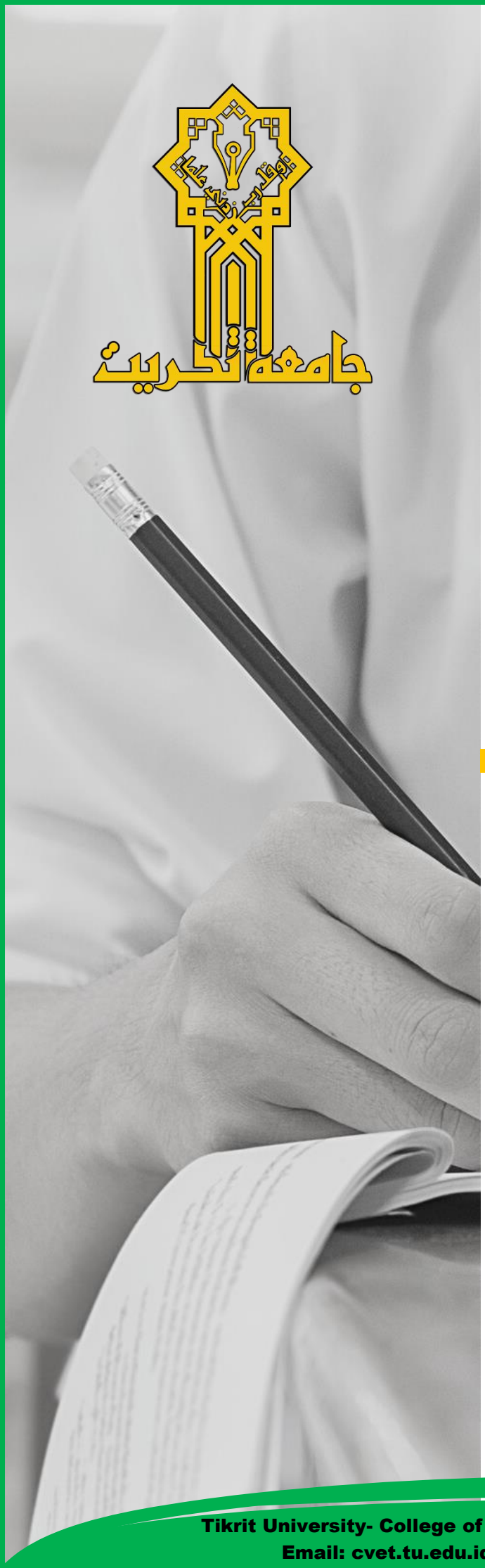

Tikrit University
College of Veterinary Medicine

Respiratory system

Subject name: Pathology

Subject year: Third

Lecturer name: Assist. Prof. Hassan Hadi Khorsheed

Academic Email:dr_patho80@tu.edu.iq

SCAN ME
Lecturers link

``Respiratory system

Structure of physiology and anatomy of R.S are consist of

Upper respiratory tract

Nose, mouth, pharynx, epiglottis, larynx and trachea

Lower respiratory tract

Bronchial tree and lungs

air pass almost explosively through the nasal passage and other species include human, dog can inhalator air from both through nose and mouth (oronasal breathing). The nasal passages are line by clear epithelium stratified sequmous epithelium in the vestibule non ciliated cuboidal columnar epi. In the interior chamber, ciliated pseudo st. Res. epithelium and olfactory epi. The greater part of internal nasal passage is cover by Res. Epi. Contain goblet cell , ciliated cell, non-ciliated columnar cell ,cuboidal cell ,brush cell located in the superior part is the olfactory Epi. Which contain sensory nerve ending.

The proximal air way trachea and bronchi have pseudo St. Epi. Containing ciliated cell and tow type of non-ciliated, mucous and serous cell, mucosal cell and glandular structure produce res. Tract mucous a family of high molecule weigh, glycoprotein with sugar contain 80%or more that coat epi. Layer with viscosity and elasticity to stick protective layer that trip pollution and cellular derbies.

Rhinitis: is inflame. of nose and nasal cavity it mean inflame. of nasal mucosal gland and C.T around them .

