

# OEDEMA



- Abnormal or excessive accumulation of fluid in the interstitial tissue spaces and serous cavities.



# ETIOLOGY



**Decreased plasma oncotic pressure**

**Increased hydrostatic pressure**

**Increased capillary permeability**

**Obstruction to lymphatic flow.**



1. *Decreased plasma oncotic pressure*

- Hypoalbuminemia or hypoproteinemia
- Most common cause of generalized symmetric edema

2. *Increased hydrostatic pressure in capillaries and veins*


- caused by chronic (congestive) heart failure or obstruction to venous return
- symmetric pulmonary edema in acute heart failure



### *3. Increased capillary permeability*

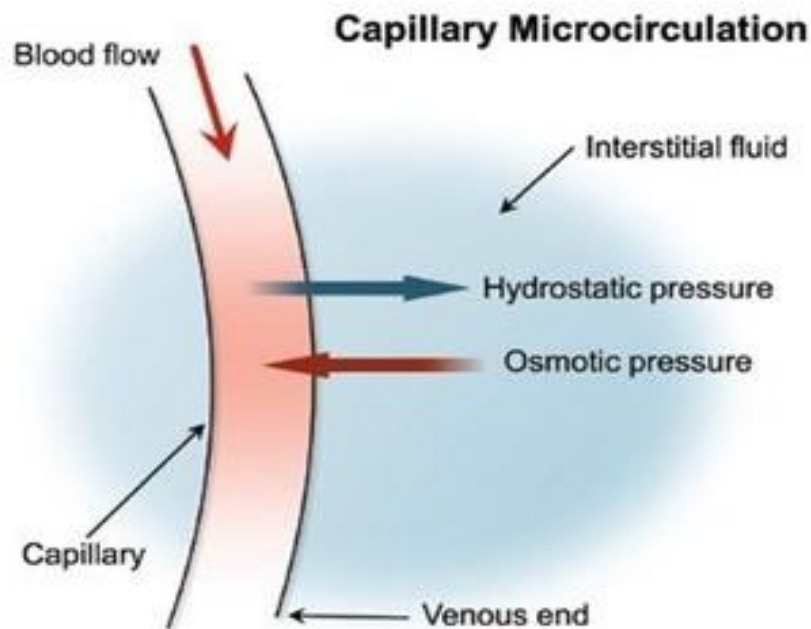
- Endotoxemia
- Part of the allergic response
- Vasculitis
- Damage to the vascular endothelium

### *4. Obstruction to lymphatic flow*

- Tumors or inflammatory swelling
  - Congenital in inherited lymphatic obstruction edema in Ayrshire and Hereford calves
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# PATHOPHYSIOLOGY

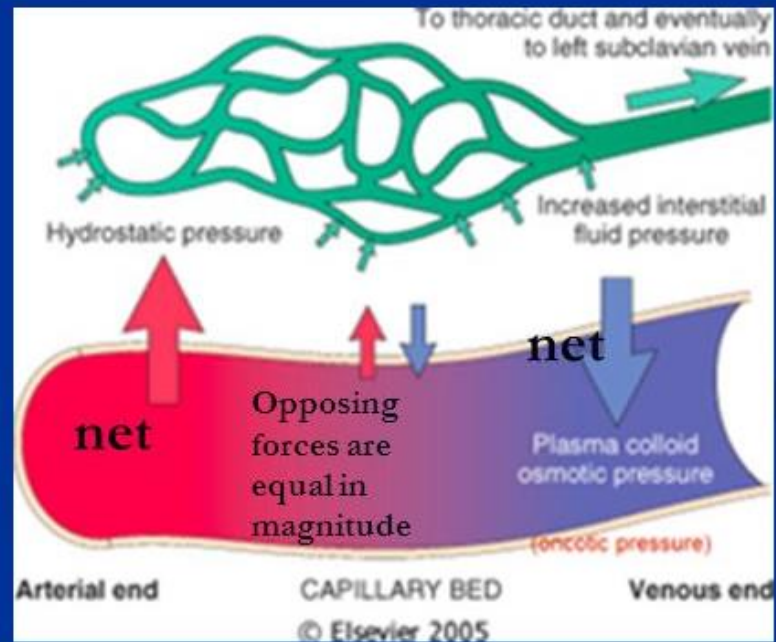
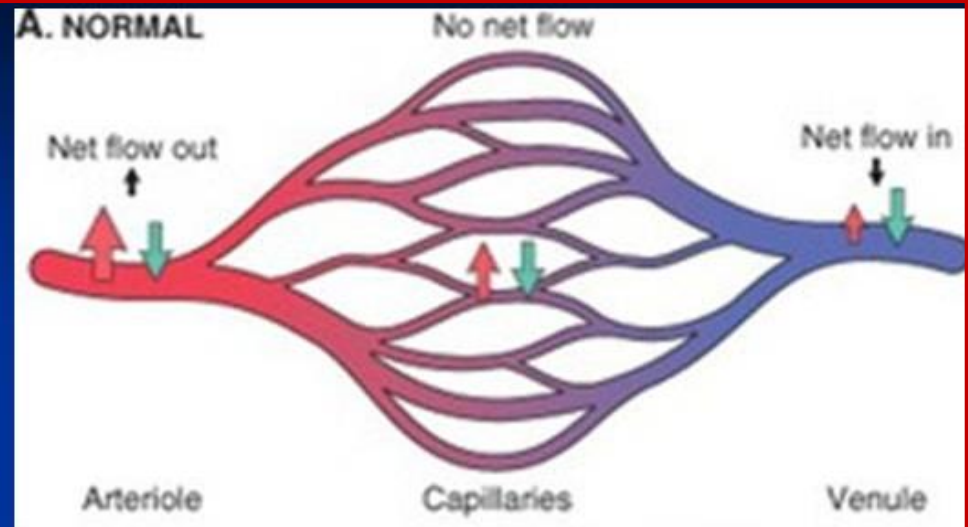
## Hydrostatic vs. Osmotic Pressure



