



Tikrit University
College of Veterinary Medicine

Lecture Title: General Pathological Conditions

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Meat Hygiene Course

General Pathological Conditions

Pigmentation

- Pigments are classified as exogenous and endogenous. Exogenous pigments are synthesized outside of the body and endogenous within the body itself.
- Pigments are coloured substances which accumulate in the body cells during the normal physiological process and abnormally in certain tumours and conditions. They have a different origins, biological significance, and chemical composition. The exogenous pigments are:
 - A)** Anthracosis, the carbon particles are found as a black pigment in tissues. This condition is seen as black pigment of the lungs and corresponding lymph nodes in animals raised in urban areas. The lungs affected with anthracosis are condemned and the carcass is approved.
 - B)** The carotenoid pigments are exogenous pigments, greenish-yellow in colour which consist of carotene A, carotene B, and xanthophyll. They are important in meat inspection because they cause yellowish discoloration in the fat and muscles of (Jersey and Guernsey) cattle. Carotenoid pigments should be differentiated from bile pigments in icterus.
- The endogenous pigments, except for melanin and lipofuscin are derivatives of haemoglobin.

(A) Melanosis

Melanosis is an accumulation of melanin in various organs including the kidneys, heart, lungs and liver, and other locations such as brain membranes, spinal cord, connective tissue, periosteum etc. Melanin is an endogenous brown-black pigment randomly distributed in tissue. Melanin deposits in the oesophagus and adrenal glands in older sheep are a common finding on postmortem examination. Multifocal deposits of melanin in the liver of a calf is known as “Melanosis maculosa”. It is common in calves and it usually disappears after the first year of age.

Judgement : Carcasses showing extensive melanosis are *condemned*. If the condition is localized, only the *affected organ* or part of the carcass needs to be condemned.

(B) Myocardial lipofuscinosis (Brown atrophy of the heart, Xanthosis)

lipofuscin pigment is a brown pigmentation of skeletal and heart muscles of cattle .This condition is seen in old animals and in some chronic wasting diseases. It is prevalent in Ayrshire cows and approximately 28 % of normal Ayrshire cows have this pigment in skeletal and heart muscles. Xanthosis is not dependent on the age of animals in this breed.

Melanin deposits in the sheep viscera.



Myocardial lipofuscinosis



(C) Congenital porphyria (osteohemochromatosis, pink tooth)

- Porphyria is the accumulation of plant or endogenous porphyrins in the blood resulting in tissue pigmentation and photosensitization. This is a hereditary disease and is observed in cattle and sheep. In porphyric cattle, exposure to light will initiate the development of photodynamic dermatitis.
- The disease is also known as osteohemochromatosis, due to a reddish brown bone pigmentation, and “pink tooth” because of a brownish-pink discoloration of teeth.
- **Judgement** : Carcass showing extensive xanthosis is *condemned*. If the condition is localized, *only the affected* organ or part of the carcass needs to be condemned. Head and bones of a carcass affected with osteohemochromatosis are condemned. The bones are “boned out” and remaining muscles are approved. If the condition is generalized the carcass is condemned.

Osteohemochromatosis showing brown pigmentation of ribs and vertebrae in a 6 months old calf.



(D) Icterus(Jaundice)

- Icterus is the result of an abnormal accumulation of bile pigment, bilirubin, or of haemoglobin in the blood. Yellow pigmentation is observed in the skin, internal organs, sclerae (the white of the eye), tendons, cartilage, arteries, joint surfaces etc. Icterus is a clinical sign of a faulty liver or bile duct malfunction, but it may be also caused by diseases in which the liver is not impaired. Jaundice is divided into three main categories.
- Prehepatic jaundice (haemolytic icterus)
- Hepatic jaundice (toxic icterus)
- Posthepatic jaundice (obstructive icterus)

Judgement : Animals suspected to have icterus should be treated as “suspects” on antemortem examination. On postmortem examination, the carcass and viscera with haemolytic, toxic icterus and obstructive icterus are *condemned*. Less severe cases are kept in the chiller for 24 hours. Upon re-examination, the carcass may be *approved or condemned* depending on the absence or presence of pigment in the tissue. If the obstructive icterus disappears after 24 hours, the carcass and viscera can be *passed* for human food.

Jaundice of an aged cow caused by liver disease. Note yellow discoloration of body fat, lungs, heart and kidneys.



