

Regional Veterinary Laboratories Report

February 2020

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 527 carcasses and 485 foetuses during February 2020. Additionally, 2,333 diagnostic samples were tested to assist private veterinary practitioners (PVP) 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 February 2020.

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

In general, the alimentary tract was the most commonly affected organ system with 30.9% of bovine carcass submissions (excluding foetuses) affected.

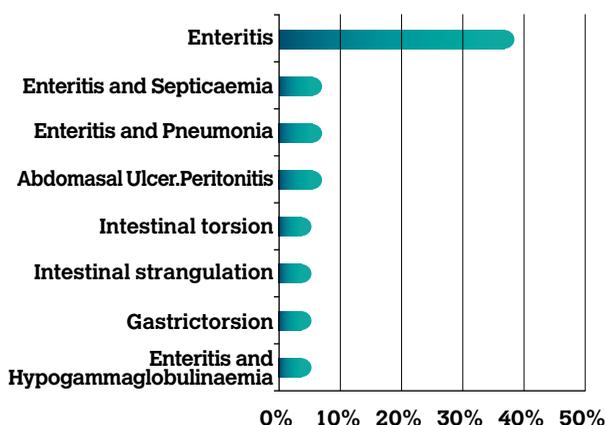


Table 1: Most common diagnoses in the alimentary tract in bovine carcasses submitted to DAFM RVLs in February 2020. Foetal submissions are not included in this data.

GASTROINTESTINAL TRACT

Hernia

Sligo RVL received the carcass of a 10-year-old cow, which had died suddenly. Post-mortem examination revealed an approximately 40cm hernia through the transverse abdominal muscle entrapping a large portion of small intestines. There was severe peritonitis and intestinal loops were red to purple discoloured. The abdominal muscles presented with myositis. The cause of the hernia could not be determined. However, hernias have been reported to occur sporadically in older pregnant cows.

Intussusception

A one-week-old Charolais heifer calf was submitted to Limerick RVL with a history of three-day inappetence. Necropsy revealed an abomasum distended with blackish fluid and intussusception of the small intestine present. There was focal peritonitis surrounding the intussusception.

Septicaemia

A two-day-old housed suckler calf was submitted to

Limerick RVL for necropsy. It appeared healthy for the first day following birth, but deteriorated from day two into recumbency and died, despite veterinary intervention. On post-mortem examination there was faecal soiling of the perineal area and reddening of the mucosa of the intestines. Petechial haemorrhages were visible on the surface of an enlarged spleen and there was congestion and oedema of the lungs. *Escherichia coli* was isolated from the liver and lung in pure growth and a sample of the faeces was positive for rotavirus. Septicaemia was diagnosed as most likely cause of death.

Atresia coli

A day-old calf was submitted to Limerick RVL with a history of bloat followed by death. This was the third animal to be affected in the herd. Necropsy disclosed a blind-end *Atresia coli*, in which a segment of colon is missing leaving two blind-ended colon segments.

Peritonitis

Athlone RVL examined a six-year-old Friesian cow. She had had a full-term stillborn calf two weeks earlier and subsequently was treated for coliform mastitis and responded. Subsequently, she developed anorexia despite treatment efforts. On gross post-mortem, a diffuse fibrinous bread-and-butter peritonitis with copious amounts of yellow abdominal fluid was discovered. The uterus was empty and involuting. There was a focal area of necrosis of the serosa of the reticulum, blackish in colour, with a thick layer of fibrin adhered to it. There was a circa 8cm length of wire in the lumen of the reticulum. A diagnosis of peritonitis secondary to foreign body reticulitis was made.



Figure 1: Diffuse peritonitis in a case of hardware disease in a cow. Photo: Denise Murphy.

