



# **Acute Heart Failure & Cardiac diseases**



# Acute Heart Failure

**Definition: Heart failure** is a state of reduced cardiac output, in which the **heart** cannot pump blood around the body effectively.

When symptoms appear suddenly, or a dog experiences rapid worsening of existing symptoms of **heart failure**, this is called **acute heart failure (AHF)**

# Acute Heart Failure


## ETIOLOGY:

- ▶ Myocarditis
- ▶ Nutritional deficiency myopathy
- ▶ Plant poisoning myopathy
- ▶ Electrocution, lightning strike
- ▶ Iatrogenic intravenous injection calcium, potassium solutions, xyaline
- ▶ Aortic valve rupture
- ▶ Anaphylaxis
- ▶ Induction stage of halothane or barbiturate anesthesia




# Clinical findings

- **Acute syndrome**
  - **Commonest during exercise or excitement; a significant cause of death in horses during training or tracing**
  - **Dyspnea**
  - **Staggering, falling, recumbency**
  - **Marked mucosal pallor**
  - **Sporadic, incoordinated limb movements; short of actual convulsions**
  - **Bradycardia, tachycardia or heart sounds absent**
  - **No pulse**
  - **Death within minutes, with deep, asphyxial gaps**

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- **Subacute syndrome**
    - **Course 12-24 hours**
    - **Tachycardia , often tachyarrththmia**
    - **Severe dyspnea**
    - **Lung base crackles**
    - **Hydrothorax, ascites in those with longer course**
    - **Clinical pathology**
    - **Not applicable in most cases**
    - **Elevated serum levels of creatine kinase, aspartase aminotransferase, lactate dehydrogenase**




# Diagnosis

- ▶ **Acute cases resemble other causes of sudden death.**
  - ▶ **Less acute cases resemble:**
    - ▶ **Congestive heart failure**
    - ▶ **Pulmonary edema**
    - ▶ **Pneumonia**
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# Treatment

- Usually impractical because of short course.
  - Cardiac massage or electric stimulation of heart can be given
  - Intracardiac injection of Epinephrine
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# CARDIAC ARRHYTHMIAS

- ▶ **Cardiac arrhythmia** refers to a group of conditions that cause the heart to beat irregular, too slowly, or too quickly.
- ▶ There are several categories of **arrhythmia**.
- ▶ Bradycardia, or a slow heartbeat.
- ▶ Tachycardia, or a fast heartbeat.
- ▶ Irregular heartbeat, also known as a flutter or fibrillation.



# CARDIAC ARRHYTHMIAS


## Etiology:

- ▶ First degree heart block:
- ▶ Second degree heart block
- ▶ Sinoatrial block
- ▶ Ventricular extrasystoles
- ▶ Atrial extrasystoles
- ▶ Atrial fibrillation



# First degree heart block

- Also known as increased PR interval.
- Slowed conduction through the atrioventricular node.
- Can be due to excessive vagal tone
- Metabolic disorders
- Cardiomyopathies or idiopathic.

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- ▶ Arrhythmia in horses at rest which disappears with exercise thought to be of no significance.
  - ▶ Mostly found in brachycephalic dogs.
  - ▶ Transient arrhythmia common in newborn foals.
  - ▶ Cardiac arrhythmia may be associated with gastrointestinal disease in cows and horses; resolves spontaneously when primary disease corrected.
  - ▶ Most cases of arrhythmia dealt with by treating the primary condition

# Second degree heart block

- ▶ Also called Partial AV block.
- ▶ **Mobitz Type I:** (Wenckebach: variable P-Q interval) is usually associated with a high vagal tone, which delays conduction through the AV node.
- ▶ This can be caused iatrogenically or be functional.
- ▶ Often reasonably benign if only occasional beat missed, and it may disappear at elevated heart rates.
- ▶ **Mobitz Type II:** (fixed P-Q interval) more often associated with more severe disease of the conduction pathways, disturbing the transmission of the impulse from atria to ventricles.
- ▶ Can be due to infiltrative or degenerative myocardial diseases.

