Optimising Early Cochlear Implantation in the Congenitally Deaf

Christopher Raine, FRCS, ChM, Rebecca Dawson, FRCS, Hannah Gooch, BSc, Elizabeth Hamilton, MA, Jane Martin, MED, David Strachan, FRCS

Dept of Otolaryngology, Yorkshire Auditory Implant Centre, Bradford, West Yorkshire

**Introduction:**

Published evidence supports early cochlear implantation surgery in the congenital paediatric patients. The aim of this report was to review the patient pathway to identify whether there are factors delaying cochlear implantation and how to avoid them.

**Material and Methods:**

Paediatric records for all CI patients aged ≤5 years at the time of surgery over a 4-year period were reviewed. Data collected were related to referral, audiological testing before and after surgery, medical and social history, and key points of contact with the multidisciplinary team. Two groups were identified: those implanted ≤18 months and those between 18 months and 5 years.

**Results:**

70 patients were identified, of whom 20 had progressive deafness and so were excluded. Of the resulting 50 patients, 23 had a unilateral or bilateral cochlear implant ≤18 months (CI<18m) and 27 aged more than 18 months (CI>18m). The majority of patients had had newborn hearing screening within their first month of life. Referral varied widely between the two groups, with a mean age at the time of referral in the CI<18m group of 7 months compared to 19.4 months in CI>18m. Audiological assessment in the group implanted aged >18 months took longer at 5.5 months compared to 3.5 months, though obvious patient outliers were identified. The number of appointments with both audiology and ENT surgeons were very similar. Other factors found more commonly in the group implanted aged >18 months were failure to attend appointments, concern about hearing aid use, prematurity, comorbidities, and falling outside the national criteria for implantation. Incidence of otitis media with effusion and requirement for grommet insertion were very similar between the two groups, and failure to condition to VRA testing was more common in the group implanted at a younger age.

**Conclusions:**

The main learning points identified by this study are the continuing need for education in referring teams to ensure early referral and a full multidisciplinary discussion of patients on a longer assessment pathway to identify avoidable delays. Some congenitally deaf paediatric patients take a much longer time to test, and there is limited evidence in the literature focusing on this particular group. The risk of implanting without the child able to condition to audiological testing is over-programming and an unpleasant sound stimulus, resulting in failure to wear the cochlear implant processor. However, we do not know if the adverse outcomes described in the literature resulting from a delay in accessing sound outweighs the benefit gained by completing assessment. A prospective randomised study examining whether or not improved benefit is gained from earlier implantation prior to completion of audiological assessment with visual reinforcement audiology would be of huge benefit in this particularly complex patient group.