

REGIONAL VETERINARY LABORATORIES REPORT

April 2024

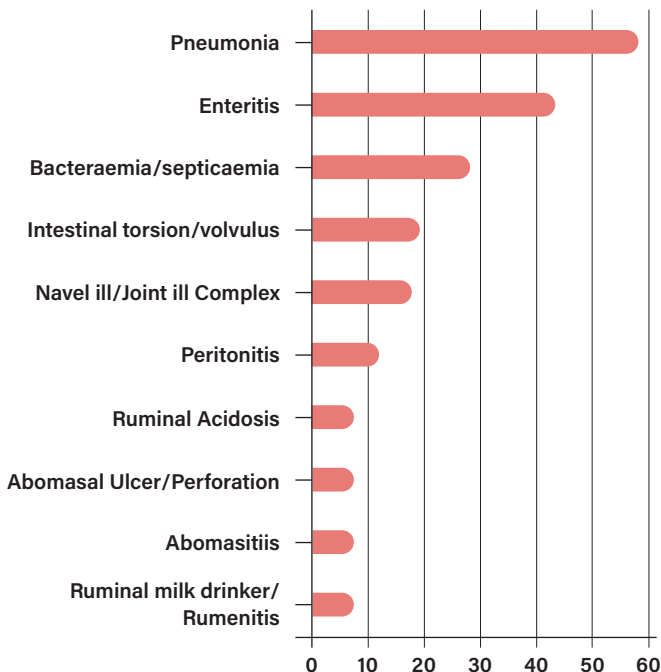
Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 793 carcasses and 79 fetuses during April 2024. Additionally, 1,523 diagnostic samples were tested to assist private veterinary practitioners with the diagnosis and control of disease in food-producing animals. This report describes a selection of cases investigated by the Department of Agriculture, Food and the Marine's (DAFM) veterinary laboratories in March 2024.

The objective of this report is to provide feedback to veterinary practitioners on the pattern of disease syndromes at this time of the year by describing common and highlighting unusual cases. Moreover, we aim to assist with future diagnoses, encourage thorough investigations of clinical cases, highlight available laboratory diagnostic tools, and provide a better context for practitioners when interpreting laboratory reports.

Cattle

Pneumonia and enteritis were the most common diagnoses at necropsy in cattle in the RVLs during April 2024.

Table 1: The most common diagnoses in cattle submitted for necropsy in April 2024.



Gastrointestinal Tract

Enteritis and septicaemia

A two-week-old calf with a history of recurring enteritis was submitted to Sligo RVL. Treatment had appeared to succeed, but the animal had been found dead with signs of dark watery diarrhoea. On post-mortem examination, there was multifocal abomasal ulceration. There were white-spotted kidneys and segmental enteritis in the distal jejunum and ileum. *Streptococcus* sp. was cultured from several organs. Bacteraemia secondary to enteritis was diagnosed as the most likely cause of death.



Figure 1: Multifocal interstitial nephritis (white-spotted kidney) in a calf. Photo: Shane McGettrick.

Abomasal ulceration

A four-year-old cow was submitted to Sligo RVL with a history of milk drop, depression and melaena. On post-mortem examination, the carcass was notably anaemic and dehydrated. The abomasal mucosa presented with several large, deep, abomasal ulcers 2-8cm in length. The intestinal contents appeared dark and tarry. Haemorrhage due to abomasal ulceration was diagnosed as the cause of death. The cause of the abomasal ulceration could not be established.



Figure 2: Abomasal ulceration in a dairy cow. Photo: Rebecca Froehlich-Kelly.

A six-week-old calf died having been "off form" for a short period and was submitted to Kilkenny RVL. On necropsy, there was multifocal peritonitis. The source was a perforated

abomasal ulcer. The abomasal mucosa was very inflamed and there was mild oedema in the folds. *Sarcina* sp. were visible multifocally upon histopathology of the abomasum. *Sarcina* has been reported associated with emphysema and oedema of the abomasal wall, mucosal hyperaemia and haemorrhage, and rupture of the abomasum.

Displaced abomasum and volvulus

A four-year-old cow was passing a bloody discharge from the vulva and developed diarrhoea, before dying and being submitted to Kilkenny RVL. On necropsy, there was a right-displaced abomasum (RDA) with volvulus, there was also metritis and mastitis in one quarter. The aetiology of displaced abomasum and abomasal volvulus is multifactorial, although decreased abomasal emptying due to abomasal hypomotility and/or dysfunction of the intrinsic nervous system are thought to play a role. Important contributing factors include low motility of the abomasum associated with hypocalcaemia, as well as concurrent diseases (mastitis, metritis) associated with endotoxaemia and decreased rumen fill, periparturient changes in the position of intra-abdominal organs, and a genetic predisposition, particularly in deep-bodied cows.



