Diseases caused by bacteria

Black quarter (Black leg)

Black quarter is an acute infectious disease of cattle and sheep manifested by severe inflammation of the muscle with high mortality. It is caused by *Clostridium chauvoei*.

**Transmission:** The organisms of blackleg are found in the soil. During grazing, organisms may enter the digestive tract of a susceptible animal. *Clostridium chauvoei* is also found in the digestive tract of healthy animals. In sheep the agent is transmitted through wounds at shearing, docking and castration and during lambing in ewes.

**Ante mortem findings:**

1. High fever (41°C)
2. Lameness
3. Loss of appetite
4. Discolored, dry or cracked skin
5. Stiff gait and reluctance to move
6. Crepitating swellings often on the hips and shoulder
7. In sheep gaseous crepitation cannot be felt before death

**Postmortem findings:**

1. Lying on one side with affected hind leg stuck out. Commonly seen in cattle
2. Bloating of carcass and blood stained frothy exudates from the nostrils and anus
3. Dark red to black muscle of the loin, back or leg
4. Sponge like bubbly appearance of the muscles with a peculiar rancid odor
5. Yellowish, gelatinous subcutaneous tissue and associated gas bubbles
6. Blood stained fluid in body cavities

**Judgment:** Carcasses of animals affected with black leg should be *condemned*. It is prohibited to slaughter and dress an animal diagnosed with this disease at ante mortem examination.
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**Differential diagnosis:** Other acute Clostridia infections, lightning strike, anthrax, bacillary haemoglobinuria, lactation tetany, extensive hemorrhage and acute lead poisoning.

**Discussion:** Black leg is worldwide in distribution. Well nourished animals are more frequently affected. It is also more commonly seen in grass fed animals than in stall fed animals. Clostridia are soil-borne organisms which cause disease by releasing toxins. Specific antitoxin and antibiotics are rarely effective in the treatment of this disease. An adequate preventive vaccination program may be the most effective method in protecting the animals from black leg.

### Botulism

Botulism is a disease manifested by progressive muscular paralysis. It is seen in humans, animals, birds and fish and is caused by various strains of *Clostridium botulinum*.

**Transmission:** Decomposed flesh and bones are the source of infection for animals. Incubation period 12 – 24 hours. However, 2 hours up to 14 days incubation period has been recorded.

**Ante mortem findings:**

In cattle and horses

1. Restlessness
2. Knuckling and in coordination
3. Paralysed tongue and drooling of saliva
4. Sternal recumbence
5. Progressive muscular paralysis from hindquarters to front quarters, head and neck

In sheep

6. Serous nasal discharge and salivation
7. Abdominal respiration
8. Stiffness upon walking and in coordination
9. Switching of the tail on the side
10. Limb paralysis and death

In pigs

11. Lack of appetite, refusal to drink and vomiting
12. Papillary dilatation
13. Muscular paralysis

**Postmortem findings:** Foreign material in fore-stomachs or stomachs may be suggestive of botulism.

**Judgment:** Total condemnation of carcass because of human hazards.

**Differential diagnosis:** Parturient paresis, paralytic rabies, equine encephalomyelitis, ragwort poisoning in horses, miscellaneous plant poisoning.

In sheep - louping ill, hypocalcaemia and some cases of scrapie.

**Discussion:** Cl. botulinum is found in the digestive tract of herbivores. Soil and water contamination occurs from faeces and decomposing carcasses. The proliferation of Cl. botulinum organisms may also occur in decaying vegetable material. Sporadic outbreaks of botulism are reported in most countries. Outbreaks of botulism in cattle and sheep in Australia, Southern Africa and the Gulf coast area of the United States are associated with phosphorus deficient diets and ingestion of carrion. Cattle, sheep and rarely swine are susceptible to this disease. Dogs and cats are resistant.

By Dr. Khaled, Fujairah Municipality
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Cl. botulinum produces neurotoxin which causes functional paralysis. Seven strains of this organism (“A through G”) are distinguished according to immunological differences. The diseases caused by various strains of this agent are frequently regarded as a separate entity owing to some of their prominent signs. Names such as “Bulbar paralysis in cattle”, “Lamsiekte in sheep” in South Africa (meaning lame sickness), and “Limberneck in poultry” are often used. Cl. botulinum is often found in anaerobic conditions of deep wounds. It produces neuropaalytic exotoxins which cause symptoms of the disease. This organism will grow and produce toxins if the temperature is between 10 – 50°C, pH above 4.6. Water activity (AW) above 0.93 and anaerobic conditions exist. Fresh meats are implicated with less than 10 % of botulism outbreaks. The major sources of this organism are fish, home cured meats, home canned vegetables and fruit. Eggs, milk and their products are rarely the cause of an outbreak. Most frequently, raw, insufficiently cooked foods or foods not fully salted, cured, dried or smoked are implicated. Botulism toxins are heat labile and food suspected of having the organism should be boiled before serving.

In man the signs of the disease are weakness, dizziness, blurred or double vision, dilatation of pupils, dry mouth, difficulties in breathing and speech, progressive muscular weakness, respiratory failure and death. Pneumonia may be a complication associated with botulism in man.


Malignant edema

Malignant edema is a bacterial disease of cattle, sheep, goats, swine, horses and poultry. It is caused by Clostridium septicum and is manifested by wound infection. The infection is commonly soil-borne. Deep wounds associated with trauma provide ideal condition for the growth of this agent.

Ante mortem findings:

1. Fever 41 – 42°C
2. Depression and weakness
3. Muscle tremor and lameness
4. Soft doughy swelling and erythema around the infection site

Postmortem findings:

1. Gangrene of the skin in area of infection site
2. Foul putrid odor is frequently present
3. Gelatinous exudates in the subcutaneous and intramuscular connective tissue
4. Suberosal hemorrhage
5. Accumulation of sero-sanguineous fluid in body cavities
6. Muscle tissue is dark-red but has little or no gas

Judgment: Carcasses of animals affected with malignant edema are condemned.

Differential diagnosis: Blackleg. In malignant edema the muscle is not involved and the wound site is noted. Anthrax in pigs. Subcutaneous edema in the throat region is present.

Tuberculosis

By Dr. khaled, fujairah municipality
Cattle meat inspection chapter 1
Tuberculosis is a chronic disease of many animal species and poultry caused by bacteria of the genus *Mycobacterium*. It is characterized by development of tubercles in the organs of most species. Bovine tuberculosis is caused by *Mycobacterium bovis*. It is a significant zoonotic disease.

**Transmission:** An infected animal is the main source of transmission. The organisms are excreted in the exhaled air and in all secretions and excretions. Inhalation is the chief mode of entry and for calves infected milk is an important source of infection. When infection has occurred tuberculosis may spread:

1. **by primary complex** (lesion at point of entry and the local lymph node)
2. **by dissemination** from primary complex.

### Ante mortem findings:

1. Low grade fever
2. Chronic intermittent hacking cough and associated pneumonia
3. Difficult breathing
4. Weakness and loss of appetite
5. Emaciation
6. Swelling superficial body lymph nodes

### Postmortem findings:

1. Tuberculosis granuloma in the lymph nodes of the head, lungs, intestine and carcass. These have usually a well defined capsule enclosing a caseous mass with a calcified centre. They are usually yellow in color in cattle, white in buffaloes and grayish white in other animals.
2. Active lesions may have a reddened periphery and Caseous mass in the centre of a lymph node.
3. Inactive lesions may be calcified and encapsulated
4. Nodules on the pleura and peritoneum
5. Lesions in the lungs, liver, spleen, kidney
6. Bronchopneumonia
7. Firmer and enlarged udder, particularly rear quarters
8. Lesions in the meanings, bone marrow and joints

The diagnosis may be confirmed by making a smear of the lesion and with Ziehl-Neelsen. The TB bacterium is a very small red staining bacillus.
Discussion: Mycobacterium invades cattle by respiratory (90 – 52 %) and oral routes (5–10 %). Congenital infection in the bovine fetus occurs from an infected dam. Tuberculosis lesions can be classified as acute miliary, nodular lesions and chronic organ tuberculosis. Young calves are infected by ingestion of contaminated milk. The incidence of human tuberculosis caused by Mycobacterium bovis has markedly dropped with the pasteurization of milk. It also has dropped in areas where programs of tuberculosis eradication are in place. Man is susceptible to the bovine type. In cattle, lesions of tuberculosis caused by the avian type are commonly found in the mesenteric lymph nodes. Tuberculosis in small ruminants is rare. In pigs the disease may be caused by the bovine and avian types. Superinfection is specific in cattle.

