Comparing Traditional Culture Methods and New Molecular Testing Techniques to Analyze Biofilm Composition on Uninfected IPPs

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Biofilm

• Protective coating formed by bacteria
  • Allows for increased survival
  • Occasional planktonic release
  • Potential source of IPP infection

Biofilm Detection

• Traditional Microbiological Culture
  • Swab of device and tissue excision
  • Bacterial growth in culture
  • Identification and sensitivity

# Biofilm Detection

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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</thead>
<tbody>
<tr>
<td>Widespread availability</td>
<td>Specimen collection requirements</td>
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<tr>
<td>Cost effectiveness</td>
<td>Time duration (bacterial growth)</td>
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<tr>
<td>Local antibiogram sensitivities</td>
<td>Poor delineation of multiple organisms</td>
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<tr>
<td>Proven historic efficacy</td>
<td>Difficulty culturing anaerobic bacteria</td>
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Biofilm Detection

• Molecular analysis
  • PCR amplification of 16S rDNA
  • Identification and sequencing
  • Known bacterial taxonomies

# Biofilm Detection

<table>
<thead>
<tr>
<th>Advantages</th>
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<tr>
<td>Increased sensitivity</td>
<td>Specimen collection requirements</td>
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<tr>
<td>Increased efficacy in biofilm analysis</td>
<td>Time duration (shipment and processing)</td>
</tr>
<tr>
<td>Antibiotic sensitivity data</td>
<td>Clinical relevance of bacteria</td>
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<tr>
<td>Relative ease of anaerobic culture</td>
<td>Increased cost</td>
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Objectives

• Compare biofilm analysis from clinically uninfected inflatable penile prostheses at removal and replacement for mechanical failure

• Traditional culture methods and 16S ribosomal DNA testing used
**Methods**

- Specimens: 11 clinically uninfected AMS IPPs during removal/replacement

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<thead>
<tr>
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<th>Mean</th>
<th>Range</th>
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<tbody>
<tr>
<td>IPP Duration</td>
<td>39 months</td>
<td>4 months to 12 years</td>
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<tr>
<td>Patient Age</td>
<td>64 years</td>
<td>51-76</td>
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Methods

- All received IV cefazolin and gentamicin
- Device swabbed at capsule entry
- Thorough washout performed
- Pre- and post-washout tissue excised
Results

• Microbiological Culture

  • Ten of 11 prostheses had negative aerobic, anaerobic, acid-fast, and fungal cultures

  • One culture report showed pan-sensitive S. lugdunensis in very small numbers, with negative molecular testing
Results

• 16S rDNA Molecular Analysis
  • Two of 11 prostheses had positive results
  • First specimen had 13 separate bacteria, with 4 known prosthetic infectious pathogens present
  • Only 2 of these infectious bacteria were susceptible to our IV antibiotic regimen
Results

• 16S rDNA Molecular Analysis
  • Two of 11 prostheses had positive results

  • Second specimen had 9 separate bacteria, with 3 known prosthetic infectious pathogens present

  • None of these infectious bacteria were susceptible to our IV antibiotic regimen
Study Limitations

• Small amount of specimens

• Inherent patient factors unknown

• Limited follow-up
Conclusions

• Molecular testing yielded biofilm information that was not reported by conventional culture methods

• Some bacteria identified by molecular testing were known prosthetic pathogens
Conclusions

• 71% of these pathogens showed poor susceptibility to our typical IV antibiotic regimen

• Further research on biofilm needed
References