- ▶ Sinus arrest or sinoatrial block can be defined as the failure of impulses to be formed within the Sinoatrial node (SA node) due to depression of automaticity of the node. The failure of the SA node to discharge impulses on correct time can cause fainting or even sudden death.

Sinus arrest may be an accidental finding in brachycephalic breeds of dog by increased vagal tone during inspiration.

**Sinoatrial block** is usually diagnosed when the pause between complexes is exactly equal to twice the previous P-P interval.




# Antiarrhythmics

- ▶ Procainamide – Membrane stabilizer. Slowed conduction, less automaticity. IV emergency tx of ventricular arrhythmias.
- ▶ Lidocaine – Membrane stabilizer. Emergency tx for ventricular arrhythmias. IV, short  $t_{1/2}$ , so slow IV drip.
- ▶ Propranolol – Class II  $\beta$  blocker.
- ▶ Atenolol – Class II  $\beta$  blocker.
- ▶ The dog was given Atropine sulphate @ 0.04 mg/kg body weight intravenously as an immediate therapy.
- ▶ The Terbutaline (Bricanyl) @ 4mg/kg body weight orally for 2 weeks was given as long term management of the condition.





# Myocarditis

- Myocarditis is a focal or diffuse inflammation of the myocardium with myocyte degeneration and/or necrosis.
  - Definitive diagnosis of myocarditis is rarely made in animals as it requires myocardial biopsy or post-mortem examination.
  - There are, however, some recognised causes of myocarditis in dogs.
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# Etiology

- ▶ Lyme disease ( Borreliosis)
- ▶ Parvovirus
- ▶ Equine infectious anaemia
- ▶ Trypanosomiasis
- ▶ Parvovirus
- ▶ Ischemic Heart disease
- ▶ Navel ill or Strangles in horse
- ▶ Tuberculosis in horse
- ▶ FMD, AHS, BT in Sheep
- ▶ Strongylus spp, cysticercosis
- ▶ Vit E /Se and Cu deficiency\_WMD and Mulberry Heart disease



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- Streptococcus spp is the most common cause of bacterial myocarditis in horse.
  - Salmonella, Clostridium, Equine influenza Borrelia burgdorferi and Strongylosis are other cause in equines
  - Cardiac toxic drugs: Monensin, blister beetle toxicosis, rubber vine, white snake root plant.
  - Diagnosis: CK, troponin and LDH level elevated.

# Endocarditis

- Dogs
  - ***Streptococcus, Staphylococcus, E.coli, Klebsiella.***
  - **Usually due to dental disease, pyoderma, prostatitis.**
  - **Vegetative lesion on the valve and can leads to valvular stenosis**
  - **Aortic stenosis.**
  - **Aortic and Mitral valve are mostly affected**



- **Horses**

- Mostly Aortic and mitral valve.
- *Streptococcus, Actinobacillus equuli.*

- **Cattle**

- Tricuspid valve.
- Staphylococcus, Clostridium chauvoei spp.

- **Cats**

- Rare



- **Clinical signs**

- Chronic fluctuant fever, heart murmur, shifting leg lameness, Malaise and weight loss, signs of systemic embolization.

- **Diagnosis**

- Echocardiogram., neutrophilic leukocytosis. Radiography show alveolar pattern & ECG shows tall R waves(LV enlargement) & wide P waves (LA enlargement) in LSHF. Positive blood/joint culture with demonstration of heart involvement.

- **Treatment**

- High dose broad spectrum antibiotics.

- Treat for heart failure

- Supportive care with prophylactic antibiotics.

# Pericarditis

- It is generally Traumatic
- Extension from other infection
- Cattle- Mycoplasma, Black disease, Pasteurellosis
- Horse- Steptococcus, Tuberculosis, Actinobacillus spp.