Aminoglycoside use resulted in increased appropriate empiric ventilator-associated pneumonia (VAP) treatment without increasing nephrotoxicity

The Problem

- In 2011, BIDMC implemented a standardized computerized prescriber order entry (cPOE) approach to therapy was implemented, including guided antibiotic selection, assisted severity scoring, directed culture sampling techniques, and de-escalation
- Initial triple antibiotic coverage was recommended for empiric coverage in concordance with national guidelines and local susceptibilities
- The preferred regimen included:
  - Cefepime 2g IV q8h
  - Tobramycin 7mg/kg IV q24h
  - Vancomycin 15 mg/kg IV q12h

Aim/Goal

The aim of this project was to review whether the routine addition of empiric, high dose aminoglycoside therapy increased the likelihood of a susceptible empiric regimen and increased the incidence of nephrotoxicity

The Team

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The Interventions

- Tobramycin 7 mg/kg IV q24h was recommended as the 2nd Gram-negative agent for all patients, unless specifically contra-indicated
- Random, 10 hour aminoglycoside serum levels were ordered for all patients to determine dosing interval
- Appropriate respiratory culture was obtained to guide de-escalation opportunities
- cPOE reminders alerted clinicians to review patient status and culture results at 48 and 72h

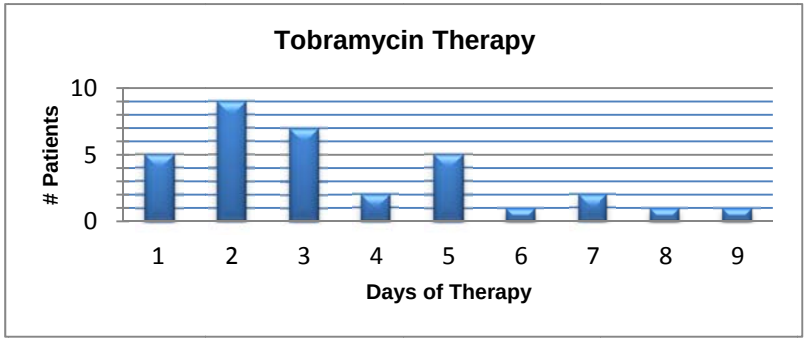
The Results

- 70 patients were enrolled and evaluated between 5/3/11 and 1/5/12
  - 53% were male, average age was 64.6 years
  - 33 patients (47.1%) received tobramycin as part of their treatment regimen

Gram Negative Organism Susceptibility Reports:

- 22/25 (88%) susceptible to 1st Gram(-) antibiotic
- 1/25 (4%) resistant to 1st Gram(-) antibiotic, but susceptible to tobramycin
- 2/25 (8%) unknown/not tested susceptibilities

Results Continued



Duration of Therapy:

- Average duration: 3.5 days
  - Range: 1-9 days
  - 21 pts (63.6%) ≤ 72h

Empiric Dosing (6-14h Random Level):

- Below goal: 4 pts (12.1%)
- At goal: 19 (57.6%)
- Above goal: 8 (24.2%)
- Not obtained: 2 (6.1%)

Dosing Schemes:

- 32/33 pts (97%) received once daily extended infusions
  - 1 pt received traditional dosing, but converted to extended interval on day 2
- 30/32 pts (93.8%) received 7 mg/kg dosing
  - 2 pts received 5 mg/kg dosing

Nephrotoxicity:

- 2 pts (6.1%) experienced Scr increases ≥0.5 mg/dL above baseline

Patient	Baseline Scr	Peak Scr	Last Measured Scr
1	1.0 mg/dL Also on: cisatracurium, IV contrast, furosemide, vancomycin	1.8 mg/dL	1.3
2	1-1.2 mg/dL Also on: furosemide, losartan, vancomycin	1.6 mg/dL	1.5

Lessons Learned

- While most Gram(-) organisms were susceptible to the 1st Gram(-) antibiotic, the addition of tobramycin increased appropriate empiric antibiotics by 4%
- Most pts received appropriate tobramycin doses and expected durations
- While 2pts experienced increases in Scr, there are alternative explanations for this

Next Steps

- Continue to review/reassess based on nosocomial pathogen susceptibility profile
- Create ICU-specific antibiograms to guide optimal selection of β-lactam and 2nd Gram-negative antibiotics

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