Judgment: Carcass of an animal affected with tuberculosis requires additional postmortem examination of the lymph nodes, joints, bones and meanings. It is suggested that the Codex Alimentarius judgment recommendations for cattle and buffalo carcasses be followed.

Carcasses are **condemned**

i. where an eradication scheme has terminated or in cases of residual infection or re-infection

ii. in final stages of eradication - natural prevalence low

iii. during early stages in high prevalence areas

Carcass of a reactor animal without lesions *may be approved* for limited distribution. If the economic situation permits, this carcass should be condemned. *Heat treatment* of meat is suggested during early and final stages of an eradication program: in low and high prevalence areas where one or more organs are affected, and where miliary lesions, signs of generalization or recent haematogenous spread are not observed. If the economical situation permits, then the carcass is condemned.

In some countries, the carcass is approved if inactive lesions (calcified and/or encapsulated) are observed in organs and without generalization in lymph nodes of carcass.

**Differential diagnosis:** Lung and lymph node abscess, pleurisy. Pericarditis, chronic contagious pleuropneumonia, actinobacillosis, mycotic and parasitic lesions, tumors, caseous lymphadenitis John's disease, adrenal gland tumor and lymphomatosis

**T.B of lung**
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**Causative agent**

*Mycobacterium bovis* .... Is cylindrical, rod shape, acid fast bacilli

It remain viable for 2 year in frozen meat
At 10 °C ----> 18 day
Decomposed lung after 167 day

**Mode of infection**

by inhalation ---- 5% by in gestation 52%

**Tissue reaction**

... *Cellular reaction*

.When organism is moderate pathogen city & ingested & destroyed by cellular reaction

... *Exudative reaction*

When the organism is high pathogenic & low body resistance → exudative → caseation & calcification

**Pathogenesis**

Entry of tubercle bacilli by respiratory tract → after 3 weeks become visible by naked eye in lymph nodes...(( it is result from proliferation of phagocyte cell → grey & translucent → necrosis → grey & opaque → caseation → yellowish & cheesy

**Acute military T.B**

Of early generalization lesions 1- millet seeds size
Same age -2
Same size -3
Uniformly distributed -4

**Lung in the adult bovine** the primary lesion is usually situated in the upper border of the main lobe

**Primary infection lesion**

.Isolated encapsulated & calcified foci with corresponding lesion in the associated lymph nodes

**Chronic acinonodular TB**

.Cavitations of lung → scattered Caseous fuci of different size involving acini of one or both lung
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**Acute acino-nodular TB**
After scattered of caseous foci in one or both lung → indicative for the breakdown of body resistance

**Caseous pneumonia**
Coalesce of Caseous foci + blood spots → large nodule of cassations reach hen egg size

**Acute military T.B**
After Caseous pneumonia → massive entry of bacilli to blood → by haematogenous rout → milliary T.B in associated lymph node or to ( sternal l.n, intercostals l.n, caudal deep cervical, ( precabular ) & lung lymph node ( apical l.n, mediastinal l.n, taracheitis, laryngitis

**:Judgment**

**A) Lymph nodes of fore quarter**
Pre scapular lymph nodes → condemn for quarter until 5th inter costal space -1
Axillary L. N → if alone condemn until 5th intercostals space…if associated with affected of other -2 lymph nodes condemn until 9th intercostals space
Intercostals L.N → oyster the chest wall or condemn it -3
sternal L. N → condemn the brisket & plate-4

**B) Military tuberculosis of both lung** → acute military T.B indicate large number of bacilli invade the blood stream lesions are ch.ch by millet seed size same age same size.

**John's disease (Bovine Para tuberculosis)**
John's disease is a chronic, infectious bacterial disease of adult wild and domestic ruminants such as cattle, sheep, and goats. It is characterized by the thickening and corrugation of the wall of the intestine, gradual weight loss and chronic diarrhea and is caused by *Mycobacterium Para tuberculosis*.

**Transmission:** Ingestion of faeces harboring Mycobacterium Para tuberculosis

1. The agent is persistent in soil, pasture, manure and stagnant water for prolonged period.
2. Carrier animals, so called "faecal shedders", are the most important source of infection.
3. Ingestion of organism. Calves may become infected from a nursing infected dam.
4. Transmission with semen and in-uterus are minor source of infection

**Ante mortem findings:**

1. Incubation period 2 - 3 years with range from 6 months to 15 years.
2. Indifferent animal which stops eating at the end of the disease
3. Gradual and chronic weight loss and emaciation
4. Rough hair coat and dry skin
5. Non responsive diarrhea with watery fluid faeces
6. Submandibular edema ("bottle jaw")
7. Reduced milk production
8. Mastitis and infertility

By Dr. khaled, fujairah municipality
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9. Debility and death

Postmortem findings:

1. Thickened and corrugated intestinal mucosa
2. Enlarged caecal lymph nodes

Judgment: Carcass of an animal affected with John's disease is approved when generalized systemic signs of disease are not present. A poor, thin and slightly moist carcass should be held in the chiller and assessed after 24 or 48 hours. If the dryness and setting of the carcass improves during this time it can be released. The carcass with associated edema and emaciation is condemned.

Differential diagnosis: Other causes of diarrhea and weight loss, malnutrition, chronic salmonellosis, parasitism (e.g. Ostertagiasis), winter dysentery, Bovine Viral Diarrhea (BVD), "hardware" disease, coccidiosis, liver abscesses, kidney disease, inflammation of the heart and its sac, toxic inflammation of the intestine caused by arsenic, plants and mycotoxicosis and neoplasm.
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Edematous skin disease or Ulcerative lymphangitis

Ulcerative lymphangitis Caseous nodules along the course of lymph vessel
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**Definition**
Is mild contagious disease of cattle that is caused by tuberculosis & characterized by Inflammation of subcutaneous lower limbs

**Pathogenesis**
Infection of skin abrasions & wounds + ((bad hygienic conditions such as overcrowding & dirty, unhygienic stable are predisposing factors for infection)) → followed by invasion of local lymphatic vessels & development of abscesses along their course

**Clinical signs**
1. there is along incubation period-1
2. high morbidity no mortality with long course of disease-2
3. affection leg is swollen hot & painful & usually associated with lameness-3
4. nodules develop in the subcutaneous tissue especially around the fetlock & some time-4 spread all over the body
5. gelatinous clear exudates may be green stained by blood the lesion or creamy green pus-5 with blood stained. The lesion heal within 2→3 weeks but new lesions usually develop
6. more prevent during summer months-6

**Treatment**
Local surgical treatment of ulcers & irrigation with iodine based antiseptic fluid, followed by oxytetracycline dressing

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**Leptospirosis**

Leptospirosis is an important and relatively common disease of domestic and wild animals and humans. In cattle, it is manifested by interstitial nephritis, anemia and mastitis and abortion in most species. *Leptospira spp.* are the causative agents.

**Transmission** : Animals contract the disease by eating and drinking leptospira-contaminated urine, water, or by direct contact of broken skin or mucous membranes with mud, vegetation or aborted fetuses of infected or carrier animals. Recovered animals and animals with unapparent (sub clinical) leptospirosis frequently excrete billions of leptospiras in their urine for several months or years.

**Ante mortem findings:**

Acute and sub acute forms

1. Transient fever
2. Loss of appetite
3. Lactating cows may stop milking
4. Mastitis
5. Milk may be yellow, clotted and frequently blood stained

Severely affected animals

6. Jaundice and anemia
7. Pneumonia
8. Abortion with frequent retention of the placenta (afterbirth)

Severe illness in young calves may be associated with yellowish discoloration of mucous membranes and reddish-brown urine before death. The chronic form has mild clinical signs and only abortion may be observed. If meningitis occurs, the animal may show in coordination, salivation and muscular rigidity.