Figure 3: Volvulus following right displacement of the abomasum. Photo: Aideen Kennedy.

Parasitic gastroenteritis

A severely dehydrated Friesian yearling heifer was submitted to Limerick RVL, the heifer was one of a group of animals treated for diarrhoea prior to housing and several cohorts were similarly affected. Necropsy revealed pale mucous membranes, the abomasal mucosa was inflamed with a cobblestone appearance (suggestive of parasitism) with

oedema of the abomasal folds. The walls of the intestines were thickened with multifocal haemorrhages on the mucosa and pale brown liquid contents, and mesenteric lymph nodes were enlarged. There was a strongyle egg count of 2,700 eggs per gram (EPG) and a diagnosis of parasitic gastroenteritis was made. *Clostridium perfringens* alpha toxin was detected by enzyme-linked immunosorbent assay (ELISA); the significance of isolating alpha toxin is difficult to interpret as type A strains of *C. perfringens* can be present in the normal intestinal micro flora. Isolation of this toxin type is not diagnostic for disease. A review of vaccination protocols is indicated, with use of a multivalent clostridial vaccine recommended.



Figure 4: Proliferative abomasitis; the "Morocco leather" or "cobblestone" appearance of the abomasal mucosa in a case of parasitic gastroenteritis. Photo: Brian Toland.

Rumen drinking

A two-week-old Aberdeen Angus cross dairy calf was submitted to Limerick RVL, it was inappetent with diarrhoea and did not respond to treatment; abomasal ulceration was suspected. The calf had been stomach tubed with milk. Necropsy revealed a rumen distended with clotted milk which had a sour smell, there were a few milk clots in the abomasum with mild inflammation of the abomasal mucosa. There were no visible signs of ulceration. The pH of the ruminal contents was 3.6 (normal ruminal contents pH is 5.5-7.0) and *Candida* sp. was cultured from the rumen wall. The zinc sulphate turbidity test (ZST) result was suboptimal at 11 units, suggesting failure of colostral transfer of passive immunity, and there was a light infection of *Cryptosporidium parvum*.



Figure 5: Clotted, fermented milk filling the rumen of a calf. Photo: Brian Toland.

Ruminal drinking occurs when milk or milk replacer enters the rumen instead of the abomasum due to failure of oesophageal groove closure. Several conditions can make calves more susceptible including neonatal diarrhoea, irregular feeding times, low-quality milk replacer, milk or milk replacer fed at too cold a temperature, drinking from an open bucket, tube feeding, and ruminal drinking may also be secondary to a primary bacterial or viral infection. When rumen pH falls from normal levels to less than 5.0 in the case of rumen drinkers, volatile fatty acids (VFA) and lactic acid will accumulate in the rumen and will subsequently be absorbed into the bloodstream. As lactic acid builds up in the blood it causes several clinical signs, including depression and anorexia, and may ultimately kill the calf. Ruminal acidosis and previous antibiotic treatment can predispose to fungal growth and invasion of tissues (mycosis).

Respiratory Tract Pneumonia

A one-month-old calf which had been found dead was submitted to Sligo RVL. On post-mortem examination, the lungs were extensively consolidated and presented with multifocal abscessation. Approximately 80 per cent of the pulmonary parenchyma was affected. On histopathology, there was diffuse, chronic, severe, necro-suppurative pneumonia. The airways (from the bronchi to the alveoli) were filled with neutrophilic debris and bacterial colonies. The bronchiolar epithelium was segmentally lost and was attenuated in some areas; there was polyp formation. Septae were expanded with fibrin and mixed inflammatory cells, predominantly neutrophils; there was microthrombosis. In the alveoli, there was type two pneumocytosis and streaming macrophages ('oat cells'). *Mannheimia haemolytica* and *Trueperella pyogenes* were detected. Bacterial pneumonia with septicæmia was diagnosed as the cause of death. An initial viral involvement could not be excluded.

