Alimentary System

Acknowledgement

- NOAH'S ARKIVE
  - http://noahsarkive.cldavis.org/cgi-bin/show_image_info_page.cgi
- Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION
- University of Tennessee Veterinary Pathology Image Database
  - http://vetgrosspath.utk.edu/?q=basic
- Tufts OpenCourseWare Search
  - http://ocw.tufts.edu/Course/72/Imagegallery
- Dr. John M. King's Necropsy Show & Tell
  - https://secure.vet.cornell.edu/nst/nst.asp?Fun=Home

Alimentary System

- Long and complex tube that varies in its construction and function among animal species
- Oral Cavity
- Teeth
- Tongue
- Salivary Glands
- Oesophaguss
- Rumen, Reticulum, and Omasum
- Stomach and Abomasum
- Intestine

Oral Cavity

Harelip / Cheiloschisis

- Primary cleft palate
- Congenital anomalies
- Failure of fusion of the upper lip along the midline or philtrum
- Unilateral or bilateral
- Superficial or
- extend into the nostril

Harelip / Cheiloschisis

F45009, Cheiloschisis, submitted by KING

Cheiloschisis

Harelip / Cheiloschisis

F07817, MOUTH CHEILOSCHISIS, submitted by HARRINGTON.

Cheiloschisis

Cleft palate / Palatoschisis

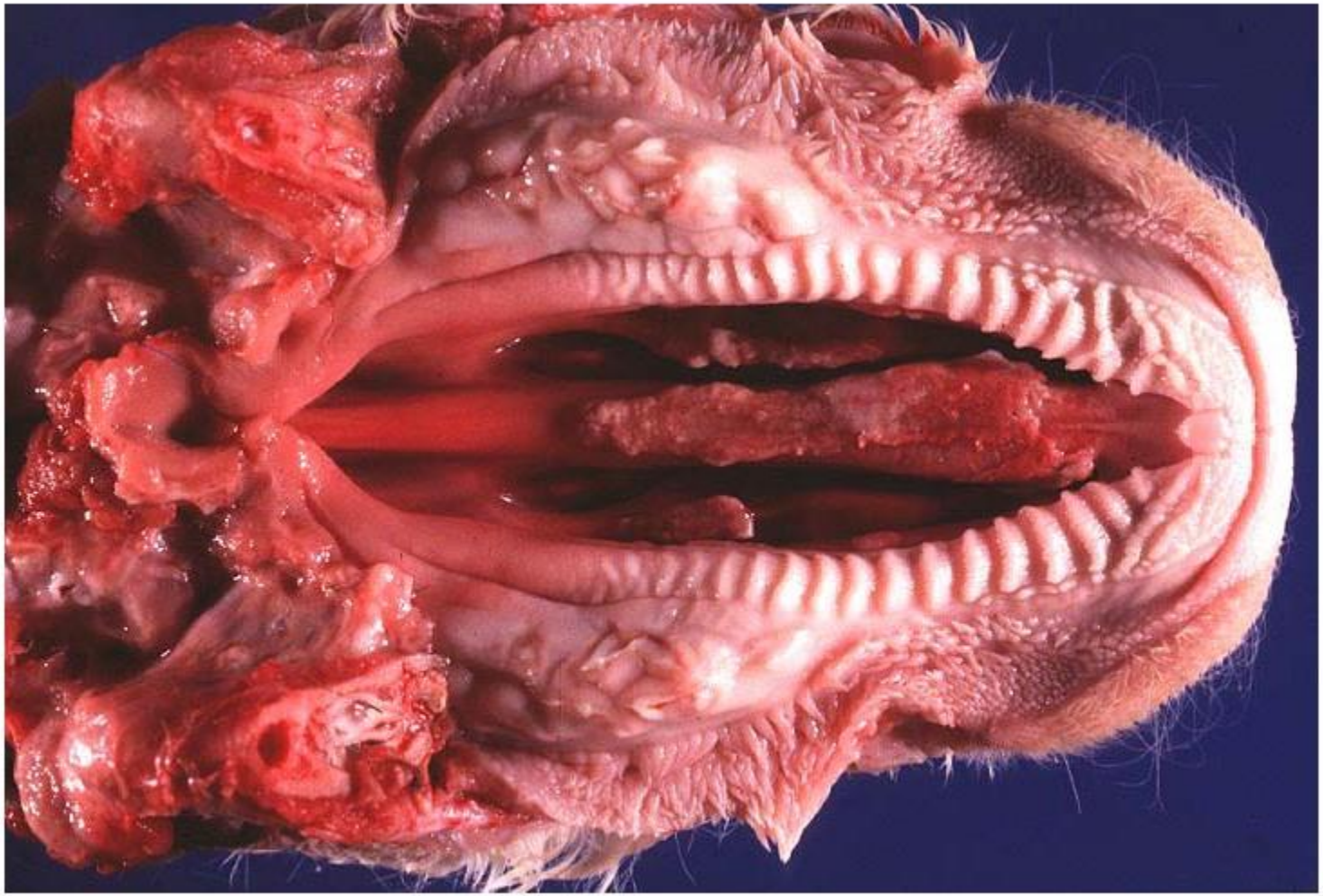
- Secondary cleft palate
- Failure of fusion of the lateral palatine processes
- Genetic or toxic in origin
- Steroid administration during pregnancy in primates and humans
- Depending on the size of the defect, which may involve only the soft palate or both the soft and hard palates

Cleft palate / Palatoschisis

F01066, PALATE PALATOCHEILOSCHISIS, submitted by CHO.

Cleft palate / Palatoschisis

Cleft palate / Palatoschisis



F00441, PALATE PALATOSCHISIS-TRAUMA, submitted by ALLISON.

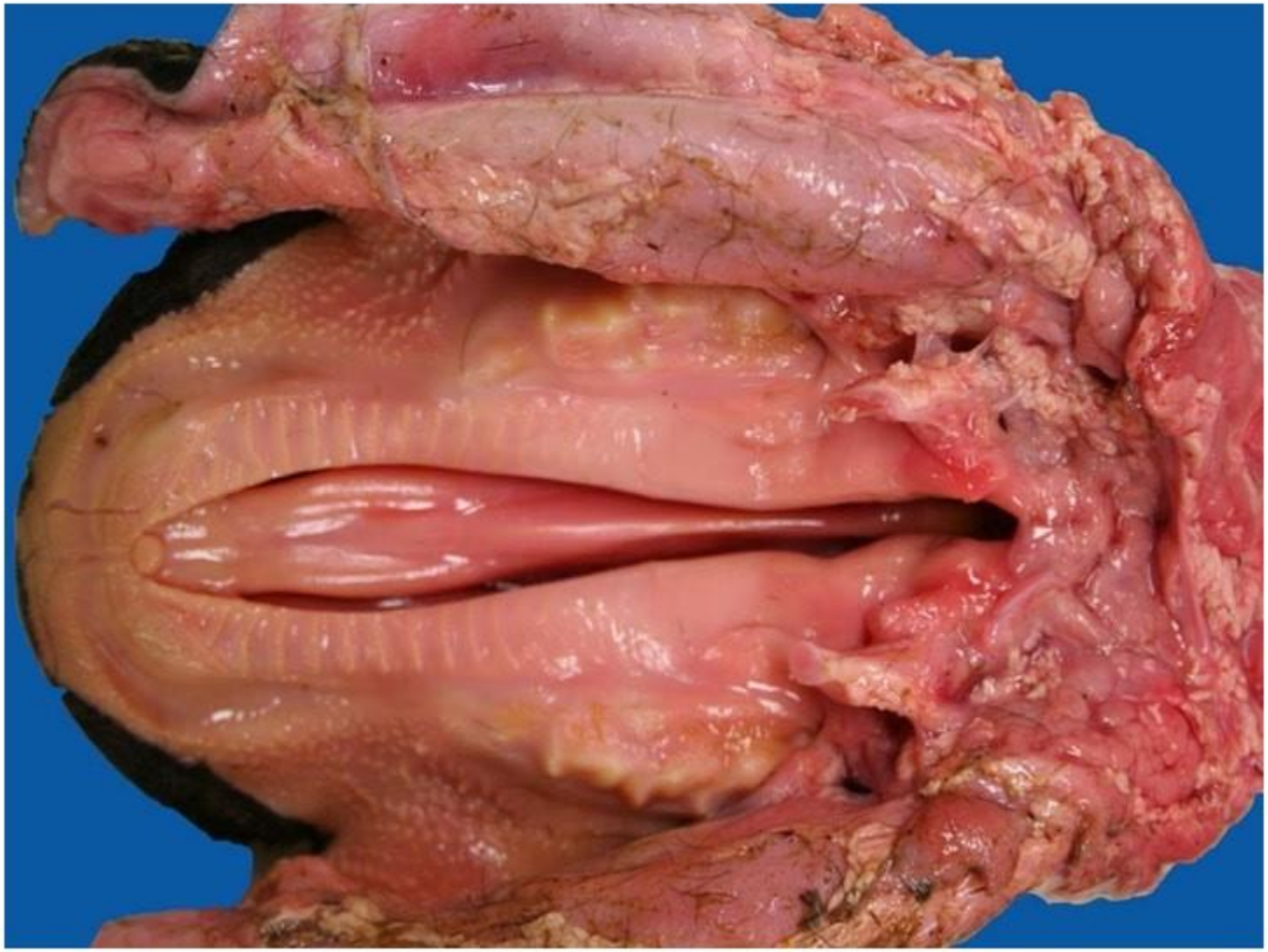
Cleft palate / Palatoschisis

Cleft palate / Palatoschisis

06984, PALATE PALATOSCHISIS, submitted by WILSON.

Cleft palate / Palatoschisis – Pig

Cleft palate / Palatoschisis



F01066, PALATE PALATOCHEILOSCHISIS, submitted by CHO.

Palatoschisis, severe, soft and hard palate – Cattle

Brachygnathia superior

- **Shortness of the maxillae**

F12919, HEAD BRACHYGNATHIA SUPERIOR,

submitted by MOSIER

Brachygnathia inferior / Micrognathia

- **Shortness of the mandibles**
- Common defect in calves
  - Associated with cerebellar hypoplasia
- Inherited, probably as a simple autosomal recessive trait
- Higher incidence in males

Brachygnathia inferior / Micrognathia

F07383, MANDIBLE BRACHYGNATHIA, submitted by WALLACE

Brachygnathia inferior – Cattle

Brachygnathia inferior / Micrognathia

F26581, BRACHYGNATHIA, submitted by LEIPOLD.

Brachygnathia inferior – Cattle

Prognathism

- **Abnormal prolongation of the mandibles**
- Common in sheep
  - May develop with recovery from calcium deficiency
- Malformation is relative, and it is not always easy to determine whether
  - The jaw is absolutely long or
  - Merely apparently so, relative to a mild brachygnathia superior

Prognathism

F07342, MOUTH PROGNATHISM, submitted by WALLACE.

Prognathism – Goat

Prognathism

F63543, Mandible: prognathism with oral papilloma, submitted by SAWANG KESDANGSAKONWUT.

Prognathism with oral papilloma – Dog

Agnathia

- **Absence of the lower jaw**

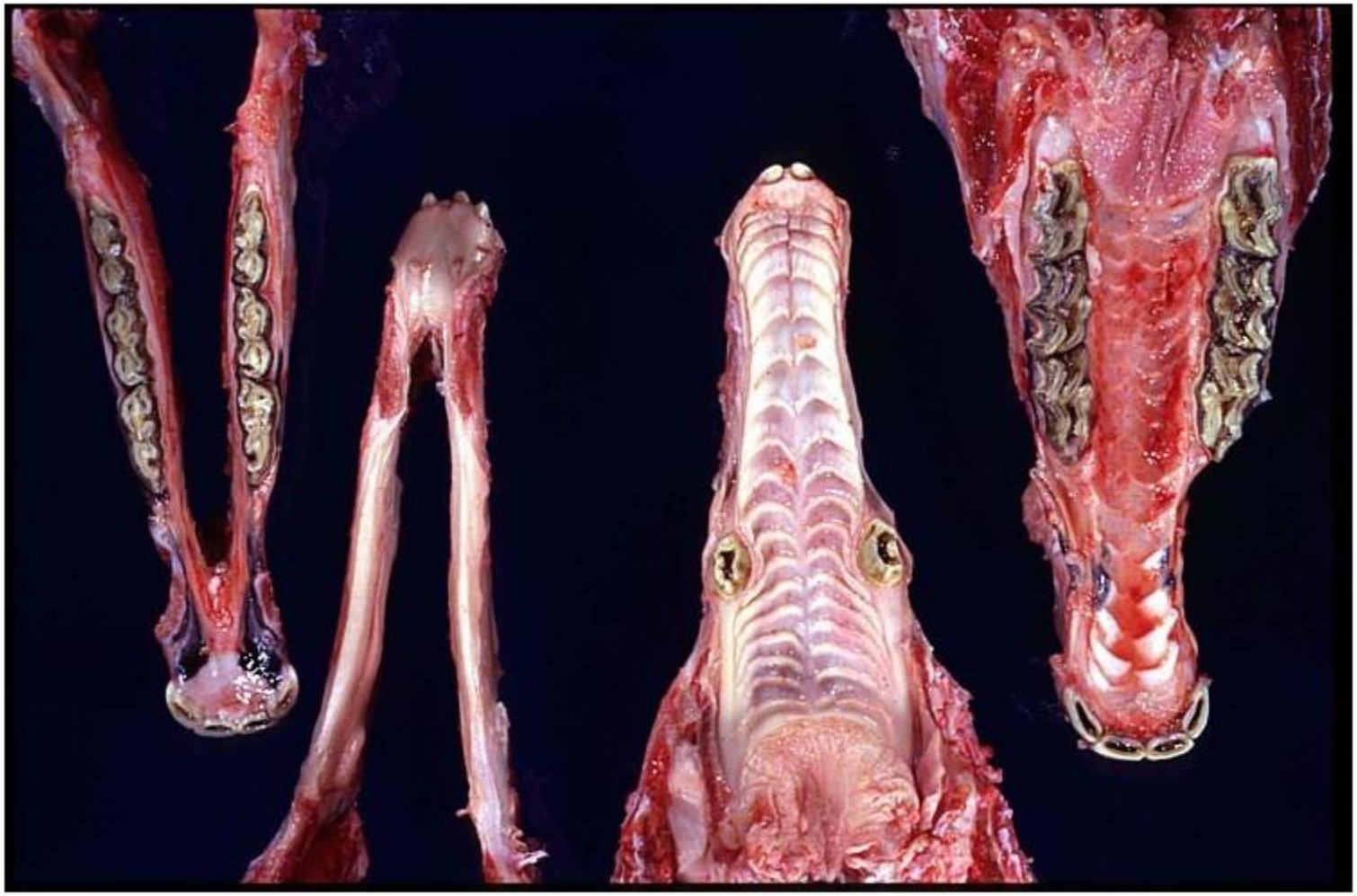
F63602, Mandibular agnathia, submitted by KELLY.

