HOT Topics in Cardiology

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- “I do not intend to discuss an unapproved/ investigative use of a commercial product/device in my presentation.”
Prevention of Infective Endocarditis
IE Prophylaxis... Is it Effective?

- Recommended prophylaxis regimens are based primarily on in vitro studies, data collected from experimental animal models, epidemiologic observations, and clinical experiences.
- There are no adequate controlled clinical trials to validate the efficacy of such prophylaxis.
- It is not always possible to predict which patients will develop IE or which particular procedure will be responsible.
IE Prophylaxis... Why is it Controversial?

- Bacteremias commonly occur during daily life activities such as routine tooth brushing or chewing.
- Poor dental hygiene and periodontal or periapical infections may produce bacteremia even in the absence of dental procedures.
- Some studies have shown no increased risk associated with dental procedures.
- Prevention of all episodes of bacteremia is impossible and IE may occur despite appropriate antimicrobial prophylaxis.
IE Prophylaxis... Why is it Controversial?

- The exact risk of developing IE following a procedure in a susceptible patient is completely unknown although certainly very low
- It has been estimated that only 50% of patients who develop IE have a recognizable predisposing cardiac lesion for which prophylaxis would be considered
- In patients with IE, there is often no history of an event likely to produce bacteremia
IE Prophylaxis... The History!

- The first extensive study of the etiology of IE in man is that of Frankel and Sanger, published in 1886
- 1960’s: one hour before procedure, then for 72 hours after the procedure
- 1977: one hour before procedure, then for 48 hours after the procedure
- 1984: one hour before procedure, then 6 hours after the procedure
- 1990: One hour before procedure, then 6-8 hours after the procedure
- 1997: only one hour before procedure
- 2007: ............
Risk Resulting From a Dental Procedure

It is estimated that dental treatment causes 1% of all cases of viridans group streptococcal IE annually in the US.

The overall risk in the general population is estimated to be as low as one case of IE per 14 million dental procedures.
Risk Resulting From a Dental Procedure

- The estimated absolute risk rates for IE from a dental procedure in patients with underlying cardiac conditions are:
  - MVP 1 per 1.1 million procedures
  - CHD 1 per 475,000
  - RHD 1 per 142,000
  - Prosthetic cardiac valve 1 per 114,000
  - Previous IE 1 per 95,000
### Who is at Risk?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Rate per 100,000 Pt Year*</th>
</tr>
</thead>
<tbody>
<tr>
<td>General population</td>
<td>5.0</td>
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<tr>
<td><strong>Mitral valve prolapse</strong></td>
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<tr>
<td>No murmur</td>
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<tr>
<td>Murmur</td>
<td>52</td>
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<tr>
<td><strong>Congenital heart disease</strong></td>
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<tr>
<td>Pulmonary stenosis</td>
<td>20</td>
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<tr>
<td>Aortic stenosis</td>
<td>180</td>
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<tr>
<td>VSD</td>
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</tr>
<tr>
<td>Corrected</td>
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<tr>
<td>Uncorrected</td>
<td>220</td>
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<tr>
<td><strong>Rheumatic heart disease</strong></td>
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<tr>
<td><strong>Prosthetic valve</strong></td>
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<tr>
<td>Mechanical</td>
<td>308</td>
</tr>
<tr>
<td>Bioprosthesis</td>
<td>383</td>
</tr>
</tbody>
</table>

*Steckelberg IDCNA 7:9-19, 1993*
Prevention of Infective Endocarditis. Guidelines From the American Heart Association. A Guideline From the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group


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Cardiac Conditions Associated with the Highest Risk of Adverse Outcome from Endocarditis for Which Prophylaxis with Dental Procedures is Recommended

- Prosthetic cardiac valve
- Previous infective endocarditis
- Congenital heart disease (CHD)*
  -- Unrepaired cyanotic congenital heart disease, including those with palliative shunts and conduits
  -- Completely repaired CHD with prosthetic material or device either by surgery or catheter intervention during the first six months after the procedure**
  -- Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
- Cardiac transplantation recipients who develop cardiac valvulopathy

* Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of congenital heart disease

**Prophylaxis is recommended because endothelialization of prosthetic material occurs within 6 months after the procedure
Dental Procedures for which Endocarditis Prophylaxis is Recommended for Patients AT HIGHEST RISK

All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa*

*The following procedures and events do not need routine prophylaxis: routine anesthetic injections through noninfected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of deciduous teeth and bleeding from trauma to the lips or oral mucosa.
Major Changes in 2007 Updated Guidelines

❤️ Bacteremia resulting from daily activities is much more likely to cause IE than bacteremia associated with a dental procedure.

❤️ Only an extremely small number of cases of IE might be prevented by antibiotic prophylaxis even if prophylaxis is 100% effective.