Enteritis and septicaemia

A 10-day-old calf was submitted to Sligo RVL for necropsy with a history of haemorrhagic diarrhoea and death despite treatment efforts. The carcass appeared pale and showed signs of dehydration. The liver appeared enlarged and orange-coloured. Intestinal contents were scant. The caecum presented with focally extensive diphtheric membranes and necrotic casts. While diagnostic tests were unrewarding, histopathology revealed a severe diffuse atrophic and necrotising enteritis with large numbers of intralumenal pleomorphic rod-shaped bacteria as well as multifocal severe acute necrotising interstitial pneumonia. The morphological appearance of the bacteria in the gut was typical of a gram negative bacterial pathogen; *Cryptosporidium spp.*, *Coccidia*, *E. coli* and *Salmonella spp.* are likely agents. Enteritis and septicaemia were concluded to be cause of death.

RESPIRATORY TRACT

Bacterial bronchopneumonia

A six-day-old Friesian heifer calf was presented to Limerick RVL with a history of peracute illness. Necropsy revealed severe acute haemorrhagic consolidation and congestion localised to the cranial lobe of the right lung. Aspiration was considered as potential cause. Subsequent laboratory investigation revealed *Bibersteinia trehalosi* and *Pasteurella multocida* both being isolated and *Mannheimia haemolytica* identified on polymerase chain reaction (PCR). A diagnosis of bacterial bronchopneumonia was made.

Embolic pneumonia

A four-year-old cow was presented to Limerick RVL with a history of a respiratory grunt. Necropsy revealed congested and oedematous lungs with numerous abscesses throughout both left and right lungs. A golf ball-sized hepatic abscess was present. The PVP was advised in relation to a possible ongoing subacute ruminal acidosis (SARA) issue on the farm as the farmer had acknowledged that they were feeding notable quantities of concentrate in the diet. In cases of rumenitis, embolic showers can occur causing abscesses in other organ systems.

URINARY/REPRODUCTIVE TRACT

Uterine rupture

A three-year-old cow in late pregnancy was submitted to Limerick RVL with a history of sudden death. Necropsy disclosed a large volume of blood clots and bloody fluid throughout the abdominal cavity. The uterus had become twisted and had ruptured cranial to the cervix, and this was the source of the haemorrhage. The lungs were very pale as is typical in cases of exsanguination. A diagnosis was made of uterine rupture and haemorrhage subsequent to a uterine torsion.

Omphalophlebitis

A three-day-old calf with a history of sudden death was delivered to Sligo RVL for post-mortem examination. It was the third death within two days in the herd. Necropsy

revealed a foul-smelling peritonitis associated with a severe omphalophlebitis. *Trueperella pyogenes* was isolated from the lesions.

Umbilical haemorrhage

A 16-hour-old calf, which had been found dead was submitted to Athlone RVL for post-mortem examination. The calf had calved by herself and the calf had suckled. The conjunctivae and carcass were very pale. There was a large circa 21cm blood clot internally at the navel extending cranially and caudally along the umbilical vessels. The liver, heart and lungs were pale. Testing for bovine viral diarrhoea (BVD) proved negative and histopathology of bone marrow was unremarkable. A conclusion of haemorrhage from umbilical vessels was made.

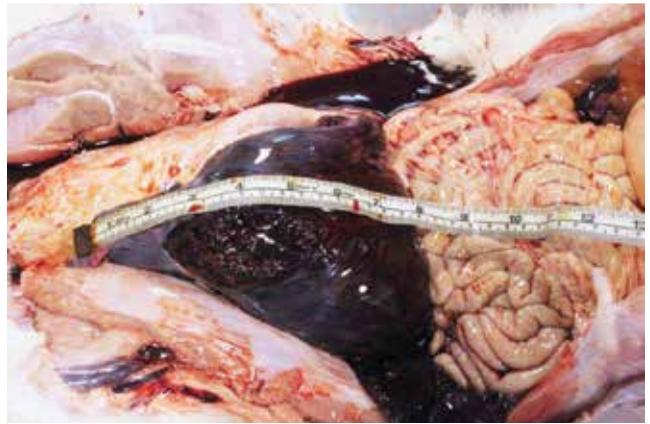


Figure 2: Abdominal blood clot associated with a navel haemorrhage in a neonatal calf. Photo: Denise Murphy.