Causes:

1- Bacterial sterp. staph pseudomonas ,pasturella
2- Viral human influenza ,equine influenza canine distemper ,fowl pox
3- Parasite oestrus ovis
4- Mycotic (fungus) asperigulis fumgatus
5- Chemical and physical irritation acids and gases

Macroscopically changes:

Congestion , swelling of the nasal mucosa membrane, drying with muco purulent secretion.

Microscopically changes:

Hyperemia and odema of the mucosa. And inflame. exudates mostly neutrophil then lymphocyte and mucosal gland hyper active.

Type of rhinitis:

1- Allergic

2- Acute

3- Chronic

4- Atrophic

1- **Allergic Rh**.: immediate hypersensitivity reaction to Ag (pollen grain)
2- **Acute Rh**.: the most common inflame. disorder due to parainfluenza virus followed by secondary infection like bacteria.
3- **Chronic Rh**. : like acute
4- **Atrophic Rh**. : accure in swine due to atrophy and shorting of the face infected with bordeltela bronchiseptica

Tumor of the nasal

1- **Nasal polyps** : Chronic inflame. of the nose lead to thickening of the mucosa, polyp rounded and bilateral gelatinous, smooth and shiny.
Microscopically:
Oedematous C.T contain mucous gland covered by normal ciliated resp. epi. Mostly seq metaplasia, lymphocyte, plasma cell and eosinophil are seen.
2- **Chronic granulomatous Rh.**: T.B, syphilis leprosy.

❖ **Trachea and Bronchi**

The Trachea. and Bron. Are form by cartilage lining by mucous mem. , this mem. Primary formed by resp. ciliated epeth. Goblet cell and mucosal gland and thin layer of mucous

Canine infectious tracheo bronchitis (kennel cough): assume cell limited tracheo bronchitis of complex etiology eg canine adeno virus canine parainfluenza viral mordatella bronchi septica , mycoplasma. Also seen necrosis and its following by repair at the same time.

Bronchostasis: irreversible dilatation of the lung air way causes by distraction of bronchial wall muscle and elastic element.

Macroscopic: Saccular form , cylinder form present in bronchus
Microscopic: Absence the epithelium cartilage and muscular layer of bronchus and present of inflame. cells inside bronchus .
Sinusitis: infla. of sinus usually chronic due to difficult chance for removal of exudates from the sinus. The most commonly affected are the frontal and maxillary sinus. The rout of infection in the rhinitis.

1- Nasal
2- Dehorning in cattle
3- As a result of fracture of the bone above sinus
4- In equine in pulpits in case of molar teeth
5- Parasitic estrus ovis in sheep

Sequel really depend on the type of exudates

Lung

Anthracosis: Sporadic case seen in domestic animal particularly dog exposure to carbon particle suspending on the air, lung have focal area of black discoloration which called pulmonary anthracosis

Congestion of the lung associated with congested of B.V due to

heart failure ⟶ oedema and intera alveolar hemorrhage with erythro phagocytosis (heart failure cell) the lung appear heavy , red when there is congestion in the lung the accumulation of the blood finally lead to hemolysis and hemosidrine and its engulf by macrophage this is called erythrophagocytosis , the macrophage called heart failure cell which is brown in colour.

Pulmonary infraction: are rare seen due to the double circulation of the lung.

Atelectasis : failure of alveoli to open or to remain open , so the lung is shrinkage ,depress, red in colour look like liver mostly accrue in neonatal lung

Causes:

1- Deficiency in pulmonary surface tension

2- The mucous is plug (plate) in shape or purulent exudates cause obstruction of alveoli

3- Pneumothorax

Emphysematous of the lung(Emphysema):

A dark , depress tern texture (granular palpation) resemble to pneumonia , collaps alveoli lead to black of alveolar space lead to emphysema then lead to abnormal and permanent enlargement of the air space distal to terminal bronchial with distraction of the alveolar wall.

Two kinds

1- **Alveolar pulmonary emphysema:** the lung is pale or white in color and easily compress by figure.

Microscopically: alveoli large , wide opening knobs rounded , hyperplastic.

2- Interstitial pulmonary emphysema: emphysema in which present of air in inter lobular septa under the pleura thickness present bubble under the pleura , striation of the lung is absence.