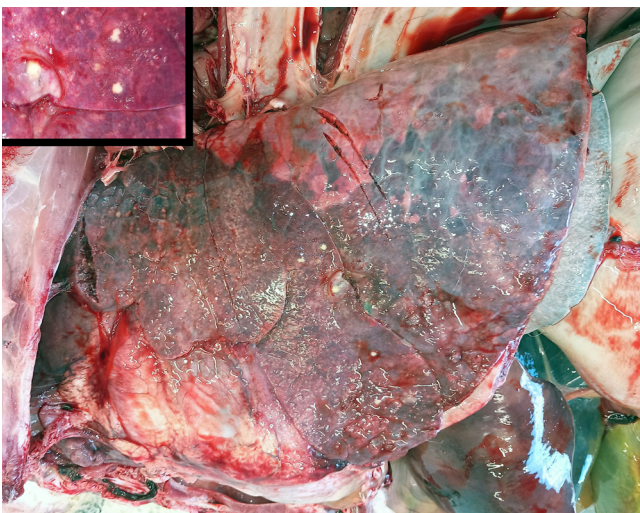


Figure 6: Consolidation in a calf's lung in a case of pneumonia with multifocal abscessation (inset). Photo: Rebecca Froehlich-Kelly.

A seven-week-old Aberdeen Angus heifer calf, which had not responded to treatment for pneumonia, was presented to Limerick RVL. On post-mortem examination, there was

consolidation of two-thirds of the lungs, with *M. haemolytica* cultured from this area, and there were also strong polymerase chain reaction (PCR) positives in lung tissue for *Pasteurella multocida* and *Histophilus somni*. Severe pneumonia was diagnosed with multiple bacteria involved.

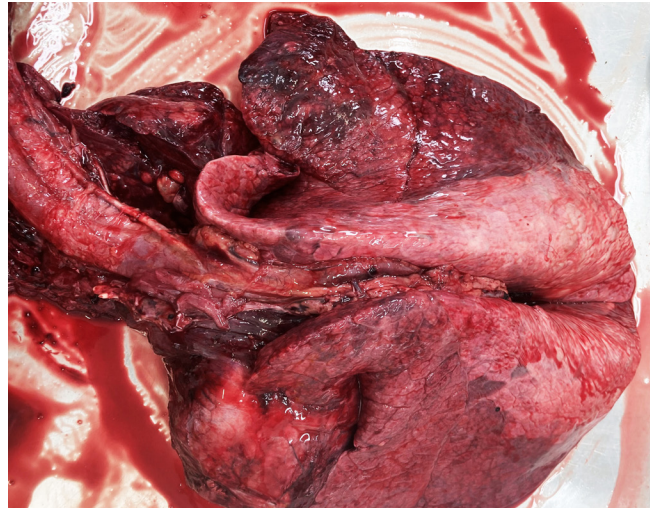


Figure 7: Pneumonia in calf lungs with cranio-ventrally distributed consolidation. Photo: Brian Toland.

Sligo RVL examined a six-year-old cow which had been noted with digestive problems. On post-mortem examination, there was severe, chronic, cranio-ventrally distributed necrotising pneumonia, affecting approximately 60 per cent of the right lung. There was a vegetative endocarditis and multifocal, variably-sized abscesses on the kidney cortex, as well as an abscess on the right hock. *T. pyogenes* and *P. multocida* were detected in the lesions. Necrotising pneumonia and endocarditis with subsequent bacteraemic embolic showers was diagnosed as the most likely cause of death.



Figure 8: Severe necrotising pneumonia in a cow, showing the pulmonary cut surface. Photo: Shane McGettrick.

Athlone RVL examined a two-month-old calf with a history of sudden death. It was the second similar loss. There was a fibrinous pericarditis, and fibrinous cranio-ventral pleuritis and pneumonia. The liver was enlarged with rounded edges. *M. haemolytica* was isolated from lungs by culture and was confirmed by PCR. No other respiratory bacteria or

viruses were detected. A conclusion of fibrinous pericarditis, pleuritis, and bronchopneumonia was made.

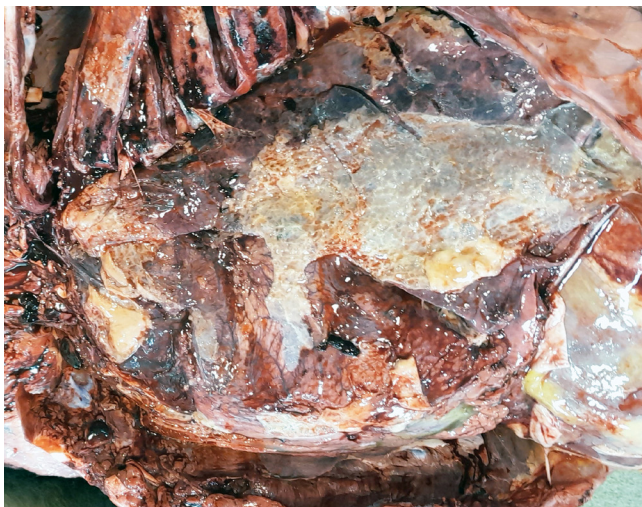


Figure 9: Fibrinous pleuropneumonia in a calf. Photo: Denise Murphy.

