questions

1. What were the cardinal mistakes made by the surgical resident, the medicine resident and the physician?

2. What are the findings of importance in the radiograph and what is the diagnosis?

Fig. 1 : Chest radiograph PA view

Answer to quiz : page 55

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