Diseases of teeth and dental tissues

Developmental anomalies of teeth

- **Anodontia** : Absence of teeth
- **Oligodontia:** Fewer teeth than normal
- **Polyodontia:** Excessive teeth
  - Occurs in brachycephalic dogs
- **Pseudopolyodontia**: Retention of deciduous teeth after eruption of the permanent dentition
- **Heterotopic polyodontia**: Extra tooth outside the dental arcade, which includes dentigerous cysts in the temporal region of horses

Oligodontia



F55730, Oligodontia/normal dentition, submitted by KING.

The outer jaw sections are from a normal foal. The central sections show bilateral loss of teeth or deformed teeth.

Pseudopolyodontia

F63543, Mandible: prognathism with oral papilloma, submitted by SAWANG KESDANGSAKONWUT.

Retained deciduous incisors in a juvenile age horse

Dental attrition

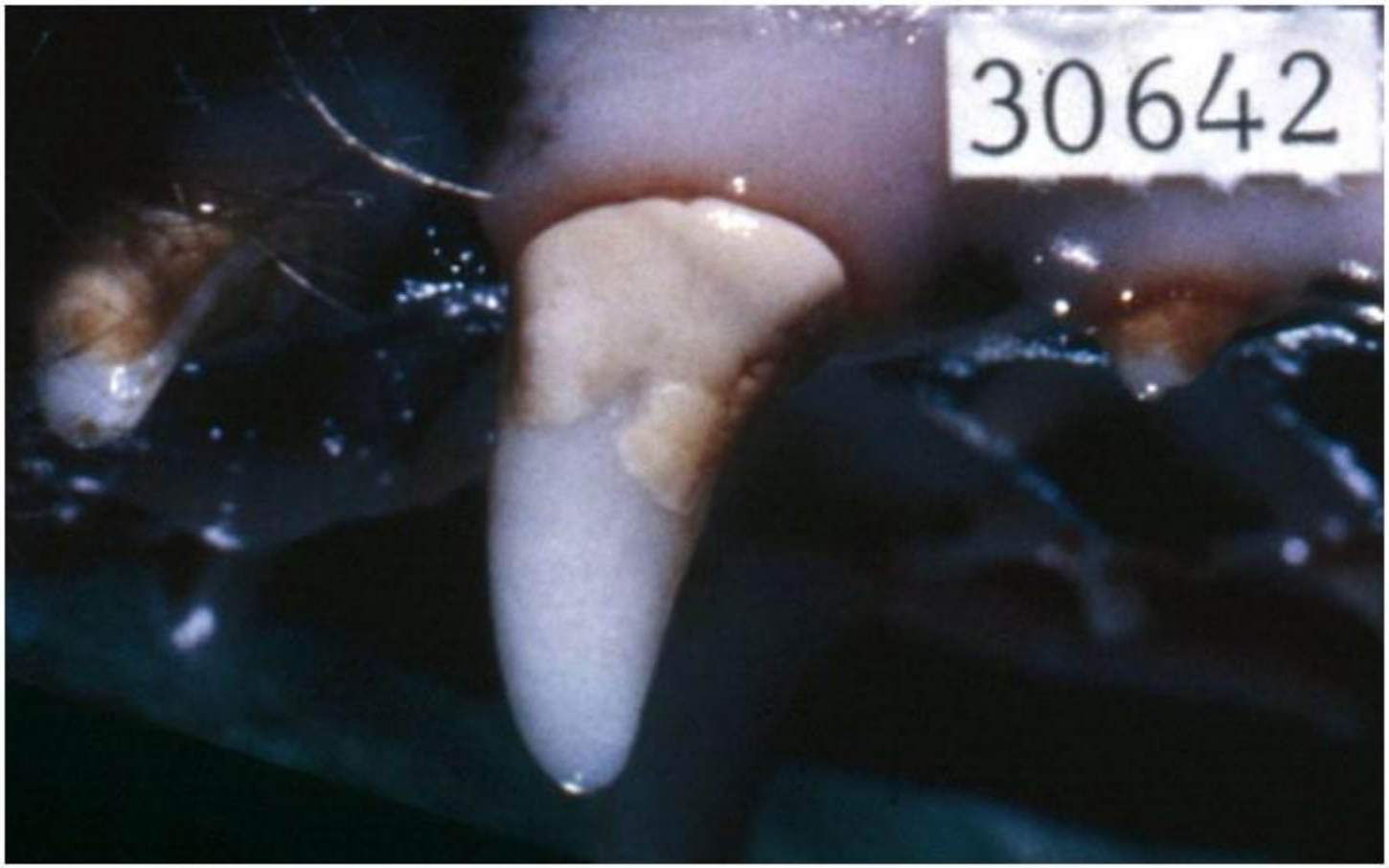
- Loss of tooth structure caused by mastication

F25571, ATTRITION (STEP MOUTH), submitted by PERCY.

Irregular wear of the teeth of a horse (Step Mouth)

Dental calculus (tartar)

- Mineralized supragingival and subgingival plaque

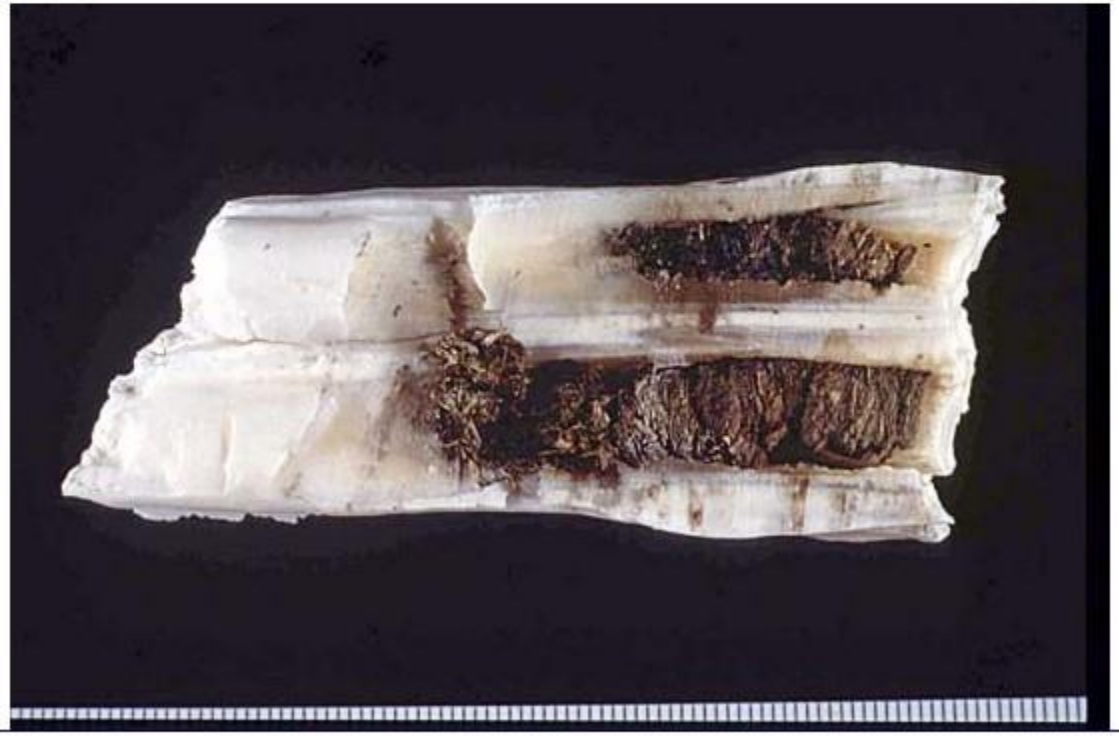


F29420, K9 canine tooth dental calculus and mild gingivitis, submitted by RICHARD JAKOWSKI.

canine tooth dental calculus and mild gingivitis

Dental caries

- Disease of the hard tissues of teeth, characterized by demineralization of the inorganic part and enzymatic degradation of the organic matrix.



F53043, Dental caries, submitted by KING.

Pulp cavities (2) filled with impacted feed.

Diseases of the buccal cavity and mucosa

Inflammation of the oral cavity

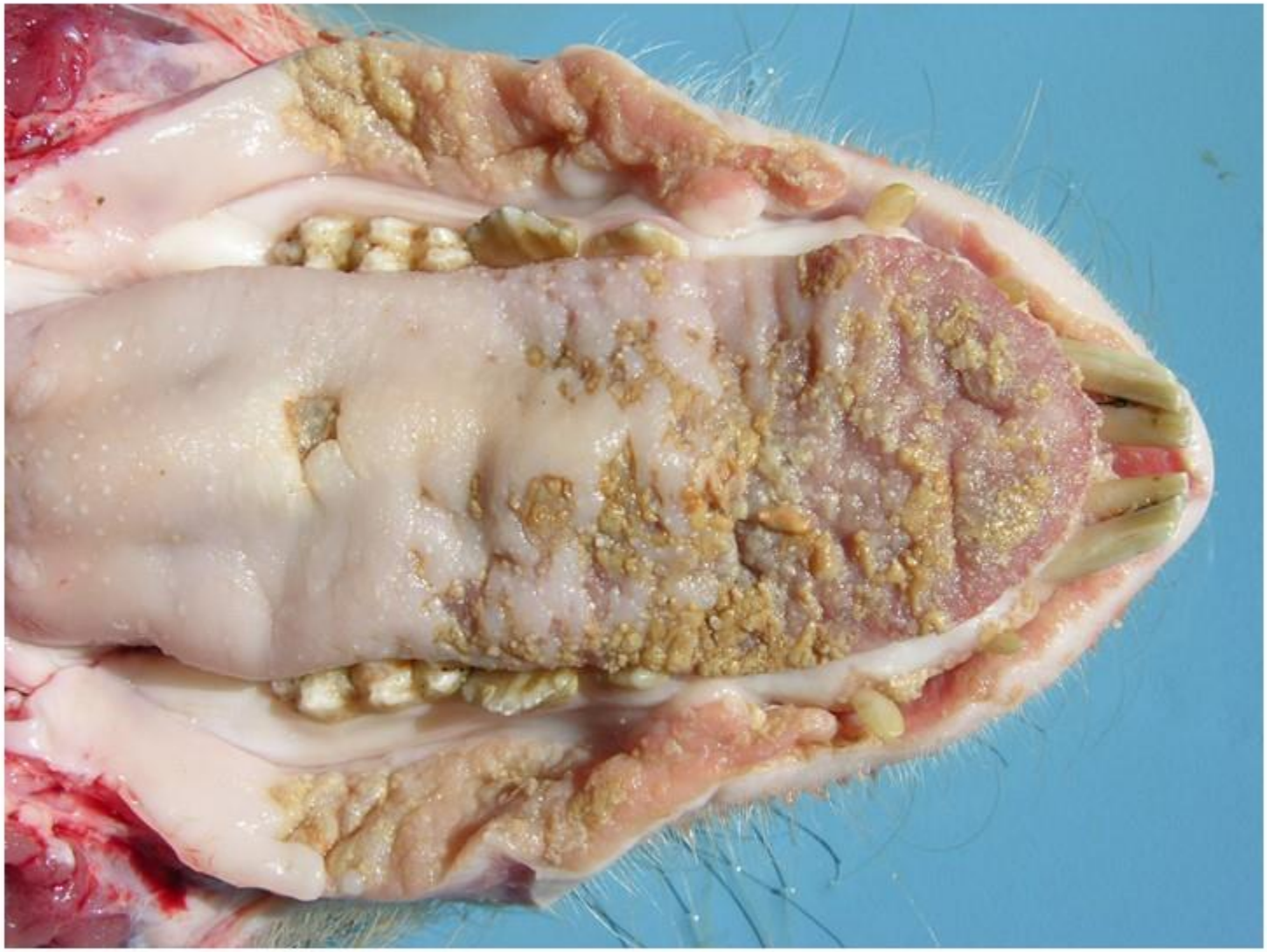
- **Stomatitis** : Inflammation of the oral cavity
- **Pharyngitis:** Inflammation of the pharynx
- **Glossitis:** Inflammation of the tongue
- **Gingivitis:** Inflammation of the gums
- **Tonsillitis:** Inflammation of the tonsils
- **Angina:** Inflammation of the soft palate
- **Lampas:** Inflammation of the hard palate

Thrush / Oral candidiasis

F33547, LINGUAL HYPERKERATOSIS DUE TO CANDIDA ALBICANS INFECTION, submitted by ACLAND

Lingual hyperkeratosis due to candida albicans infection

Thrush / Oral candidiasis



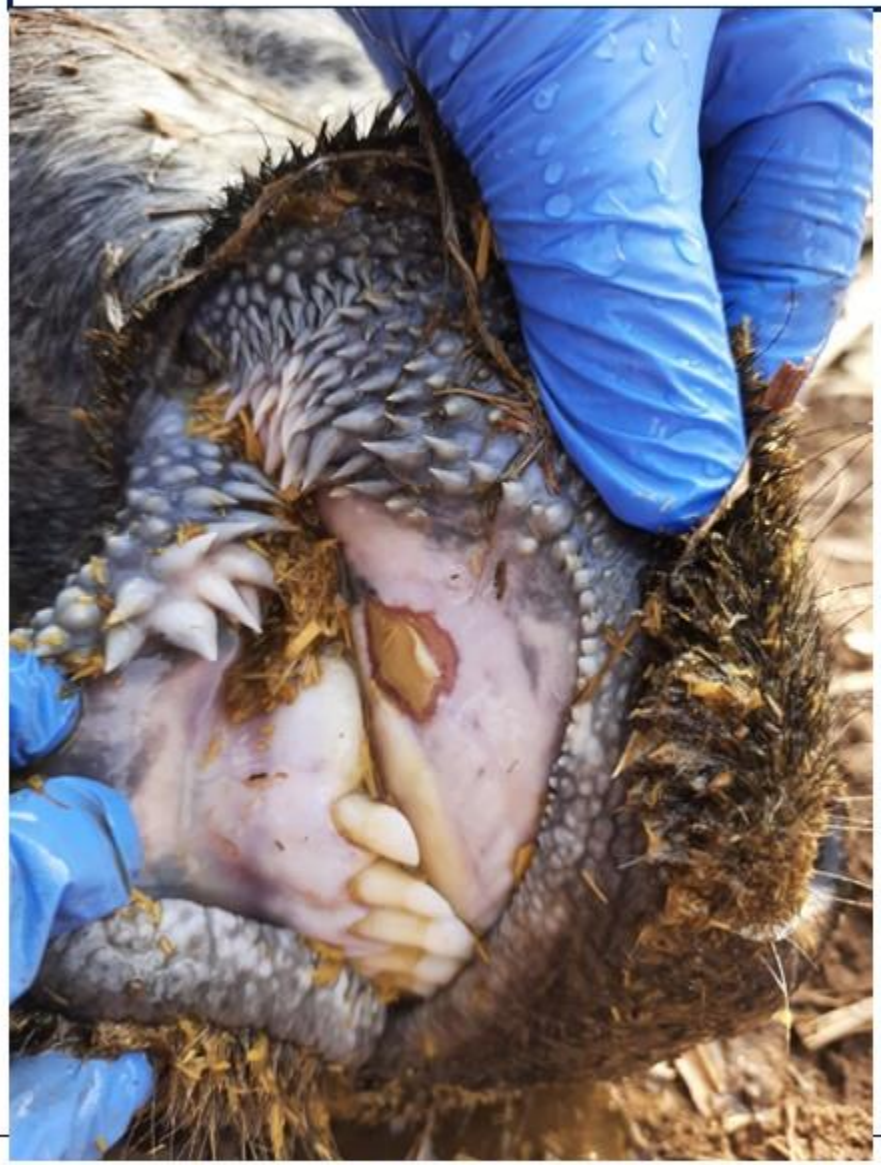
F32120, ORAL CANDIDIASIS CANDIDA ALBICANS THRUSH, submitted by DRIEMEIER.

