

NATIONWIDE
CHILDREN'S
HOSPITAL
Daniel G. Rowland, MD
The Heart Center
Cardiology

Infective Endocarditis Prophylaxis

- :: Etiology of endocarditis
- :: When to use prophylaxis
- :: Recommended antibiotic regimens

About The Heart Center

The Heart Center at Nationwide Children's Hospital has earned an international reputation for innovation and forward thinking. From the creation of the world's first Hybrid Cardiac Catheterization Suites and the first Hybrid Congenital Cardiac Operating Room in the nation, to the development of a comprehensive adolescent and adult congenital heart disease program, The Heart Center team is constantly looking to improve care options. Recently ranked as one of America's best for Heart and Heart Surgery by *U.S. News & World Report*, you can be assured that your patients have access to expertise and resources that can handle any level of care necessary.

Our world-class team, comprised of cardiologists, surgeons, intensivists, nurses and technicians, have in place all the comprehensive services and resources such as electrophysiology, interventional cardiology, cardiothoracic surgery and echocardiology, just to name a few, readily available for you and your patients. We offer convenient outpatient cardiology services at our main campus and *Close To Home*SM Center locations throughout Columbus and throughout the Ohio region.

About Cardiothoracic Surgery

The cardiothoracic surgical program at Nationwide Children's Hospital is dedicated to the treatment of patients with congenital disorders of the thorax which includes heart, lungs, mediastinum and chest wall. Non-cardiac thoracic diseases that the surgeons in the cardiothoracic program treat include chest wall deformities, such as Jeune's Syndrome and pectus deformities, in addition to Benign Thoracic Disorders and Primary or Secondary Malignant Thoracic Diseases. Successful diagnosis and treatment is accomplished by a multidisciplinary team of specialists from Hematology/Oncology/BMT, Pulmonary Medicine, Physical Therapy, Plastic Surgery and Cardiothoracic specialists, who tailor the treatment to meet individual patient needs.

In addition to the premier team of experts, Nationwide Children's continues to be a pioneer in the development of new strategies for treating patients, including being one of the first children's hospitals in the nation to utilize 3D Video Assisted Thoracoscopy. This technology provides improved clarity to perform the most delicate maneuvers within the thoracic cavity and allows us to expand the use of minimally invasive techniques to the treatment of our patients.

To refer a patient to The Heart Center, please call (614) 722-6200, fax referrals to (614) 722-4000 or visit us at www.NationwideChildrens.org.

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- :: ICAEL Accredited Echocardiography Laboratory
- :: OptumHealth Center of Excellence for Congenital Heart Disease (CHD) and Heart Transplant
- :: Ranked as one of America's best for Heart and Heart Surgery by U.S. News and World Report
- :: Named one of America's top three in cardiology/cardiothoracic services by Parents magazine
- :: Aetna Institute of Excellence for Pediatric Congenital Heart Surgery

Infective Endocarditis

Also known as bacterial endocarditis or subacute bacterial endocarditis (SBE), infective endocarditis (IE) occurs when blood-borne bacteria infect the endocardium and/or heart valves. If not detected and treated, heart valves can be damaged or even destroyed.

Various occurrences can cause bacteria commonly found on the skin, in the oropharynx or elsewhere to enter the bloodstream, where they can multiply and cause bacteremia. Certain strains of bacteria lodge on susceptible portions of the heart – typically, on damaged or foreign material in the heart. For this reason, some groups of patients are more susceptible than others. The most common cause is frequent exposure to bacteria during daily activities—chewing, brushing, etc. Poor dental hygiene may be a main contributing factor, making good oral health and hygiene, including regular dental visits, important in at-risk patients of all levels. Injuries or invasive procedures such as certain surgeries or dental procedures can also cause endocarditis.

Often such an infection “smolders,” creating nonspecific symptoms which hinder diagnosis, until or unless the amount of bacteria in the blood reaches critical levels, producing a high fever and more fulminant symptoms. Diagnosis is often further hindered, however, by administration of antibiotics before cultures are drawn, eliminating the bacteria in the blood but not the heart. Prevention is therefore extremely important. This has commonly been accomplished by administering antibiotics before and after certain procedures.

DETECTING INFECTIVE ENDOCARDITIS: AN IMPORTANT PROCEDURAL NOTE

Should a patient have signs or symptoms which indicate endocarditis, they should see a doctor immediately and have blood cultures and other relevant tests done **before** antibiotics are started in order to obtain an accurate diagnosis.

PROPHYLAXIS: NEW GUIDELINES

In recent years, the Endocarditis Committee of the American Heart Association conducted an extensive review, determining which procedures were most likely to cause endocarditis, and released new guidelines indicating which patients should receive prophylaxis. In comparison to the old guidelines, the revised guidelines suggest fewer patients would be candidates to receive IE Prophylaxis.