NERVOUS SYSTEM

Botulism

A yearling heifer was examined in Athlone RVL with a history of having been purchased a week earlier. It was found dull and frothing from the mouth and had to be euthanised later. It was the second similar loss in a few days and there was another animal showing similar signs. Botulism was suspected. On gross post-mortem examination the abomasal mucosa was hyperaemic and jejunal contents were haemorrhagic. There were very large numbers of adult rumen fluke in the rumen and reticulum. Samples of abomasal, rumen and small intestine contents and faeces were submitted to the Agri-Food and Biosciences Institute, Stormont, for botulism testing. The *Clostridium botulinum* CD toxin ELISA was positive in all four samples tested. A diagnosis of botulism was made. Delayed appearance of clinical signs, sometimes described as a 'latent period', of up to 17 days post exposure has been reported in case reports of botulism outbreaks. This may relate to the delay in release of toxin from the ingested contaminated material that has remained in the lumen of the digestive tract.

SYSTEMIC

Systemic IBR

A number of calves were submitted to Kilkenny RVL for post mortem from a herd with a history of inappetence, malaise,

drooling and respiratory signs. Some of the calves examined had congested lungs with pleuritis, and there were also cases with peritonitis and diarrhoea. One of the calves had a yellow-coloured liver. Some calves presented with necrotic foci in the fore stomachs. Bovine herpes virus (BHV-1)/Infectious bovine rhinotracheitis (IBR) was detected from a number of these calves and the histopathological findings confirmed a diagnosis of systemic Infectious IBR. The advice issued was to commence IBR vaccination in the herd.

Systemic IBR is encountered in young calves from unvaccinated mothers. Typically multifocal areas of necrosis are seen in a number of organs eg. the liver and in these cases there were foci of necrosis in the alimentary tract. The protection of neonatal calves relies on dam vaccination.

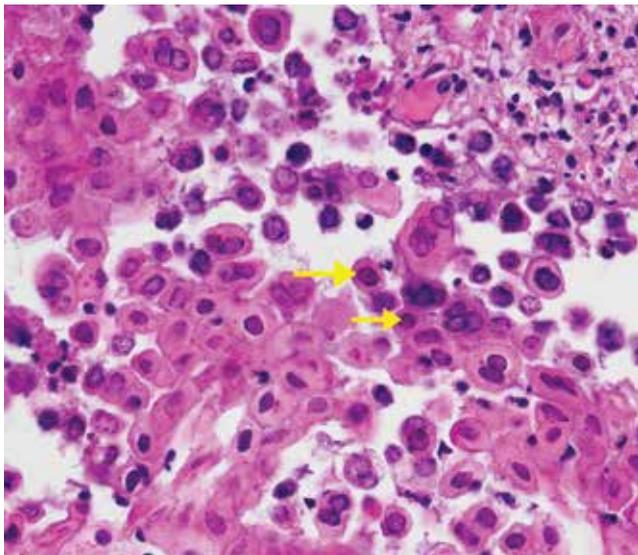


Figure 3: Intra-nuclear inclusions (arrows) in the epithelial cells of the reticulum; there were necrotic foci affecting the epithelial surface of the epithelium. Photo: Maresa Sheehan.