Pneumonia:

General term used to dismtate any inflame. or infection of the lung this term of inflame. dismatate condition of complement in to alveoli of lung

pneumonitis : inflame. of the lung same the synom us the word pneu. But mean well restricted to condition involved any interstitial infiltration to cellular of the lumen of alveoli

Classification of pneumonia

1- **Anatomical pneumonia**
   a- Lobal pneu.
   b- Broncho pneu.
   c- Segmental pneu.
2- **Atiology pneumonia**
   a- Viral pneu.
   b- Yeast pneu.

c- Protozoa pneu.
d- Radiation pneu.
e- Aspiration pneu.
f- Verminous pneu.

Stage of pneumonia

1- **Congestion**: early stage of pneu. Characterize by active hyperemia and the capillary distended with blood , alveoli filled with serous fluid.
2- **Stage of Hepatization** :(**red hepatization**) : Consolidation or hepatized look like due to the alveoli filled with inflammatory cell, exudates and fibrin during 2^{nd} days.
3- **Stage of Gray hepatization** :the lung tissue still hepatized red in color due to ischemia , increase of WBCs infiltration , blood vessels clot and RBCs lysis.
4- **Stage of Resolution**: in this stages lysis and disappear of the exudates via lymphatic vessels and veiniols, disappear of hyperemia and fibrin and inflame. cell.

Types of pneumonia

1- **Broncho pn**.: it's very common in animal, the infection begin at bronchi, bronchiolar alveoli junction then spread to alveoli there is acute inflame. in bronchi due to bacterial invasion and congestion of wall and neutrophil infiltration and macrophage in alveoli the bacteria causes congestion and edema and neutrophil accumulation and spread up and down the air way .

Predisposing factor of broncho pn.:

1- Viral infection
2- Irritant
3- Edema

The early stage of broncho pn. There are enlargements of B.V (active hyperemia) and air way contain edema. The final result of broncho pn. Lead to the lumen of bronchi and alveoli filled with exudates called consolidation of the lung characterize by fibrinous exudates.

2- **Verminous pn :**inflammation of the lung due to parasitic infectation or other parasite which migrate to lung (hydatid cyst) in sheep and goat

Microscopically: depend on the stage of parasite in case of larvae in the alveoli there is necrosis surrounded by lymphocyte and macrophage and eosinophil and neutrophil.same time present exudates and bronchostasis

3- **Viral pn:** e.g pulmonary adenomycosis characterize by hyperplasia and hyper atrophy of the alveoli glandular appearance

4- **Interstitial pn:** thickening because of exudate of fibrin or serous and inflammatory cells and F.C.T.

Hyperplasia of alveolar epith. Hyaline mem. In alveoli and air space

Causes:

1- Virus swin influenza

2- Bacteria salmonella leptospira

3- Parasite ascaris

Macroscopically : the lung is pale to blue in color, cannot collaps and oedematous and thickening of inter alveolar septa.

Microscopically: fibrinous or serous exudates in inter lobular septa and alveoli , hyperplasia and metaplasia of alveolar epith. and perivascular cuffing of lymphocyte .

5-Fibrinous pn: there is fibrinous exudates due to pasturella spp. In cattle and sheep.

Macro and Microscopically : in the early stage the lobules is consolidation and emphysemastous, then hyperemic with pink exudates. In advance stage the lung red to black in color due to fibrin and WBCs.

6-**Hypostatic pn:** in the aging and ill animal due to sleeping for long period ,causing congestion of BVs in the lower area of the lung and stagnation (stasis) of blood, cause bacterial infection, cause hypostatic pn.

Macro and Microscopically: oedematous lung in lower area and bacterial infection.

Pleuritis (pleurisy)

Inflammation of pleura due to :

1- Septicemia

2- Pneumonia
3- Traumatic reticulo pericarditis
4- T.b
5- Break in the ribs Serous or fibrinous exudates with bacterial infection, cause empyema

Pneumothorax: present of the air in the pleura due to rupture and collaps of the lung.

Hemothorax: present of blood in the pleura.

Hydrothorax: Present of inflammatory and non imflam. exudates in the pleura due to T.B ,bacteria, kidney failure, hypo-thrombo protinemia , which cause accumulation of fluid in the pleura.