



Lecture title: Blood vessels and lymphatic vessels

Lecturer Affiliation: department of pathology and poultry diseases

Summary:

Arterial diseases :-

a- Aneurysm & ruptures An Aneurysm is a localized dilation or out pouching of a thinned & weakened portion of a vessel. Usually in large elastic arteries but the lesion can also occur in veins. Known causes include copper deficiency in Pigs, infection with *Spirocercalupi* in dogs or *Strongylus vulgaris* in horses. Aortic rupture & ruptures of large arteries can be the sequela of severe trauma or occur spontaneously.

b- Growth Disturbances

Arterial hyperatropy: is a response to sustained increases in pressure or volume loads. Affected vessels are generally muscular arteries. It may be physiological hyperatropy for example hyperatropy of uterine arteries in pregnant animals. Or Pathological hyperatropy of arteries which associated with infection by several parasites including Lung worm of cats, *Toxocara* spp & *Dirofilaria immitis*.

c. Degeneration And Necrosis: Generalized vascular degenerative diseases in animals are classified into three principle groups:-

- 1- Arteriosclerosis
- 2- atherosclerosis
- 3- arterial medial calcification

1- Arteriosclerosis: is characterized by intimal fibrosis of large elastic arteries. It is an age related disease that occurs frequently in many animal species but rarely causes clinical signs the disease develops as a chronic degenerative & proliferative response in the arterial wall & results in loss of elasticity (hardening of the arteries) & Luminal narrowing. The abdominal aorta is most frequently affected.



Grossly:- The lesions are seen as slightly raised firm, white plaques.

Microscopically: initially the intima is thickened by accumulation of mucopolysaccharides & later by the proliferation of smooth muscle cells in the tunica media & fibrous tissue infiltration into intima splitting & fragmentation of the internal elastic lamina are common.

2- Atheroseclerosis: The vascular disease of greatest importance in human being. It is characterized by intimal & medial lipid deposits in elastic & muscular arteries. The principle alteration is accumulation of lipid deposits in vessel wall which result in luminal narrowing. Rabbit, Chicken, Cow, Goat & rat are resistant. Grossly, Arteries of heart, mesentery, kidneys are prominently thickened firm & yellow white. Microscopically, lipid globules accumulated in the cytoplasm of smooth muscle cells & macrophages, often termed (foam cell) in the media & intima. Necrosis develops in some arterial lesions.

3- Arterial medial calcifications: are frequent lesion involve both elastic & muscular arteries. The causes of arterial medial calcification include calcinogenic plant toxicosis, Vit D toxicosis, renal insufficiency & sever debilitation as seem in Johne's disease.

Grossly: Affected arteries such as aorta have a unique gross appearance, they appear as a solid, dense pipe like structures with raised white solid intimal plaques.

Microscopically: In elastic arteries prominent basophilic granular mineral deposits are present on elastic fibers of media but in muscular arteries a complete ring of mineralization in the tunica media.

Hyaline degeneration: fibrinoid necrosis and amyloidiosis are vascular lesions of small muscular arteries & arterioles & occur in all animal species.

Inflammation of arteries (Arteritis): occurs as a feature of many infections & immune mediated diseases. Often, all types of vessels are affected rather than only arteries, & then vasculitis or angitis is term applied to the lesions. Arteritis is characterized by inflammatory reaction in the arterial wall, the nature of



inflammation varying with specific causes. Secondly, arteritis may occur as part of most any inflammatory disease of other tissues. Causes:- parasites, such as *Strongylus vulgaris* in horse, *Spirocerca Lupi*+*Dirofilaria immitis*. Viral infection such as equine viral arteritis, blue tongue, hog cholera . Bacterial infection such as *Haemophilus* spp. Mycotic disease, *Aspergillus fumigatus*. **Lesions:-** In inflamed vessels, leukocytes will be present within & surrounding the wall & damage to the blood vessel wall be evident as fibrin deposits or necrotic endothelia /& smooth muscle cells. These vascular alteration are accompanied by thrombosis which result in ischemic injury or infarction in the circulatory field.

Neoplastic Diseases:

Neoplasms arising from vascular endothelial cell in many different organs includes:-

Hemangioma, hemangiosarcoma (origin endothelial cells)

hemangiopericytoma: more common in blood vessels of skin in dog.