Pulmonary abscessation

A four-month-old calf was presented to Kilkenny RVL with a history of having previously received treatment for coccidiosis and more recent treatment for pneumonia. On gross post-mortem examination, there was extensive, severe abscessation of the left cranial lung lobes with copious pus present in the trachea. There were multiple adhesions of the pleura to the rib-cage. There was a rib callus suggesting previous rib fracture in close proximity to the area of the abscess. A diagnosis of severe pulmonary abscessation with possible association with costal fracture was made. Common causes of rib fracture include dystocia and injury.



Figure 10: Pulmonary abscessation associated with a costal fracture. Photo: Maresa Sheehan.

Increased potential for early lungworm infection due to mild wet winter

Lungworm infection or 'hoose' is one of the most important respiratory diseases of cattle in Ireland. Clinical disease is most commonly seen in first season grazing calves but can also be seen in older cattle that have failed to develop or maintain immunity. Disease

due to lungworm is most commonly seen in the second half of the grazing season, when large numbers of lungworm larvae can appear on pastures. **However, this year due to our mild and wet winter there is risk of larger volumes of over wintered lungworm which could result in earlier cases seen this year.** This April, the Regional Veterinary Laboratories have already seen a case of lungworm in a yearling which, due to the warm wet winter, has the potential to be an acute infection. Farmers should monitor cattle closely for signs of lungworm infection throughout the grazing season. Lungworm infection commonly causes an intermittent cough, particularly after exercise. However, more serious signs of respiratory distress, including coughing at rest, increased respiratory rate and open mouth breathing may be seen in severely-affected animals. Deaths may also occur, particularly if treatment is delayed. Infected adult cows may also have a severe drop in milk yield, and this can be observed prior to development of respiratory signs. Viral and/or bacterial pneumonias can be seen as a secondary complication of lungworm infection.

Urinary/Reproductive Tract



Figure 11: Inflammation and fibrin tags arising from an umbilical infection. Photo: Aideen Kennedy.

Omphalitis and peritonitis

A one-day old calf was found dead and submitted to Kilkenny RVL. The umbilicus was inflamed and there were multifocal fibrin tags on the lungs, liver and the umbilical arteries. ZST results indicated failure of passive transfer of colostral immunity (FPT). A review of colostrum management and umbilical hygiene at calving was recommended.



Figure 12: Fibrinous peritonitis in a two-day-old calf. Photo: Denise Murphy.

Athlone RVL examined a two-day-old calf that had been found recumbent and died before treatment. The cow had calved unassisted. On post-mortem examination, there was a diffuse fibrinous peritonitis, enlarged umbilical vessels, and a congested umbilicus. The ZST result was three units and indicates severe failure of passive transfer. *Escherichia coli* was isolated from several tissues. A diagnosis of peritonitis secondary to umbilical infection and hypogammaglobulinaemia was made.

Cardiovascular System



Figure 13: Cause and effect: haemoglobinuria and a tick from a heifer with babesiosis. Photo: Shane McGettrick.

Babesiosis

Sligo RVL examined a one-year-old heifer which had reportedly had a suspected respiratory infection the previous day, which did not improve on treatment by the owner. The animal died before receiving veterinary attendance. On post-mortem examination, there were numerous ticks (*Ixodes ricinus*) present in the carcass. There was notable jaundice and haemoglobinuria. *Babesia divergens* as well as *Anaplasma phagocytophilum* were detected by PCR. Babesiosis or 'red water' was concluded as cause of death based on post-mortem findings.



Figure 14: A steel rod passing through a cardiac inter-atrial septal defect from one atrium to the other. Photo: Denise Murphy.

Atrial septal defect

Athlone RVL examined a one-week-old Charolais male calf with a history of sudden onset illness and rapid deterioration. The liver was enlarged with rounded edges and a 'nutmeg' pattern (mottled dark and light parenchyma) was apparent on cut surfaces, indicating hepatic congestion. There was an inter-atrial septal defect. Severe diffuse bilateral pulmonary congestion and haemorrhage were also present. A diagnosis of an atrial septal defect was made.