REGIONAL SERVICES AVAILABLE

The Heart Center offers patient evaluation for infants, children and adolescents, as well as the following services:

- :: ECG, Echocardiography
- :: Evaluation of murmurs
- :: Evaluation of chest pain and syncope with possible cardiovascular causes
- :: Cardiology clearance for school sports participation
- :: Follow-up visits for cardiac patients

Visit us at NationwideChildrens.org/HeartCenter for more information, including:

- :: Custom driving directions for your patients
- :: Downloadable fact sheets
- :: Physician information



New Prophylaxis Guidelines: Who and When?

PATIENTS AT HIGHEST RISK

The Endocarditis Committee of the American Heart Association now recommends antibiotic prophylaxis only for those patients at highest risk for an adverse outcome. These patients include:

- :: Those who have a prosthetic cardiac valve or a cardiac valve repair done with prosthetic material
- :: Those who have had previous endocarditis
- :: Those with the following particular congenital conditions:
 - Unrepaired cyanotic congenital heart disease, including those with palliative shunts and conduits
 - A congenital heart defect that is completely repaired with prosthetic material or a prosthetic device, placed by either surgery or catheter, for the first six months after the procedure
 - Congenital heart disease that is repaired but with residual defects (persistent leaks or abnormal flow) at or adjacent to the site of a prosthetic patch or device
- :: Those who have had a cardiac transplant and have developed cardiac valve abnormalities.

PATIENT GROUPS NO LONGER REQUIRING ANTIBIOTIC PROPHYLAXIS

Some previously-included patient groups were found not to require antibiotic prophylaxis. Among these are patients who have:

- :: Congenital heart defects not listed above
- :: Hypertrophic cardiomyopathy
- :: Coronary artery bypass graft surgery
- :: Coronary artery stents

Changes in guidelines do not, however, change the fact that some patients are inherently more at risk than others, even if excluded from the current groups for whom prophylaxis is recommended. The judgment of each patient's cardiologist, based upon their specific case, should be the deciding factor regarding antibiotic administration.

PROCEDURES WHICH DO NOT REQUIRE ANTIBIOTIC PROPHYLAXIS

The Endocarditis Committee of the American Heart Association and national and international experts on IE determined that there is no conclusive evidence that dental procedures create IE, nor is there evidence that gastrointestinal (GI) or genitourinary (GU) tract procedures cause IE, even in the highest-risk patients.

Procedures which do not require antibiotic prophylaxis include:

- :: Gastrointestinal (GI) procedures, even in the highest-risk patients
- :: Genitourinary (GU) procedures, even in the highest-risk patients
- :: Any dental procedures other than in the highest-risk patients
- :: The following dental procedures even in the highest-risk patients:
 - routine injections of anesthetic through noninfected tissue
 - dental radiography
 - placing prosthodontic or orthodontic appliances
 - adjusting orthodontic appliances
 - placing orthodontic brackets
 - deciduous tooth loss
 - lip or oral mucosa trauma with bleeding

Antibiotic Prophylaxis for Highest-Risk Patients

PROCEDURES WHERE ANTIBIOTIC PROPHYLAXIS IS RECOMMENDED

For highest-risk patients, prophylaxis is appropriate for all dental procedures that involve:

- :: manipulation of gingival tissue
- :: manipulation of the periapical region of teeth
- :: perforation of the oral mucosa
- :: trauma to the lips or oral mucosa with bleeding

Antibiotic Prophylaxis is also recommended for highest-risk patients in the case of an invasive procedure involving incision or biopsy of the respiratory mucosa such as:

- :: tonsillectomy
- :: adenoidectomy
- :: bronchoscopy only in the case of incision of the mucosa
- :: treatment of an established infection, i.e. drainage of an abscess or empyema

In highest-risk patients in procedures involving infected skin, skin structure, or musculoskeletal tissue.

ANTIBIOTIC PROPHYLACTIC REGIMENS FOR DENTAL PROCEDURES

Situation	Agent	Regimen – Single Dose 30-60 minutes before procedure	
		Adults	Children
Oral	Amoxicillin	2g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM or IV*	50 mg/kg IM or IV
		1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins or ampicillin – Oral regimen	Cephalexin**†	2 g	50 mg/kg
	OR Clindamycin	600 mg	20 mg/kg
	OR Azithromycin or Clarithromycin	500 mg	15 mg/kg
Allergic to penicillins or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV
	OR Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

*IM — intramuscular; IV — intravenous

**Or other first or second generation oral cephalosporin in equivalent adult or pediatric dosage.

†Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema or urticaria with penicillins or ampicillin.

Source: American Heart Association

SPECIFIC SITUATIONS AND CIRCUMSTANCES – PATIENTS ALREADY RECEIVING ANTIBIOTICS

If a patient is already receiving long-term antibiotic therapy it is prudent to select an antibiotic from a different class rather than to increase the dosage of the current antibiotic. For example, antibiotic regimens used to prevent the recurrence of acute rheumatic fever are administered in dosages lower than those recommended for the prevention of IE.

REFERENCES

Wilson W, Taubert KA, Gewitz M, Lockhart PB, Baddour LM, Levison M, et al. 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. *Circulation* 2007; 116:1736–1754.

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