Oral candidiasis candida albicans thrush

Other conditions involved oral cavity

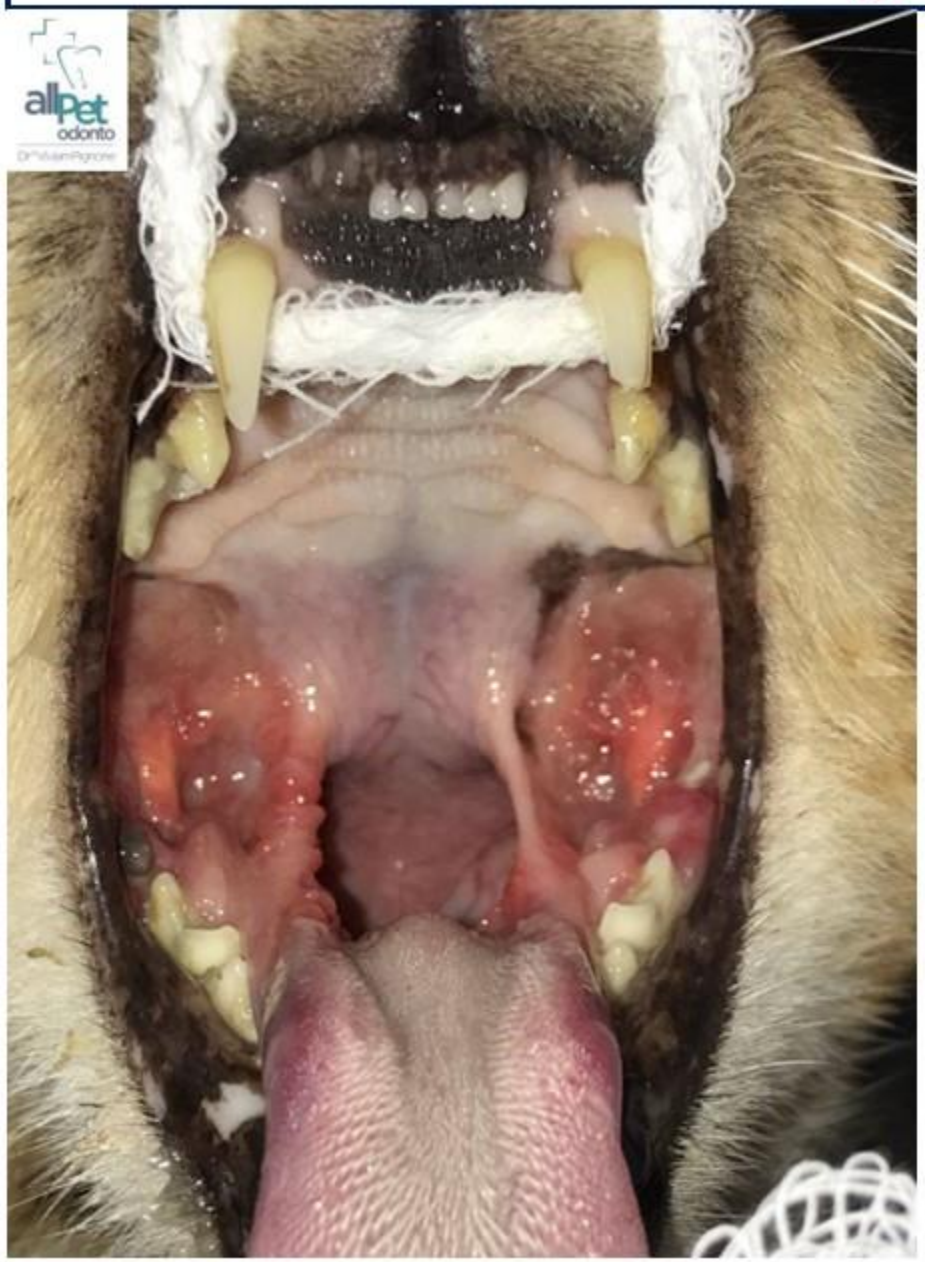
- Vesicular Stomatitis
- Pemphigus vulgaris
- Feline ulcerative stomatitis and glossitis or lymphocyticplasmacytic stomatitis
- Feline chronic gingivostomatitis
- Eosinophilic ulcer (Lick granuloma/Rodent ulcer)
- Oral eosinophilic granuloma
  - familial disease in young Siberian Huskies
- Uremia
- *Fusobacterium necrophorum* infection
  - Necrobacillary stomatitis / Calf diphtheria
- Actinobacillosis

FMD



Vesicular / Ulcerative stomatitis

Feline chronic gingivostomatitis



Feline chronic gingivostomatitis /lymphoplasmacytic gingivostomatitis)

F34487, FELINE CHRONIC GINGIVOSTOMATITIS (LYMPHOPLASMACYTIC GINGIVOSTOMATITIS)
CONTRIBUTORS: DRS. FABRIZIO GRANDI AND VIVIAM PIGNONE, submitted by GRANDI.

Eosinophilic granuloma / Rodent ulcer

F34226, SEVERE, BILATERAL, ULCERATIVE, CHEILITIS; FELINE ORAL EOSINOPHILIC GRANULOMA., submitted by GRANDI.

Severe, bilateral, ulcerative, cheilitis

Eosinophilic granuloma / Rodent ulcer

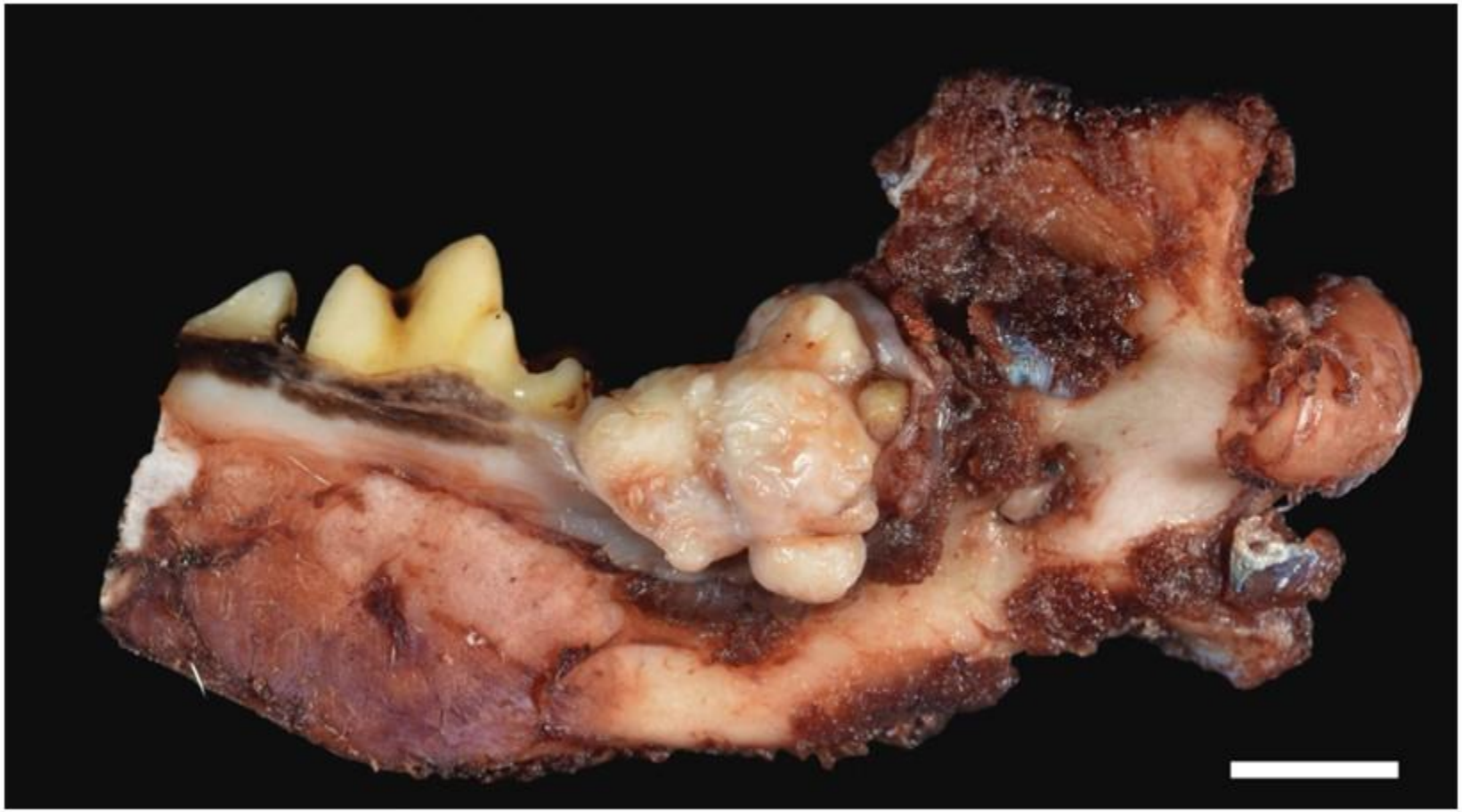
F53068, Eosinophilic granuloma, Rodent ulcer, submitted by KING.

Severe, ulcerative, cheilitis

Epulis

- Generic clinical term for tumor-like masses on the gingiva
- In the past, been used to describe developmental, inflammatory, and hyperplastic lesions, as well as several neoplastic lesions of tooth germ origin

Epulis



F3212F62685, PERIPHERAL ODONTOGENIC FIBROMA, submitted by JENNINGS.0, ORAL CANDIDIASIS CANDIDA ALBICANS THRUSH, submitted by DRIEMEIER.

PERIPHERAL ODONTOGENIC FIBROMA

Neoplasms

- The most common types of malignant oral tumors in
  - **Dogs and cats**
    - Squamous cell carcinoma
    - Fibrosarcoma
  - **Dogs**
    - Malignant melanomas

Diseases of the Salivary glands

Salivary glands

- **Ptyalism (tī-ə-ˌli-zəm)**
  - Increased secretion of saliva
    - Stomatitis, organophosphate or heavy metal poisoning, encephalitis, and mycotoxicosis.
- **Aptyalism**
  - Reduced or absent secretion of saliva
    - Fever, dehydration, and salivary gland disease
- **Sialolith:** Calculi in salivary glands
- **Sialoadenitis:** Inflammation of the salivary glands

Salivary glands

Ranula

- Smooth, rounded, fluctuant cystic distention of the salivary duct in the floor of the mouth.
- Cavity have lining epithelium

Salivary mucocele or sialocele

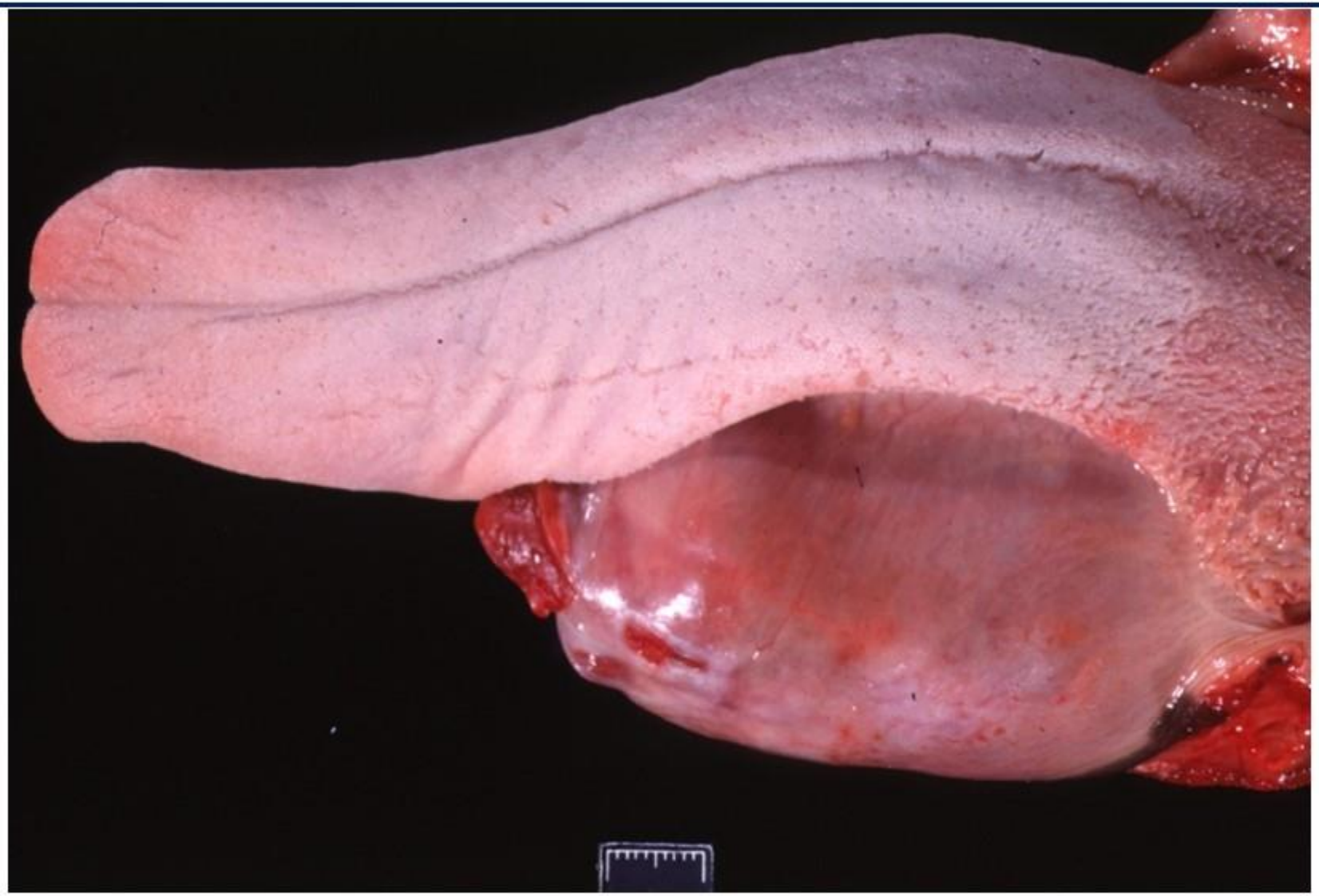
- An accumulation of salivary secretions in single or multiloculated cavities, *not lined by secretory epithelium*, in the soft tissues of the mouth or neck
- Result of trauma to the duct
- May be a history of ranula-like swelling in the mouth

Sialolith

Dr.
B. Cooper, College of Veterinary Medicine, Oregon State University.

