

*Antibiotic Prophylaxis*  
*Why the new guidelines?*



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# *Antibiotic Prophylaxis*



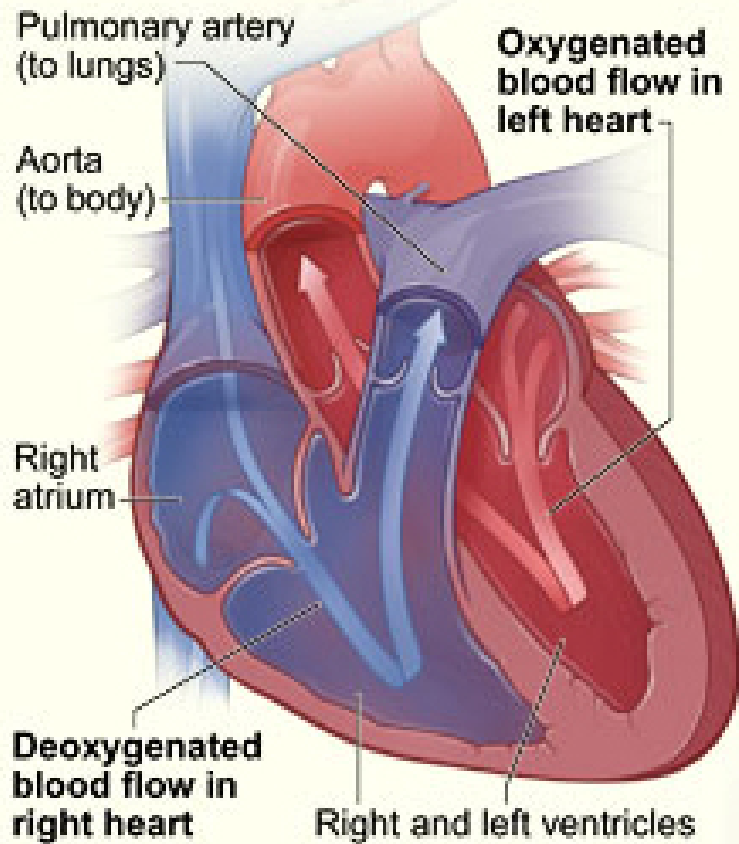
- A. Cardiac conditions**
- B. Intravascular Prosthesis
- C. Prosthetic Joints
- D. Hemodialysis
- E. CAPD
- F. Transplant
- G. Neutropenia

# *Cardiac Conditions*

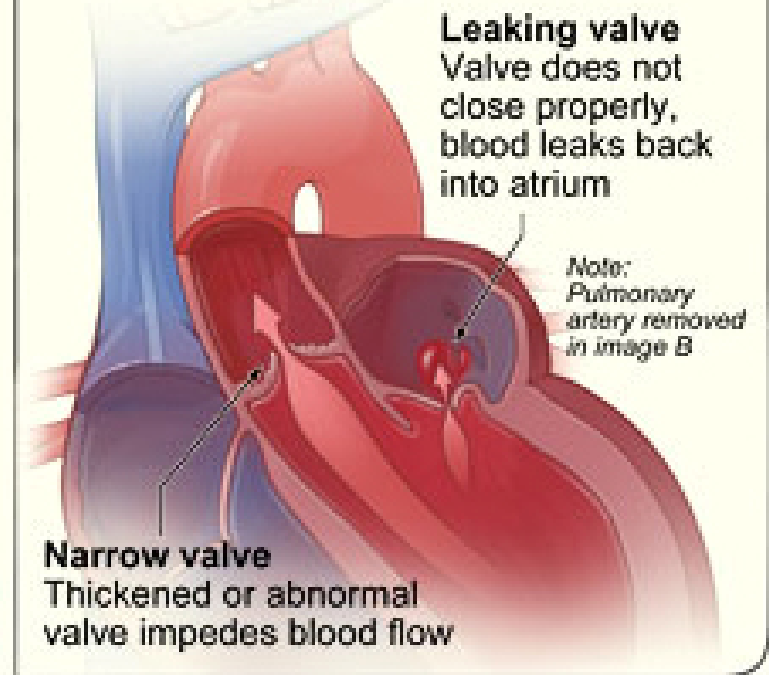


Antibiotic prophylaxis is being used to avoid infection of the heart valve and/ or endothelial surfaces of the heart. (Bacterial Endocarditis)