**Postmortem findings:**
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1. Anemia and jaundice
2. Subserosal and sub mucosal hemorrhage
3. Ulcers and hemorrhages in the abomasal mucosa
4. Rarely pulmonary edema or emphysema
5. Interstitial nephritis
6. Septicemia

Judgment: Carcass of an animal affected with acute leptospirosis is condemned. A chronic and localized condition may warrant an approval of the carcass.

Differential diagnosis: Acute and sub acute forms to be differentiated from babesiosis, anaplasmosis, rape and kale poisoning, bacillary haemoglobinuria, post parturient haemoglobinuria and acute hemolytic anemia in calves. The presence of blood in the milk is a characteristic clinical sign which will differentiate leptospirosis from other infectious diseases.

Discussion: Leptospirosis is a zoonosis and is also an occupational hazard for farmers, veterinarians and butchers.

Human infection may occur by contamination with infected urine and urine contents. The bacteria may be also found in milk in acute cases; however, it does not survive for long period of time in milk. Pasteurization will also kill leptospiras. They can survive for months in moist and humid environments, particularly in swamps, ponds and streams or poorly drained pastures.

Brucellosis (contagious abortion, Bang's disease)

Brucellosis of cattle is an infectious, contagious disease caused by *Brucella abortus* and is characterized by abortion in late pregnancy and a high rate of infertility. *B. melitensis* affects goats, *B. ovis* sheep and *B. suis* swine. *B. abortus* may occur in horses.

Transmission: An uninfected animal may become infected with Brucella organisms by contaminated feed, pasture, water, milk, by an aborted fetus, fetal membranes and uterine fluid and discharges. The disease may also be spread by dogs, rats, flies, boots, vehicles, the milking machine and other equipment used in the barn. The Brucella organism may be occasionally shed in urine.

Ante mortem and postmortem findings:

In cattle
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1. Abortion in non vaccinated pregnant cows in the last 3 - 4 months of pregnancy
2. Occasional inflammation of testes and epididymis
3. Swelling of scrotum (one or both sacs)
4. Edematous placenta and fetus
5. Hygromas on the knees, stifles, hock and angle of the haunch, and between the nuchal ligament and the primary thoracic spines.

In sheep

6. Fever, increased respiration and depression
7. Inferior quality of semen in rams
8. Edema and swelling of scrotum in sheep inspection
9. In chronic stage enlarged and hard epididymis, thickened scrotal tunics and frequently atrophic testicles
10. Infertility in rams and abortion in ewes

Judgment: Cattle and horse carcasses affected with brucellosis are approved (after removal of affected parts), as Brucella bacteria remain viable for only a short period in the muscles after slaughter. In acute abortive form (after the miscarriage), cattle carcasses are condemned. Pig, sheep, goat and buffalo carcasses require total condemnation. Heat treatment may be recommended in some areas for these species due to economic reasons. Affected part of the carcass, udder, genital organs and corresponding lymph nodes must be condemned.

Reactor animals should be carefully handled during slaughter and dressing procedures. Gloves and goggles should be worn when known reactors are being slaughtered and hygroma lesions should be sprayed liberally with 1 % lactic acid at meat inspection.

Differential diagnosis: Causes of abortion in cattle, IBR, vibriosis, leptospirosis, trichomoniasis, mycoplasma infections, mycosis, nutritional and physiological causes.

Discussion: Brucella organisms have only a short life in the muscles of slaughtered animals. They are destroyed by lactic acid. While slaughtering and dressing the reactors, a hook should be used in handling the uterus and udder. Employees in close contact with infected animals should wear gloves and avoid accidental cuts.

In humans, brucellosis is called “Undulant Fever”. The general population is not at risk with this disease if high levels of hygiene and sanitation are practiced. Pasteurized milk is brucella-free. Affected humans will suffer from intermittent high fever, headache and generalized malaise.

Brucellosis is an important zoonosis in particular in rural areas in developing countries and is an important occupational hazard for veterinarians, meat inspectors, farmers, animal health inspectors and butchers.

By Dr.khaled, fujairah municipality
Brucellosis, Hygromas on the knee joints. This condition may be a sequel to Brucella abortus infection.

**Anthrax**

Anthrax is a per acute disease of ruminants manifested with septicemia, sudden death and tarry blood from the body openings of the cadaver. It is caused by *Bacillus anthracis*.

**Transmission:** Man may contract anthrax by inhalation, ingestion and through a wound in the skin. Biting flies have been shown to be transmitters.

**Ante mortem findings:**

The per acute and acute forms in cattle and sheep are without clinical signs. Death may follow in the acute form after 1 – 2 hours of illness. The acute form lasts about 48 hours.

In pigs and horses this disease is usually localized and chronic and is often characterized by swelling around the throat and head.

Ante mortem findings in pigs:

1. Incubation 1 – 2 weeks
2. Edematous swelling of the throat and neck
3. Swallowing and breathing difficulties
4. Death due to choking or toxemia
5. Septicemia is not observed.

**Postmortem findings:**

1. Dark-tarry blood discharge from body orifices
2. Absence of rigor mortis
3. Hemorrhage of the mucous and serous membranes, lymph nodes and subcutaneous tissue
4. Enlarged spleen
5. Severe hemorrhagic enteritis
6. Degeneration of the liver and kidneys
7. Bloating and rapid decomposition of carcass
Diagnosis of anthrax is carried out by direct microscopic examination of tissues and fluids.

**Judgment:** Condemnation of the carcass and its parts by burning or burial. If disposed by burial, the carcass should be buried at least 6 feet below ground. The site should be surrounded by a foot thick layer of quicklime.

**Differential diagnosis:** Per acute black quarter and septicemia form of other diseases. In splenic enlargement as seen in babesiosis, anaplasmosis and leucosis, spleen consistency is firm. In anthrax, the spleen is soft and upon incision the pulp exudes like thick blackish-red blood.

**Discussion:** If an animal has died from an unknown cause in an abattoir's pen or in the stockyard, a blood smear from the tip of the ear should be examined to eliminate anthrax as a cause of death. All measures should be taken to prevent further contact with the carcass. The orifices of the nose, vulva and anus should be packed with cotton swabs to eliminate further spillage of discharge. The carcass must not be opened. Due to insufficient oxygen supply in the closed carcass, spores of B. anthraces will not be formed and the organism will be killed. The spilled discharge is firstly removed by drying with sawdust and sand and is then destroyed together with the carcass. The carcass is wrapped in thick plastic sheets and destruction is performed under the supervision of an appropriate government official.

An open carcass facilitates exposure of B. anthraces to air and consequently, spores are formed within a few hours. Anthrax spores are resistant to heat and disinfectants and may survive in a suitable environment for years.

The abattoir's pen or stockyard area suspected of being in contact with an anthrax animal should be disinfected with 10 % NaOH or 5 % formaldehyde and cleaned. This cleaning should also include the cattle trucks or cars used for the transportation of infected animals. All personnel that were in contact with anthrax or that handled contaminated material are also subjected to decontamination. The arms and hands should be washed with liquid soap and hot water. After they have been rinsed, they should be immersed for about one minute, in an organic iodine solution or 1 p.p.m. solution of mercuric perchloride or other acceptable agents. This is followed by a potable water rinse. Clothing of the personnel involved should also be cleaned and thoroughly disinfected by boiling.

If the carcass is discovered on the killing floor, all operations must cease. The carcass and its parts including hides, hooves, viscera and blood must be condemned and destroyed. The carcasses which have been dressed by the same abattoir employees prior to or after the affected carcass must also be condemned and destroyed. Those carcasses which had been dressed before the affected carcass may...
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have a second option of being salvaged with sterilization. They must be boiled for a minimum of 3 hours if contamination occurred with blood splashes. If impractical, these carcasses may be used for “canned meat” for which heat treatment is recommended.