Sialolith, Horse. Pressure necrosis from this large stonelike mass (arrows) has destroyed the gland in which it formed

Ranula



F01661, TONGUESALIVARY CYST(RANULAS), submitted by READ.

Cystic distention of the salivary duct in the floor of the mouth

Salivary mucocele or sialocele

F01661, TONGUESALIVARY CYST(RANULAS), submitted by READ.

Cervical salivary mucocele or sialocele

Diseases of the esophagus

Esophagus

- **Choke**
  - Intrinsic obstruction of esophagus lumen
  - Large or inadequately chewed and lubricated foods, masses of grain or fibrous ingesta, or medically administered boluses lodge in the lumen of the esophagus
- **Megaesophagus /Esophageal ectasia**
  - Dilation of the esophageal lumen, and is the result of atony and flaccidity of the esophageal muscle

Bloat line

F34354, BLOAT LINE, submitted by PFENT.

Cattle esophagus: line of demarcation between the blanched side and the congested side

Bloat line

F34354, BLOAT LINE, submitted by PFENT.

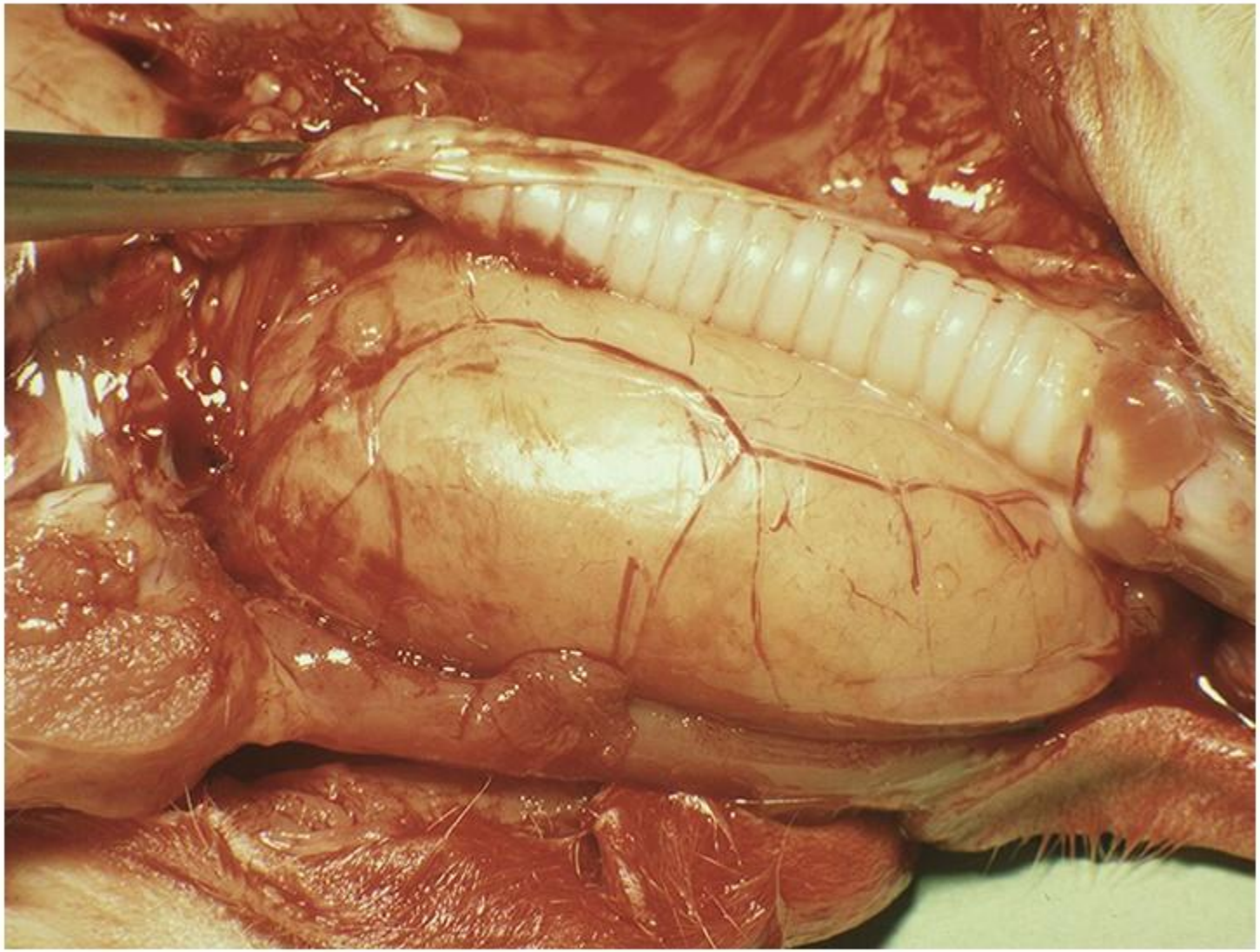
Cattle esophagus: line of demarcation between the blanched side and the congested side

Choke

F18801, CHOKE, submitted by TYLER.

Choke and erosions of esophagus

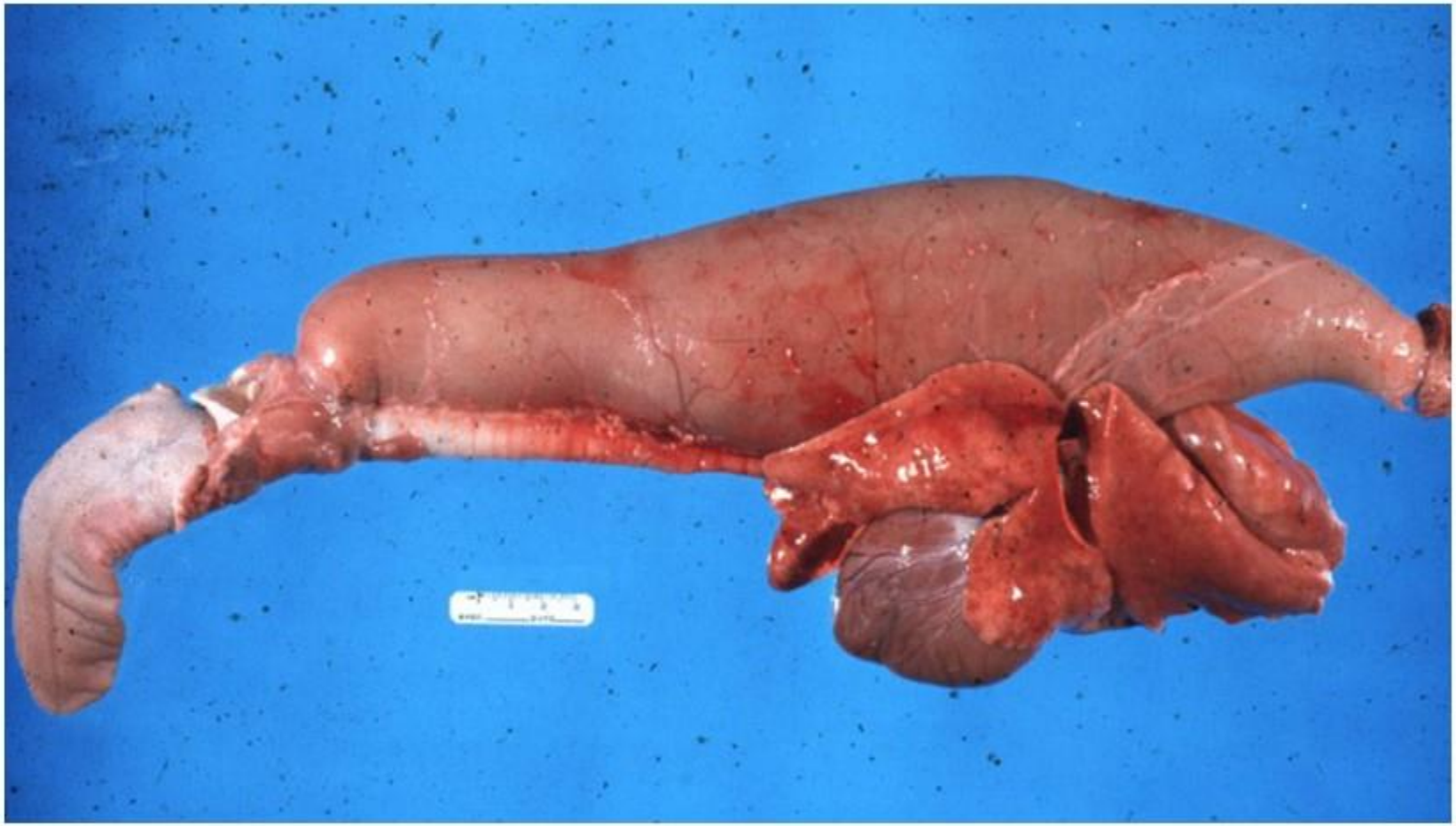
Megaesophagus



F28977, MEGAESOPHAGUS CONGENITAL, submitted by HARRINGTON.

Canine megaesophagus congenital

Megaesophagus



F00412, ESOPHAGUS ACHALASIA-MEGAESOPHAGUS, submitted by SYNDER.

Canine megaesophagus

Gongylonema pulchrum

F00412, ESOPHAGUS ACHALASIA-MEGAESOPHAGUS, submitted by SYNDER.

Blood-filled tracks and small hematoma in esophageal mucosa caused by Gongylonema pulchrum migration in a cow.

Spirocerca lupi

Courtesy
R.G. Thomson

Spirocerca lupi nodules in distal esophagus of a dog.
Worms protrude through fistulae into esophageal lumen

Diseases of the forestomachs

Rumen

- Overly dry contents - dehydration
- Voluminous frothy contents -primary bloat
- Urea toxicity - ammoniacal odor and alkaline pH
- An odor of cooked turnips or a pungent insecticidal smell is suggestive of organophosphates.
- In grain overload, contents have a fermentative odor and pH may be <5.0
- Several other toxic substances can be identified by visual inspection of the ruminal contents

Rumen - Postmortem change

- Ruminal mucosal epithelium usually sloughs within a few hours after death
- **Persistent firm attachment of the ruminal epithelium is abnormal**
  - Acute and chronic rumenitis, especially if caused by fungi, and about scars of healed rumenitis.
  - Adhesion may not occur in the early stages of ruminal acidosis.

Bloat

- Tympanitic distention of the forestomachs / Dilation of the rumen
- Also known as **tympany, hoven**
- May be acute, or chronic and recurrent
- May be primary or secondary

Bloat

Primary tympany

- Acute tympany
- Also called **frothy bloat**
- Excess foam production in rumen depends upon various factors
  - **Soluble proteins** (especially fraction I proteins)
    - Present in high levels (up to 4.5%) in bloat-inducing legumes
    - Stabilised the foam in rumen
  - **Pectins** - increase viscosity of ruminal fluid and stabilised the foam
  - Plant lipids may act as antifoaming agents

Bloat

Primary tympany

- Excess foam production in rumen depends upon various factors
  - **Saliva quantity**
    - Secretion of saliva ↓ → viscosity ↑ → promotes foaming
    - Succulent and high-concentrate feeds reduce salivary secretion, viscosity ↑ → promotes foaming
    - Salivary bicarbonate binds with acid in rumen → ↑ carbon dioxide production → enhancing bubble formation

Bloat

Primary tympany

- Excess foam production in rumen depends upon various factors
  - **Rations high in concentrate and low in roughage**
    - Secretion of saliva ↓ → viscosity ↑ → promotes foaming
    - Change the ruminal microflora
    - ↑ growth of encapsulated bacteria → ↑ concentration of polysaccharides viscosity ↑ → promotes foaming
  - Smaller particle size of grain → predisposing to bloat

Bloat

Primary tympany

- Excessive foam production causes distention of the rumen because it prevents formation of a free gas cap and the clearing of the cardia

Bloat

Primary tympany

Gross lesions

- Rumen distended with foam/gas
  - Soon after death, the ruminal contents are bulky and foamy
  - Foam gradually disappears after death and is usually absent if the necropsy is delayed for 10-12 hours
- Blood exudes from the orifices
- Carcass may show sawhorse posture
  - Forelegs extended forward and rear legs pointing backward.
- The blood is dark and clots poorly;
  - Both features are indicative of death from anoxia

Bloat

Primary tympany

Gross lesions

- Subcutaneous hemorrhages in anterior part of body (head and neck)
- Marked edema, congestion, and hemorrhage of the cervical muscles and of the lymph nodes of the head and neck
- Blot line in esophagus (not always present)
- Trachea: hemorrhagic and may contain blood clot
- Most visceral organs are compressed

Bloat

Primary tympany

Gross lesions

- Posterior half of body is paler than normal
- Subcutaneous edema, particularly of the vulva, inguinal region, and perineum
- Intestines may herniate through the inguinal canals.

Bloat

Cause of death

- Physical and metabolic effects
- Increased intra-abdominal pressure
  - On the diaphragm ***inhibits respiration***
  - Adversely affects cardiac function
  - Abdominal organs are compressed
    - Driving blood out of them
  - Caudal vena cava is also compressed
    - Decreasing venous return to the heart
  - Distention also affects mucosal permeability and alters vagosympathetic reflexes

Bloat

Secondary tympany

- May be acute, but is generally chronic or recurrent
- Result of a **physical** or **functional defect** in eructation of gas produced by normal rumen fermentation.
- **Physical causes**
  - Obstructions of the esophagus or groove by
    - Tumor, foreign body, or esophageal stenosis
    - Reticular adhesions, abscesses, peritonitis, or tumor masses → interfere with contractions of the forestomach → bloat.

