Hearing Loss in HIV-Infected Children in Lilongwe, Malawi

Susan Hrapcak\textsuperscript{1,2,3}, Hannah Kuper\textsuperscript{4}, Peter Bartlett\textsuperscript{5}, Akash Devendra\textsuperscript{1}, Atupele Makawa\textsuperscript{1}, Maria Kim\textsuperscript{1,2,3}, Peter Kazembe\textsuperscript{1,2,3}, Saeed Ahmed\textsuperscript{1,2,3}

\textsuperscript{1}Baylor College of Medicine Abbott Fund Children’s Clinical Centre of Excellence, Lilongwe, Malawi
\textsuperscript{2}Department of Pediatrics, Baylor College of Medicine, Houston, Texas, United States
\textsuperscript{3}Baylor International Pediatric AIDS Initiative, Texas Children’s Hospital, Houston, Texas, United States
\textsuperscript{4}International Centre for Evidence in Disability, London School of Hygiene & Tropical Medicine, London, UK
\textsuperscript{5}African Bible College (ABC) Hearing Clinic and Training Center, Lilongwe, Malawi
BACKGROUND

• With improved access to ART, HIV has become a chronic illness and a variety of disabilities has been described.

• A previous study at Baylor-Malawi found a high rate of disabilities by caregiver report in HIV-infected children when compared to their uninfected sibling (33% vs 7%).
BACKGROUND

• Previous studies in the US, Uganda, South Africa, Peru and Mexico have found a prevalence of hearing loss ranging from 20-38% in HIV-infected children

• This prevalence is higher than in uninfected children in these countries (4% in US, 6.9% in Peru)
Purpose of study

• Primary aim: Determine the prevalence of hearing loss through audiologic testing in HIV-infected children at Baylor

• Secondary aims:
  - Identify clinical and sociodemographic factors associated with hearing loss in HIV-infected children
  - Assess the association of hearing loss and quality of life
Methods

• Cross-sectional study from December 2013-March 2014

• HIV-infected patients aged 4-14 years old were recruited from Baylor clinic in Lilongwe, Malawi

• Surveys completed:
  - Sociodemographic questionnaire
  - PedsQL™
  - Electronic medical record (EMR) review
Methods

• Audiologic assessment at African Bible College
  - Otoscopy
  - Tympanometry
  - Otoacoustic emissions
  - Audiometry
Methods

• Hearing loss was defined as >20dB on audiometry

• Children were fitted with hearing aids based on:
  - Severity of hearing loss
  - Unilateral vs Bilateral hearing loss
  - Impact of hearing loss on level of function
Methods: Data Analysis

- Factors thought to be associated with hearing loss were explored by regression analysis generating age- and sex-adjusted odds ratios comparing clinical and sociodemographic factors between those with hearing loss and those without hearing loss.
Results: Prevalence of Hearing Loss

• 90/380 children (24%) had hearing loss in either ear

• 21/90 (23%) with hearing loss were referred for hearing aid fitting

Figure 1: Types of hearing loss

- 83% Conductive
- 14% Sensorineural
- 3% Mixed
Results: Sociodemographic Factors

- There was no difference in age, gender, or family income between those with hearing loss and those without
Results: Caregiver perception

• Caregiver perception of hearing loss was related to hearing loss, OR= 5.9 (3.3-10.6)

• However, only 40% of caregivers accurately perceived that their child had hearing loss
Results: Screening questions
Results: Hearing in Relation to Other Health Conditions

• Hearing loss was associated with:
  - History of ear drainage, OR = 6.4 (3.6-11.6)
  - History of frequent ear infections, OR = 7.4 (4.2-13.0)
  - History of malnutrition recorded in the EMR, OR = 2.1 (1.3-3.5)

• Children with hearing loss tended to report experiencing other disabilities (OR 1.8, 95% CI 1.0-3.5)

• Hearing loss was not related to history of meningitis or current nutrition status (ie: BMI)
Results: Hearing in relation to HIV characteristics

• 98% of children with hearing loss were on ART, for an average of 4.6 years

• There was no significant difference between the age of ART initiation, duration of ART, or measures of CD4 in children with and without hearing loss.

• Children with hearing loss were more likely to have been WHO Stage 3 (OR 2.4, 1.2-4.5) or Stage 4 (OR 6.4, 2.7-15.2) at enrollment in clinic
Results: School-Related Factors

• Among children above 5 years, those with hearing loss tended to be less likely to be attending school (OR = 2.5, 1.0-6.0).

• However, if the child was attending school, hearing loss did not seem to affect school performance.
Result: Quality of Life

• There was no difference in overall quality of life between those with hearing loss and those without.

• Children with hearing loss reported poorer emotional (p=0.02) and school functioning (p=0.04).
Conclusions

• 24% of HIV-infected children tested had hearing loss >20dB in either ear

• 5.5% of the 380 children tested qualified for a hearing aid

• Caregiver assessment of hearing loss was not reliable
Conclusions

• Significant associated factors include:
  - WHO Stage 3 or 4 at enrollment
  - perceived hearing loss by caregiver
  - history of frequent ear infections or ear drainage
  - positive screens for subtle signs of hearing impairment
    (need for repetition, not speaking clearly, and difficulty
    following instructions)
Limitations of the Study

• Etiology of hearing loss was not able to be determined

• Certain risk factors (ie: exposure to gentamicin and quinine) were not reliably documented

• No control group of HIV uninfected patients
Next steps

• Educate patients and caregivers

• Targeted screening of high risk patients if universal screening not available

• Better screening tools need to be identified for ART clinic settings
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