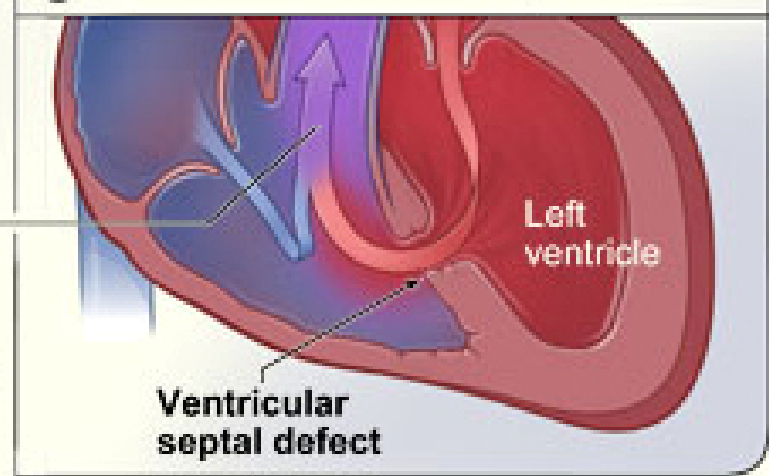
**A** Normal heart



**B** Heart with valve defects



**C** Heart with ventricular septal defect



# *Cardiac Conditions*



## Effects of Bacterial Endocarditis

- Local complications
- Embolic complications
- Immune complex mediated complication

# *Cardiac Conditions*

- Local complications:

Valvular Insufficiency, CHF

Myocardial Abscesses



# *Cardiac Conditions*

- Embolic complications:
  - Skin
  - Eyes
  - Brain
  - Liver
  - Spleen
  - Kidney
  - Intestine



# *Cardiac Conditions*

- Immune complex mediated complications:
  - Arthritis
  - Glumeronephritis



# *Cardiac Conditions*



- Extremely rare
- A concern in patients with Pre-existing conditions
- 7- 10 % mortality and severe morbidity
- Treatment: Aggressive antibiotic and surgical therapy

# *Cardiac Conditions*

- Incidence of SBE

2-5/ 100,00 in general population

20/ 100,000 Bicuspid Aortic Valve

25/ 100,000 MVP w/o Regurgitation

56/ 100,000 MVP with Regurgitation

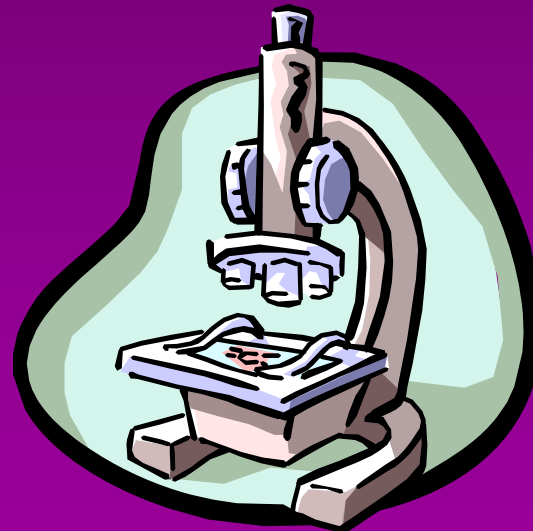
220/ 100,000 Ventricular Septal Defect

10,000/ 100,000 Previous history of one SBE

25,000/ 100,000 Previous history of two SBE

# Cardiac Conditions

- 30 – 40 % of patients with SBE have streptococcal infections
- *S. Viridans* (most common, only in oral cavity)
- *S. Sanguis*
- *S. Salivarius*
- *S. Mutans*
- *S. Mitis*
- *S. Anginosus*



# *Cardiac Conditions*



## Clinical Triad:

- X. Known underlying cardiac defect
- Y. Organism from Oral Flora
- Z. Dental Procedure within 90 days.

