Sustainability and Outcomes of a Standardized Aminoglycoside Induced Ototoxicity Monitoring Algorithm

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**Recommended Citation**

Elson, Claire; Oermann, Christopher M.; Weltman, Michelle; and Meier, Ellen, "Sustainability and Outcomes of a Standardized Aminoglycoside Induced Ototoxicity Monitoring Algorithm" (2018). *Posters*. 43.  
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Sustainability and Outcomes of a Standardized Aminoglycoside Induced Ototoxicity Monitoring Algorithm

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**Background**
- Aminoglycoside (AG) antibiotics are essential for the treatment of cystic fibrosis (CF) lung infections.
  - *Pseudomonas aeruginosa*
  - Nontuberculous mycobacteria
- Monitoring is critical secondary to potential nephrotoxicity and ototoxicity.
- Children’s Mercy – Kansas City (CMKC)
  - Standardized nephrotoxicity monitoring
  - Variable ototoxicity monitoring practices
- Prevalence of ototoxicity
  - 2016 CFF Patient Registry
    - 1.1% pediatric patients (<18 years)
    - 2.2% overall population
  - National Institute of Deafness and Other Communication Disorders
    - 13% total US population ≥12 years old
- A standardized AG induced ototoxicity monitoring algorithm (AIOA) was developed and implemented at CMKC in 2017.

**Methods**
- Pre-Implementation
  - Provider Survey
  - Retrospective Chart Review
  - Observational Cohort Analysis
  - Review of Published Literature
- AIOA implementation: 1/1/2017
- Eligible patients identified during pre-clinic huddles and hospitalizations by PharmD and CF Center Coordinator
- Monthly retrospective review of AG prescriptions and inpatient AG orders
- Database developed to track audiograms, therapy modifications, and adherence to algorithm
- Data collected through: 6/30/2018

**AIO Algorithm**

**Pre-Implementation Results**
- 12 of 50 patients (24%) treated with IV AG in 2 years had a lifetime audiogram.
- 18 of 70 patients (26%) treated with 2+ courses of INH AG in 2016 had a lifetime audiogram.

**Post-Implementation Results**
- 18 months post-implementation, 34 of 35 patients (97%) treated with an IV AG had an audiogram.
- In 2018, 35 patients had received an INH AG ≥5 years. Audiograms were obtained in 17 patients (49%).
- Based on audiogram results 7 interventions have been made including: 2 referrals to otolaryngology, 2 dose modifications, 2 changes in IV antibiotic selection, and 1 adjunct otoprotective medication utilized

**Conclusions**
- Implementation of an AIOA increased the frequency of audiograms obtained among patients treated with IV and INH AG.
- The prevalence of hearing abnormalities at CMKC is higher than that reported in the CFF Patient Registry as well as the overall US population.
- In 51 audiograms obtained over 18 months, 28 (55%) had some degree of abnormality in either distortion product otoacoustic emissions or varying degrees of high frequency hearing loss. Among the patients with abnormalities, an intervention was made in 7 (25%) patients.
- The frequent use of AG among CF patients and the probability of AG induced hearing loss suggest a need to establish an AIOA nationally.

The authors have no relevant disclosures.