The Need for an Age-Dependent Antibiogram

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Objectives

• Discuss the need for antibiograms
• Determine how an antibiogram can improve patient care
• Explain the advantages and disadvantages of antibiograms
• Assess the need for an age-dependent antibiogram
• Understand how to create an antimicrobial stewardship program (ASP)

Disclosures

• None

What is an Antibiogram?

• Overall results of laboratory testing for the sensitivity of an isolated bacterial strain to different antibiotics
• Reference guide for community or hospital specific resistance patterns
• Can be used by clinicians, pharmacists, infection control personnel and microbiologists

Advantages

• Feasible
• Inexpensive
• Relatively rapid
• Accurate
• Not extremely time consuming

Example of Antibiogram

<table>
<thead>
<tr>
<th>Antibiotic Size</th>
<th>Isolates</th>
<th>Penicillin</th>
<th>Amoxicillin</th>
<th>Ceftazidime</th>
<th>Ciprofloxacin</th>
<th>Gentamicin</th>
<th>Aztreonam</th>
<th>Meropenem</th>
<th>Piperacillin</th>
<th>Tazobactam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gram Positive</td>
<td>S. aureus</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>100</td>
</tr>
<tr>
<td>E. coli</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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</tr>
<tr>
<td>Example of</td>
<td>Staphylococcus</td>
<td>95</td>
<td>95</td>
<td>95</td>
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</tr>
<tr>
<td></td>
<td>Peptostreptococcus</td>
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<td>90</td>
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</tr>
<tr>
<td></td>
<td>Streptococcus</td>
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<td>85</td>
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<td>85</td>
<td>85</td>
<td>85</td>
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</tr>
</tbody>
</table>

Disadvantages

- Only collect data at the hospital level
- Lack of case-specific data
- Lack of patient-specific variables:
  - Risk factors
  - Demographics
  - Race
  - Gender
  - Age

Evidence

- To our knowledge, there have been no published trials comparing antibiograms based on age
- “Development of an antibiogram in a long-term care facility”
  - Design: Retrospective analysis of culture and sensitivity data from July 1, 2009, through June 30, 2010 in a long-term care facility in Huntsville, AL
  - Results: High resistance rates including: methicillin-resistant S. aureus and extended-spectrum beta-lactamase-producing bacteria

Solution #1:
Antimicrobial Stewardship Program (ASP)

- Systematic, multidisciplinary program that promotes the appropriate selection, dosing, and route of antimicrobials

Age and Antibiograms

- There are significant changes to the human body as we age
- Organs are less efficient than when the body is younger
  - Especially the immune system
- Elderly patients are at higher risk for infection in general – especially with highly resistant bacteria

William Jennings Bryan Dorn
Veterans Affairs Medical Center

- Columbia, South Carolina
- 216 bed facility with attached primary and subspeciality clinics
- Over 70,000 unique patients seen a year

ASPs

- Specific objectives:
  - Reduce antimicrobial resistance
  - Development and refinement of local antibiograms
  - Improve patient outcomes
  - Prevent adverse drug effects
  - Optimize cost, time, and resources
William Jennings Bryan Dorn’s ASP

- ASP Pharmacy Standard Operating Procedure:
  - **Purpose**: Optimize clinical outcomes while minimizing unintended consequences of antimicrobial use
  - **Procedures**:
    - Multidrug resistant organisms (MDRO)
    - Non-formulary & restricted anti-infectives
    - Education & dissemination of information
    - Guidelines & clinical pathways
    - Transition of care

**Solution #2: Research Question**

- Development Of An Age-Dependent Antibiogram In A Veterans Affairs Community
  - Single center, retrospective, observational chart review
  - **Observational period**: January 1st through December 31st, 2011
  - **Purpose**: To determine if an alternative antibiogram should be developed for geriatric patients

**Conclusion**

- As we age, changes in the immune system could put patients at risk for highly resistant microbials
  - To our knowledge, there have been no published trials comparing antibiograms based on age

- To help manage patient-specific variables:
  - ASPs are an appropriate option
  - Conduct research

**Training Resources for ASPs**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centers for Disease Control and Prevention’s (CDC)</td>
<td>Get Smart for Healthcare: Know When Antibiotics Work [<a href="http://www.cdc.gov/getsmart/healthcare">http://www.cdc.gov/getsmart/healthcare</a>]</td>
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<tr>
<td>Society for Healthcare Epidemiology of America</td>
<td><a href="http://www.sheh.org">http://www.sheh.org</a></td>
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<td>Infectious Diseases Society of America (IDSA)</td>
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<td>Society of Infectious Diseases Pharmacists</td>
<td><a href="http://www.sidp.org">http://www.sidp.org</a></td>
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<td>Institute for Healthcare Improvement</td>
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</tr>
<tr>
<td>Medscape</td>
<td><a href="http://www.medscape.org">http://www.medscape.org</a></td>
</tr>
</tbody>
</table>

**Research in Progress**

- IRB/R&D approved 1/2013
- Research will be conducted between 7-12/2013
- Results will be discussed at the South-Eastern Residency Conference (Athens, GA) in 4/2014

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