# *Cardiac Conditions*



- ❖ Cheurbin, et al (1971): 15% of patients with SBE had dental work in past 90 days

# Cardiac Conditions

❖ Strom (2000): 273 cases

37 had the clinical triad (13.5 %)

27/37 had AHA Prophylaxis (87 %)

10/37 had triad and did not have  
prophylaxis 13%

10/273 (4%)

# *Cardiac Conditions*

Recent Studies suggest 78% of IE cases occur within 7 days and another 7% within the following 7 days.



# Cardiac Conditions

- Procedure Bactremia

Mastication	0- 55 %
Flossing	5- 86 %
Brushing	24- 26 %
Scaling	30 – 70 %
Extraction	9- 100 %
Endo	0 –54 %
Perio Surgery	58 %

General Dentistry March-April 2005 P.131

# *Cardiac Conditions*

- ❖ Guntheroth in 1984, reviewed 21 articles from 1935- 1976 and 2403 cases:
  - Bacteremia due to extraction 40%
  - Bacteremia due to mastication 38%
  - Estimated a cumulative exposure of 5730 minutes of bacteremia over a 1-month period from daily activities.
  - The bacteremia due to extraction is 6-30 minutes following the extraction.

# *Cardiac Conditions*



## ❖ Roberts (1999):

- Estimated that tooth brushing 2 times daily for a year had a 154,000 times greater risk of exposure to bacteremia than that resulting from a single tooth extraction.
- The cumulative exposure during this period may be as high as 5.6 million times greater than that resulting from a single tooth extraction.

# *Cardiac Conditions*



## **Conclusion:**

1. Infective Endocarditis ( IE) is more likely results from daily activities.
2. Prophylaxis may prevent an exceedingly small number of cases
3. Risk of antibiotic-associated adverse events exceeds the benefits, if any, from prophylactic AB therapy
4. Optimal oral health and hygiene may reduce the incidence of bacteremia from dental activities

# *Cardiac Conditions*



## Adverse reactions:

1. Non-fatal adverse reaction: rash, diarrhea and GI upset
2. Fatal anaphylactic reactions:
  - 15-25 / 1 million individuals (64% had no history of penicillin allergy)
  - 1/ 1 millions for clindamycin

# *Cardiac Conditions*



Adverse reaction Cont'd:

## 3. Bacterial resistance:

Prabhu et al (2002):

Antimicrobial susceptibility patterns among viridans group isolated from infective endocarditis patients from 1971 to 1986

And from 1994 to 2002.

Prabhu and colleagues in 2002:

<b>1971 - 1986</b>	<b>1994 - 2002</b>
<b>Susceptibility to Viridans</b>	<b>Susceptibility to Viridans</b>
0 % resistant to penicillin	13% resistant to penicillin
11 % resistant to macrolides	26 % resistant to macrolides
0 % resistant to clindamycin	4 % resistant to clindamycin

# *Cardiac Conditions*



## **New Guidelines**

Conditions requiring AB prophylaxis:

1. Prosthetic cardiac valve
2. Previous infective endocarditis
3. Cardiac transplantation recipients who develop cardiac valvulopathy

# *Cardiac Conditions*

4. The following congenital heart diseases:
  - A. Un-repaired Cyanotic CHD, including palliative shunts and conduits
  - B. Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first six months after the procedure
  - C. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or device ( which inhibit endothelialization)

# *Cardiac Conditions*



Cyanothic heart defects:

- Due to oxygenated blood bypassing the lung and entering the systemic circulation.
- The patient appears blue (cyanotic).