Bloat

Secondary tympany

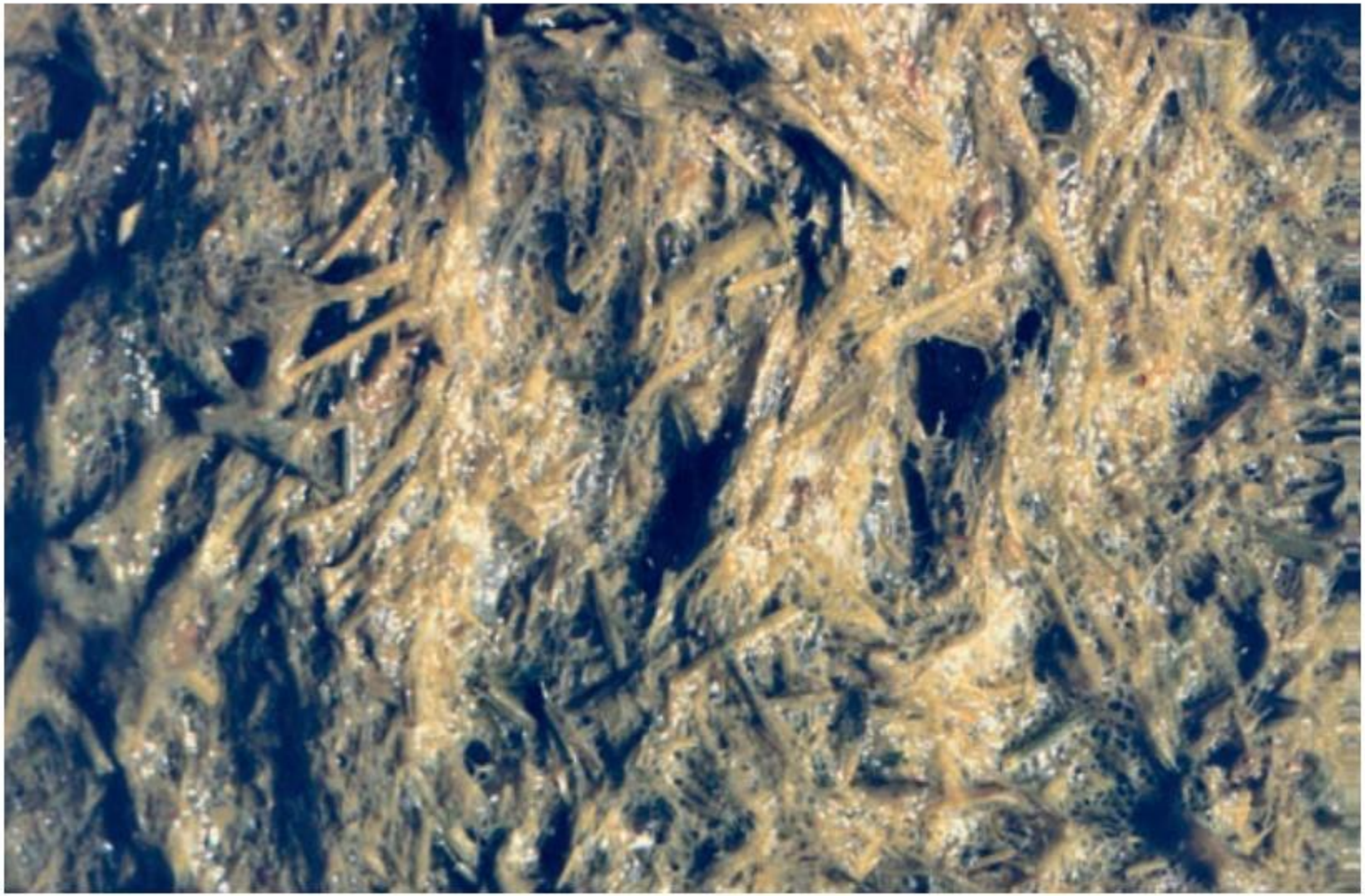
- May be acute, but is generally chronic or recurrent
- **Functional causes**
  - Organophosphate intoxication
  - Vagal damage caused by adhesions, lymphosarcomatous infiltrates
  - Right-sided abomasal displacement and volvulus
- Too much indigestible roughage may have recurrent episodes of bloat
- Component of the syndromes collectively termed vagus indigestion
- PM findings: same as primary blot except froth

Bloat

Bloat due to squamous cell carcinoma of rumen

F32348, BLOAT SQUAMOUS CELL CARCINOMA RUMEN, submitted by BARROS.

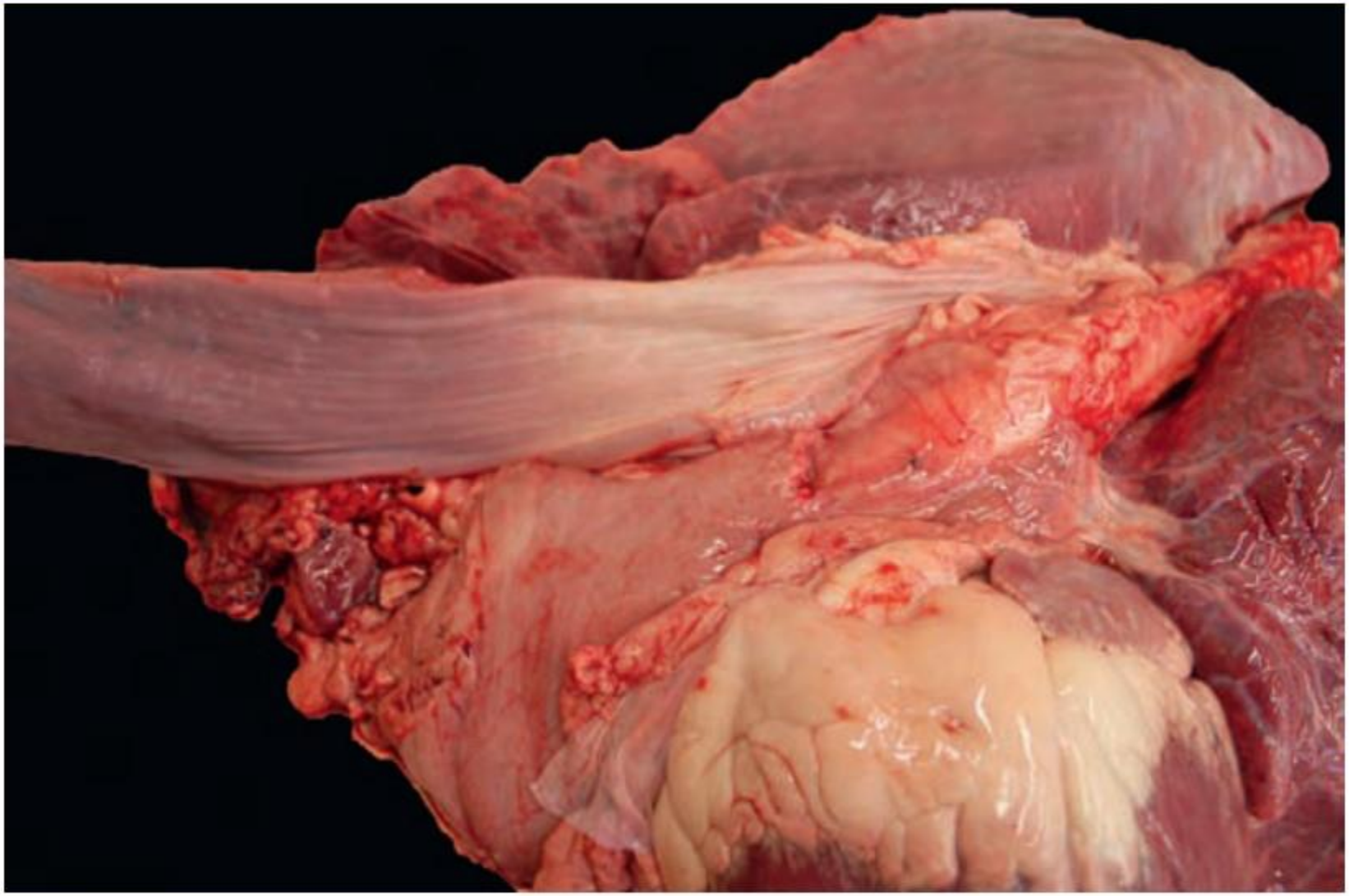
Bloat



Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Frothy bloat in a cow. Fine bubbles are evident in the rumen content.

Bloat



Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

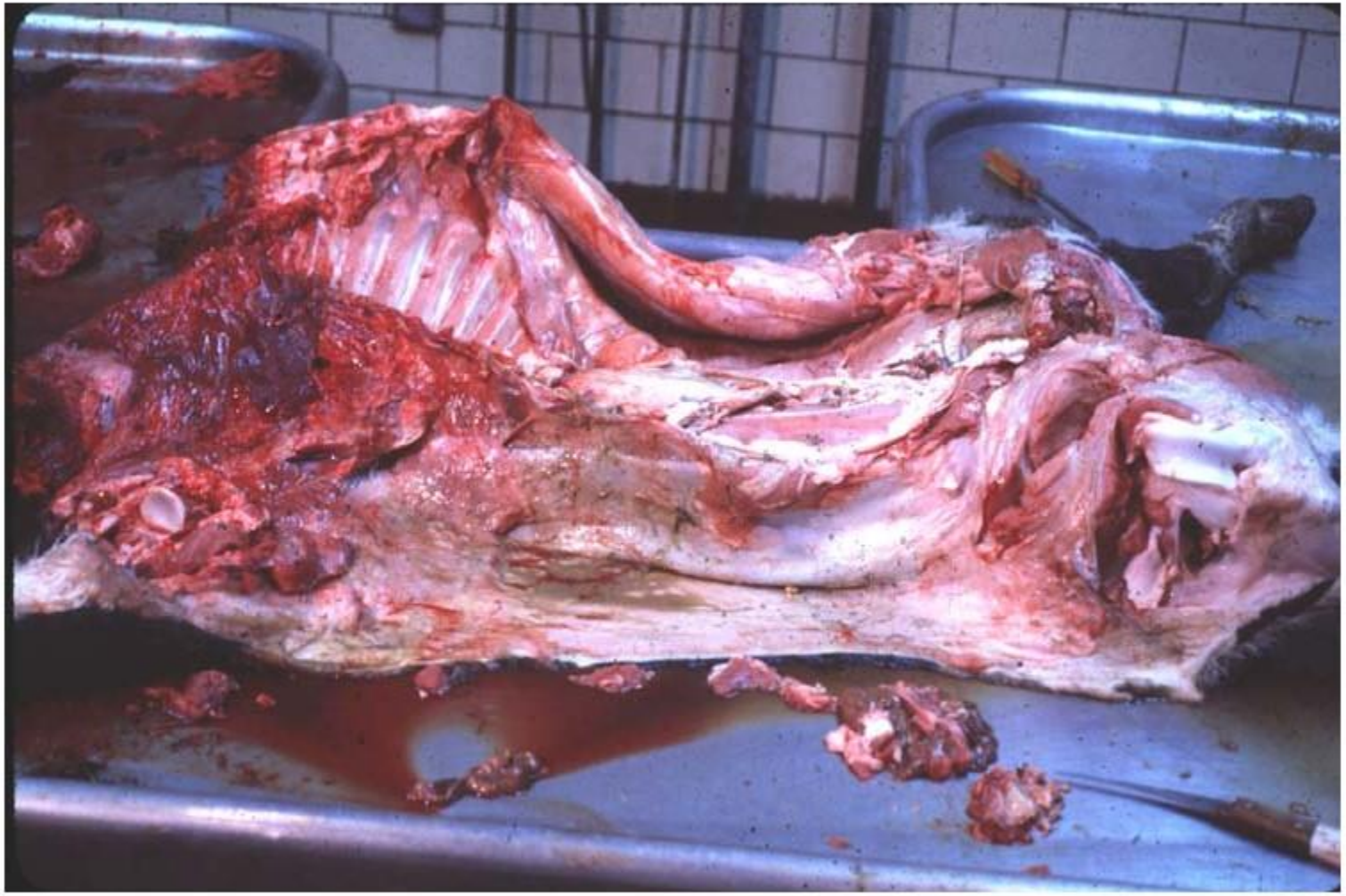
Bloat line in the esophagus of a cow with ruminal tympany.

Bloat

F29647, Bovine cranial congestion associated with fatal rumen bloat, submitted by RICHARD JAKOWSKI.

Bovine cranial congestion associated with fatal rumen bloat

Bloat

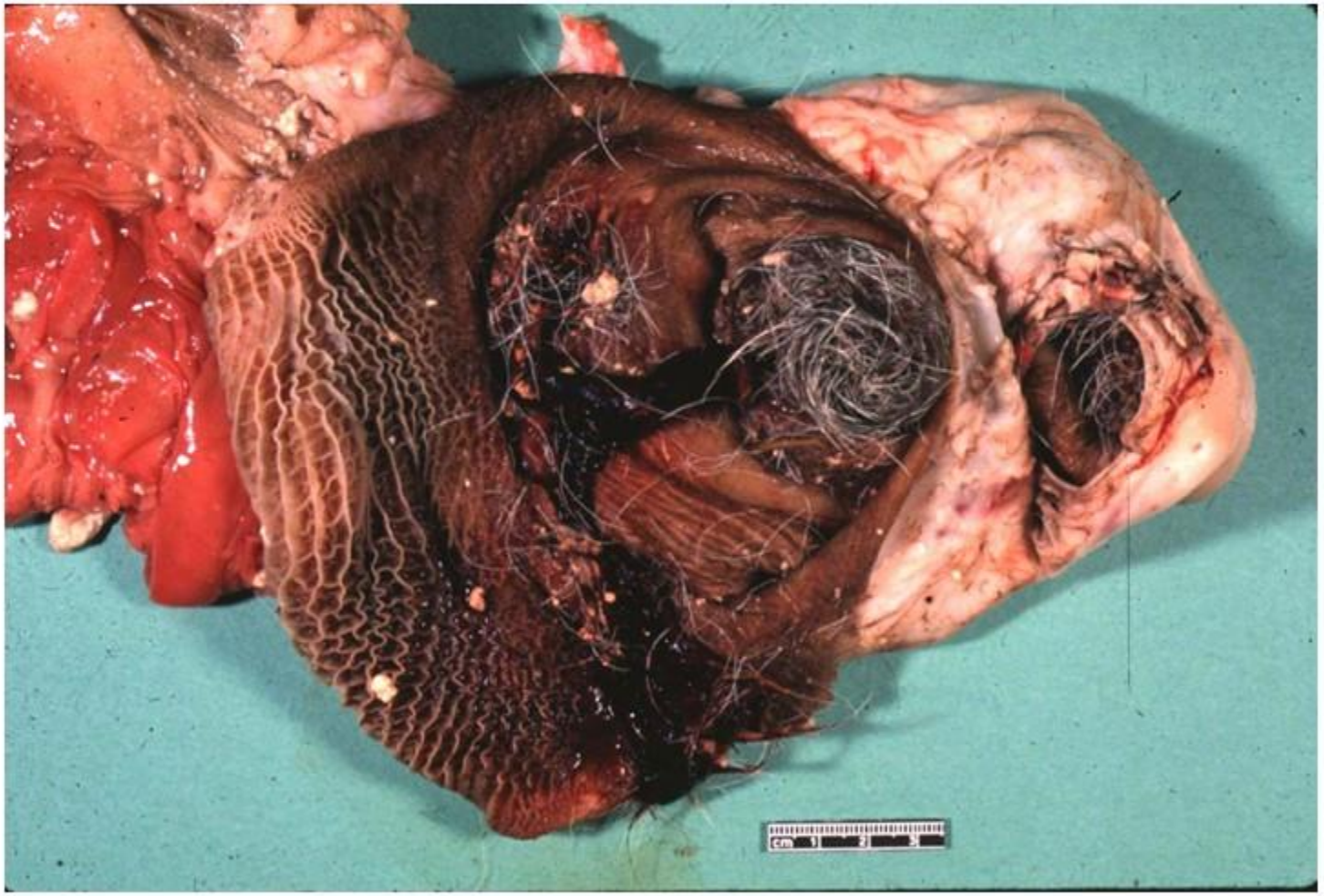


F37581, Caudal half anemic and cranial half congested, submitted by KING.

Bovine cranial congestion associated with fatal rumen bloat

Trichobezoars

- Spherical masses consisting largely of hair/wool in stomach



F04629, RUMEN TRICHOBEZOARS
HEMORRHAGE NEOMYCIN HEMO. DIATHESIS
RETICULUM, submitted by HARRINGTON.