Figure 15: 'Nutmeg' liver; chronic venous congestion creates this characteristic speckled pattern. Photo: Aoife Coleman.

Vegetative endocarditis

Athlone RVL examined a three-year-old Friesian cow with a history of inappetence and lethargy. On post-mortem examination, there was pronounced oedema of the brisket, mesocolon, intestinal walls and forestomachs. There was severe ascites and thoracic effusion. A markedly firm liver was noted with a dramatic nutmeg pattern on cross section. Affecting the right atrio-ventricular (AV) valve was a severe, extensive, vegetative endocarditis with extension into the interventricular septum with necrosis and abscessation. There was a similar, smaller focal vegetative lesion on the left AV valve.



Figure 16: Cross section of the vegetative masses in a case of endocarditis. Photo: Aoife Coleman.

A cow was presented to Kilkenny RVL with a history of "stomach problems". Post-mortem examination revealed a vegetative endocarditis with associated septic emboli in the lungs. Two of the animal's feet were being treated for lameness. Although the origin of the infection could not be confirmed, an association with the lameness could not be ruled out.



Figure 17: A septic embolus in the lung in an animal with vegetative endocarditis. Photo: Maresa Sheehan.

Musculoskeletal

Dwarfism

Two calves were submitted to Kilkenny RVL, which had been euthanised. Both calves had displayed shortening of the long bones of the limbs at birth. On histopathology, chondrodysplasia was diagnosed – there was thickening of the physis, multifocal disorganisation of chondrocytes, lack of normal proliferative and hypertrophic zones in the physis, with tongues of cartilage extending into the metaphysis. Differential diagnosis of congenital short stature in livestock includes genetic chondrodysplasia, nutritional chondrodysplasia, and chondrodysplasia due to exposure to plant toxins. Attention has sometimes focused on manganese deficiency because manganese is involved in the formation of bone and cartilage, however only a small percentage of Irish soils are deficient in manganese. In some cases, an association with prolonged grass silage (solely) feeding of the pre-partum dam has been observed, so it has been advised not to feed pregnant cows solely on grass silage during the winter housing period. Farmers are advised to replace a proportion of the dry matter with non-silage feeds such as hay, straw and/or concentrate feed.



Figure 18: Chondrodysplasia in the deformed long bones of a calf with dwarfism. Photo: Aideen Kennedy.

Mortellaro disease

Limbs from fattening cattle with acute severe lameness, which had been harvested at slaughter for investigation of the lameness, were submitted to Kilkenny RVL. There was severe dermatitis, with ulceration and suspected necrosis extending deep into the subdermal layers. Histopathology showed multifocal, necro-suppurative dermatitis, and numerous silver-stained spiral filamentous rods. This suggests a role for Mortellaro disease. Mortellaro is a persistent and painful foot infection in cattle that often starts at the back of the heel, where the two heels separate at the transition of skin and horn. Mortellaro is also called digital or interdigital dermatitis and is caused by *Treponema* spp. bacteria. Additional bacterial agents were also seen. A review of lameness control, including foot bathing to control Mortellaro, was recommended.



Figure 19: Interdigital dermatitis in an animal with Mortellaro disease. Photo: Aideen Kennedy.

Blackleg

Athlone RVL examined the carcass of a one-year-old heifer with a history of sudden death, having been turned out

grass in the preceding fortnight. There was fibrin deposition and haemorrhage in the parietal pleura and there was florid fibrin deposition within the pericardium. The right quadriceps muscle was dark red in colour, dry, and markedly emphysematous with severe subcutaneous haemorrhages over the right hind quarter. There was severe splenomegaly. Impression smears from muscle lesions stained positive in the *Clostridium chauvoei* fluorescent antibody technique (FAT) test, confirming clostridial myositis caused by *C. chauvoei*, or blackleg. Clostridial spores can enter the body of an animal by ingestion, through skin wounds, or via contaminated needles/injection equipment. Muscle trauma from bulling events in heifers (involvement of back muscles) and injuries at congested feed barriers (neck) trigger spore activation and lead to disease. Outbreaks of blackleg have been reported after earthworks such as field drainage work, road construction, and exposure of earth floors during mucking out buildings, causing exposure to the highly resistant clostridial spores in the soil. A review of the farm's clostridial vaccine programme with the herd owner was advised, with recommendations to vaccinate with multivalent clostridial vaccine (containing clostridial toxoids of multiple likely species).