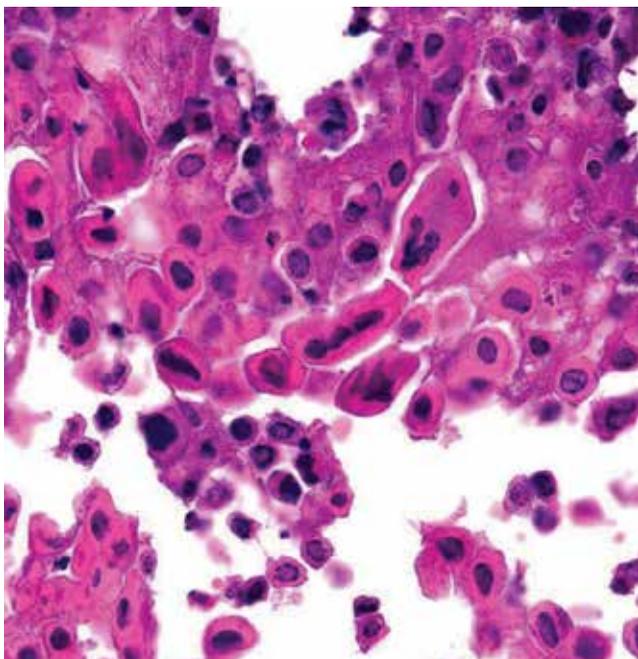


Figure 4: Syncytial cells associated with IBR infection. Photo: Maresa Sheehan.

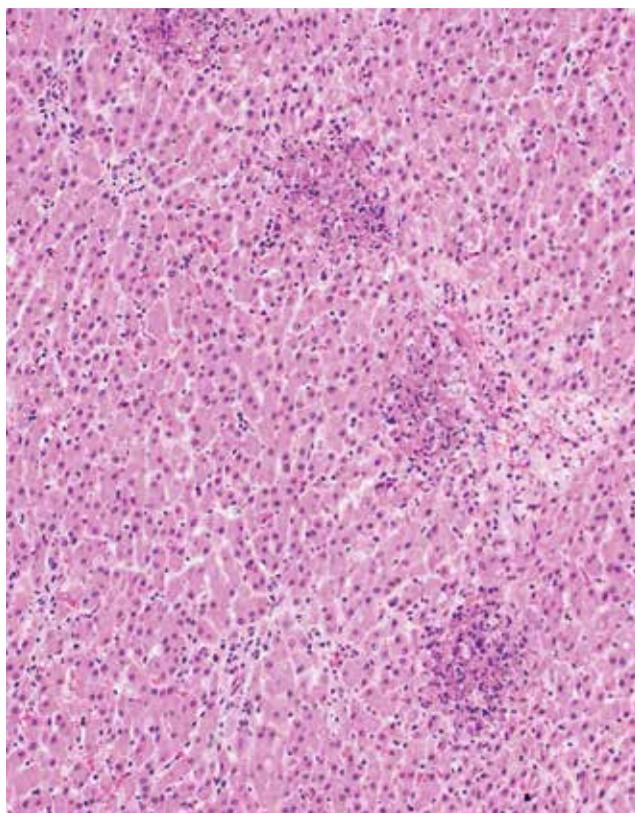


Figure 5: Multifocal areas of necrosis in the liver associated with systemic IBR. Photo: Maresa Sheehan.

Systemic Mycosis

A three-year-old bull with a history of being unwell, anorexic, pining and frequently lying for the previous three weeks was delivered to Sligo RVL. Death occurred despite several treatment attempts. On necropsy, there was severe dehydration and peritonitis. There were circular (up to €2 coin-sized) pale lesions on rumen and reticulum. The ruminal wall appeared thickened and oedematous. The reticular wall was necrotic with a focal ulcer approximately 5cm in diameter. There was an approximately 20cm-sized blood clot in abomasum. The liver presented with multifocal 0.3-2cm pale lesions on the capsule and throughout the parenchyma. The kidneys showed multifocal necrotic-haemorrhagic lesions, approx 0.5cm. The pericardium was oedematous and there were ecchymosae on the base of the papillary muscles. The lungs were heavy and oedematous. There were multifocal hard nodules on the pleural lung surface. The lungs had a mottled appearance. Histopathology revealed vasculitis and thrombosis, most likely of fungal origin, in all examined organs. Systemic mycosis was diagnosed as cause of death. It could not be determined if there was another underlying condition. Systemic mycosis can occur secondary to prolonged antimicrobial treatment. The fungal species could not be identified.