Disinfection of equipment used for the dressing of a diseased carcass as well as the infected abattoir area, should be done with 5% solution of sodium hydroxide (NaOH). This disinfectant is used because of its action on fat and grease removal. Heat in the form of a blowtorch can be used for disinfecting buildings.

**Salmonellosis in bovine**

Salmonellosis is a disease which occurs in all animals and humans. In animals, salmonellosis is characterized clinically by one of three syndromes: a) *per acute septicemia form*: b) *acute enteritis* or c) *chronic enteritis*.

The young, old, debilitated and stressed animals are at greater risk. More then 200 antigenically different serotypes of Salmonella have been identified and all of these possess pathogenic potential. The most frequently identified serotypes of the organisms which cause the disease in cattle are *S. typhimurium*, *S. Dublin*, *S. Muenster* and *S. Newport*. Salmonellosis in stressed animals is frequently associated with inadequate diet, irregular feeding, water deprivation, overcrowding, parasitism, weather extremes, pregnancy, parturition, intercurrent diseases etc. The calving complications which may predispose the disease include abortion or early termination of pregnancy, retained placenta, endometritis and post-parturient metabolic conditions.

**Transmission**: Ingestion of feed that have been contaminated by the faeces of infected animals, by drinking water in stagnant ponds and by the carrier animals. In housed animals, transmission is via contaminated feedstuff containing improperly sterilized animal by-products such as bone and meat meal and fish meal. Casual workers, infected clothing and utensils, transportation trucks and birds may transmit the disease to the farm. Active carrier animals shed Salmonella organisms intermittently and without obvious stress factors. Latent carriers with stress factors are also identified in the transmission of salmonellosis.

*Human infection* is transmitted via contaminated water, raw milk and meat. Compared to bovines, pigs and poultry are more significant sources of infection in humans.

**Ante mortem findings:**

Per acute septicemia form

1. Occurs most frequently in colostrum deficient animals up to four months of age.
2. Increased temperature 40.4°C – 41.5°C.
3. Depression
4. Diarrhea and dehydration
5. Death within 24–48 hours

Approximately four weeks after the onset of diarrhea

6. Polyarthritis
7. Meningoencephalitis
8. Necrosis of distal limbs, tails and ear

Acute enteritis

9. Common form in adult cattle in late pregnancy and early postpartum
10. High temperature of 40°C – 41°C
11. Depression and loss of appetite
12. Watery, foul smelling diarrhea and dehydration
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13. Emaciation
14. Reduced milk production and abortion
15. Death

Chronic enteritis - Preceded by acute enteric form

16. Further emaciation (poor doer), diarrhea and dehydration
17. Fluctuating fever (35.5°C – 40.0°C)

Postmortem findings:

Septicemia form

1. Absence of gross lesions in animals
2. Sub mucosal and Subserosal hemorrhage

Acute enteritis

3. Mucoenteritis to diffuse hemorrhagic enteritis
4. Severe necrotic enteritis of ileum and large intestine caused by S. typhimurium
5. Abomasitis in S. dublin infection
6. Enlarged, edematous and hemorrhagic lymph nodes
7. Thickened inflamed gall bladder wall
8. Fatty change of the enlarged liver
9. Sub serous and epicedial hemorrhage

Chronic enteritis

10. Areas of necrosis in the wall of caecum and colon
11. Swollen mesenteric lymph nodes and spleen
12. Chronic pneumonia

In the septicemia and acute enteric forms, *Salmonella organisms* are present in the blood, liver, bile, spleen, mesenteric lymph nodes and in intestinal content. In the chronic form, bacteria are present in the intestinal lesions and less frequently in other viscera.

Liver (sheep). Salmonellosis enlargement & congestion of the liver & distention of the gall bladder

Intestine & gall bladder (calf ). salmonellosis yellow cast of soft tissue & fibrin intestine & gall bladder

By Dr.khaled, fujairah municipality
Small intestine – mesenteric lymphnodes moderate enlargement (chronic lymphadinopathy). (Chronic salmonellosis).

Judgment: Carcass affected with Salmonellosis is **condemned**.

Differential diagnosis: Acute diarrhea in calves: Diarrhea caused by infections (such as rotavirus, corona virus, cryptosporidiosis, and E. coli), septicemia, and dietetic gastroenteritis, coccidiosis, and Clostridium perfringens type C enterotoxaemia

Acute diarrhea in adult cattle: Bovine viral diarrhea, coccidiosis, “grain overload”, gastrointestinal parasitism, winter dysentery, arsenic and lead poisoning, bracken fern poisoning and intestinal obstruction

Chronic diarrhea of adult cattle: John's disease, copper deficiency and gastrointestinal parasitism

**Hemorrhagic septicemia**

Hemorrhagic septicemia is a systemic disease of cattle, buffalo, pigs, yaks and camels. It is caused by *Pasteurella multocida* type B of Carter. Outbreaks of this disease are associated with environmental stresses such as wet chilly weather and overworked, exhausted animals. It is specific type of pasteurellosis distinct from of other forms of pasteurella infections.

Transmission: By ingestion of contaminated feedstuff.

**Ante mortem findings:**

1. Disease more severe in buffalo than in cattle
2. High fever up to 42°C
3. Salivation and difficulties in swallowing
4. Cough, and difficult breathing and associated pneumonia in later stages
5. Edematous swelling of throat, dewlap, brisket and peritoneum
6. Diarrhea

**Postmortem findings:**

1. Subcutaneous swellings characterized with yellowish gelatinous fluid especially around the throat region, brisket and perineum
2. Enlarged hemorrhagic lymph nodes
3. Hemorrhage in the organs
4. Pneumonia
5. Rarely hemorrhagic gastroenteritis
6. Petechial hemorrhage in the serous membranes which are extensive in some cases

**Judgment:** Carcass of an animal affected with hemorrhagic septicemia is *condemned*. If the disease is diagnosed on ante mortem examination, an animal should not be allowed to enter the abattoir. Dressing of such a carcass would create potential danger for the spread of infection to other carcasses.

**Differential diagnosis:** Anthrax, blackleg, acute leptospirosis, rinderpest, other pasteurellosis, snake bite and lighting stroke.

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**Calf diphtheria**

Calf diphtheria is an acute oral infection of calves less than 3 months old. It is caused by *Fusobacterium (Sphaerophorus) necrophorum*. This agent also causes liver abscesses and “foot rot” in cattle.

**Transmission:** Fusobacterium necrophorum is an inhabitant of cattle’s digestive tract and the environment. Under unhygienic conditions, infection may be spread on feeding troughs and dirty milk.
pails. Some of the contributory factors for occurrence of this disease include abrasions in the oral mucosa, animals suffering from poor nutrition and other (intercurrent) disease present in young calves.

**Ante mortem findings:**

1. High temperature
2. Coughing
3. Loss of appetite and depression
4. Difficult breathing, chewing and swallowing
5. Swollen pharyngeal region
6. Deep ulcers on the tongue, palate, and inside of cheeks
7. Pneumonia

Calf diphtheria (oral necrobacillosis): necrosis of the cheek, tongue, pharynx & larynx

Calf diphtheria (oral necrobacillosis): necrosis of the cheek, tongue, pharynx & larynx

Calf diphtheria: large necrotic lesions in the tongue

Necrobacillosis lesions in the liver (bovine)
Cattle meat inspection chapter 1

Necrobacillosis (bovine liver): pale yellowish gray dry necrotic area

Necrobacillosis (bovine liver): opaque dry yellowish grey necrotic areas

Postmortem findings:

1. Inflammation and ulceration with large masses of yellow-grey material in the mouth, tongue, pharynx and larynx
2. Often aspiration pneumonia

Judgment: Carcass of an animal affected with local lesions is approved. Generalized diphtheric lesions associated with pneumonia or toxemia require the carcass condemnation. The carcass is also condemned if lesions are associated with emaciation.

Differential diagnosis: Vesicular diseases, neoplasm and abscesses

Actinobacillosis

Actinobacillosis is a chronic disease of cattle caused by *Actinobacillus lignieresi*. It is manifested by inflammation of the tongue and less frequently lymph nodes of the head and of even the viscera and carcass.

