

College of Medicine

Department of Medical Education

Curriculum Development Unit

Template for a lecture summary

Year 1

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| Title of the lecture: Myocarditis & Pericarditis |

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Block / week: Cardiovascualr

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Objectives of the lecture:

1. Describe the epidemiology and risk factors for myocarditis.

2. Explain the pathogenesis of myopericarditis.

3. Differentiate between the various types of myocarditis and pericarditis.

4. Name various etiological agents causing myocarditis and pericarditis.

5. Describe the clinical presentation and differential diagnosis of myocarditis and pericarditis.

6. Discuss the microbiological and no microbiological methods for diagnosis of myocarditis and pericarditis.

7. Explain the management complication and prognosis of myocarditis and pericarditis.

Background:

* Myocarditis is inflammatory disease of the heart muscle. It can be due variety of infectious and non infectious causes and viral infection is the most common cause .Coxsackievirus B is the most common cause . Most patients present with signs and symptoms of viral infection like fever, headache, muscle aches, diarrhea, sore throat and rashes. Myocarditis can be diagnosed by CBC, WBC and ECG ,blood cultures are indicated to rule out concomitant bacterial endocarditis and viral serology. Contrast enhanced MRI.. Heart muscle biopsy for rare cases . Treatment of patient with myocarditis is often supportive; restricted physical activity. Specific antimicrobial therapy is indicated when an infecting agent is identified.
* Pericarditis*:* Pericarditis is an inflammation of pericardium usually of infectious etiology.
* Respiratory viruses (coxsackievirus A and B, echovirus) are the most common causes. Bacterial Pericarditis usually complication of pulmonary infections (e.g. pneumonia empyema)eg *S. pneumonia, M. tuberculosis, S. aureus, H. influenzae, K. pneumoniae legionella.* Parasitic infections (disseminated toxoplasmosis, contagious spread of Entamoeba histolytica from liver are rare causes.HIV patients may develop pericardial effusions due to (tuberculosis *M. avium* complex). There are different types of pericarditis and effusions. Patients with Pericarditis will present with chest pain, fever, dyspnea and a friction rub. Patient with tuberculous pericarditis has insidious onset of symptoms. For diagnosis Pericarditis. ECG will show ST elevation, PR depression .Blood culture, Leukocytosis and an elevated ESR are typical other routine testing urea and creatinine. PPD skin test is usually positive in tuberculous pericarditis. Chest x-ray may show enlarged cardiac shadow or calcified pericardium and CT scan show pericardial thickening >5mm. Pericardial fluid or pericardial biopsy specimens for fungi, antinuclear antibody tests and histoplasmosis complement fixation in endemic area. Management is a mainly supportive for cases of idiopathic and viral Pericarditis including bed rest. Specific antibiotics must include activity antiviral and antibacterial agents as indicatedif indicated. Pericardiocentesis to relief tamponade.

Main concepts of the lecture:

Myocarditis

- Myocarditis is inflammatory disease of the heart muscle.

- Myocarditis can be due variety of infectious and non infectious causes .Viral infection is the most common cause .Others causes include: toxin drugs and hypersensitivity immune,giant cell myocarditis due thymoma, SLE or thyrotoxicosis.

- Coxsackievirus B is the most common cause of myocarditis. Other virus like coxsackievirus A, other echoviruses, adenoviruses influenza, EBV, Rubella, Varicella, Mumps, Rabies, Hepatitis viruses and HIV.

-Bacterial causes of myocarditis include *Corynebacterium diphtheriae*, syphilis, Lyme disease or as a complication of bacterial endocarditis.

-A parasitic cause includes Chagas diseases, *Trichinella spiralis,Taxoplasma gondii* and *Echinococcus.*

-Other includes Rickettsia, fungi, Chlamydia, enteric pathogens, Legionella and tuberculosis.

-Patient with endocarditis present with signs and symptoms of viral infection like fever, headache, muscle aches, diarrhea, sore throat and rashes.

-Other symptoms include chest pain, arrhythmias or swelling fatigue and may present with congestive heart failure.

-Myocarditis can be diagnosed by CBC, WBC and ECG (to rule out arrhythmias) which might show cardiomegaly or reduced ejection fraction and cardiac enzyme.

-Blood cultures are indicated to rule out concomitant bacterial endocarditis.

-Indium III – labeled antimyosin antibody imaging to see if the patient has myocardial necrosis.

-Contrast enhanced MRI.

-Heart muscle biopsy is standard for diagnosis but is rarely warranted.

-Specific test for Lyme, diphtheria and Chagas disease maybe indicated on a case by case basis.

-Viral serology.

-Treatment of patient with myocarditis is often supportive; restricted physical activity especially in patient with heart failure.

-Specific antimicrobial therapy is indicated when an infecting agent is identified, i.e. bacterial myocarditis/Lyme disease.

-Heart failure should be treated and anti- arrhythmic drugs may be indicated in some cases.

-Other drugs indicated in special situations like anticoagulant, NSAID steroid or immunosuppressive immunomodulatory agents.