**Figure 2.** Fluid exchange occurs across capillaries according to hydrostatic and colloid osmotic pressures maintained between the extracellular and intravascular compartments.

- **Hydrostatic** pressure is water being pushed out by some force. If there is a lot of water in the blood vessel, it will get pushed out, causing edema in the tissues.
- **Osmotic** pressure is water moving from its area of high concentration to its area of low concentration. If there are too many particles in the plasma, water will be sucked into the blood vessel, causing the blood pressure to elevate.

- **Hydrostatic pressure** and **oncotic pressure** are opposing forces in blood vessels.
- Under normal conditions, **hydrostatic pressure** tends to “push” fluid out of the capillary (filtration) whereas **oncotic pressure** tends to “pull” fluid into the capillary (reabsorption)
- The “net force” determines whether *filtration* or *reabsorption* occurs at any single location along the capillary microvasculature



# CLINICAL SIGNS

- Accumulation of edematous transudate in  
subcutaneous tissues – **anasarca**  
peritoneal cavity - **ascites**  
pleural cavities - **hydrothorax**  
pericardial sac - **hydropericardium**





- Anasarca in large animals is usually confined to the *ventral wall of the abdomen and thorax, the brisket*
- Edema of the limbs is **uncommon in cattle, sheep, & pigs** but is **quite common in horses** when the venous return is obstructed or there is a lack of muscular movement
- Local edema of the head in the horse is a common lesion in African horse sickness and purpura hemorrhagica



- Edematous swellings are **soft, painless, and cool to the touch** and **pit on pressure**.
- In **ascites** there is distension of the abdomen & fluid can be detected by a fluid thrill on tactile percussion, fluid sounds on succussion, & by paracentesis



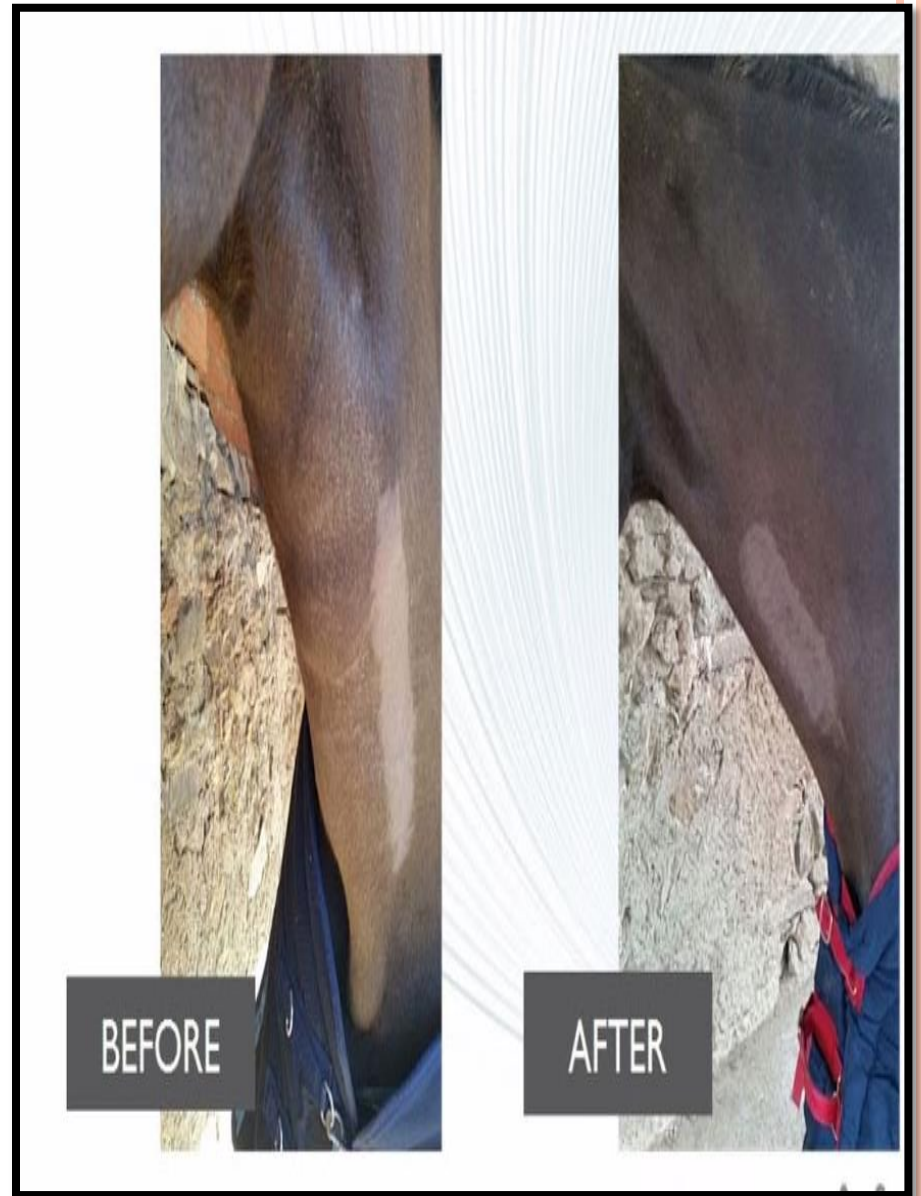
- In **pleural cavities and pericardial sac-** restriction of cardiac movements, embarrassment of respiration, and collapse of the ventral parts of the lungs



