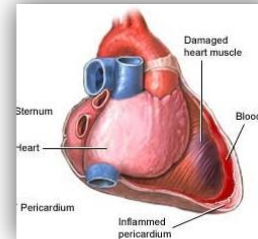
Microbiology TEAM 432

Lecture (1)

Microbiology of Myocarditis & Pericarditis



Objectives

1. 1. Describe the epidemiology, risk factor for myocarditis.
2. 2. Explain the pathogenesis of myopericarditis.
3. 3. Differential between the various types of myocarditis and pericarditis.
4. 4. Name various etiological agents causing myocarditis and pericarditis.
5. 5. Describe the clinical presentation and differential diagnosis of myocarditis and pericarditis.
6. 6. Discuss the microbiological and no microbiological methods for diagnosis of myocarditis and pericarditis.
7. 7. Explain the management complication and prognosis of patient with myocarditis and/or pericarditis.

Done by: Abdullah Al Onaizi, Hamad Al Braidi & Rakan Al Mutairi
Designed by: Rakan Al Mutairi

Mind map

(Myocarditis & Pericarditis)

important things are highlighted in RED

- **Myocarditis**
  - Causes
  - Clinical Presentation
  - Management
  - Diagnosis
- **Pericarditis**
  - Diagnosis
  - Types of Effusive Fluid
  - Pathophysiology
  - Causes
  - Types
  - Clinical Presentation
  - TB
  - Management

Myocarditis:

Myocarditis is inflammatory disease of the heart muscle.
Inflammatory doesn't mean infection, cause there are noninfectious causes.

Epidemiology	We do not know (because of huge variability from mild to sever)
Causes	Coxsackie B is the most common virus, other viruses can cause it. Bacterial causes are many but the most important ones are (corynebacterium diptheriae, syphilis & Lyme disease). Parasitic infections are caused by Taxoplasma gondii, this organism come from the cats' stool when it go to the soil and dry, it can spread to the air and lead to myocarditis by inhalation. It's also common in pregnant ladies and lead to abortion. If patient present with myocarditis we suspect this parasite.
Clinical Presentation	They present with either mild symptoms like viral infections (flu symptoms), or might present with severe infections like congestive heart failure (CHF).
Diagnosis	Routine tests are done: WBC count & ESR (should be elevated). Important blood test: **troponine and CK-MB* levels** (should be elevated) Then, we go for specific tests: ECG, Viral Serology, Chest X-Ray, and heart muscle biopsy (and muscle biopsy in difficult cases). ECG changes in Myocarditis are not important.
Management	Most of the cases need only supportive treatment, i.e. if the patient was in pain, we treat him/her for that pain. Same thing for other symptoms and complications like heart failure. Viral infections are mild and don't need any treatment (self-limited). In difficult cases: NSAID, steroid, or immunosuppressive therapy (rarely done). In sever cases, when the myocardium is deteriorating, we do heart transplant. Doctor said it's hard to ask a question in Management of the myocarditis, so just read it briefly. ☺

- Was mentioned by the male side.

*: a complex protein and an enzyme. Both are considered to be cardiac markers

Pericarditis:

Pericarditis is an inflammation of pericardium.

- tuberculoius perocarditis is very common. Malignancy & rheumatoid arthritis could cause pericarditis as well.
- We have to differentiate between infectious and non infectious causes, because the treatment is quite different.

The treatment for Autoimmune diseases is steroid, the treatment for TB: Anti TB drugs and treatment for bacterial infection are Antibiotics.

- **What are the roots of bacterial Pericarditis?** It comes from adjacent organs (e.g. lungs), such patients may die if treated with steroids, because suppressing the immune system will help bacteria get stronger. For TB Pericarditis and TB meningitis, steroids are given along with Anti-TB to decrease the inflammation (because it'll destruct the tissue and will cause fibrosis).

How patients develop Pericarditis ?

From Adjacent organ, through the Blood (bacteremia), by trauma, or from the lymphatic spread. It can turn to Constrictive Pericarditis (the Pericardium becomes small and limit the end diastolic volume), the results could be right sided heart failure or increased JVP (caused by the inflammation).

Types of Pericarditis

1- Caseous Pericarditis (commonly with TB).
2- Serious Pericarditis (with autoimmune diseases).
3- Fibrous Pericarditis: if caseous and serious pericarditis are chronic they will lead to fibrous Pericarditis.

Types of Effusive fluid

1- Suppurative (colour of pus: green or yellow).
2- Hemorrhagic (with TB, Malignancy, or trauma)
3- Serosanguinous (between bloody and serous).
4- Serous

Clinical Presentation

Stabbing chest pain, fever, **friction rub.** if sever: heart failure and maybe death.
On examination we will find elevated JVP (Jugular venous pressure).

To be continued .. ☺

- Additional information.

