

Management of Single Sided Deafness in Children: Retrospective Case Series



Oxford University Hospitals
NHS Foundation Trust

G Chawdhary, M Mancheno, D Moualed, J Ramsden

West Wing, John Radcliffe Hospital, Headley Way, Headington, Oxford OX3 9DU.

Background

Paediatric single sided deafness (SSD) was historically not managed proactively. Increasingly, the benefits of binaural hearing are becoming clear¹⁻⁵. These include better speech understanding in noise, better sound localisation and better cortical sound processing. In addition, binaural hearing is necessary for effective auditory cortex development. Single sided deafness on the other hand is associated with poorer speech and language development, psychosocial difficulties and poorer academic performance: 22-35% of children repeat a grade in school^{6,7}. This evidence has prompted a rethink about how we manage SSD.

Aims

The primary aim of this study was to retrospectively review the current management of paediatric Single Sided Deafness at our institution and therefore consider whether this could be improved.

Methods

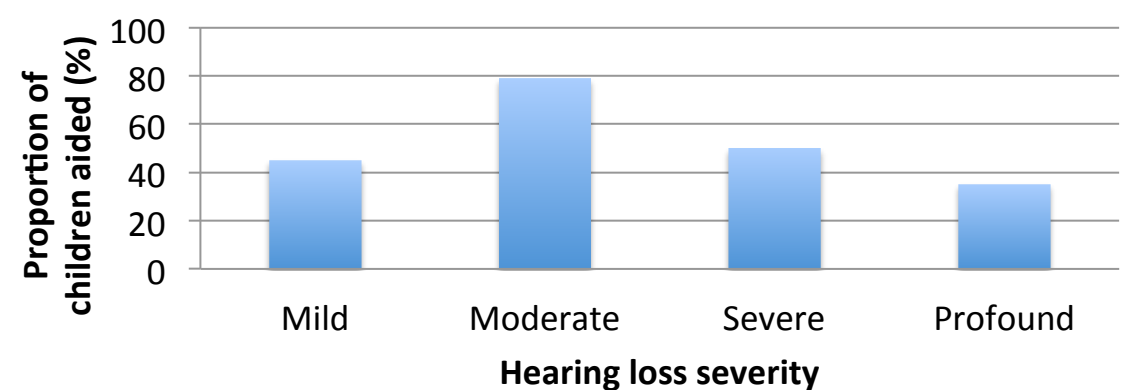
We identified all children with single sided deafness under review by Audiology (using our Auditbase Database) and retrospectively reviewed the audiograms, audiology notes and clinical ENT letters.

Results

Fifty seven children were identified of which 30 were boys and 27 were girls. Age range 1y6m – 14y. 28 left ears, 29 right ears.

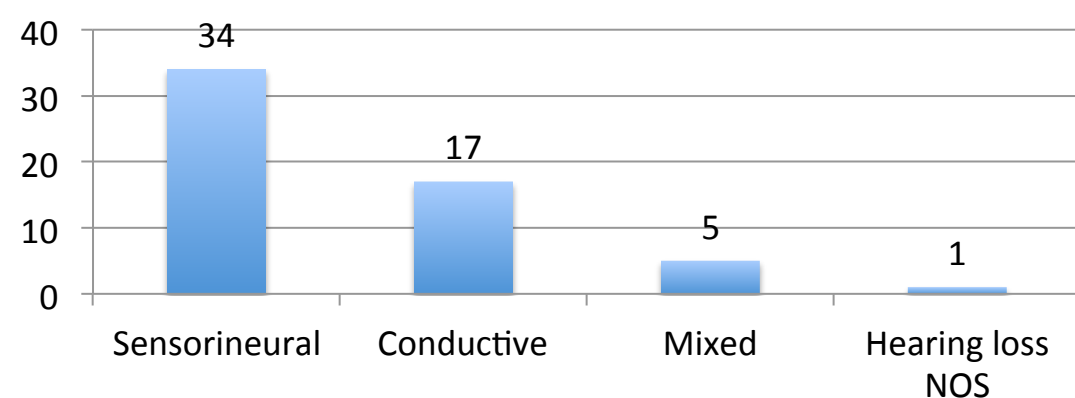
Aid	n	Percentage
No treatment	24	42%
Hearing Aid	21	37%
Softband BAHA	6	11%
CROS Aid	4	7%
FM system	1	2%
Reconstructive Surgery	1	2%
Total	57	100%