- Muffled heart & respiratory sounds
- Presence of fluid may be ascertained by percussion and thoracocentesis or pericardiocentesis
- **Pulmonary edema** is accompanied by respiratory distress; outpouring of froth from the nose
- **Cerebral edema**- severe nervous signs of altered mentation



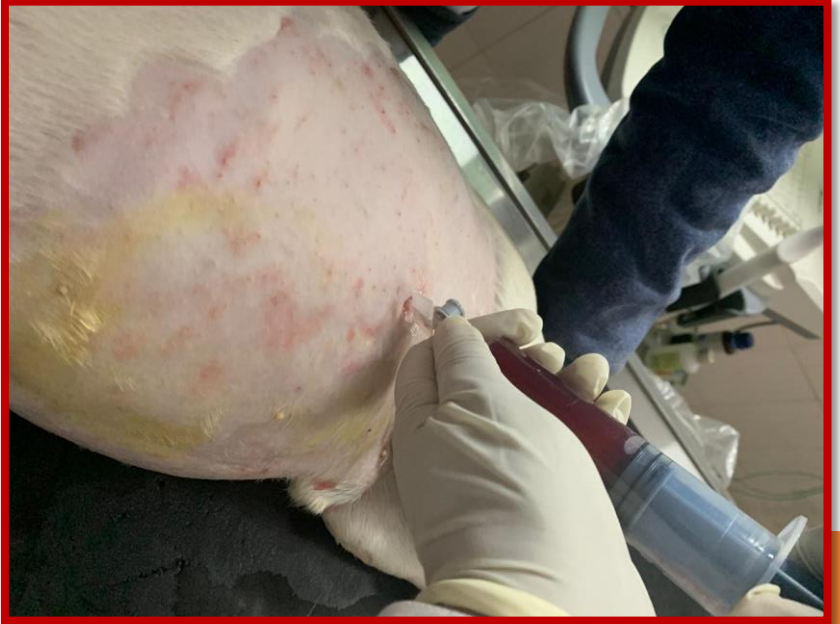
- **Thrombophlebitis** is a **common** **cause** of **localized** **edema**, particularly of the head in horses and cattle with thrombophlebitis of both jugular veins.



# CLINICAL PATHOLOGY

- Cytologic examination of a sample of fluid -----  
presence & absence of inflammatory cells
- Thoracocentesis or abdominocentesis -----  
differentiation of fluid accumulation
- Conjunction with measurement of serum albumin  
concentration & mean central venous pressure





# TREATMENT

- Correction of cause
- Hypoalbuminemia..... administration of colloids such as plasma or Dextran
- Parasitic gastroenteritis.... appropriate anthelmintic
- Obstructive edema.....removal of the physical cause & increased permeability edema ..... resolution of the cause of endothelial damage



- Ancillary nonspecific measures - restriction of the amount of salt in the diet and the use of diuretics
- Aspiration of edema fluid is rarely successful and is not routinely recommended but usually provides temporary relief because the fluid rapidly accumulates





