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Infective Endocarditis

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Infective Endocarditis

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Introduction:

Infective Endocarditis (IE) is a relatively rare disease, but it is well known to ICUs around the world. It is a condition of endothelial damage to the heart as the result of a pathogen (Rajani & Klein, 2020). These pathogens are most commonly bacterial but can also be caused by fungi or other infectious organisms. It is associated with a mortality rate of up to 30% at 30 days from time of diagnosis (Rajani & Klein, 2020).

IE can lead to several different complications, which include but are not limited to: heart failure, pulmonary embolism, and stroke (Endocarditis- Symptoms and Causes- Mayo Clinic, n.d.). Unfortunately, IE has become more prevalent as invasive procedures are implemented, such as placement of central access and pacemakers (Hidalgo-Tenorio et al., 2020). For these reasons, prevention, recognition, and appropriate treatment is crucial for successful patient outcomes.

Signs & Symptoms:

- Fevers
- Night sweats
- Fatigue
- Loss of appetite
- Weight loss
- Heart murmurs
- Aching joints
- Shortness of breath
- Chest pain
- Lower extremity edema
- Janeway lesions- red spots on palms and soles of feet
- Osler's nodes- tender red spots on fingers and toes

(Rajani & Klein, 2020)
(Endocarditis- Symptoms and Causes- Mayo Clinic, n.d.)

Diagnostics:

A diagnosis of Infective Endocarditis is made through a combination of patient-reported symptoms, physical assessment, and diagnostic tests (echocardiogram, chest x-ray, CT scan). If IE is suspected, blood cultures are the first step to 1) determine if a bacterial pathogen is present and 2) determine the best antibiotic for coverage. Staph. aureus is the most common pathogen in IE, and is also associated with a high mortality rate (Hidalgo-Tenorio et al., 2020).

An official diagnosis is made through the modified Duke Criteria (see table below):

- Definitive IE: 2 major; 1 major and 3 minor; or 5 minor criteria met
- Possible IE: 1 major and 1 minor; or 3 minor criteria met

(Rajani & Klein, 2020)

Table 34.3. The Modified Duke Criteria for the Diagnosis of Endocarditis

Major Criteria

- Blood culture positive for IE
 - Typical microorganisms consistent with IE from two separate blood cultures
 - Viridans streptococci; *Streptococcus bovis*, HACEK group, *Staphylococcus aureus*; or
 - Community-acquired enterococci, in the absence of a primary focus
 - Microorganisms consistent with IE from persistently positive blood cultures, defined as follows:
 - At least two positive blood cultures of blood samples drawn >12 h apart; or
 - All of three or a majority of ≥4 separate cultures of blood (with first and last sample drawn at least 1 h apart)
 - Single positive blood culture for *Coxiella burnetii* or antiphase I IgG antibody titer >1:800
- Evidence of endocardial involvement
- Echocardiogram positive for IE (TEE recommended in patients with prosthetic valves, rated at least "possible IE" by clinical criteria, or complicated IE [paravalvular abscess]; TTE as first test in other patients), defined as follows:
 - Oscillating intracardiac mass on valve or supporting structures, in the path of regurgitant jets, or on implanted material in the absence of an alternative anatomic explanation; or
 - Abscess; or
 - New partial dehiscence of prosthetic valve
- New valvular regurgitation (worsening or changing or preexisting murmur not sufficient)

Minor Criteria

- Predisposition, predisposing heart condition or injection drug use
- Fever, temperature >38°C
- Vascular phenomena, major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, and Janeway lesions
- Immunologic phenomena: Glomerulonephritis, Osler nodes, Roth's spots, and rheumatoid factor
- Microbiological evidence: Positive blood culture but does not meet a major criterion as noted previously (excluding single positive cultures for coagulase-negative staphylococci and organisms that do not cause endocarditis) or serologic evidence of active infection with organisms consistent with IE
- Echocardiographic minor criteria eliminated

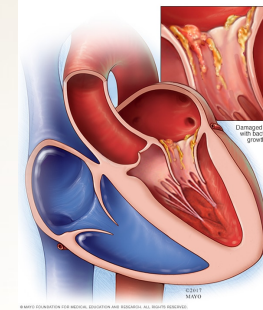
IE, Infective endocarditis; TEE, transesophageal echocardiography, TTE, transthoracic echocardiography. Modified from Li, J. S., Sexton, D. J., Mick, N., Nettles, R., Fowler, V. G., Ryan, T., et al. (2000). Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis. Clinical Infectious Diseases, 30(4), 633–638.

(Swaminathan, 2017)

Risk Factors:

- Artificial valves
- Rheumatic valve disease
- Congenital heart disease
- Implanted cardiac devices
- IV drug use
- Chronic kidney disease
- Chronic liver disease
- Malignancy
- Advanced age
- Diabetes
- Dental procedures and poor dental hygiene

(Rajani & Klein, 2020), (Endocarditis- Symptoms and Causes- Mayo Clinic, n.d.)



(Endocarditis- Symptoms and Causes- Mayo Clinic, n.d.)

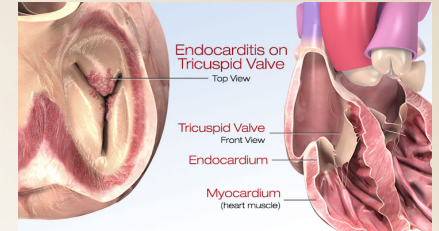
Treatment:

IV Antibiotics:

- Selection of antibiotic dependent upon offending organism and type of valve (native vs. prosthetic)
- Must consider renal function when dosing
- Often require inpatient stay
- (Rajani & Klein, 2020)

Surgery:

- Valve replacement
- Several pre-operative factors can attribute to increased post-operative mortality (Varela Barca et al., 2020):
 - Cardiogenic shock
 - Urgent surgery
 - Paravalvular abscess
 - Renal failure
 - Previous cardiac surgery
 - S. aureus
 - Female sex
 - Advanced age
 - NYHA Class >III
 - Prosthetic valve
 - Multivalvular Involvement



(Endocarditis: Symptoms, Causes, Tests and Treatment, n.d.)

Implications for Nursing:

- As Infective Endocarditis is increasingly becoming a consequence of invasive medical devices, nurses must recognize the importance of proper hand washing and sterile technique during dressing changes of central access lines
- Patient education is a crucial step in prevention:
 - Dental hygiene
 - Central access care at home
 - Avoidance of IV drug abuse
 - Diabetes management
- Early recognition of symptoms leads to earlier testing and treatment, so nurses should be familiar with common signs and symptoms to decrease mortality rate (Zhu et al., 2017)
- Obtain blood cultures before administering antibiotics

References and Additional Resources:



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