-Heart transplant in patient with intractable heart failure and cardiomyopathy.

-Most cases of viral myocarditis are self limited.

-Severe cases of myocarditis can cause permanent heart failure.

-About one third of the patients are left with lifelong complications, ranging from mild conduction defects to severe heart failure.

-Patient should be followed regularly every 1-3 months.

-Sudden death may be the presentation of myocarditis in about 10% of cases.

Pericarditis

-Pericarditis is an inflammation of pericardium usually of infectious etiology.

-Respiratory viruses (Coxsackie virus A and B, Echovirus) are the most common causes and other includes Herpes viruses, Hepatitis B ,Adeno virus and Varicella.

-Bacterial Pericarditis usually a complication of pulmonary infections (e.g. pneumonia empyema): *S. pneumoniae, M. tuberculosis, S. aureus, H. influenzae, K. pneumoniae* and *Llegionella.*

-Disseminated fungal infection (Histoplasma, Coccidioides) may cause septic Pericarditis.

-Parasitic infections (disseminated toxoplasmosis, contagious spread of *Entamoeba histolytica* from the liver are rare causes.

-HIV patients may develop pericardial effusions (tuberculosis *M. avium complex*).

-Purulent pericarditis during cardiotomy may occur and hemorrhagic pericarditis most commonly due tuberculosis, direct neoplastic invasion or in patient with a bleeding diathesis.

-Caseous pericarditis commonly occur in tuberculosis in origin.

-Serious pericarditis by autoimmune diseases (rheumatoid arthritis & SLE).

-Fibrous pericarditis: A chronic pericarditis usually caused by suppurative, caseous, or encased in a thick layer of scar tissue.

-Patients with pericarditis present with chest pain, fever, dyspnea and a friction rub.

-Patient with tuberculous pericarditis has insidious onset of symptoms.

-On examination exaggerated pulsus paradoxus, JVP and tachycardia.

-As the pericardial pressure increases, palpitations presyncope or syncope may occur.

-Diagnosis of pericarditis is by ECG will shows ST elevation, PR depression and T-wave inversion may occur later.

-Blood culture

-Leukocytosis and an elevated ESR are typical .Other routine testing are urea and creatinine.

-PPD skin test is usually positive in tuberculous pericarditis.

-Chest x-ray may show enlarged cardiac shadow or calcified pericardium and CT scan show pericardial thickening >5mm.

-Pericardial fluid or pericardial biopsy specimens for fungi, antinuclear antibody tests and histoplasmosis complement fixation in endemic area.

-Management is mainly supportive for cases of idiopathic and viral Pericarditis including bed rest and NSAIDS, Colchicine.

-Steroid is controversial and anticoagulants usually contraindicated.

-Specific antibiotics must include activity against *S. aureus* and respiratory bacteria.

-Antiviral: Acyclovir for Herpes simplex or Varicella .Ganciclovir for CMV ,etc.

-Pericardiocentesis to relief tamponade.

-Patients who recovered should be observed for recurrence.

-Symptoms due to viral Pericarditis usually subsided within 1 month.

-Uremic, rheumatic, collagen in 30% of patients include pericardial effusion and tamponade, constrictive pericarditis and pleural effusion.

-Restrictive pericarditis and heart failure.

Conclusion:

Myocarditis is an inflammation of the myocardium due to infectious and non infectious causes. Viral infection is the most common causes. Most cases are self-limited but severe cases progress to heart failure and dilated cardiac muscle. Clinical presentation is similar to flu like illness in most cases. Diagnosis is by ECG and lab diagnosis include blood culture, biochemical and serological tests. Management is usually supportive.

Pericarditis is an inflammation of the pericardium .Usually due to infectious cause where viruses are the common cause. There are different types of pericarditis. Acute cases present with sudden pleuritic chest pain ,fever, dyspnea and friction rub. Tuberculous pericarditis is of insidious onset. Diagnosis include ECG, CT scan and lab diagnosis and pericardiac fluid or biopsy. Management is supportive in addition to antiviral /or antibacterial drugs as indicated in addition to pericardiocenthesis.

Take home messages:

1. Myocarditis and Pericarditis are an inflammatory disease of the myocardium and pericardia respectively.
2. Viral infection is the most etiological agents but other infectious and non infectious agents may also instigate an inflammation of the heart muscle and pericardium.
3. Recognizing the clinical symptoms and signs of myocarditis are critical for better management of the patients with these syndromes.
4. It is important to send the required laboratory test as soon as possible either microbiological (blood culture, serology ,etc.) and non microbiological tests in addition to radiological and immunological investigation to confirm the diagnosis.
5. Supportive care, bed rest and anti -inflammatory drugs are the common approach for management of these patients.
6. Specific treatment like antibiotics and antiviral indicated on a case by case basis.

Further reading:

*Sherries* Medical Microbiology, an Introduction to Infectious Diseases. Latest edition, Kenneth Ryan and George Ray. Publisher : McGraw Hill .