Rumen trichobezoars hemorrhage

Phytobezoars

- Spherical masses consisting largely of plant fibers in stomach

F00405, RUMEN CONTENTS PHYTOBEZOARS, submitted by SYNDER.

Rumen contents phytobezoars

Traumatic reticuloperitonitis

- Long, thin, and sharp foreign body, usually a wire or nail, penetrating the reticular wall
- Perforation is usually in the **cranioventral**
  - **F**ollowed immediately by acute local peritonitis
  - If foreign body - short or bent -no progression
  - Chronic local peritonitis with adhesions
  - Ventral penetration may result in subperitoneal and subcutaneous abscess near the xiphoid.
- The foreign body may advance to perforate the diaphragm and pericardium, resulting in traumatic pericarditis
- May induced vagus indigestion

Ruminal acidosis and rumenitis

- In cattle and sheep
- Normal pH of ruminal fluid varies between 5.5 and 7.5
- Ingestion of excess carbohydrate in the form of grain, or other fermentable feedstuffs
  - Sudden increments in the amount of carbohydrate ingested are of more importance than the actual amount.
- Carbohydrate → fermentation → ↑ Lactic acid production → ruminal pH fall → *Streptococcus bovis* proliferate → ↑ Lactic acid production

Ruminal acidosis and rumenitis

- When the pH reaches 5.0-4.5, the numbers of streptococci decrease, with a concomitant increase in lactobacilli.
- As ruminal pH drops, ruminal atony develops
  - Cessation of salivary secretion
- Lactate in rumen increase in ruminal osmotic pressure
  - Movement of fluid from the blood into the rumen
  - Producing bulky and liquid ruminal contents
  - Induced severe dehydration

Ruminal acidosis and rumenitis

- Hemoconcentration, anuria, and circulatory collapse follow
- ↑ serum protein levels, urea, inorganic phosphorus, lactate, pyruvate, and liver enzymes
- High lactate concentrations intestine → increase in osmotic pressure → movement of fluid in lumen → diarrhea → severe dehydration
- In acute cases, animals died due to acidosis and dehydration
- If survive the acute phase, recovery is not complete until a normal ruminal flora is restore

Ruminal acidosis and rumenitis

- *Fusobacterium necrophorum* - normal inhabitant
- Low pH → Inflammation of wall of rumen → Bacteria gain entry in mucosa and portal circulation → Necrosis in ruminal wall and liver
- Mycotic infection may also aoocur

Ruminal acidosis and rumenitis

Gross Pathology

- Marked dehydration of carcass
- Ruminal content varies upon stage of disease
- Early stage → ruminal pH is low (<5.0)
- Secondary bacterial infection produced ruminal wall necrosis
- Liver abscess

Ruminal acidosis and rumenitis

Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Plaques and coalescing areas of necrosis are evident on the mucosa. Necrobacillosis in rumen of a cow

Ruminal acidosis and rumenitis

Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Stellate scarring of incompletely healed ulcer in the rumen mucosa in necrobacillary rumenitis

Ruminal acidosis and rumenitis

Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Roughly circular and dark areas of infarction, most of them with a pale center, involving rumen and reticulum.

Ruminal acidosis and rumenitis

Appearance of mucosal surface of rumen; superficial necrosis overlies congested submucosa.

Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Ruminal acidosis and rumenitis

Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Necrobacillosis in the liver of a lamb. Multiple abscesses are present.

Parasitic diseases of the forestomachs

- *Gongylonema spp.*
- Rumen flukes
  - *Paramphistomum*

Paramphistomum spp. flukes on the mucosa of the reticulum

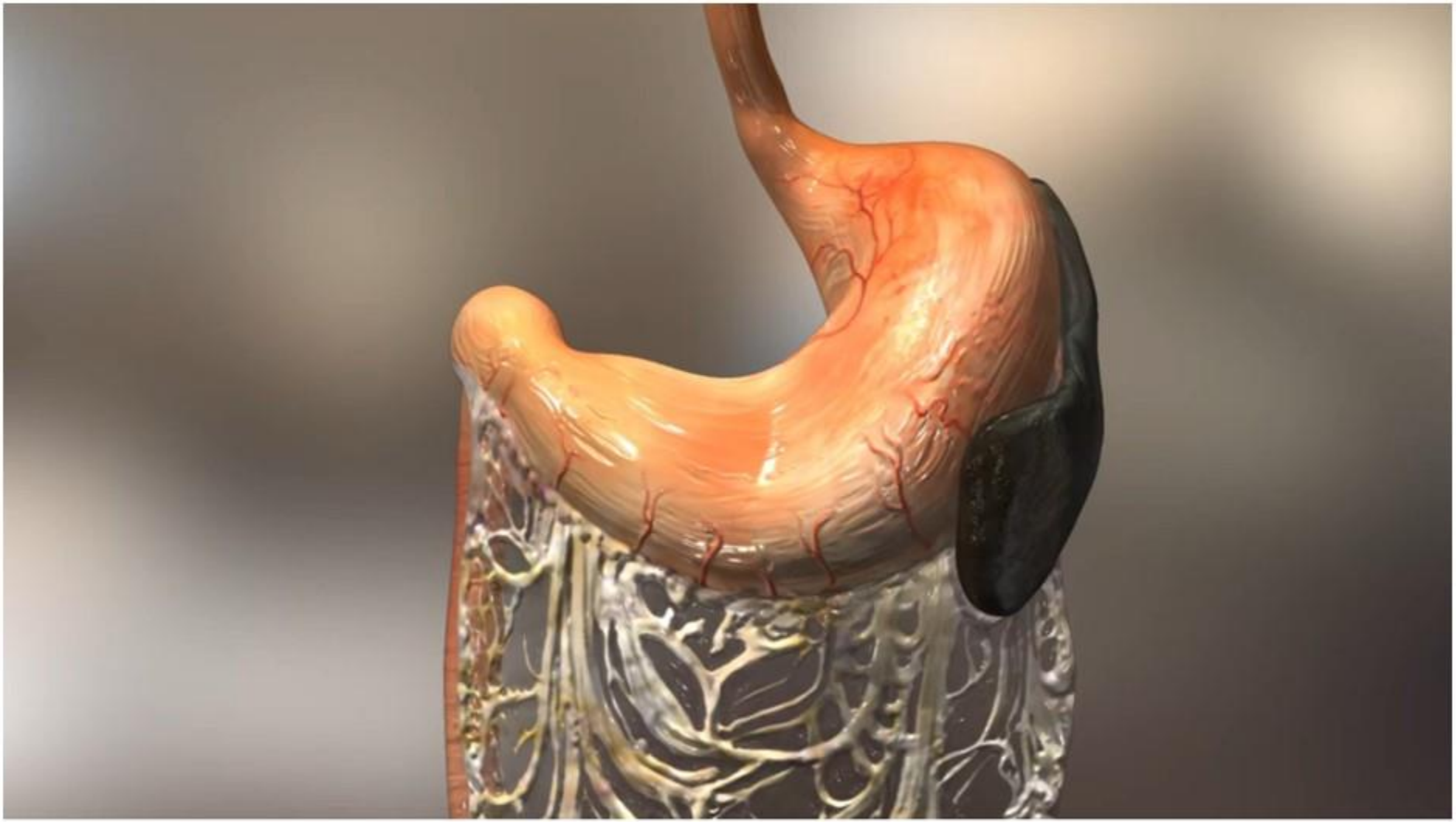
Jubb, Kennedy, and Palmer's Pathology of Domestic Animals, SIXTH EDITION

Neoplasia of the forestomachs

- Rare in domestic animals
  - With exception of papilloma
- Squamous cell carcinoma
  - Associated with BPV-4–induced papilloma

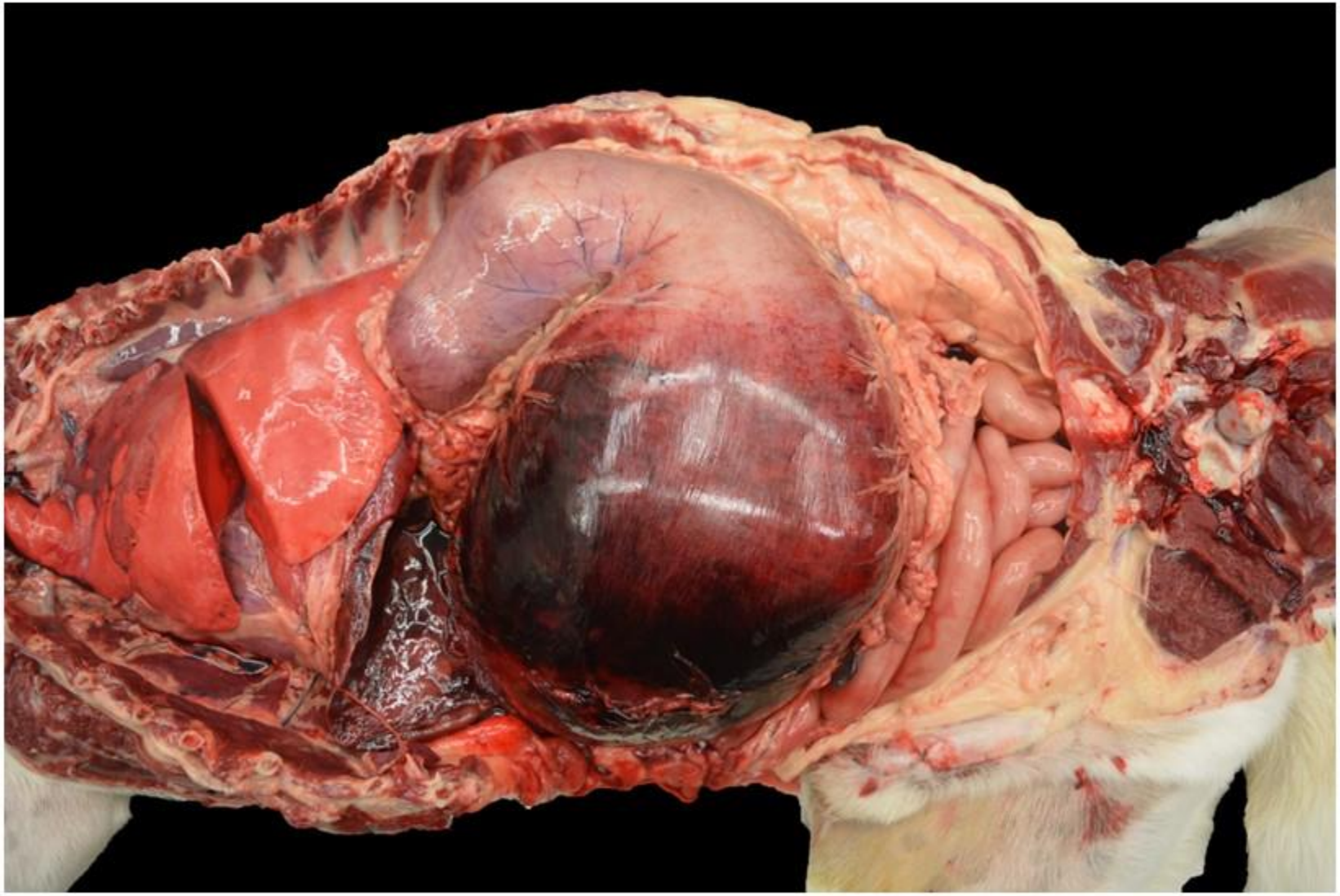
Diseases of the stomach and abomasum

Gastric dilation and volvulus



https://www.youtube.com/watch?v=JaAN-6FrPTM

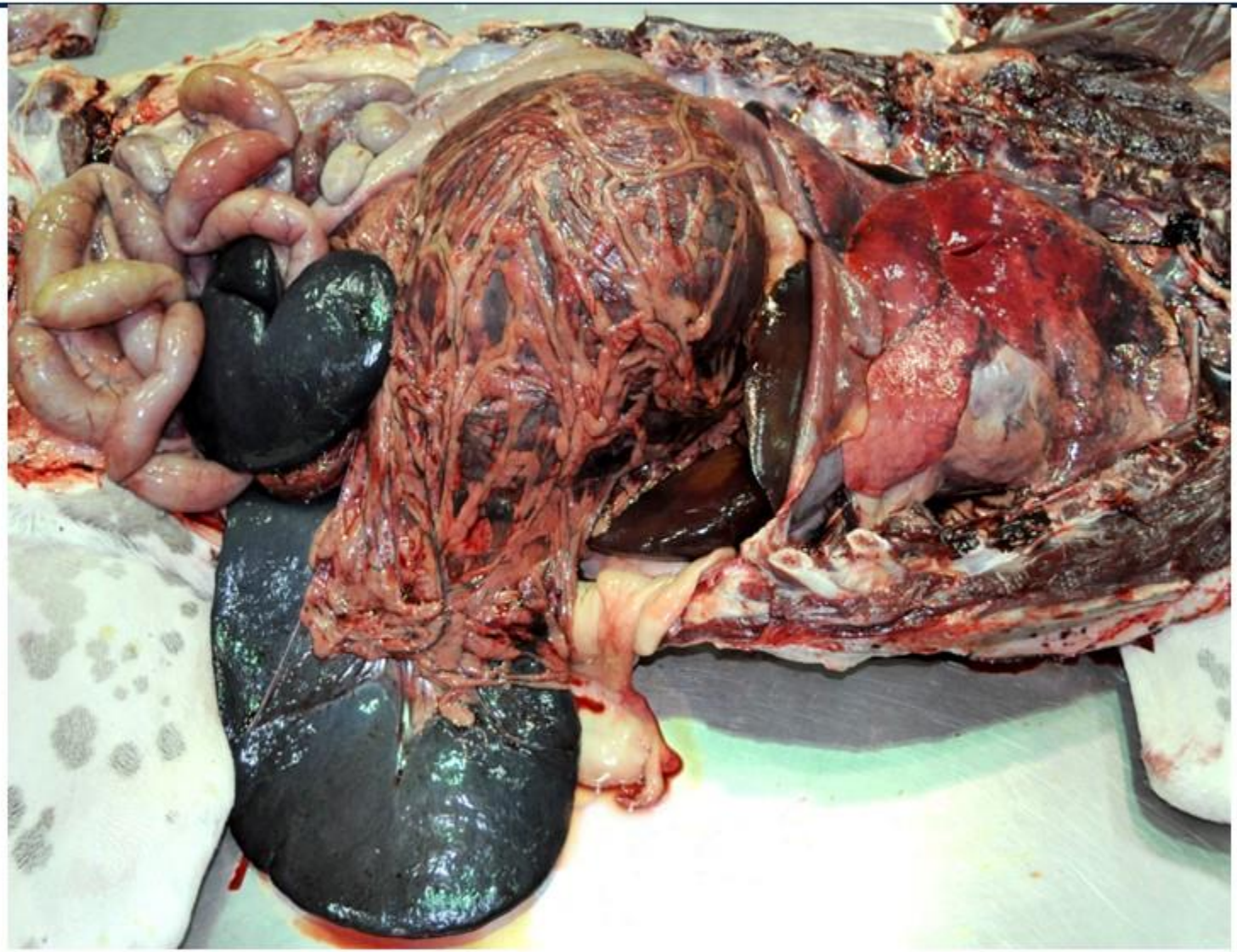
Gastric dilation and volvulus



F33028, F64779, Stomach and spleen: Gastric dilatation and volvulus with regionally extensive ischemic necrosis and splenic displacement, submitted by Schreeg.Gastric dilation, volvulus, splenomegaly, submitted by RAQUEL RECH.