Figure 20: Dry and emphysematous lesions of clostridial myositis in an animal with blackleg. Photo: Aoife Coleman.

Miscellaneous Septicaemia

An eight-day-old calf was submitted to Dublin RVL. A couple of days after calving, the calf was struggling to get up, was weak and flexing ('knuckling') on the front limbs. It was found dead the following morning. Post-mortem examination revealed bilateral mild congestion of the ocular mucosa, diffusely moderately-swollen head, large amount of foam within trachea and airways, and the presence of approximately 70ml of orange-tinged fluid within the pericardium. There was segmental congestion within the endocardium. The lungs were diffusely moderately-wet, heavy, and with meaty consistency and with severe interlobular oedema. There was presence of several fibrin tags within the peritoneal cavity, including on the liver surface. The liver was diffusely, moderately enlarged with rounded edges, and with a mottled appearance; on cross-section, there was a 'nutmeg' pattern. On the kidneys, there were multifocal pale lesions scattered on the cortex within

one single kidney lobule. *Listeria monocytogenes* was cultured from the liver and spleen. Histologically, there were: a multifocal, suppurative, interstitial nephritis associated with gram positive bacterial rods, a multifocal bacterial hepatitis associated with gram positive bacterial aggregates, and a multifocal interstitial pneumonia with thrombosis. The histopathological examination of the multiple organs was consistent with the *L. monocytogenes* (gram positive bacteria) isolated from multiple organs, and therefore it was concluded that *L. monocytogenes* was the cause of the septicaemia and death in this case.

Hypomagnesaemia

Sligo RVL examined a five-year-old cow that had collapsed suddenly while nursing her calf; she died despite treatment attempts by the owner. The post-mortem examination did not show any significant lesions. The horn was notably grown into the skull causing a focal osteomyelitis in the frontal bone. The underlying meninges appeared grossly thicker in this area. On histopathology, the meninges underlying the frontal bone appeared mildly thickened and there was multifocal mild localised vasculitis. The significance of these brain findings remained unclear as they were considered relatively mild. Magnesium levels in the vitreous humour were at the lower end of the reference range. This finding and clinical history given make hypomagnesaemia the most likely ultimate cause of death. Concurrent meningitis that may have altered the cow's feeding behaviour cannot be ruled out. However, the findings around the tip of the horn highlight the need for timely correction of abnormal horn growth.



Figure 21: An ingrown horn in a cow with removal of bone to highlight depth of indentation. Photo: Rebecca Froehlich-Kelly.

Sheep

Enteritis and bacteraemia/septicaemia were the most common diagnoses at necropsy in sheep in the RVLs during April 2024.

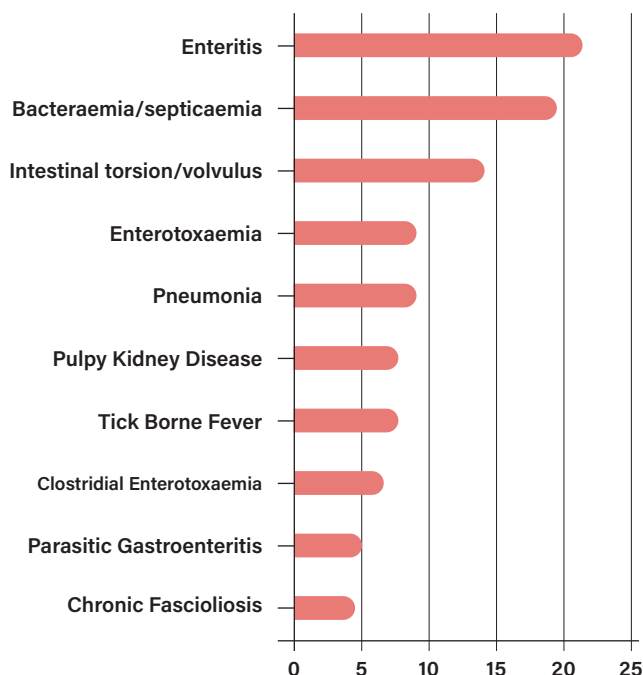


Table 1: The most common diagnoses in sheep submitted for necropsy in April 2024.