Ante mortem findings:

1. Loss of appetite
2. Salivation and chewing
3. Swollen tongue
4. Mouth erosions
5. Enlarged parotid and retropharyngeal lymph nodes

Postmortem findings:

1. Enlarged tongue showing tough fibrous consistency. (“wooden tongue”)
2. A cluster of small yellowish nodules and erosions of tongue mucosa
3. Granulomatous lesions in the lymph nodes
4. Marked thickening of the lower part of esophagus and stomach wall
5. Raised plaques and erosions in the mucosa of rumen and reticulum
6. Liver and diaphragm lesions due to contact spread from reticulum

Typical actinobacillosis lesions in the lymph nodes and organs consist of greenish-yellow thick creamy pus with “sulphur granules”. These are bacterial colonies surrounded by club like structures

By Dr. khaled, Fujairah municipality
Cattle meat inspection chapter 1

**Judgment:** Carcass of an animal affected with active progressive inflammatory lesions of actinobacillosis in lymph nodes and lung parenchyma is *condemned*. Condemned material should be sent to authorize rendering plant. If the disease is slight and confined to lymph nodes, the head and tongue and whole carcass are *approved* after the condemnation of lymph nodes. If the tongue is diseased and no lymph nodes are involved the head and carcass are *approved*. The tongue is *condemned*.

**Differential diagnosis:** Neoplasm, tuberculosis, abscesses in the lymph nodes, foreign body, salivary cysts, fungal granulomas, chronic pneumonia and parasites

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Actinobacillosis of the tongue. The tongue is enlarged, firm and contains numerous glaucomatous lesions. It is called "wooden tongue" because of its firmness due to diffuse proliferation of fibrous tissue.

Actinobacillosis. Multifocal, well demarcated yellow lesions in the retropharyngeal lymph node of a bovine animal.

Actinobacillosis: localized, firm swelling of the dorsum of tongue

Actinobacillosis: nodules over the surface of the tongue except tip

By Dr. khaled, Fujairah municipality
Actinomycosis ("Lumpy Jaw")

Actinomycosis is a chronic glaucomatous disease of cattle and pigs and rarely in sheep and horses. It is caused by *Actinomyces bovis* which is an obligatory parasite in the mucous membrane of the mouth and pharynx. Infection occurs following injury with a sharp object or hard feed pieces to the oral mucosa.

**Ante mortem findings:**

1. Painful swelling of the maxilla and mandible (lumpy jaw); rarely in feet.
2. Suppurative tracts in the granulation tissue breaking towards oral cavity or skin
3. Ulceration of cheeks and gums and wart like granulations outward on head
4. Difficult breathing and salivation
5. Loss of weight
6. Diarrhea and bloat

**Postmortem findings:**

1. Lesions in the mandible (Lumpy jaw) or maxilla
2. Granulomatous lesions in lower part esophagus or anterior part of the reticulum
3. Local peritonitis
4. Mild abomasitis and enteritis

**Judgment:** see Actinobacillosis
Differential diagnosis: Tooth infection, impacted food, bone injury, neoplasm and osteomyelitis due to other causes

Actinomycosis. Diffuse granulomas in maxilla and formation of green yellow pus. “Sulphur granules” are found in the pus.

Actinomycosis: abscess in the lower jaw with extensive fibrous encapsulation leading to rarefying osteitis.

Pyelonephritis (Contagious Bovine Pyelonephritis)

Pyelonephritis is a purulent and inflammatory bacterial disease of the kidney pelvis and parenchyma caused by Corynebacterium renal. This disease is essentially observed in adult cows and sows.
predisposing factor for developing a kidney infection is trauma to the bladder and urethra during parturition.

**Transmission**: Infection is spread from clinically normal "carrier cows". The organism enters via vulva from: a) bedded contaminated with urine b) tail swishing by "carrier cows" c) venereal transmission by infected bulls, and d) non sterilized obstetrical instruments.

**Ante mortem findings:**

1. Persistent increased temperature (39.5°C)
2. Loss of appetite and progressive weight loss
3. Painful urination and increased frequency of urination
4. Ammoniac odor from animal
5. Acute abdominal pain (colic)
6. Ceased rumen contraction
7. Decreased milk production

**Postmortem findings:**

1. Pyelonephritis showing enlarged, pale and grayish colored kidney and enlarged renal lymph nodes. Purulent lesion in the medulla, pelvis and ureters
2. Inflammation of kidney and kidney stones
3. Enlarged renal lymph nodes
4. Uremia

**Judgment**: It depends on infection of one or both kidneys and/or presence of a urine odor. Carcass of an animal affected with Pyelonephritis or nephritis is **condemned** if: 1) renal insufficiency is associated with uremia; 2) acute infection of the kidney is accompanied with systemic changes in the organs and lymph nodes, and/or degeneration of body tissues. Borderline cases with uraemic odors should be kept in the chiller for 24 hours. They are subjected to a boiling test. If a urinary odor is not present after detention, the carcass may be **approved**.

Sub acute or chronic kidney infections with no systemic changes allow for a **favorable judgment** of carcass. Only the affected parts are **condemned**. Pyelonephritis associated with kidney stones often has a **favorable judgment** of the carcass.

**Differential diagnosis**: Enzootic haematuria in certain areas, post-parturient haemoglobinuria, reticulitis, peritonitis, cystitis, metritis, leptospirosis, John's disease, white spotted kidneys of calves, urinary obstruction, infarcts, neoplasm and hydronephrosis

Pyelonephritis (Contagious) Bovine Pyelonephritis). Cut section of kidney showing multifocal abscessation in the cortex and medulla.
Pyelonephritis associated with urolithiasis (stones). Chemical analysis revealed oxalate composition.

**Diseases caused by viruses**

**Foot and mouth disease (FMD, Aphthous fever)**

FMD is an acute viral and extremely contagious disease of cloven footed animals such as cattle, sheep, goats, pigs and antelope. It is manifested by vesicles and erosions in the muzzle, nares, mouth, feet, teats, udder and pillar of the rumen. There are three main strains of viruses causing FMD, namely A, O and C. Three additional strains, SAT 1, SAT 2 and SAT 3 have been isolated from Africa and a further strain ASIA-1 from Asia and the Far East.

**Transmission**: Direct and indirect contact with infected animals and their secretions including saliva, blood, urine, faeces, milk and semen, aerosol droplet dispersion, infected animal by-products, swill containing scraps of meat or other animal tissue and formats and vaccines.

**Ante mortem findings:**

Before vesicle formation:

1. Incubation is 1 - 5 days or longer
2. Morbidity: Nearly 100 %
3. Mortality: variable depending on the strain of virus and its virulence and susceptibility of host; 50 % in young animals, 5 % in adults
4. Fever up to 41.7°C
5. Dullness
6. Lack of appetite
7. Drastic drop in milk production.
8. Uneasiness and muscle tremors

Vesicle formation:

9. Smacking and quivering of lips
10. Extensive salivation and drooling
11. Shaking of feet and lameness

By Dr. khaled, Fujairah municipality
Cattle meat inspection chapter 1

The vesicles and later erosions are commonly found on the muzzle, tongue, oral cavity, and teat and on the skin between and above the hoofs of the feet. In more chronic cases in cattle the hoof become loose and the animal may walk with characteristic “clicking” sound (Slippering).

Some strains of FMD, particularly in swine, sheep and goats cause erosions instead of vesicles.

Postmortem findings:

1. Necrosis of heart muscle (tiger heart), usually only in young acutely infected animals.
2. Ulcerative lesions on tongue, palate, gums, pillars of the rumen and feet.

Judgment: In countries or in zones within a country free or nearly free of FMD diseased or suspect animals are prohibited to be admitted in an abattoir or slaughtered. If FMD is suspected on postmortem examination the carcass and viscera are condemned and appropriate action recommended by the regulatory authorities of the country must be taken. In countries where this disease is present, the judgment should be in accordance with the current animal health requirements, and consisted with effective public health protection. Particular attention should be paid to secondary bacterial infections and general findings. Sanitary measures should be taken to comply with national animal health policy.