MISCELLANEOUS

Oesophageal Trauma

A two-day-old calf was submitted to Kilkenny RVL with unremarkable history. Post mortem-examination revealed

a traumatic perforation of the oesophagus with fibrinous adhesions running adjacent to the oesophagus. There was free fluid in the thorax and multifocal pulmonary consolidation. The abomasum had multifocal shallow bleeding ulcers. There was a very small volume of milk in the abomasum. Zinc sulphate turbidity (ZST) results indicated colostrum feeding had not been successful. The most likely cause of the lesion was considered to be a stomach tube injury. A review of technique and examination of the tubing equipment was recommended to ensure there are no sharp edges on the tube and that excessive force is not used.



Figure 6: Tubing injury in the oesophagus; here highlighted with a metal rod. Photo: Aideen Kennedy.

SHEEP

Systemic disease was the cause of death in 17.2% of ovine carcass submissions with bacteraemia and septicaemia the most common diagnoses in sheep carcasses (excluding foetuses) submitted to DAFM RVLs in February 2019.

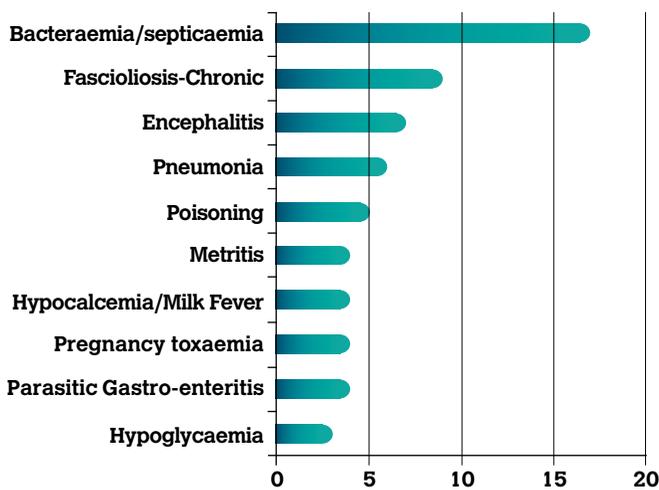


Table 2: Ten most common diagnoses in ovine carcass submissions in February 2020. Foetal submissions are not included.

SYSTEMIC DISEASE

Septicaemia

Two lambs, one and four days old respectively were submitted to Limerick RVL with a history of high mortality in the small flock. These lambs became lethargic soon

after birth. Some other lambs affected had diarrhoea and watery mouths. *E. coli* (K99) negative was isolated from all organs cultured from both lambs. Tests on intestinal contents were negative for rotavirus and *Cryptosporidium*. Septicaemia was diagnosed.

GASTROINTESTINAL TRACT

Fascioliosis

A three-year-old ewe was submitted to Athlone RVL with a history of sudden death. On gross post-mortem examination the carcass was very pale and the blood was less viscous than normal. There was marked ascites and excess pericardial fluid. The liver was pale, hard and enlarged with multifocal coalescing white lesions throughout (fibrosed tissue) and haemorrhagic tracts also. Copious numbers of liver fluke were seen in the gall bladder and bile ducts. The uterus was empty but the caruncles were prominent and the uterus had not involuted. The ewe had a very high strongyle egg count of 3,100epg in faeces. The ewe had been treated with a flukicide a month earlier but the type used wasn't known and she was still outdoors. A diagnosis of chronic active fascioliosis was made.



Figure 7: Hepatic fibrosis and haemorrhagic tracts visible in a case of chronic-active fascioliosis in a ewe. Photo: Denise Murphy.

Clostridial disease

A farmer submitted two one-month-old lambs with a history of scour and dehydration to Kilkenny RVL. The farmer reported others in the flock with scour. One lamb showed a severe fibrinous peritonitis. The intestines were adherent to each other and to the body wall. The source of infection appeared to be umbilical. *Trueperella pyogenes* was cultured from multiple organs. A review of flock umbilical hygiene management at lambing was advised.

The other lamb had an intestinal torsion at the root of mesentery. The intestine was filled with a haemorrhagic content. Positive results for *C. perfringens* alpha and epsilon toxin were obtained. A review of vaccination protocols was indicated with use of a multivalent clostridial vaccine recommended.