Haemorrhage and Haematoma

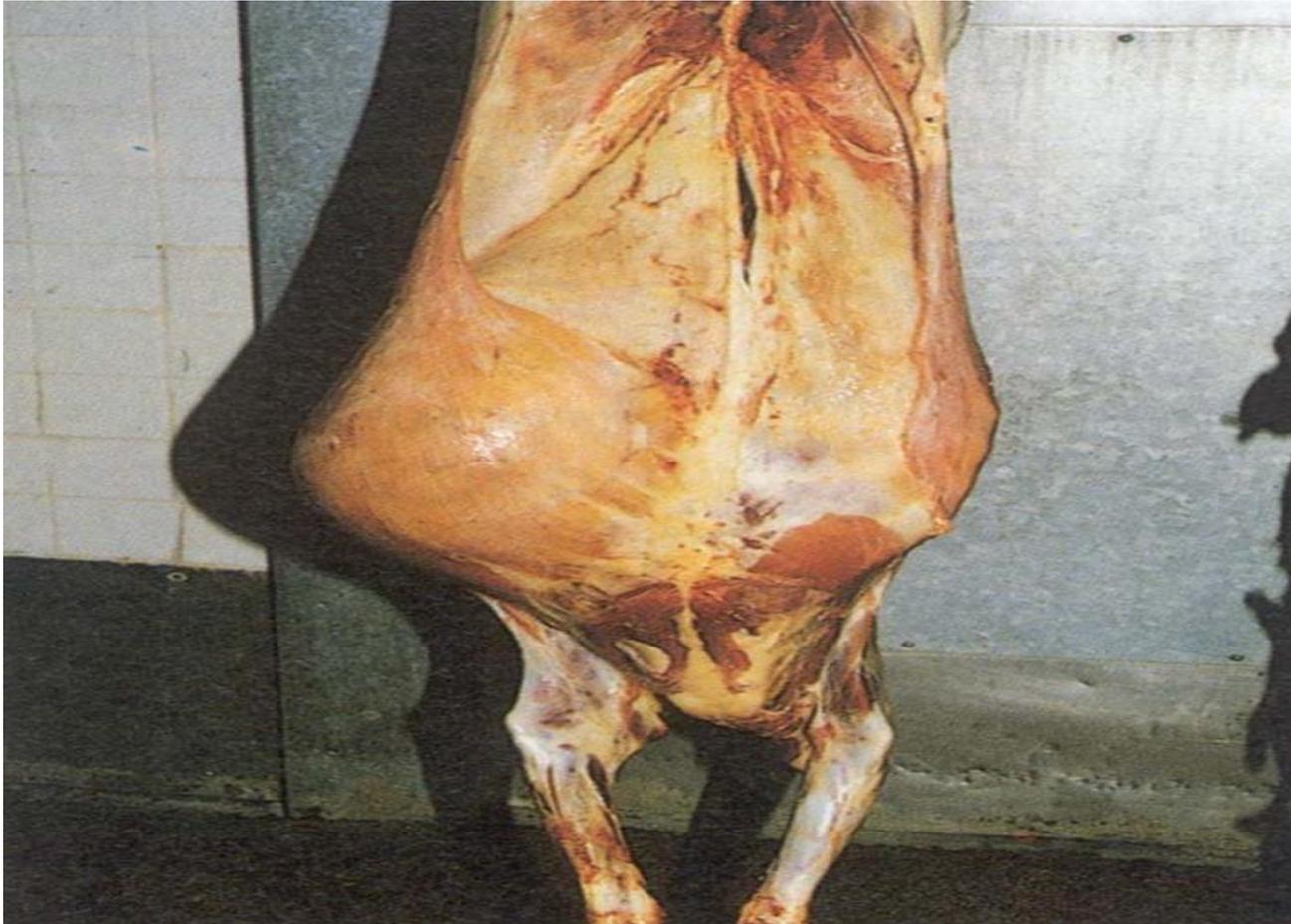
- Haemorrhage is seen at slaughter in various organs, mucous and serous membranes, skin, subcutaneous tissue and muscles. It may be caused by trauma, acute infectious diseases or septicemia.
- Petechial haemorrhage is noted as tiny foci 1 – 2 mm in diameter. Ecchymotic haemorrhage is larger being up to 2 - 3 cm in size. Paint brush haemorrhage includes extensive streaking with haemorrhage. Haemorrhage is also associated with vitamin C deficiencies, a sudden increase in blood pressure with weakened blood vessels, and improper electric current stunning. Lengthy transportation, exposure to stress before slaughter, hot weather and excitement are some of the other factors which contribute to muscle haemorrhage. A lump formed from a blood clot in tissues or organs is called a haematoma. They are associated with trauma or a clotting defect.

