Antibiotic Prescribing Trends Following Suppression of Fluoroquinolone Susceptibilities

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Objective

- Describe the implementation of an antibiotic stewardship strategy, it’s effectiveness, potential benefits, and limitations

Q: In 2018, the FDA issued safety warnings around fluoroquinolone (FQ) use because of?

- Increased incidence of aortic rupture or aneurysm
- Blood sugar disturbances, including reports of hypoglycemic comas
- Increased risk of agitation, nervousness, memory impairment, and/or disturbances in attention
- Increased incidence of tendonitis or tendon rupture
Answer: In 2018, the FDA issued safety warnings around FQ use because of:

- Increased incidence of aortic rupture or aneurysm
- Blood sugar disturbances, including reports of hypoglycemic comas
- Increased risk of agitation, nervousness, memory impairment, and/or disturbances in attention
- Increased incidence of tendonitis or tendon rupture (Blackbox warning added in 2008)

Background

Increasing motivation to limit FQ use:
- Extensive and serious adverse effects
- *Clostridium difficile* infections
- Increasing resistance

IDSA & CLSI guidelines endorse Cascade Reporting to influence prescribing practices
- Protocols within microbiology reporting system
- “Passive” tool for Antimicrobial Stewardship
- Improves antibiotic selection, data limited
Background continued

January 2018, cascade reporting protocols were implemented with FQ susceptibilities suppressed if narrower, more appropriate agent susceptible

Purpose of this study was to:

- Identify if FQ use decreased over a six month period after implementing
- Identify alternative antibiotic use during this intervention

Susceptibility Reporting

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Urine Sample</th>
<th>Urine Sample</th>
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</thead>
<tbody>
<tr>
<td>Ampicillin/Sulbactam</td>
<td>REPORT</td>
<td>REPORT</td>
</tr>
<tr>
<td>Aztreonam</td>
<td>REPORT</td>
<td>REPORT</td>
</tr>
<tr>
<td>Cefazolin (CZ)</td>
<td>DO NOT REPORT</td>
<td>REPORT</td>
</tr>
<tr>
<td>Ceftepime (TEP)</td>
<td>DO NOT REPORT</td>
<td>DO NOT REPORT</td>
</tr>
<tr>
<td>Cefazolin (CAZ)</td>
<td>REPORT WHEN CRB OR R</td>
<td>REPORT WHEN CRB OR R</td>
</tr>
<tr>
<td>Ceftriazone (CRO)</td>
<td>REPORT</td>
<td>REPORT WHEN DEM I OR R</td>
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<tr>
<td>Cefurozine (CXM)</td>
<td>REPORT</td>
<td>REPORT WHEN CZ I OR R</td>
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<tr>
<td>Ciprofloxacin</td>
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<tr>
<td>Gentamicin</td>
<td>REPORT</td>
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<tr>
<td>Levofloxacin</td>
<td>REPORT WHEN CRB OR R</td>
<td>REPORT WHEN CAM I OR R</td>
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<td>Meropenem</td>
<td>REPORT ON REQUEST OR IF I OR R</td>
<td>REPORT ON REQUEST OR IF I OR R</td>
</tr>
<tr>
<td>Piperacillin/Tazobactam</td>
<td>REPORT WHEN CRB IS OR R</td>
<td>REPORT WHEN CAM IS OR R</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>REPORT IF GENT R</td>
<td>REPORT IF GENT R</td>
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<tr>
<td>Sulfamethoxazole/Trimethoprim</td>
<td>REPORT</td>
<td>REPORT</td>
</tr>
</tbody>
</table>
Methods

- Pre-post cohort comparison matched on antibiotic administration time accounting for seasonality
  - Intervention data: included antibiotic use for first six months of 2018
  - Control data: included antibiotic use for first six months of 2017
- Total DDD per 1,000 patient days
  - Antibiotic use normalized, defined as defined daily dose (DDD) per 1,000 patient days
  - Percent change calculated and analyzed for statistical significance using student’s T test
- Antibiotics grouped based on spectrum of activity in secondary analysis

Results

Between 2017 (control data) and 2018 (intervention data) there was a 32.6% reduction in FQ use, \( P=0.018 \)
Limitations

- Patient level data with indications was unavailable to incorporate into analysis
- DDD does not provide total number of courses prescribed
- Additional stewardship efforts during intervention time including:
  - Increased pharmacy stewardship presence and recommendations
  - Order sets updated to recommend cefepime over piperacillin/tazobactam (agents grouped together to account for this)
Conclusions

- Suppression of FQ susceptibilities resulted in a reduction in FQ use that was statistically significant over six months
- Increased use of narrower spectrum agents observed during intervention that were consistent with stewardship recommendations in place of FQ’s:
  - Nitrofurantoin in uncomplicated cystitis
  - Macrolides in community acquired pneumonia
- Increase use of broader spectrum agents did not appear during intervention
- Required minimal implementation time and daily maintenance

References

Questions?