RESPIRATORY TRACT

Ovine pulmonary adenocarcinoma

A four-year-old ram with a history of pneumonia and fading away despite treatment was submitted to Kilkenny RVL. Necropsy revealed approximately 60% of the lung tissue was grey/white and consolidated. The liver had multifocal small white lesions. The abomasum had small raised areas focally on the mucosal surface. Jaagsiekte sheep retrovirus (JSRV) was detected by PCR. The strongyle egg count was 1,100 eggs per gram of faeces. On histology of the lung, findings indicated ovine pulmonary adenocarcinoma (OPA)/Jaagsiekte and bronchopneumonia. Additionally, there was multifocal non-suppurative hepatitis and chronic active abomasitis with cross sections of nematodes. The lesions in the abomasum were consistent with parasitism, so a review of parasite control was recommended. The lesions in the liver were suggestive of a bacteraemia/septicaemia. It was advised that the role of a gram negative bacteraemia should be investigated, particularly *Salmonella* spp.



Figure 8: Consolidated pale lung areas in a case of OPA in a ram. Photo: Aideen Kennedy.

Ovine pulmonary adenocarcinoma (OPA) is a progressive, fatal, neoplastic lung condition of sheep that is caused by infection with Jaagsiekte sheep retrovirus (JSRV). JSRV induces neoplastic changes in pulmonary tissues. Normal lung tissue is replaced with tumour growth, which leads to compromised respiratory function. Variability is reported in the time for progression from infection to the appearance of clinical signs. Infection typically occurs in early life with clinical disease typically occurring at two to four years of age. In addition to contact with respiratory secretions, young lambs can also become infected through the ingestion of milk and colostrum containing the virus.

During advanced stages of the disease there can be clear frothy fluid, appearing at both nostrils, with up to 50ml of fluid production during the wheelbarrow test. The 'wheelbarrow test' is considered pathognomonic for OPA but causes considerable distress, and is typically not recommended for welfare reasons.

A number of JSRV-infected animals do not exhibit signs of copious fluid production or respiratory distress. OPA is considered a slowly progressive disease and can prove difficult to diagnose in the early stages. Infected animals do not produce a humoral response. Definitive diagnosis of OPA requires the identification of characteristic gross lesions and histological changes.

Pleuropneumonia

Sligo RVL received a one-year-old hogget which had shown non-specific sickness for two days prior to death. She had stillborn twin lambs two weeks before death. Post mortem examination revealed a significant purulent endometritis as well as pleuropneumonia. While the endometritis was deemed significant, pleuropneumonia with subsequent toxæmia/bacteraemia was diagnosed as most likely cause of death.

URINARY/REPRODUCTIVE TRACT

Enzootic abortion of ewes

Two 4.5-month-gestation ovine foetuses were submitted to Kilkenny. There had been three additional abortions from a flock of 140. No vaccinations were used in the flock. Both foetuses were autolysed, with no visible lesions. The placenta was leathery and there was an intercotyledonary exudate. Culture of the foetal stomach content was sterile. PCR positive results for *Chlamydia abortus* were obtained.

Foetal kidney dysplasia

A neonatal lamb was submitted to Sligo RVL. The lamb was a single and had a difficult birth due to foetal-maternal size mismatch. The farmer had noticed progressive weakness from about 24 hours after birth and blood in faeces. On post-mortem examination, the right kidney appeared enlarged to approximately six times the expected size. The left kidney was very small. The ureters were blind ending and did not connect with the bladder. There was excess thoracic and abdominal fluid. Hydronephrosis secondary to ureter/bladder dysplasia and malformation of foetal kidneys was diagnosed as the cause of death. Renal congenital defects are a sporadic occurrence.