Gastrointestinal Tract

Caecal torsion

Sligo RVL diagnosed caecal torsion in three ewes in April 2024. The first case involved a four-year-old ewe which died suddenly and had a notable unilateral abdominal swelling at the time of discovery. On post-mortem examination, there was a caecal torsion as well ruminal acidosis (pH was 5.29). The other two cases involved animals from the same holding, both of which were noted anorexic and mildly bloated. In one of the two animals, the caecum had perforated and caused a peritonitis. It also presented with parasitic abomasitis. In the other, the caecum was notably dilated, and the torsion involved the mesentery. It is likely that parasitism and poor dietary management were contributory in these cases. In general, intestinal torsions are attributed to digestive changes, causing hypomotility/hypermotility or fermentation issues, and producing large amounts of gas.

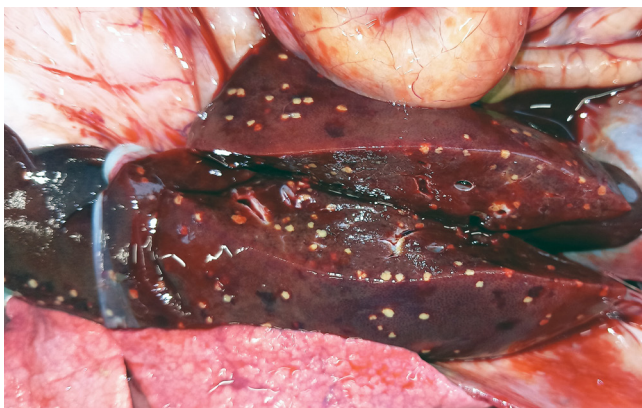


Figure 22: Multifocal hepatic necrosis in a one-week-old lamb. Photo: Rebecca Froehlich-Kelly.

Hepatic necrosis

Sligo RVL examined a one-week-old and a three-week-

old lamb from the same holding, which had reported several lamb losses. The one-week-old lamb presented with multifocal small white lesions across the liver and severe dehydration. On histopathology of the liver, there were circumscribed, random areas of coagulative necrosis bordered by a zone of degenerate neutrophils, eosinophilic and karyorrhectic debris.

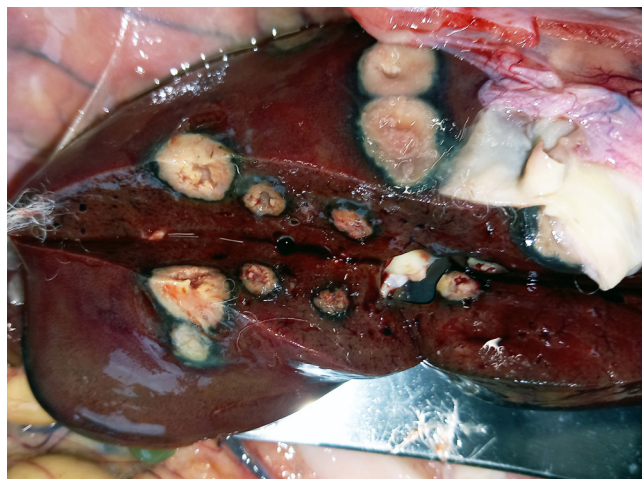


Figure 23: Multifocal hepatic necrosis in a three-week-old lamb. Photo: Rebecca Froehlich-Kelly.

The older lamb presented with large white dry areas present throughout the liver parenchyma, 2-3cm in size, surrounded by a black border. On histopathology, there were diffuse, circumscribed, randomly-distributed areas of coagulative necrosis bordered by a zone of degenerate neutrophils, cellular debris and extensive mineralisation. Mixed bacteria were present at the edge of the lesions. No agent could be identified in the lesions by culture. Bacteraemia and hepatic necrosis were diagnosed as the cause of death in these lambs. Hepatic necrobacillosis is an important differential diagnosis in this case.

Respiratory Tract



Figure 24: Fibrinous pleuropneumonia in a lamb. Photo: Aideen Kennedy.

Pneumonia

A one-month-old lamb was found dead and submitted to Kilkenny RVL. There was a severe fibrinous pleuritis, pneumonia, and peritonitis. *M. haemolytica* was cultured from multiple organs – this agent can be associated with polyserositis.

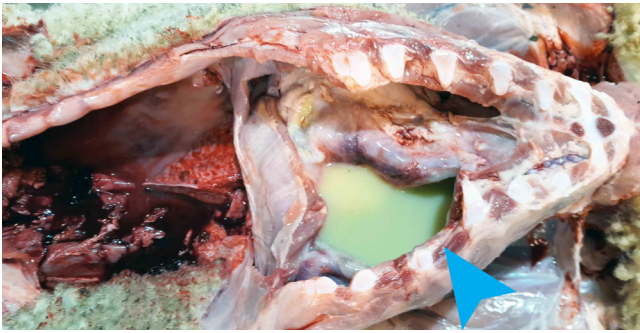


Figure 25: Pyothorax (arrow) in a lamb. Photo: Denise Murphy.