Gastric dilation, volvulus

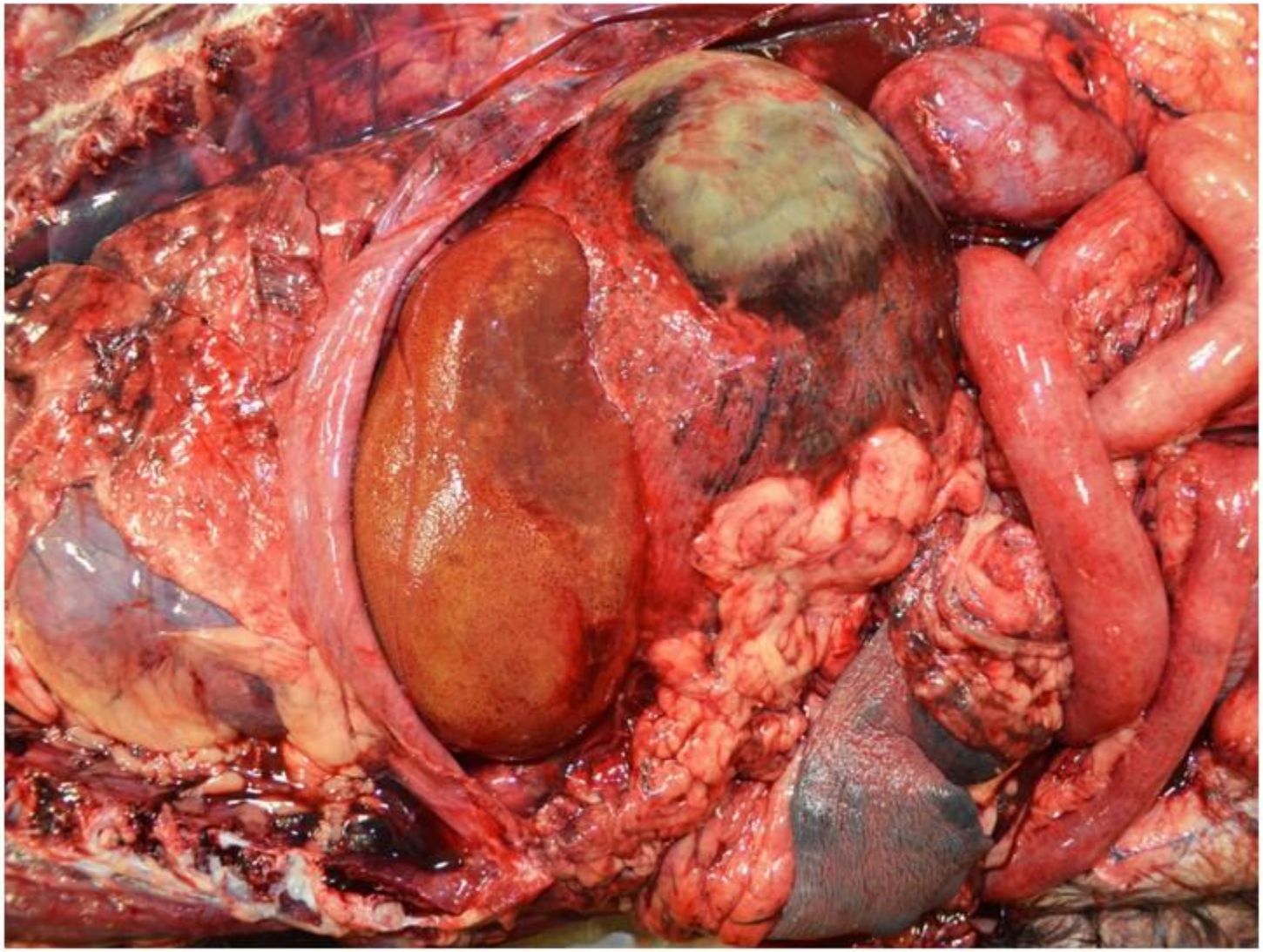
Gastric dilation and volvulus



F33028, Gastric dilation, volvulus, splenomegaly, submitted by RAQUEL RECH.

Gastric dilation, volvulus, splenomegaly

Gastric dilation and volvulus



F33891, GASTRIC DILATION AND VOLVULUS (GDV) WITH GASTRIC INFARCTION, submitted by CROSSLAND.

Gastric dilation and volvulus (gdv) with gastric infarction

Gastritis

Chemical gastritis or abomasitis

- Arsenic, thallium, formalin, bronopol,
- Steroidal and nonsteroidal anti-inflammatory drugs (NSAIDs)
- Phosphatic fertilizers
- Toxic principle in bitterweed (Hymenoxon odorata).
- Blister beetle (Epicauta spp.) intoxication in horses, induced by the cantharidin contained in these insects, may cause necrosis and ulceration of the distal esophagus and pars esophagea

Gastritis

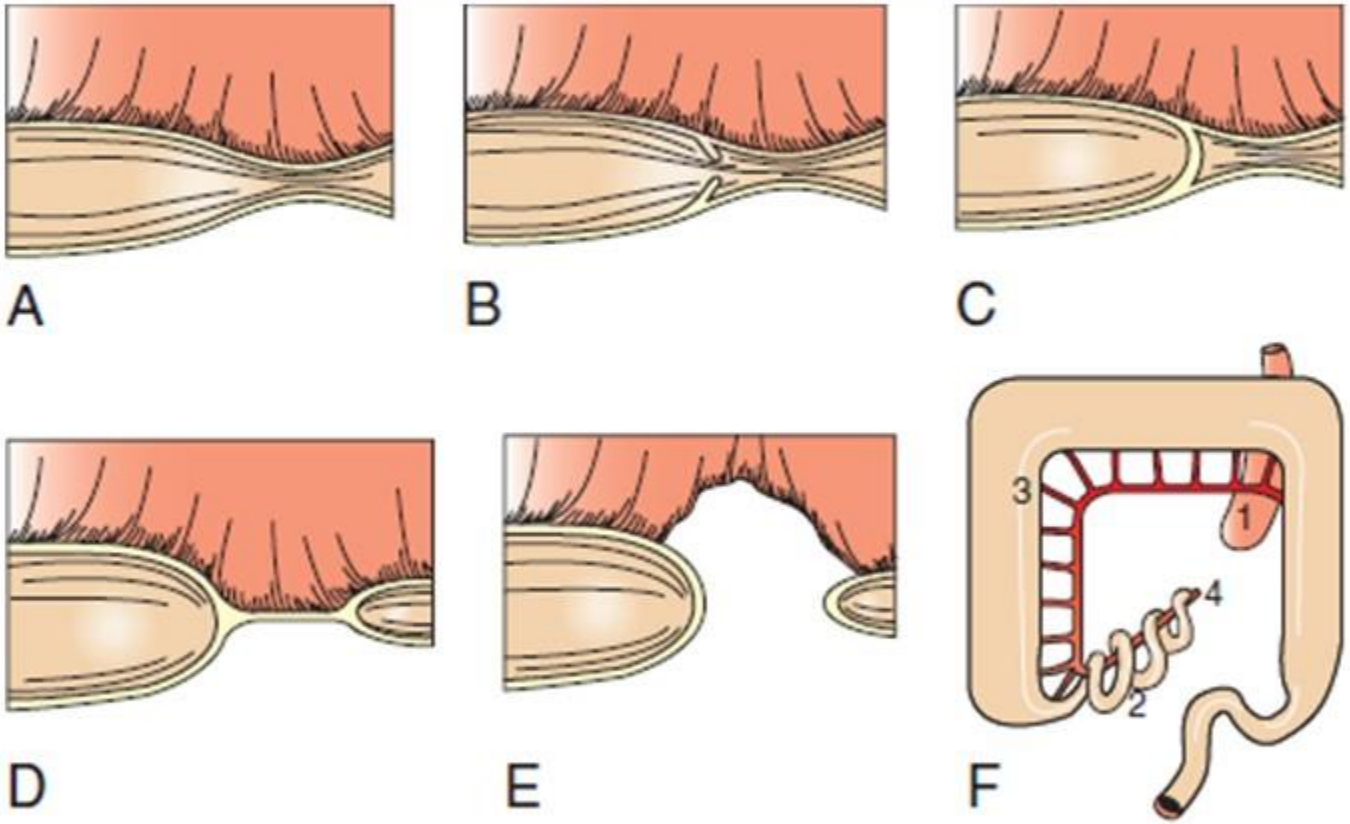
Infectious agents

- *Helicobacter pylori*
- Chlamydophila (Chlamydia)
- *Clostridium septicum* (Braxy / bradsot)
- *Clostridium perfringens* type A
- Herpesviral infections of small ruminants
- BVD, Rinderpest, malignant catarrhal fever, and bluetongue
- Zygomycetes (phycomycetes) such as *Rhizopus*, *Absidia*, or *Mucor*; rarely, *Aspergillus*

Diseases of the Intestine

Atresia

- Complete occlusion is referred to as atresia.

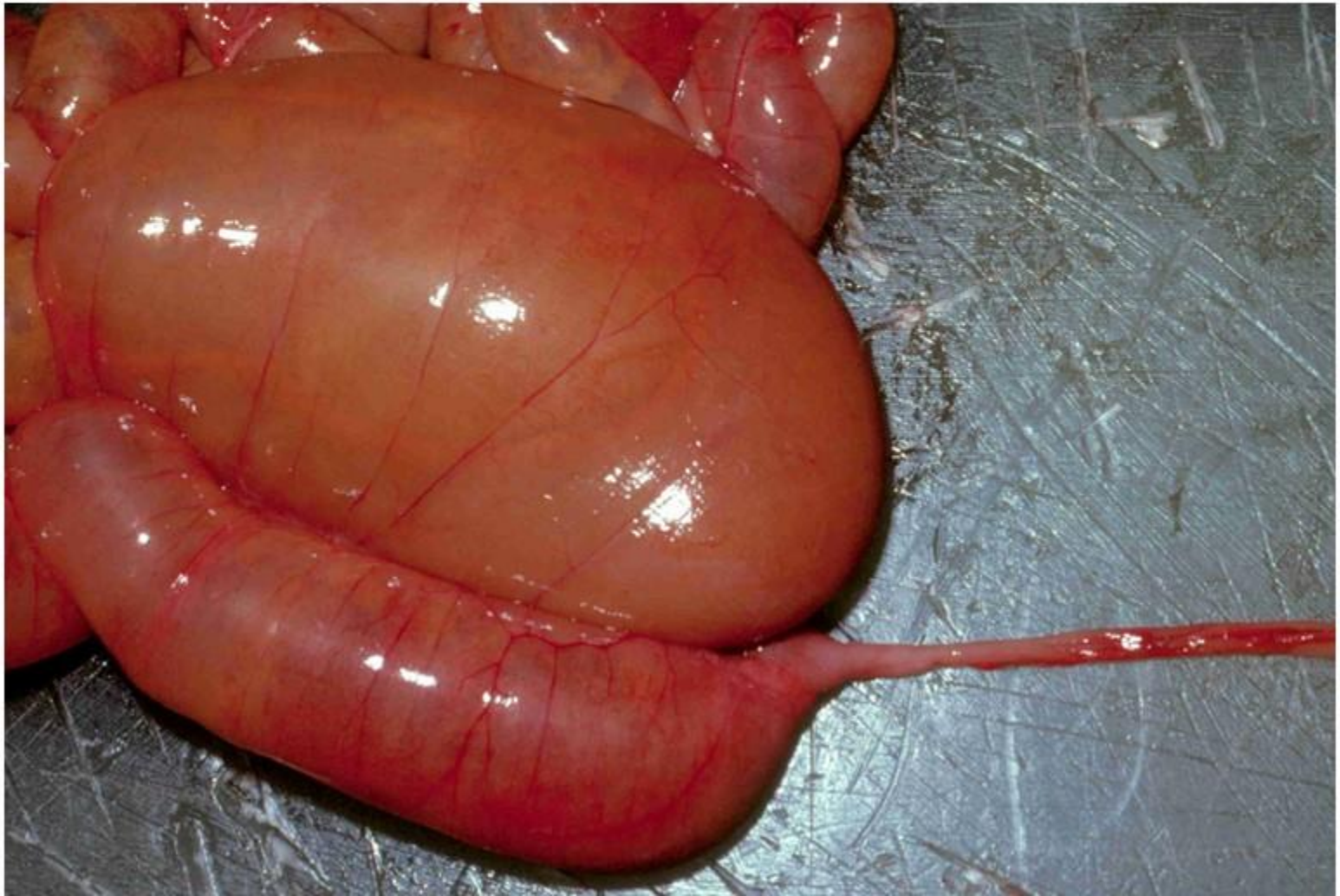


Pathologic basis of veterinary disease [edited by] James F. Zachary.Description: Sixth edition. | St. Louis, Missouri : Elsevier, [2017] |

Types of Stenosis And Atresia. A, Stenosis. B, Stenosis with partial membrane. C, Membrane atresia. D, Cord atresia. E, Blind-end atresia. F, Christmas tree atresia (1, jejunum; 2, ileum; 3, colon; 4, ileocolic artery)

Atresia coli

- Complete occlusion of colon, most common in domestic animals



F63703, Atresia coli, submitted by KELLY.

Atresia ani

- Imperforate anus

F07377, ANUS ATRESIA ANI, submitted by WALLACE.

Eventration

- Displacement of a portion of the gut, usually the small intestine, outside the abdominal cavity
- Commonly congenital or predisposed by a congenital anomaly, as in
  - Schistosomus reflexus
  - Patent umbilicus
  - Congenital diaphragmatic hernia
- Acquired eventrations result from trauma

Schistosomus reflexus

F12840, BODY AS A WHOLE SCHISTOSOMUS REFLEXUS, submitted by LEIPOLD.