Treatment by degree of hearing loss

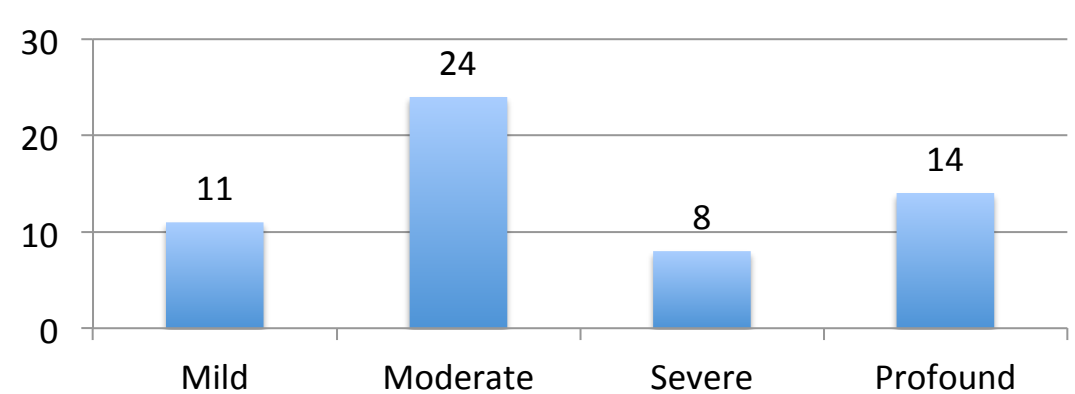


58% had some form of hearing aid and 63% had input from Community Hearing Impairment Team

Type of Hearing Loss



Degree of Hearing Loss



Diagnoses

Sensorineural Loss NOS	26
Conductive Loss NOS	7
Microtia with or without Ear Canal Atresia	5
Mixed Loss NOS	4
Cholesteatoma/Middle Ear Disease	3
Congenital CMV	2
Cochlear Nerve Aplasia	2
Neonatal Meningitis	1
Osteogenesis Imperfecta	1
Congenital SNHL	1
Multiple Congenital Abnormalities	1
Goldenhar Syndrome	1
Treacher Collins Syndrome	1
Hearing Loss NOS	1
22.11q duplication	1
Total	57

Summary and Discussion

Single sided deafness in children remains a challenging condition to manage as there is currently no clear consensus on optimal treatment⁸. Multiple treatment options exist, including hearing aids, contralateral routing of signal (CROS) aids, softband bone conduction hearing aid, bone anchored hearing aid (BAHA) and cochlear implant. No active treatment is also an option.

Although evidence exists of the theoretical benefits of binaural over monaural hearing, robust data showing clear clinical benefit of one modality of treatment over others are lacking. Consequently, parents are faced with a multitude of options, each requiring significant investments of time and effort on the part of both parents and the child. For the family to commit to any particular aiding option, there needs to be clear demonstrable benefit shown both in the literature and after an individual trial.

In the absence of such data, a sensible approach would be to consider the individual child's handicap and the parents' views and circumstances. A sequential, stepwise interventional approach can then be applied, from least invasive options offered first.

References

- Bronkhorst AW, Plomp R. Binaural speech intelligibility in noise for hearing-impaired listeners. *J Acoust Soc Am* 1989;86:1374–83.
- Lieu JE, Tye-Murray N, Fu Q. Longitudinal study of children with unilateral hearing loss. *Laryngoscope* 2012;122:2088–95.
- MacKeith NW, Coles RR. Binaural advantages in hearing of speech. *J Laryngol Otol* 1971;85:213–32.
- Lieu JE. Speech-language and educational consequences of unilateral hearing loss in children. *Arch Otolaryngol Head Neck Surg* 2004;130:524 – 30.
- Cabral F, Hausen M, Alves R, dos Santos Malerbi A, Bento R. Cochlear Implantation and Single-sided Deafness: A Systematic Review of the Literature. *Int Arch Otorhinolaryngol* 2016;20:69–75
- Lieu JE. Unilateral hearing loss in children: speech-language and school performance. *B-ENT* 2013;2013:107–15.
- Lieu JE. Speech-language and educational consequences of unilateral hearing loss in children. *Arch Otolaryngol Head Neck Surg* 2004;130:524 – 30.
- Appachi S, Specht JL, Raol N, Lieu JEC, Cohen MS, Dedhia K, Anne S. Auditory Outcomes with Hearing Rehabilitation in Children with Unilateral Hearing Loss: A Systematic Review. *Otolaryngol Head Neck Surg*. 2017 Oct;157(4):565-571.