❤️ Antibiotic prophylaxis not recommended based solely on an increased lifetime risk of acquisition of IE.
Limit recommendations for IE prophylaxis ONLY to those conditions listed earlier.

Antibiotic prophylaxis is no longer recommended for any other form of congenital heart disease, except for the conditions listed earlier.

Recommend antibiotic prophylaxis for all dental procedures that involve manipulation of gingival tissues or periapical region of teeth or perforation of oral mucosa ONLY for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from IE.
Heart

Recommend antibiotic prophylaxis for procedures on respiratory tract or infected skin, skin structures, or musculoskeletal tissue ONLY for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from IE.

Heart

Antibiotic prophylaxis solely to prevent IE not recommended for genitourinary or gastrointestinal tract procedures.

Heart

Endocarditis prophylaxis is not recommended for ear and body piercing, tattooing, vaginal/cesarean delivery and hysterectomy.
IE... Take Home Message

- Antibiotic prophylaxis in at-risk patients has been accepted as reasonable practice for five decades, however, the evidence to support the effectiveness of prophylactic regimens is not as convincing as one would like.

- The AHA has made substantial revisions to previously published guidelines on IE prophylaxis. Based on these current recommendations, fewer patients will receive IE prophylaxis for a dental procedure.
A Child with Congenital Heart Disease...

Parental Counseling
Congenital Heart Disease

- Incidence of CHD: ~ 1%
- A heart murmur is not always BAD

- Heart defects:
  - Cyanotic lesions
  - Acyanotic lesions
  - Obstructive lesions
Diagnosis-Specific Information

- Handouts
- Normal heart physiology and child’s defect pathophysiology
- Internet resources
Decision-Making Information

- Current information about the defect
- Statistics
- Treatment options
- Surgical experiences
- Outline the “Best Case Scenario”
Parental Support

- Acknowledge parent’s emotions
- Too much to learn
  - Retention of info ~ < 20%
- Decision-making
- Respect their decision
- Social support
- Support groups “You are not Alone”
- Insurance
“Parents sometimes don’t recall hearing or understanding much of the diagnosis-specific information after the initial diagnosis is given, but they do recall the manner in which the information is presented”
What Would You Do if This was Your Child?

“Since I’m not in your situation, I honestly can’t answer that. But, let me put you in contact with other parents who have made these tough decisions”
Future Expectations

- Natural history of the defect
- Medical therapy
- Catheter intervention
- Surgical options
- Sports participation
- SBE prophylaxis
Recurrence Risks
<table>
<thead>
<tr>
<th>Defect</th>
<th>Percent at Risk</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>One Sibling</td>
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<tr>
<td>Ventricular septal defect</td>
<td>3</td>
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<tr>
<td>Patent ductus arteriosus</td>
<td>3</td>
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<tr>
<td>Atrial septal defect</td>
<td>2.5</td>
</tr>
<tr>
<td>Tetralogy of Fallot</td>
<td>2.5</td>
</tr>
<tr>
<td>Pulmonary stenosis</td>
<td>2</td>
</tr>
<tr>
<td>Coarctation of aorta</td>
<td>2</td>
</tr>
<tr>
<td>Aortic stenosis</td>
<td>2</td>
</tr>
<tr>
<td>Transposition</td>
<td>1.5</td>
</tr>
<tr>
<td>Endocardial cushion defects</td>
<td>3</td>
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<tr>
<td>Fibroelastosis</td>
<td>4</td>
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<tr>
<td>Hypoplastic left heart</td>
<td>2</td>
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<tr>
<td>Tricuspid atresia</td>
<td>1</td>
</tr>
<tr>
<td>Ebstein anomaly</td>
<td>1</td>
</tr>
<tr>
<td>Truncus arteriosus</td>
<td>1</td>
</tr>
<tr>
<td>Pulmonary atresia</td>
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</table>

<table>
<thead>
<tr>
<th>Defect</th>
<th>Percent at Risk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mother</td>
<td>Father</td>
</tr>
<tr>
<td>Aortic stenosis</td>
<td>13–18</td>
<td>3</td>
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<tr>
<td>Atrial septal defect</td>
<td>4–4.5</td>
<td>1.5</td>
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<tr>
<td>Atrioventricular canal</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>Coarctation of aorta</td>
<td>4</td>
<td>2</td>
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<tr>
<td>Patent ductus arteriosus</td>
<td>3.5–4</td>
<td>2.5</td>
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<tr>
<td>Pulmonary stenosis</td>
<td>4–6.5</td>
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<tr>
<td>Tetralogy of Fallot</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Ventricular septal defect</td>
<td>6–10</td>
<td>2</td>
</tr>
</tbody>
</table>

Prenatal Diagnosis

- Periodic prenatal care
- Amniocentesis
- Fetal echocardiogram
  - Outline limitations