Ecchymotic haemorrhage in the tongue muscle of a cow.



- In haemorrhage caused by improper stunning, there may be a delay between stunning and sticking of the animal. The electrical current used in stunning causes cardiac muscle stimulation and vasoconstriction of blood vessels. This might induce a rapid rise in blood pressure leading to haemorrhages in the organs and muscle (so called “blood splashing”).
- The stunning of animals by a mechanical blow to the head is still practised with sheep and is a significant cause of haemorrhage in organs particularly the lungs and heart. The blow to the head will initiate a rise in blood pressure. Immediate bleeding with the fast blood flow from the cut vessels could prevent this type of haemorrhage in sheep.
- **Judgement** : A carcass is *approved* if the haemorrhage is minor in extent and is due to physical causes. The affected tissue is *condemned*. A carcass affected with extensive haemorrhage or a haemorrhagic carcass associated with septicemia is *condemned*.

Haematoma in the abdominal wall of an ewe



Haematoma of the bovine spleen



Abnormal odours

- Abnormal odours may result from the ingestion of certain *feedstuff, drugs, various pathological conditions, absorption of odours* from strong smelling substances and *sexual odour* from some male animals. Drugs which may cause absorption of odours include turpentine, linseed oil, carbolic acid, chloroform, ether, aromatic spirits of ammonia etc.
- In cows affected with ketosis, the sweetish odour of acetone may be present in the muscles. the odour of acetone may be noted in the connective tissue, kidney fat and musculature. The flesh of bloated and constipated animals may give off a faecal odour. If the meat is kept in a room which was recently painted, the odour may pass on to the carcass. The odour is most noted in a carcass right after slaughter.
- **Judgement:** The carcass having fish meal odour has *inferior* meat. Viscera and organs are also inferior. Generalized drug treatment requires *condemnation* of the carcass. If local treatment and withholding periods are observed, the carcass and viscera are *approved*. Sexual odour in a carcass can have a *limited* distribution according to the consumers taste. Extremely strong sexual odour requires *condemnation* of the carcass.

- A carcass which gives off a pronounced odour of medicinal, chemical or other foreign substances shall be *condemned*. If the odour can be removed by trimming or chilling, the carcass *may be passed* for human food after the removal of affected parts or dissipation of the condition.
- Carcasses affected with sexual odour should be held in the cooler and *re-tested* periodically. If the odour disappears the carcass is *approved*. If the sexual odour is present after 48 hours, the carcass shall be *condemned*.
- If abnormal odour is suspected the smell will be enhanced by placing a piece of muscle or tissue in cold water and bringing to the boil.

Plant poisoning

- In developing countries, slaughter animals, particularly cattle are often trekked some hundreds of kilometres on the hoof to the abattoirs. During this journey, animals may suffer from various plant poisoning. In addition cattle living in areas where pasture has poisonous plants may suffer from the effects of chronic plant poisoning. Different body systems may be affected and various lesions may be seen at meat inspection.
- Clinical signs and gross lesions observed in animals that have ingested certain poisonous plants: Tulip (*slangkop*) causes *diarrhoea*, *bloated abdomen* and *heart failure*. Lantana camara causes *photosensitization*.
- **Judgement:** Judgement of the animal or animal carcass will *depend on the clinical signs* and the extent and severity of the lesions.

Immaturity

- Immaturity occurs mainly in **calves**. In many countries, the slaughter of calves younger than **two weeks** of age is **prohibited**.
- The muscle of immature animals is **moist, pale, flabby and poorly developed**. It is low in **protein, high in water content and contains a high proportion of bone**.
- **Immature animals should not be slaughtered for human consumption.**

Antemortem and postmortem findings:

- 1. Presence of the umbilical cord
- 2. Bluish and not completely retracted gums
- 4. Dark red kidney and edematous kidney capsule

Judgement : Carcass and offal of immature animals are condemned