Remarks: Latent infections with Salmonella organisms were reported in animals affected with FMD.

Differential diagnosis in bovine and ovine species: Vesicular stomatitis, allergic stomatitis, feedlot glossitis, photosensitization, bluetongue, rinderpest, infectious bovine rhinotracheitis, malignant catarrhal fever, bovine papular stomatitis, bovine viral diarrhea, pseudo cowpox, ovine pox, contagious ecdhyma, footrot, mycotoxicosis and increased salt in concentrate.

Discussion: In order to prevent the spread of the virus in the abattoir, the equipment and room should be disinfected with 2 % NaOH (caustic soda). In some countries sodium carbonate (Na₂CO₃) is used. The vehicle conveying diseased animals should also be disinfected and abattoir personnel leaving the abattoir should pass through a footbath with 1 % solution of NaOH.

The virus of FMD can survive in meat and meat products for a considerable length of time. Outside the pH range of 6 – 9, viral infectivity is destroyed. A bovine carcass matured at above +2°C produces a drop in the pH of muscle tissue to between 5.3 – 5.7 within 24 hours of slaughter. This is caused by the formation of sarcolactic acid. Quick freezing of the meat arrests acid production and consequently the virus remains infective for about 6 months. In salted meat at 4°C, the virus is still infective in bone marrow and lymph nodes for 6 months. In blood clots in large vessels of cattle and swine, the virus is infective for 2 months. The virus is inactivated by ultraviolet rays, acetic acid, 2 % lye and ethylene oxide. At high temperatures, the virus is only active for a short period. 2 % NaOH solution inactivates the virus in 1 – 2 minutes. In dry refuse in stalls, the virus remains infective for 14 days, 3 days on soil surfaces in summer compared to 39 days in fall. It is also infective for 39 days in urine and for 20 weeks on hay dried at 22°C. The virus can be destroyed with 0.5 % citric or lactic acid, by cooking meat to an internal temperature of 69°C and by pasteurization processes of milk.
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Excessive salivation in a cow affected with FMD.

Foot & mouth disease recently ruptured vesicle on the mucosa above the dental pad

FMD. Extensive areas of eroded epithelium on a bovine tongue.

Foot & mouth disease ruptured vesicles in the interdigital space of the claws

By Dr. Khaled, Fujairah Municipality
Cattle meat inspection chapter 1

| Foot & mouth disease tiger heart  (affected calf) | Foot & mouth disease vesicles in the teat of an affected caw |
| Foot & mouth disease erosions on the ruminal pillars |

**Rinderpest (RP)**

Rinderpest is an acute, highly contagious, fatal viral disease of *cattle, buffalo* and *wild ruminants* manifested by inflammation, hemorrhage, erosions of the digestive tract, wasting and often bloody diarrhea. Some swine species are also susceptible. Man is not susceptible to RP virus.

**Transmission:** Direct contact with infected animals or their excretions and secretions and fomites. The virus appears in the blood and in secretions before the onset of clinical signs and this may cause infection in abattoirs and stockyards.

**Ante mortem findings:**

1. Incubation: 3 – 10 days or longer
2. Morbidity: Up to 100 % in a susceptible herd
3. Mortality: 50 % and may reach 90 – 95 %
4. High fever (41–42°C)
5. Nasal discharge and excessive salivation
Punched out erosions in the mouth
- Loss of appetite and depression
- Abdominal pain (grunting, arched back)
- Constipation followed by bloody diarrhea and straining
- Dehydration and rough hair coat
- Marked debility
- Abortion
- The classical “milk fever position” in cattle

Postmortem findings:

1. Punched out erosions in the esophagus
2. Edema or emphysema of the lungs
3. Hemorrhage in the spleen, gallbladder and urinary bladder
4. Hemorrhagic or ulcerative lesions in the omasum
5. Congested abomasums filled with bloody fluid. Ulcers may also be observed.
6. Severe congestion and hemorrhage in the intestine and enlarged and necrotic Payer’s patches
7. Last portion of the large intestine and rectum are hemorrhagic showing “tiger stripping” of longitudinal folds
8. Enlarged and edematous lymph nodes
9. Emaciated carcass

Judgment: The carcass derived from a feverish and debilitated animal showing the sign of acute disease on ante mortem examination should be condemned. In the areas free of RP and in zones where final stages of eradication exist, the animals are also condemned. In endemic zones, if acute symptoms of the disease are not present during clinical examination, the carcass may have limited distribution. In areas affected with outbreak which are protected by vaccination, heat treatment of meat is suggested if economically worthwhile. The affected organs are condemned.

Remarks: Rinderpest virus is sensitive to environmental changes and is destroyed by heat, drying and great number of disinfectants.

Differential diagnosis: Bovine viral diarrhea, malignant catarrhal fever, infectious bovine rhinotracheitis, bluetongue, coccidiosis, foot and mouth disease, vesicular and necrotic stomatitis and bovine papular stomatitis. Vesicular diseases do not have accompanying hemorrhage and blisters should be differentiated from erosions (ulcers) seen at RP.
Cattle plague mortality may reach 100%

Rinderpest Erosions on the dental pad and the hard palate which resemble FMD

Cattle plague: congestion & reddening of the root of the teeth & erosions of the lower gum

Cattle plague necrotic glossitis in the tongue pin headed foci of the dorsum of the tongue giving appearance as if the organ being sprinkled with bran mash

The mucosal surface of Payer’s patches showing necrosis and congestion.

Esophagus: severe infection with focal yellowish-white necrotic area of the mucosa
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Vesicular stomatitis (VS)

This is a viral disease of *ruminants, horses* and *swine* characterized by vesicular lesions of the mouth, feet and teats. VS virus has two immunological distinct serotypes, Indiana and New Jersey.

**Transmission:** In susceptible animals, contamination of pre-existing abrasions with saliva or lesion material, by ingestion of contaminated pasture or during milking within dairy herds. Mechanical transmission by biting arthropods is also a possibility. The virus is isolated from mites, tropical sand flies and mosquitoes.

**Ante mortem findings:**

1. Fever
2. Mouth lesions in cattle and horses
3. Vesicles tend to disappear quickly and only papules may be seen in cattle outbreaks.
5. Chewing movements and profuse salivation
6. Refuse food but eagerly accept water
7. Horses rub lips on edges of mangers
8. Foot lesions occur in about 50 % cases in cattle.
9. Lameness
10. Teat lesion may occur in all species.

Postmortem findings:

1. The skin and mucous membrane lesions resemble the lesions of other vesicular diseases.
2. Secondary bacterial or fungal infections
3. Mastitis

Judgment: The carcass of an animal affected with vesicular stomatitis is approved if the disease is not in the acute stage and secondary changes are not present. Parts of the affected carcass and organs are condemned. A carcass showing acute changes and systemic lesions is condemned. If VS is not confirmed by laboratory examination, the judgment will be the same as for the FMD.

Differential diagnosis: Foot and mouth disease, swine vesicular exanthema, vesicular disease, bovine papular stomatitis

The mouth and muzzle lesions: Bovine viral diarrhea, rinderpest, mycotic stomatitis, photosensitization and Potomac valley fever in horses

Teat lesions: Cowpox, pseudo-cowpox, pseudo-lumpy skin disease and bovine herpes mammillitis

Malignant catarrhal fever (MCF)

An acute viral disease of cattle, deer, bison and buffalo characterized by inflammation of mucous membranes of the nose, eyes, corneal opacity, profuse nasal discharge and enlargement of lymph nodes. MCF is arbitrarily divided into per acute, intestinal, head-eye and mild forms according to ante mortem findings. It is not communicable to man.

Transmission: Close contact between cattle and wildebeest (gnu, antelope), by common use of drinking troughs or by direct contact between cattle and newborn wildebeest and placenta of parturient dams. In American or European MCF, cattle are infected from sheep.