# Cardiac Conditions



## Cyanothic Heart Defects:

- Transposition of great arteries
- Tetralogy of Fallot
- Truncus arteriosus
- Total anomalous pulmonary return
- Hypoplastic left heart syndrome
- Pulmonary atresia

# *Cardiac Conditions*



Patient that no longer need AB Prophylaxis:

Mitral Valve Prolapse

Rheumatic Heart Disease

Bicuspid Valve Disease

Calcified Aortic Stenosis

Congenital Heart Conditions such as VSD,  
ASD and hypertrophic cardiomyopathy

# *Bacterial Endocarditis*

- Recommendation

## Standard

	Adults	Children
Amoxicillin	2.0 grams	50mg/kg

One hour before procedure

Unable to take oral medications:

Ampicillin	2.0 grams	50mg/kg
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IM/ IV 30 minutes before the procedure

# *Bacterial Endocarditis*

- Bacterial Endocarditis
  - Allergic to penicillin:

	Adult	Children
Azithromycin (zithromax)	500mg	15mg/kg
Clarithromycin (biaxin)	500mg	15mg/kg
Clindamycin (cleocin)	600mg	20mg/kg
*Cephalexin (Keflex)	2.0 grams	50mg/kg
*Cefadroxil (Duracef)	2.0 grams	50mg/kg

All one hour before the procedure

# *Bacterial Endocarditis*

- Allergic to penicillin and unable to take oral medications:

	Adults	Children
Clindamycin	600mg	20mg/kg
*Cefazolin	1.0 gram	25mg/kg

IM/ IV 30 minutes before the procedure

# *Bacterial Endocarditis*



Next guideline:

- Keflex will be omitted from the list
- Possible change in dosage and type of the antibiotic
- Berney's Rule: Although it is advisable to take antibiotics an hour in advance, but antibiotic can be given immediately before the procedure.

# *Bacterial Endocarditis*

## Commonly Asked Questions:

1. Q: What procedures need AB prophylaxis?

A: Procedures that cause bacteremia and/or severe bleeding

# *Bacterial Endocarditis*



2.

Q: I am already on amoxicillin for another condition. Is that o.k?

A: Flora changes within 48 hours change the antibiotic protocol. Same antibiotic can not be used within 9-14 days of the procedure

# *Bacterial Endocarditis*

3.

Q: I need a lot of dental work, what should I do?

A:

- Interval procedure 9-14 days
- Alternate antibiotics



# *Bacterial Endocarditis*

4.

- Q: I didn't expect bleeding or I instrument my endo beyond apex. What should I do?

A: 2 hours rule: Berney, et al. 1990

- Less than two hours: effective antibiotic prophylaxis
- More than four hours: antibiotic not effective
- 2-4 hours?

# *Bacterial Endocarditis*

5.

Q: I forgot to take my antibiotic?

A: Reschedule the patient

Give the antibiotic, and wait one hour  
2 hour rule?

# *Bacterial Endocarditis*



6a .

Q: Should I use antimicrobial agents before the procedure?

A: AHA recommendation: 15cc of chlorhexidine 30 seconds before the procedure

# *Bacterial Endocarditis*



6b. Does it make sense?

Lockhart in 1996:

Use 70 patients

37 were placed on chlorhexidine

31/37 post extraction bacteremia

33 patients were placed on placebo

31/33 post extraction bacteremia

# *Bacterial Endocarditis*



7

Q: Should I contact the physician about what kind of antibiotic I should prescribe?

A: NO



- AHA:

Consequences of substantive changes in recommendation:

1. Violate long-standing expectations and practice patterns
2. Make fewer patients eligible for IE prophylaxis
3. Reduce malpractice claims related to IE prophylaxis
4. Stimulate prospective studies on IE prophylaxis



- ADA division of legal affairs:

What should the dentist do if the patient brings to the appointment a recommendation for premedication from his or her physician with which the dentist disagrees?