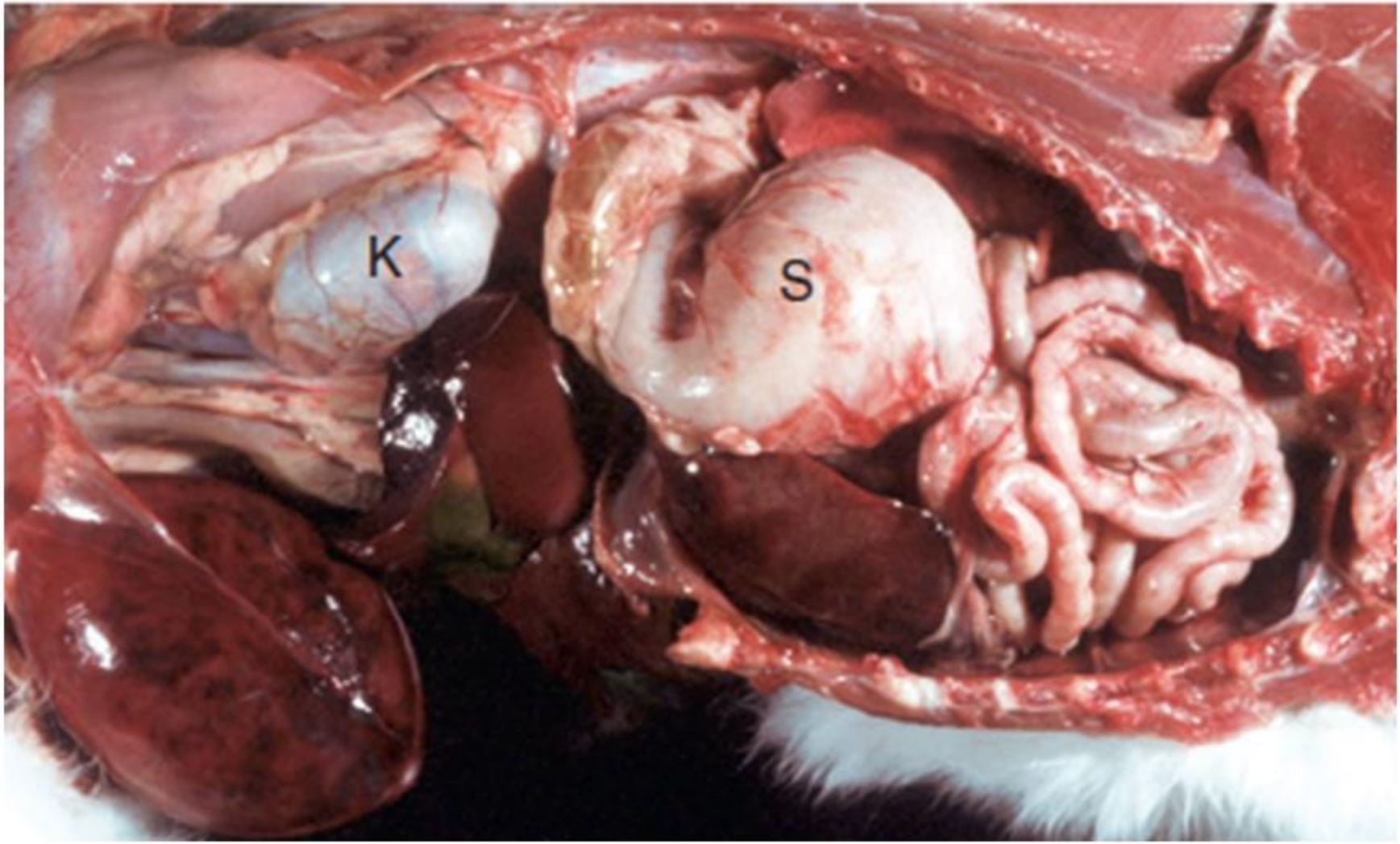
Internal hernia

- Displacement of intestine through normal or pathological foramina within the abdominal cavity ***without the formation of a hernial sac.***
  - Omental hernia
  - Mesenteric hernia
  - Pelvic hernia

External hernia

- External hernia typically consists of a
  - Hernial sac formed as a
    - pouch of parietal peritoneum
    - A covering of skin and soft tissues
  - Depending on the location of the hernia, a hernial ring
  - Hernial contents
- Ventral hernia
- Umbilical hernia
- Inguinal hernia

Diaphragmatic Hernia



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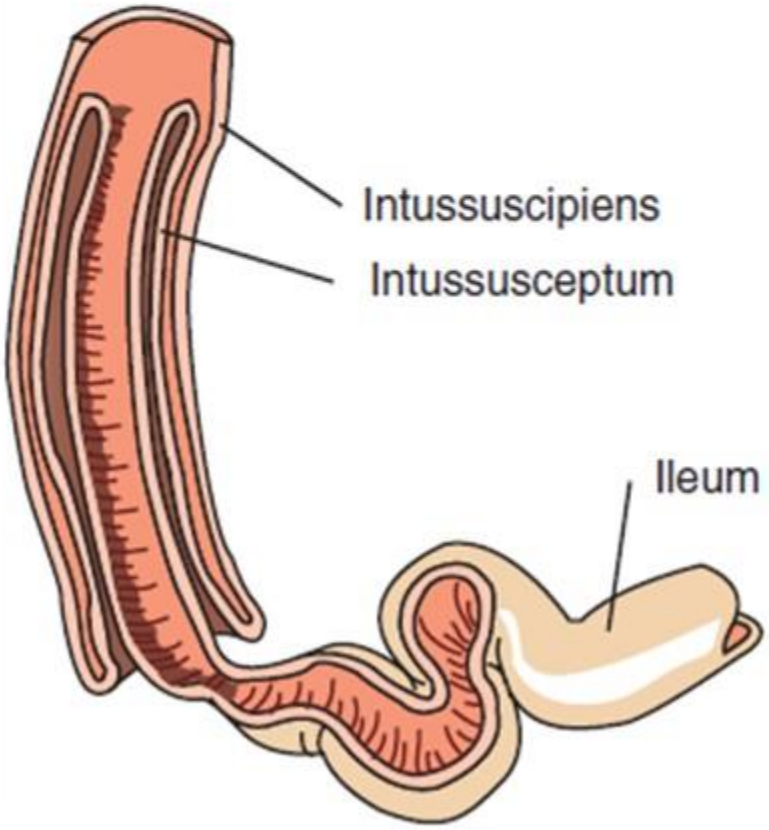
Intussusception

- When one segment of intestine becomes telescoped into the immediately distal segment of intestine, the lesion is called an intussusception



Pathologic basis of veterinary disease [edited by] James F. Zachary.Description: Sixth edition. | St. Louis, Missouri : Elsevier, [2017] |

Volvulus and Torsion

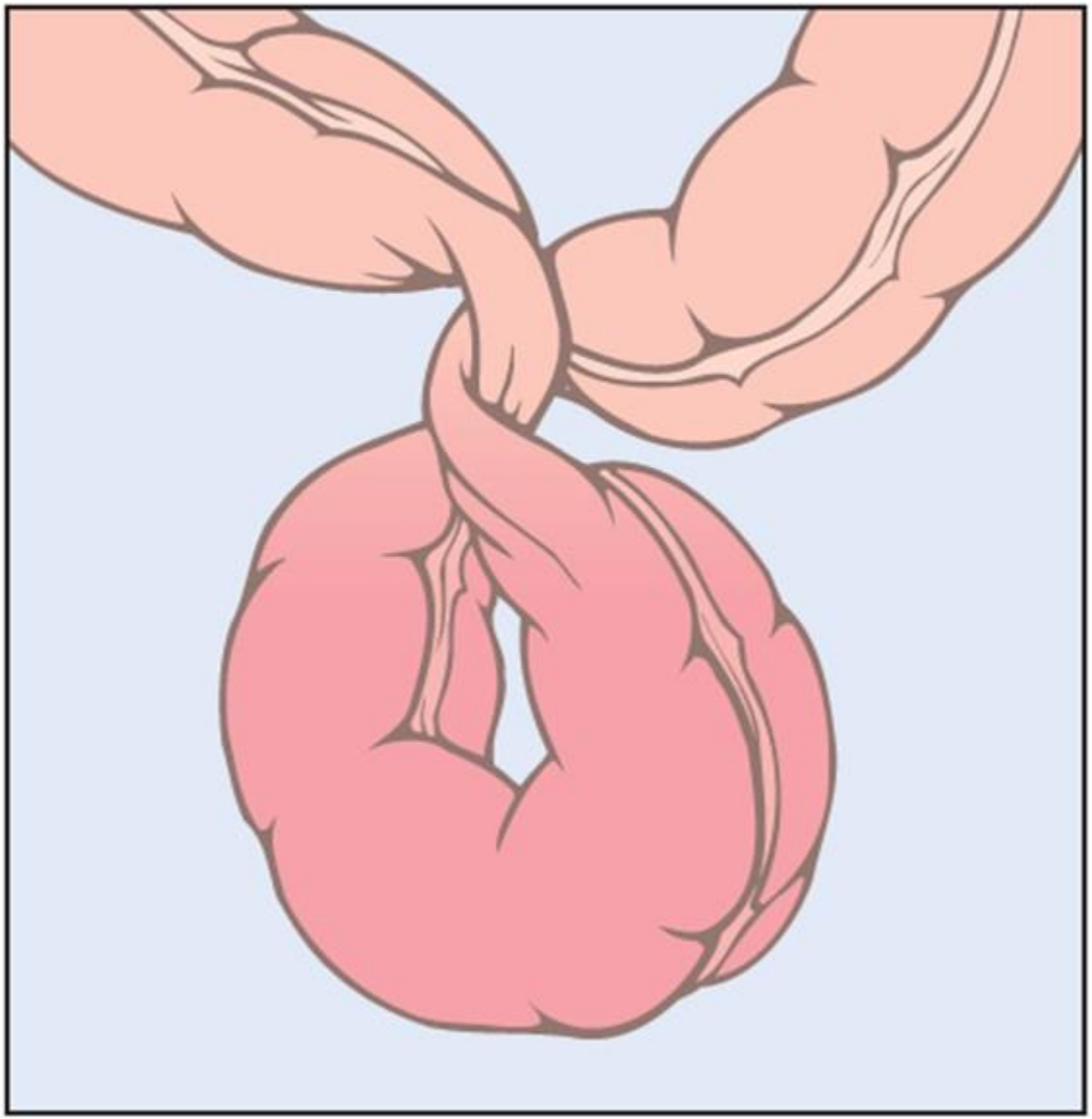
Volvulus

- A volvulus is a twisting of the intestine on its mesenteric axis

Torsion

- A torsion is a rotation of a tubular organ along its long axis.
  - Most common in the
    - Cecum of cattle and horses
    - Abomasum of calves

Volvulus



Robbins and Cotran pathologic basis of disease

Enteritis

- Enteritis is inflammation of the small intestine
- Inflammation of the colon - Colitis
- Inflammation of the cecum – Typhlitis
- Inflammation of the rectum – Proctitis

Etiology

- Bacteria
- Virus
- Protozoa
- Fungi
- Chemical etc

Enteritis

- Based on the nature of the exudate and the changes produced in the intestinal tract, enteritis is classified as follows.
- Catarrhal Enteritis
- Hemorrhagic Enteritis
- Fibrinous Enteritis
- Suppurative Enteritis
- Necrotic Enteritis

Catarrhal enteritis

- May be acute or chronic
- Mildest of inflammation of the intestinal tract

Acute Catarrhal Enteritis

Etiology

- *E.coli, Pasteurella, Salmonella, Proteus, Vibrio and Streptococci.*
- Enterotoxemia in sheep
- Viral Diarrhoea -Mucosal Disease in cattle
- Virus gastroenteritis in pigs
- Salmon poisoning in dogs.

Catarrhal enteritis

Gross pathology

- The intestinal contents are watery
- The mucosa is reddish in color and slightly thickened, covered with a mucinous exudate
- The Peyer's patches are prominent being hyperplastic, outlined by a zone of hyperemia

Histopathology

- The intestinal contents consist of mucus, fibrin and exfoliated epithelial cells
- Goblet cells are numerous and produce large amounts of mucin

Catarrhal enteritis

Chronic Catarrhal Enteritis

Etiology

- It may develop from the acute condition or more usually it may arise gradually as in Johne's disease, intestinal helminthiasis, chronic venous congestion (due to congestive cardiac failure) and cirrhosis of liver.

Catarrhal enteritis

Chronic Catarrhal Enteritis

Gross pathology

- The wall of the intestines is greatly thickened.
- The mucosa is smooth (covered by thick mucus)
- The corrugations are sometimes present at right angles to the length of the intestines

Histopathology

- The mucosa is thickened
- The characteristic appearance is the presence of numerous macrophages, plasma cells, lymphocytes and connective tissue cells in the lamina propria and even in the sub-mucosa

Hemorrhagic enteritis

- More severe form of enteritis
- Characterized by the presence of erythrocytes in the exudate

Aetiology

- This is mostly seen in septicemic bacterial and viral diseases e.g Anthrax and Rinderpest.
- Poisoning by arsenic and croton oil
- Colibacillosis
- Enterotoxemia
- Coccidiosis

Hemorrhagic enteritis

Gross pathology

- Patchy in distribution
- The intestinal contents are blood stained.

Histopathology

- Red blood cells may be found in the exudate of the mucosa.
- The villi may show necrotic changes.
- The intestinal wall shows haemorrhages.
- Thrombosis of some enteric vessels is evident

Fibrinous enteritis

- diphtheritic type of enteritis

Etiology

- Chemicals: Salts of mercury and arsenic
- Bacteria: Campylobacteriosis, Salmonella cholerae suis and Escherichia coli
- Parasites

Fibrinous enteritis

Gross pathology

- Presence of fibrin on the mucosa of intestine
- The wall of the intestine is edematous
- In more severe conditions, diphtheric membrane
- The mesenteric lymph nodes are swollen

Histopathology

- Exudate consists of strands of mix with neutrophils and exfoliated epithelial cells.
- Necrosis of epithelium

Suppurative enteritis

Etiology

- infection by pyogenic organisms (Streptococci, Salmonella and Shigella)

Gross pathology

- Macroscopically, the exudate contains pus

Histopathology

- The exudate besides mucus contains exfoliated cells, neutrophils and bacteria

Necrotic enteritis

Etiology

- Severe irritants: Chemical- croton oil, mustard gas, wood preservatives; insecticides.
- Bacteria- Fusiformis necrophorum and Salmonella sp.
- Viral diseases - Rinderpest, Viral Diarrhoea-Mucosal Disease, Hog cholera
- Protozoal diseases - Coccidiosis and histomoniasis.
- Vitamin deficiency – Niacin deficiency in swine.

Necrotic enteritis

Gross pathology

- Patchy necrotic areas are seen
- Fibrin may be found on the necrotic mucosa
- The mesenteric lymph nodes are swollen

Histopathology

- Exudate consists of strands fibrine mix with neutrophils and exfoliated epithelial cells.
- Necrosis of epithelium
- Infiltration of inflammatory cells

Major neoplasms lower GIT of domestic animals

Epithelial

- Benign
  - Papillary adenomatous hyperplasia
  - Gastric pyloric mucosal hypertrophy
  - Canine rectal papillary adenoma
- Malignant
  - Gastrointestinal adenocarcinoma
  - Neuroendocrine carcinoma (carcinoid)
  - Gastric squamous cell carcinoma

Stromal

- Benign
  - Leiomyoma
- Malignant
  - Leiomyosarcoma
  - Gastrointestinal stromal tumor

Round Cell

- Benign
  - Plasmacytoma
- Malignant
  - Malignant lymphoma (lymphosarcoma)
  - Mast cell tumor
  - Malignant plasmacytoma

Neoplasms Metastatic to the Gastrointestinal Tract

Thank You