Ante mortem findings:

1. Incubation: 9 – 44 days
2. Morbidity is low and mortality is high
3. Increased temperature
4. Bilateral ocular and nasal discharges
5. Dyspnea and cyanosis
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6. Loss of appetite
7. Encrustation of muzzle and eczema of the perineum, scrotum and udder
8. Erosions on the lips, tongue, gums, soft and hard palate
9. Swollen reddened eyelids, corneal opacity and conjunctivitis
10. Photophobia associated with corneal opacity and blindness
11. Reluctance to swallow because of esophageal erosions and drooling
12. Enlarged body lymph nodes
13. Rarely, uncoordinated movements and shivering

Postmortem findings:

1. Lesions are not present in acute cases
2. Crater like erosions of the nose, mouth, conjunctiva, esophagus and gastrointestinal tract
3. Lungs may be congested, swollen or emphysematous
4. White areas in the kidneys
5. Swollen and reddened abomasal folds
6. Intestinal edema and Petechial hemorrhage
7. “Tiger striping” in the distal colon
8. Enlarged and reddened lymph nodes
9. Dehydrated and emaciated carcass

Judgment: In the early stages of the disease, when fever, emaciation and systemic signs are lacking, the carcass of the affected animal may be approved as inferior meat. Otherwise, when fever, emaciation and systemic signs are present, the entire carcass and viscera are condemned. The condemned material may be used for rendering.

Differential diagnosis: Bluetongue, rinderpest, bovine viral diarrhea/mucosal disease, foot and mouth disease, vesicular stomatitis

Malignant catarrhal fever early stages of corneal opacity, conjunctivitis and the reddening of the eye lids.

Malignant catarrhal fever: erosion on the tongue

Malignant catarrhal fever: erosion on the soft & hard palate

Malignant catarrhal fever: erosion on the mucosa of the omasum

Malignant catarrhal fever: lymphnode edema & enlargement

Rift valley fever (RVF) (see sheep inspection)

Rabies

This is an acute infectious viral disease of the central nervous system in mammals.

Transmission: It is usually transmitted through the saliva by a bite from a rabid animal, commonly the dog or jackal. Man is infected the same way.

Ante mortem findings:

Furious form

1. Incubation from 2 weeks to 6 months or longer
2. Restlessness
3. Aggressive, may attack other animals
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4. Sexual excitement
5. Bellowing
6. Paralysis and death

Paralytic form

7. Sagging and swaying of the hind quarters
8. Drooling and salivation
9. The tail is held to one side
10. Tenesmus or paralysis of the anus
11. Paralysis
12. The animal falls to the ground
13. Death after 48 hours of decubitus

Rabies: rabid calf biting a wood
Rabies: increased sexual desire

Postmortem findings: Possible inflammation of gastrointestinal mucosa

Judgment: In endemic areas carcasses may be approved if the animal was bitten eight days before slaughter and within 48 hours of slaughter. The bite area and surrounding tissue must be condemned, and prevention taken to prevent occupational hazards.

Differential diagnosis: Indigestion, milk fever or acetonemia when first seen, foreign body in the mouth, early infectious disease, poisoning

Discussion: In a diseased animal, the virus is found in saliva, salivary gland and nervous tissue. Extreme caution should be instituted in abattoirs in order to prevent occupational hazards. Abattoir personnel can contract the disease through surface contact with infected tissue. Infection does not occur by consumption of meat from a rabid animal.

Slaughter may be prohibited during a quarantine period of 8 months following exposure to the disease. An animal suspected of having rabies should be placed under a “Held tag”. The warning sign should read “The animal is not to be handled”. Any person who was in touch with the animal should thoroughly wash his/her hands with strong soap and/or disinfectant. If possible, the wound should be opened to encourage bleeding in order to flush out the virus and expose the deeper area of the wound. Tincture of iodine (up to 0.001 % aqueous solution of iodine or ethanol 43.70%) should be further applied.

Lumpy skin disease

By Dr.khaled, fujairah municipality
Acute pox viral disease of cattle manifested with sudden appearance of nodules on the skin.

**Transmission:** Insect vectors by direct and indirect transmission. Seasonal and geographic distribution.

**Ante mortem findings:**

1. Incubation: 4 – 14 days  
2. Fluctuating fever  
3. Diarrhea  
4. Nasal discharge and salivation  
5. The first lesion appear in the perineum  
6. Various sized cutaneous nodules may occur throughout the body  
7. Skin lesions may show scab formation  
8. Swelling of superficial lymph nodes and limbs, and lameness  
9. Infertility and abortion  
10. Secondary infection may lead to joint and tendon inflammation

**Postmortem findings:**

1. Ulcerative lesions in the mucosa of the respiratory and digestive tract  
2. Reddish, hemorrhagic to whitish lesions in the lungs  
3. Edema (interlobular) and nodules in the lungs  
4. Heart lesion (endocardium)  
5. Thrombosis of skin vessels followed by cutaneous infarction and sloughing.

**Judgment:** Carcass of an animal showing mild cutaneous lesions and no fever associated with general signs of infection is conditionally approved pending heat treatment. The affected parts of the carcass and organs are condemned. Carcass of an animal showing, on ante mortem examination, generalized acute infection accompanied with fever, is condemned.

**Differential diagnosis:** Allergies, screw-worm myiasis, urticaria, dermatophilosis (streptothricosis), bovine herpes dermophatic infection, cattle grubs, vesicular disease, bovine ephemeral fever, photosensitization, besnoitiosis (elephant skin disease), sweating weakness of calves, bovine farce and skin form of sporadic bovine lymphomatosis.
Cattle meat inspection chapter 1

Cut surface of the nodules in the parenchyma of the lung and interlobular edema.

Lumpy skin disease. Lesion on the skin and around the nostrils.

Bovine herpes dermophatic disease (BHD)

A herpes virus infection of cattle and sometimes sheep and goats manifested by cutaneous lesions and fever.

Transmission: Biting insects, mechanical milking

Ante mortem and postmortem findings:

1. Incubation: 3–7 days
2. Morbidity: High in primary infections
3. Fever
4. Cutaneous nodules. At first these are round, then later become flattened and covered with dry scabs
5. Hairless skin is normal after the scab falls off.
6. Ulcerative lesions of the teats and udder
7. Erosions between the digits

Microscopy reveals intranuclear inclusions and giant cells in the skin.

Judgment: Carcass of an animal affected with BHD is disposed similar to an animal affected with lumpy skin disease

Differential diagnosis: Dermatophilosis infection, cowpox and pseudo cowpox, vesicular stomatitis and lumpy skin disease. The latter is differentiated from BHD by enlarged lymph nodes.
Ulcerative lesions of the teats and udder.

**Infectious bovine rhinotracheitis (IBR)**

IBR is a highly infectious viral respiratory disease of *cattle, goats* and *pigs* manifested by inflammation of respiratory passages and pustular lesions on the male and female genital organs. Generally four forms of the disease are recognized; the respiratory form, the genital form, the enteric form and the encephalitic form.

**Transmission:** Respiratory droplet and nasal exudates in the respiratory form of IBR. Obstetrical operations, coitus and licking of genitalia of affected animals in the genital form of disease.

**Ante mortem findings:**

Respiratory form

1. Incubation: 5 – 14 days
2. Fever
3. Nasal and ocular discharge and red, swollen conjunctiva
4. Drop in milk yield
5. Breathing through the mouth and salivation
6. Hyperemia of the nasal mucosa and necrotic areas on the nasal septum
7. Secondary bronchopneumonia
8. Abortion

Genital form

9. Frequent urination and tail elevation
10. Edematous swelling of the vulva and pustule formation on reddened vaginal mucosa
11. Mucoid or Mucopurulent exudates in the vagina

Enteric form

12. Severe oral and stomach necrosis in new born animals
13. High mortality

The encephalitic form in calves

14. Depression
15. Excitement
16. High mortality

**Postmortem findings:**

1. Acute inflammation of the larynx, trachea and bronchi
2. Profuse fibrino-purulent exudates in the upper respiratory tract in severe cases
3. Chronic ulcerative gastro-enteritis in feedlot cattle
4. Lung emphysema
5. Secondary bronchopneumonia

By Dr. khaled, Fujairah municipality
Cattle meat inspection chapter 1

**Judgment:** Carcass of an animal affected with IBR is approved if signs of acute infection are not present and the animal is in good body condition.