The courts recognize that each independent professional is ultimately responsible for his or her treatment decisions.

# *Bacterial Endocarditis*



8

Q: Should we pre-medicate patients that had coronary stent?

A: Stents usually endothelialize 6-8 weeks after placement, so premedicate the patient only for the first six months after stent placement.

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# *Intravascular prosthesis*



Intravascular prosthesis such as aortic graft, femoral popliteal graft, abdominal and thoracic grafts and etc, all endothelialize within six months.

Antibiotic prophylaxis is required the first six months.

***Positive proof of global warming.***



***18th  
century***

***1900***

***1950***

***1970***

***1980***

***1990***

***ExtremeFunnyHumor.com***

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## *Prosthetic joint*



- Only 17 cases reported
- Most common organism is Staph especially aureus and epidermidis which are not common in the mouth
- It is an extra vascular prosthesis and not exposed to blood vessels.

# *Prosthetic Joint*



- Why should we premedicate the patients?

It has very high morbidity

Treatment:

- Remove the joint
- 6 weeks on antibiotic
- Need a new joint replacement
- Patient can't work for three months

# *Prosthetic joint*



- AAOP recommendations
  - Not recommended for routine procedures
  - To be use only on high risk patients
  - Be use in the procedures that cause high bacteremia

# *Prosthetic Joint*



- High risk joints:
  - Joint placement within past two years
  - Prior history of joint infection
  - Patients with hemophilia
  - Patients with diabetic mellitus
  - Patients on immunosuppressive therapy
  - Rheumatoid arthritis

# *Prosthetic Joint*



Which antibiotic should we use?

Cephalixin                      2.0 grams

Clindamycin                    600 mg

Azithromycin                 500 mg

Clarithomycin                500 mg

Amoxicillin                    2.0 grams

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# *Renal Dialysis*



Renal Dialysis can be done in two different ways:

1. Hemodialysis: Blood cleansing machine
2. CAPD: Continuous Ambulatory Peritoneal Dialysis

# *Hemodialysis*



- Patients on blood cleansing machine need to go to dialysis every other day.
- Dialysis patients are repeatedly punctured and infections can happen
- Dialysis patients receive heparin during dialysis

# *Hemodialysis Patients*



- Schedule treatment on non-dialysis day; this will minimize excessive bleeding due to residual heparin in blood stream.
- Standard antibiotic prophylaxis need to be use on these patients.

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# CAPD



## Continuous Ambulatory Peritoneal Dialysis:

- Patient requires a permanent catheter to be implanted through the wall of stomach into the peritoneum.
- Four times every day a bag of warmed glucose fluid is drain through this catheter to peritoneum.

# CAPD



- Through osmosis impurities present outside the peritoneum will be drawn inside the fluid.
- This fluid then will be drained out, a new bag of warm fluid will be drain in and the catheter will be seal until next exchange.

# CAPD

- Patient on CAPD can develop Peritonitis
- They require standard antibiotic prophylaxis



# *Antibiotic prophylaxis*



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# *Transplant*



- All transplant patients are immunosuppressed
- Use standard antibiotic prophylaxis
- Avoid clarithromycin ( Biaxin), as it will increase the level of cyclosporine.

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# *Neutropenia*

- Mild 1000-2000 mm<sup>3</sup>
- Moderate 500-1000 mm<sup>3</sup>
- Severe < 500



# *Neutropenia*



Conditions that can cause severe neutropenia:

- HIV/ AIDS
- Chemotherapy
- Drug toxicity
- Infections such as TB and typhoid
- Bone marrow disorders
- etc

Patients with severe neutropenia require AB prophylaxis



# References

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## 2) Prevention of Bacterial Endocarditis: Recommendation by the American Heart Association, 2007

## 3) CE Magic: Volume 1, Antibiotics in Dentistry Leslie Shu-Tung Fang M.D., PhD