MUSCULO-SKELETAL

Septic poly-arthritis (Joint ill)

A three-week-old lamb was examined in Athlone RVL with a history of recumbency, swelling of hind limbs and weakness. The stifle joints were bilaterally swollen and there was pus in the synovial fluid of the right stifle. There was vegetative endocarditis on the right atrioventricular valves and there were multifocal pale 1-2mm foci in the heart muscle near the apex of the heart. There were multifocal 1-2mm pale lesions throughout the lung lobes and multifocal 1-2mm pale foci throughout both kidney cortices. The spleen was enlarged and the navel was unremarkable. *Staphylococcus aureus* was isolated from several tissues. A diagnosis of joint ill, endocarditis and septic pulmonary emboli was made.

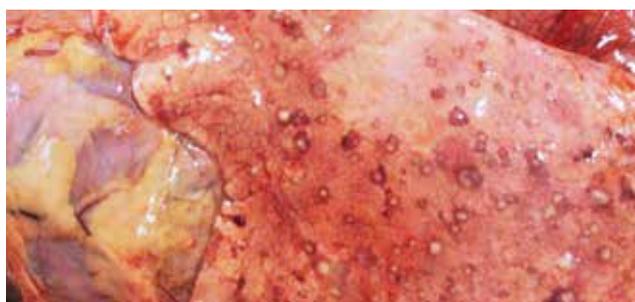


Figure 9: Septic embolic lesions in a lung of a lamb with septic polyarthritis (joint ill) and bacteraemia. Photo: Denise Murphy.

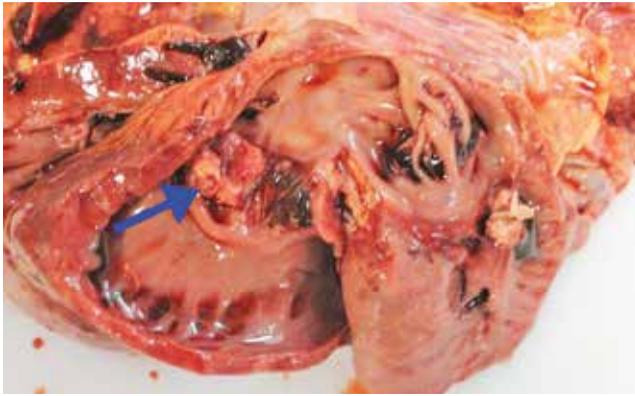


Figure 10: Vegetative endocarditis (blue arrow) in a lamb with septic polyarthritis (joint ill) and bacteraemia. Photo: Denise Murphy.

POISONINGS

A two-year-old ewe was submitted to Sligo RVL with a history of sudden death. On post mortem examination, generalised severe jaundice was noted. The liver was orange and the kidneys appeared black. The urine was black. Histopathology of the liver revealed severe acute necrotizing hepatitis with intralesional pigment. High concentrations of copper were detected in liver tissue. Copper poisoning was determined to be cause of death. Copper concentration in diets should be reviewed for other sheep in flock especially if pre-lambing concentrates are being used.

Haemorrhage

Sligo RVL received the carcass of a four-year-old ewe with a history of sudden death. The animal was near term and had been scanned in lamb with triplets. The carcass appeared very pale on post-mortem examination. There was a large blood clot present in the mesentery. Cause of death was diagnosed as haemorrhage following rupture of a mesenteric blood vessel.

OTHER SPECIES

Red Deer

A six-year-old female Red Deer was submitted to Limerick RVL from an open farm. The animal had been found dead and no prior clinical signs had been noticed. The animal had been in a small field with five other deer. It had access to a shed and was on a diet of grass, hay and concentrates. On necropsy, pulmonary emphysema was obvious and large numbers of lungworm larvae were visible in the airways. A diagnosis of parasitic bronchitis was made and urgent attention to the other deer in the group was advised. Red deer has been reported affected by *Dictyocaulus viviparus*, *Dictyocaulus eckerti*, *Varestrongylus sagittatus*, *Protostrongylus rufescens* and *Muellerius capillaris*. *D. viviparus*, *P. rufescens* and *Muellerius capillaris* are also reported in farmed cattle and sheep.