Pyothorax and pulmonary abscessation

Athlone examined a one-month-old lamb with a history of having been found "slow" the day before and the flock owner was bringing the lamb to the vet when it died. There was a left-sided pyothorax and pulmonary abscessation in the cranial lung lobe. Other organs, joints, and navel were unremarkable. *T. pyogenes* was isolated from the thoracic fluid and lungs. A diagnosis of pyothorax and pulmonary abscessation was made.

Urinary/Reproductive Tract



Figure 26: Multifocal abscessation in a case of Navel ill. Photo: Shane McGettrick.

Omphalophlebitis

Sligo RVL examined two three-week-old lambs from the same holding, one which had been found dead and one which had been unable to rise on its front legs. The first lamb presented with multifocal abscessation on the liver and lungs. A large spinal abscess was discovered in the other. *Streptococcus dysgalactiae* was cultured from both lambs. As there was no sign of castration or tail docking and there was no evidence of tick involvement, this was diagnosed as a sequel to an infection elsewhere, most likely to an umbilical infection.



Figure 27: Spinal abscessation in a case of sequelae to Navel ill. Photo: Shane McGettrick.

Poisonings

Pieris

Limerick examined a four-year-old lactating ewe presented with a history of sudden death. The ewe and twin lambs had spent the previous day grazing in the front garden. There was some green discharge from the mouth of the dead ewe. On necropsy, there were mild lesions of localised fibrinous pleuritis. Leaves were found in the rumen of the ewe: the appearance was consistent with that of the glossy leaves of the common garden shrub *Pieris*. The consumption of *Pieris* can lead to death in sheep.

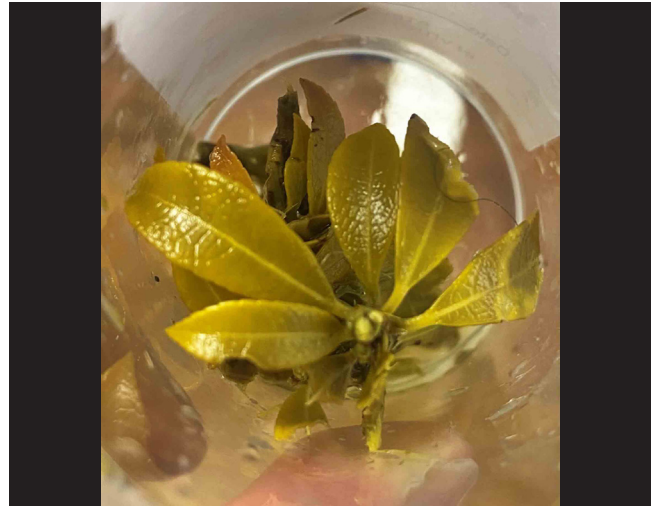


Figure 28: *Pieris* leaves. Photo: Alan Johnson.

Avian

Intussusception

A two-year-old emu was passing blood from the cloaca, failed to respond to treatment, and was submitted to Kilkenny RVL for necropsy. On examination, there was multifocal peritonitis and an intussusception of the intestine (which explained the melaena). No underlying agent was detected. Coccidia and parasites were not detected. Routine culture was unrewarding; however, there had been recent antibiotic use.

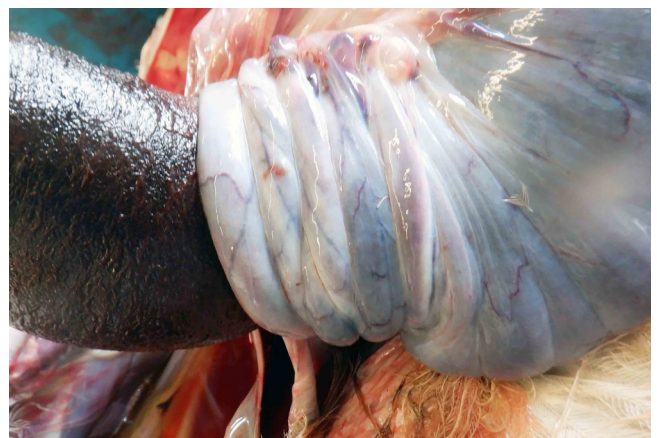


Figure 29: An intussusception of the intestine discovered in an emu. Photo: Aideen Kennedy.