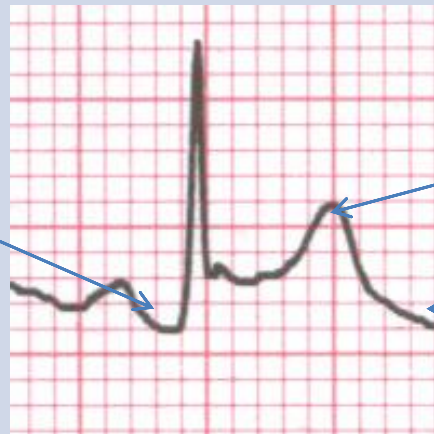
We are Back .. ☺
Tuberculous Pericarditis
Incidence of Pericarditis to happen by Pulmonary TB is 1-8%. Symptoms are similar to any other pericarditis.
Diagnosis
Routine testing, blood culture, TB serology, Chest X-Ray (enlargement of Pericardium). then we take fluid if it was negative we take biopsy. If we didn't find anything in the fluid, what we do ? We do a Z-N stain. << 5 riyals question ☺

Listen to Friction rub: http://www.youtube.com/watch?v=J1R8Oxgqhfk

ECG changes in Pericarditis

Important

PR wave depression



ST complex elevated

T wave inversion

Lecture Notes:

Pericarditis, can be due to Coxsackie A or B and other viruses, bacteria, parasite, fungus Or can be non infectious. And all of them can also cause Myocarditis. Non infectious don't memorize them for the exam, but know that they exist ☺

Diagnosis for Pericarditis, we take fluid (called pericardiocentesis), and if there was no bacteria it doesn't mean that it's negative for TB. Incase of Pericardial infection and we suspect TB we have to collect BIOPSY from pericardium.

Treatment, the treatment depend on the causes, if it was Viral most of the time we leave them.

Clinical symptoms and how we differentiate between them? They might present with the same symptoms (Fatigue, weakness, fever), if it's bad disease they present with Arrhythmia, congestive heart failure, shortness of breath so what do we do ?
The findings of ECG are important to differentiate between them, incase of Pericarditis PR wave depression, T wave inversion, and ST complex elevated.

Pericardial will present with stabbing in nature, chest pain, fever. If we have a case patient with stabbing pain, fever, shortness of breath, we suspect pericardial infection then we have to do physical exam listen for friction rub (we use stethoscope we hear friction rub that indicate the heart is not smooth) and we do ECG, afterwards we decide if it is pericarditis or myocarditis.

He will not ask the most common cause of Pericarditis, **but viruses are the most common**, TB, Fungus, Parasite.

lecture closure:

Doctor want us to differentiate between them clinically.
He wants us to know what's the most common cause for myocarditis, and other causes of Pericarditis.
Know that there are other routine culture tests , we do (blood culture, chemistry ..ext), and there are some specific test we do the major one in myocarditis viral serology, and for Pericarditis also viral serology, but we should put TB in mind, if the fluid is negative we have to do AFB and do biopsy if needed.

For management they are almost the same, mild disease (they might not come to the hospital), sever disease (they will come with complications: congestive heart failure), in between they might be admitted to the hospital giving supportive treatment, if it severe we might give anti inflammatory drugs.

	Myocarditis (Myocardium)	Pericarditis (Pericardium) Common in KSA
Epidemiology	We do not know (because of huge variability form mild to sever)	
Causes	**Viral :** coxsackie B virus (most common) **bacterial :** C. diptheriae, Syphilis & lyme. **Parasitic :** toxoplasma gondii (come from the stool of cat by inhalation which is common in pregnancy – watery stool can not spread until it will get dry)	(There is nothing common) **Infectious :** coxsackievirus A, b, other viruses Bacteria , fungi and parasites **Non Infectious :** many factors
Clinical presentation (symptoms)	Fatigue, fever If it gets worse, it can cause arrhythmias, shortness of breath, Chest pain and may present with congestive heart failure.	Pleuritic pain (stabbing), Fever and chest pain By auscultation : friction rub (not smooth sound - scratchy)
Diagnosis	• Blood culture and CBC • ECG •Chest x-ray (cardiomegaly) •Viral serology • If the case is difficult → take biopsy	• ECG, Blood culture & Elevated JVP • Pericardial fluid + biopsy • Chest x-ray (heart look like ball) • For TB Pericarditis : take biopsy (because they are waxy & pericardial fluid, will be negative) , x-ray (hilar lymph node) and Mantoux test
Treatment	Supportive management if it's sever NSAID and steroid	•Like Myocarditis, but depend on the causes •Don't give steroid (patient die)except for : TB meningitis & TB Pericarditis

By : Hamad Albraidi

Questions

What's the most common cause of Myocarditis?
Coxsackie B.

a pragnent patient presented with myocarditis, she have a history of exposure to cats. What is the most likely organism?
Taxoplasma gondii.

What are the findings of ECG in case of Pericarditis?
PR wave depression, T wave inversion, and ST complex elevated.

Give an example of bacterial cause for Myocarditis?
corynebacterium diptheriae, syphilis and Lyme disease

Name some tests used to diagnose myocarditis?
Viral Serology. (muscle biopsy in difficult cases).

Rakan Al Mutairi:
I listened to the lecture and wrote everything that the doctor said, cause in the lecture he said that anything I don't say is not important, and he didn't go through many info in the slides. Also, at the end of the lecture he said that he have told us the questions. So, hopefully as he said this work will be enough
إن شاء الله ☺

Please read Page 6 cause it is a continuation of Pericarditis & Myocarditis.

This work does not have all the info in the slides, it is what the doctor said, and emphasized.

(The note is for the future first year medical students ☺)

THANK YOU

We hope that we made this lecture easy for you.
We hope for you nothing but A+ ☺.

If there was something wrong in this work, then please contact the team's leader:
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