11-2019

Standardizing Aminoglycoside Induced Ototoxicity Monitoring

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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 in 2016
  - Observed variable ototoxicity monitoring practices
- Prevalence of ototoxicity
  - 2016 CFF Patient Registry
    - 1.1% in pediatric patients (≤ 18 years)
    - 2.2% in pediatric and adult population
  - National Institute of Deafness and Other Communication Disorders
    - 13% in US population ≥12 years old
- A standardized AG induced ototoxicity monitoring algorithm (AIOA) was developed and implemented at CMKC in 2017

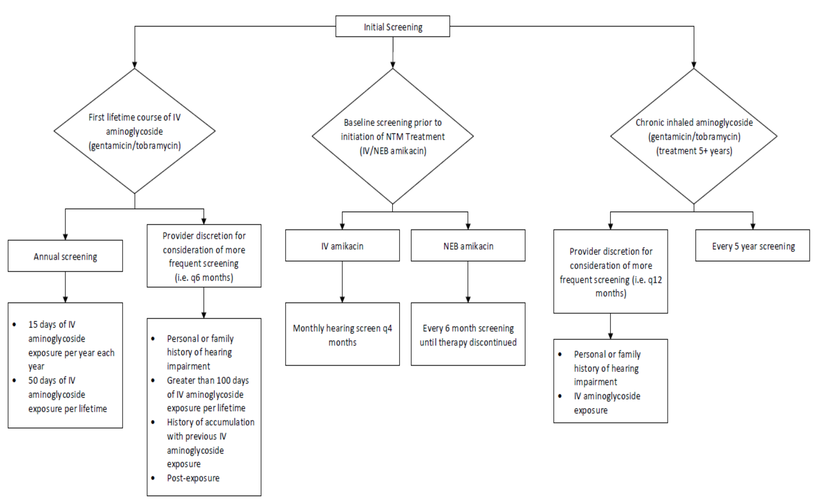
Methods

- 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: 6/30/2019

AIO Algorithm and Results

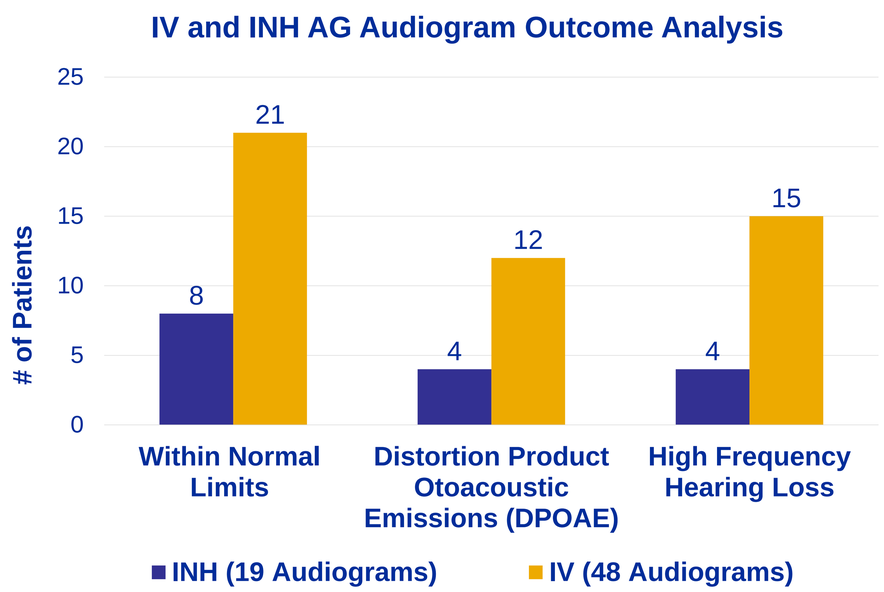
Pre-Implementation Results

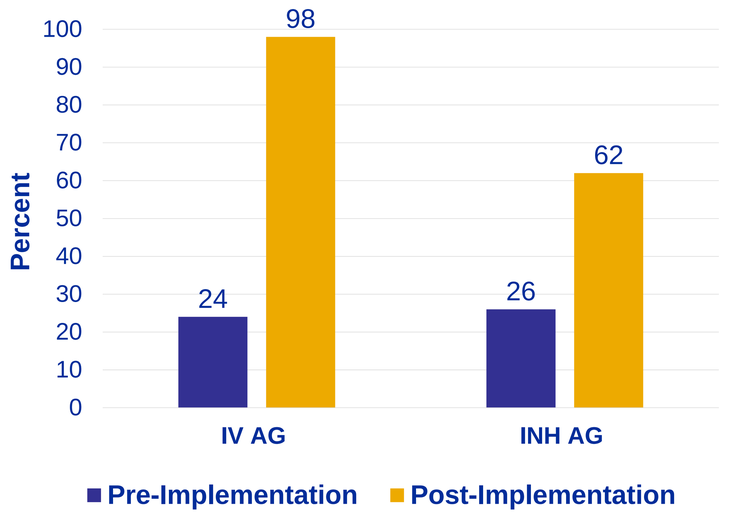
- 12 of 50 patients (24%) treated with IV AG between 2014 and 2015 had a lifetime audiogram.
- 18 of 70 patients (26%) treated with 2+ courses of INH AG in 2016 had a lifetime audiogram.

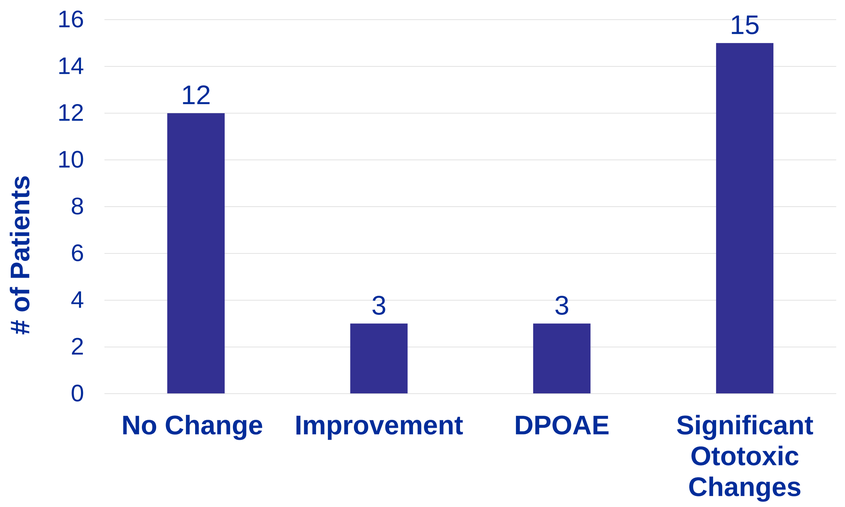


Post-Implementation Results

- 30 months post-implementation, 48 of 49 patients (98%) treated with an IV AG had an audiogram. Of these, 27 (56%) had abnormalities.







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 67 audiograms obtained over 30 months, 35 (52%) had some degree of abnormality in either DPOAE or high frequency hearing loss. Among the patients with abnormalities, an intervention was made in 12 treatment courses for 4 patients. Two patients were referred to otolaryngology for hearing aid evaluation.
- The frequent use of AG among CF patients and the incidence of AG induced hearing loss suggest a need to establish an AIOA nationally.

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The authors of have no relevant disclosures