**Differential diagnosis:** Pneumonic pasteurellosis, bovine viral diarrhea, malignant catarrhal fever and calf diphtheria

Breathing through the mouth and salivation in a bovine affected with IBR.

IBR. Acute inflammation of the larynx and trachea

Infection bovine rhinotracheitis: hemorrhages & erosions in the buccal mucosa & gums

Infection bovine rhinotracheitis: infectious pustular Volvovaginitis

Infection bovine rhinotracheitis: inflammation & presence of ruptured pustules on the penis

Infection bovine rhinotracheitis: red nose
Cattle meat inspection chapter 1

**Bovine viral diarrhea (BVD)**

This is an infectious viral disease of *cattle* manifested by an active erosive stomatitis, gastroenteritis and diarrhea.

**Transmission:** Direct contact with clinically sick or carrier animals, indirect contact with feedstuffs or fomites contaminated with urine, nasal and oral secretions or faeces and contact with aborted fetuses. Transmission through aerosol droplet dispersion or by insect vector may also be a possibility. Virus may persist in recovered and chronically ill cattle which are considered a potential source of infection.

**Ante mortem findings:**

1. Incubation: 1 – 3 days
2. Fever
3. Congestion and erosions in the mucous membranes of the oral cavity
4. Depression and anorexia
5. Cough, polypnea and salivation
6. Dehydration and debilitation
7. Foul-smelling diarrhea
8. Cessation of rumination
9. Reduced milk supply
10. Abortion in pregnant cows
11. Laminitis
12. Congenital anomalies of the brain (cerebellar ataxia) and arthritis in young calves

**Postmortem findings:**

1. Shallow erosions present on the entrance of the nostrils, mouth, pharynx, larynx, esophagus, rumen . omasum, abomasums, and caecum and less frequently in Payer’s patches in the small intestine.
2. Erythema of the mucosa with sub mucosal hemorrhage in the abomasums, small intestine, caecum and colon. Stripped appearance on the caecal and colon mucosa is similar to that seen in rinderpest.
3. Cerebral hyperplasia and cataracts in calves.

**Judgment:** Carcass and viscera of an animal, which on ante mortem examination showed generalized signs of acute infection accompanied with fever and/or emaciation, are **condemned**. Chronic cases of BVD with no systemic involvement have a **favorable judgment** of carcass, viscera and organs.

**Differential diagnosis:** Malignant catarrhal fever, rinderpest, blue tongue and vesicular diseases. The latter produce vesicles which are not present in BVD. Diseases with no oral lesion nor diarrhea include salmonellosis, Johne's disease and parasitism.

By Dr.khaled, fujairah municipality
BVD. Inflammation of the abomasums (abomasitis, gastritis).

Intestine (calf) bovine viral diarrhea. Acute fibro necrotic changes in payer's patches.

BVD. Erosions in esophagus mucosa

BVD. Erosion on the ventral surface & edges of tongue

BVD. Secondary bacterial infection of pharynx & epiglottis
Bovine leukosis

Bovine leukosis is a persistent and malignant viral disease of the lymphoreticular system. It occurs in all breeds and in both sexes.

Bovine leukosis is observed in two forms: a) the sporadic and b) the enzootic form. The sporadic form is rare and occurs in cattle under three years of age. The enzootic form is most commonly found in adult cattle, particularly in culled cows.

**Transmission:** By small amounts of infected blood (e.g. infected needles, dehorning), vertical transmission from the dam to the calf (3 – 20 % of calves may become infected) and by colostrums or milk (less than 2 %). Insect transmission is also a possibility; higher rates of infection were reported in the summer.

**Ante mortem findings:**

1. Laboured breathing due to heart involvement
2. Persistent diarrhea following infiltration of the abomasums wall by neoplastic cells
3. Marked enlargement of several superficial lymph nodes
4. Edema of the brisket and the intermandibular region
5. Paralysis of the hind legs due to tumor compression of the spinal cord
6. Protrusion of the eye as a result of tumor invasion of the orbital cavity
7. Debilitation or emaciation
8. Pale mucosal surface
9. Bloated animal
10. Swelling of the neck when thymus is involved
11. Cutaneous nodules in the terminal stage

**Postmortem findings:**

1. Lymph node enlargement (clay-like consistency)
2. Enlargement of spleen (splenomegaly)
3. Thin watery blood
4. Neoplastic lesions in the heart, intestines (Virtually all of the organs may be involved.)
5. Ventral edema
6. Enlarged haemolymph nodes

**Judgment:** Carcass of an animal affected with leukosis (lymph sarcoma) is *condemned*. When a diagnosis cannot be made by postmortem findings, a laboratory diagnosis should be performed. If lymph
Cattle meat inspection chapter 1

Node hyperplasia is the histological diagnosis, the carcass is approved for human consumption. Depending on disease prevalence, leukosis reactors may be totally approved or conditionally approved pending heat treatment.

**Differential diagnosis:** Lymphadenitis, lymphoid hyperplasia, hyperplastic haemolymph nodes, pericarditis, enlarged spleen in septicemia conditions, other neoplasm and parasitism.

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**Bovine spongiform encephalopathy (BSE, “Mad cow disease”)**

BSE is a progressive and fatal disease of adult cattle characterized by a progressive degeneration of the central nervous system causing neurological signs in animals. Some scientists suspect that an unusual and atypical virus-like transmissible agent called a prion is associated with the etiology of BSE. Prion is the term currently used in literature.

**Transmission:** The ingestion of protein feed supplements prepared from sheep meat or sheep by products contaminated with scrape virus.

**Ante mortem findings:**
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1. Incubation period 2 – 8 years
2. Reduction in milk production
3. Weight loss, while maintaining good appetite
4. Behavior changes (nervousness and aggressiveness), kicking in the milking parlour

The progressive degeneration of the central nervous system causes neurological signs:

5. Apprehension, teeth grinding
6. Tremors and abnormal ear position
7. Abnormal posture and disorientation
8. In coordination and stiff gait
9. Paresis
10. Recumbence and death

BSE. Degenerative lesion in the cerebral cortex. Bovine spongiform encephalopathy (spongiform appearance) multiple uniform vacuoles

Bovine spongiform encephalopathy: gait especially in the hind leg

Diagnosis can be confirmed only on the postmortem histological examination of brain tissue. Microscopic lesions include degenerative lesions of the cerebral cortex, medulla and central grey matter of the midbrain.

**Judgment:** Carcass is *condemned.*

**Differential diagnosis:** Rabies, listeriosis, bovine pseudo rabies (mad itch), other brain infections in cattle, the nervous type of acetonemia, hypocalcaemia, hypophosphatemia and hypomagnesaemia tetany

By Dr. khaled, Fujairah Municipality
Discussion: The first reported cases of this disease were in dairy cows in 1514 from different locations in the United Kingdom. The disease is now also recognized in some other countries in and outside Europe. BSE belongs to a group of human and animal diseases classified as transmissible spongiform encephalopathy. Significant human diseases of this group are Kuru and Creutzfeldt-Jacob’s disease. Scrapie, which affects sheep and goats, also belongs in this group.

Researchers are trying establishing if BSE and scrapie have the same causative agent, and if the modified form of the scrapie agent is also a possible causative agent of BSE. Prions are also the causative agents of transmissible mink encephalopathy (TME) and of chronic wasting disease (CWD) of mule deer and elk.

BSE affects only adult animals and the incidence within-herd is low. The breed, gender or year and seasons are not associated with the development of this disease, nor are contact with sheep. In order to control this disease, in the U.K. the following actions were taken:

1. Ruminant derived protein is prohibited in all ruminant rations.
2. The consumption of milk from affected animals by humans or animals is also prohibited.
3. Bovine brain cannot be used for human consumption.

The mandatory slaughter of all animals manifesting signs of BSE and compensation awarded to the owner.