Regional Veterinary Laboratories Report

December 2019 and January 2020

Regional Veterinary Laboratories (RVLs) carried out necropsy examinations on 743 carcases and 837 foetuses during December 2019 and January 2020. Additionally, 3,717 diagnostic samples were tested to assist private veterinary practitioners (PVPs) 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 December 2019 and January 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

Respiratory Tract

Bacterial pneumonia

The carcase of a cow was submitted to Kilkenny RVL with a history of a sudden onset of respiratory clinical signs including froth coming from her nose. This was the second case in a herd of 250 cows. Gross post-mortem findings included severe fibrinous bronchopneumonia, pleuritis and pericarditis. The pulmonary interlobular septae were distended with fibrin. There were adhesions between the lungs and the thoracic wall and to the pericardium. There were approximately two litres of fluid in the thorax and the intestine appeared oedematous and the content was liquid. *Mannheimia haemolytica* was cultured and identified on polymerase chain reaction (PCR). Bovine herpesvirus-4 (BHV4) was detected by PCR in lung tissue. Histopathology of the intestines revealed a chronic-active enteritis. The severe lung pathology was ruled to be the cause of death. The significance of the detection of BHV-4 is uncertain as most BHV-4 infections are subclinical. The involvement of BHV-4 in respiratory and genital diseases of cattle, and possibly clinical mastitis most likely occurs in synergism with other pathogens (Thiry et al, 2000; Wellenberg et al, 2000). The cause of the enteritis was not identified. However, bacterial pathogens such as *Salmonella spp.* could not be ruled out.

Figure 1: Well-demarcated consolidation and fibrin covering in a case of bacterial pleuro-pneumonia caused by *Mannheimia haemolytica*. Photo: Aideen Kennedy.

Figure 2: Pulmonary interlobar septae expanded with fibrin in a case of pleuropneumonia in a cow. Photo: Aideen Kennedy.

Athlone RVL examined a four-year-old Friesian cow that had been sick for two days, apparently in pain, was inappetent and died despite treatment efforts. On gross post-mortem examination, there was a severe bilateral fibrinous pleuropneumonia with marked interlobular fibrin and oedema. Small foci of necrosis were present throughout the parenchyma. *M. haemolytica* was isolated from the lungs. Histopathology of lung showed a fibrinosuppurative necrohaemorrhagic bronchopneumonia with necrotic inflammatory cells ('oat cells'). A diagnosis of severe fibrinous pleuropneumonia caused by *M. haemolytica* was reported.

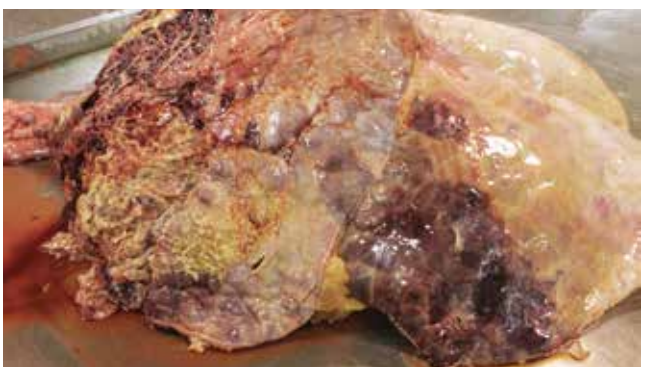

Figure 3: Fibrinous pleuropneumonia in a cow caused by Mannheimia haemolytica. Photo: Denise Murphy.

VIRAL PNEUMONIA

Athlone RVL examined a 2.5-month-old calf with a history of pneumonic signs for two weeks without response to treatment. On gross post-mortem, there was diffuse consolidation of the left lung with scattered multifocal areas of consolidation on the right side. There was fibrinonecrotic laryngitis. There was an approximately 10cm focal haemorrhagic necrotic lesion on the reticular wall and the liver was enlarged and there were several 3-4cm circular lesions with a pale necrotic centre and dark red rim. The spleen was enlarged. *Aspergillus sp.* was isolated from the larynx and lung. Bovine parainfluenza-3 virus (PI3) and bovine respiratory syncytial virus (BRSV) were detected in the lungs by PCR. Histopathology showed necrotising hepatitis with thrombosis and copious fungal hyphae, a fibrinonecrotic rumenitis with thrombosis and copious fungal hyphae and fibrinohaemorrhagic necrotising bronchointerstitial pneumonia. A diagnosis of pneumonia with secondary systemic mycosis was reported.

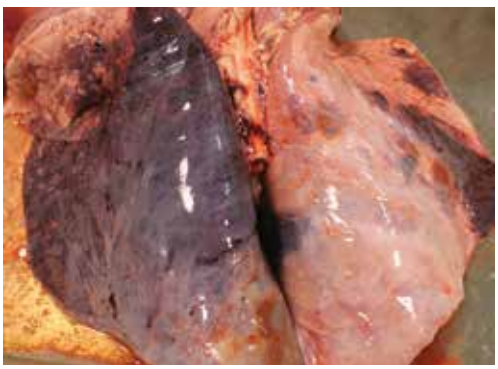

Figure 4: Consolidation of the left lung in a case of pneumonia and secondary systemic mycosis. Photo: Denise Murphy.

Figure 5: Round mycotic lesions in a case of secondary systemic mycosis in a cow. Photo: Denise Murphy.

ASPIRATION PNEUMONIA

A two-day-old calf was presented to Kilkenny RVL with a history of wheezing, which progressed to severe lung sounds very quickly. On necropsy, the lungs were very heavy with diffuse consolidation and some emphysema. There was white material in the trachea and extending into the bronchi. There was milk in the forestomachs and abomasum. There were petechial haemorrhages in the spleen. *Escherichia coli* was isolated from a number of organs, suggesting a bacteraemia. Bovine coronavirus was detected by PCR. Histopathology of the lungs revealed a necrotising bronchopneumonia with large amounts of basophilic material in the airways with an associated inflammatory response. A diagnosis of aspiration pneumonia likely caused by the inadvertent inhalation of milk was made.

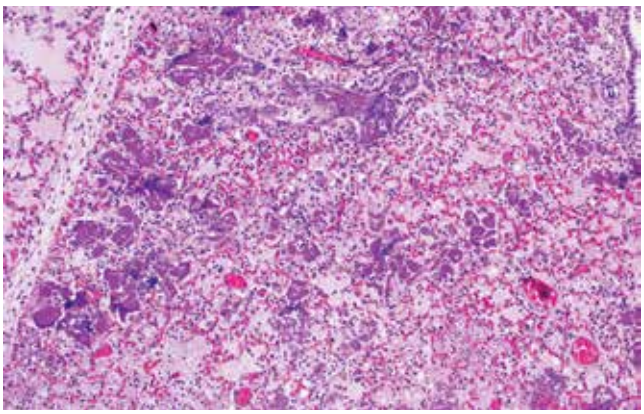

Figure 6: Photomicrograph of a lung section in a case of aspiration pneumonia with basophilic material (milk) in the airways. Photo: Maresa Sheehan

URINARY/REPRODUCTIVE TRACT

Renal failure

A two-year-old bullock was submitted to Kilkenny RVL. The bullock was noticed 'off-form' for a few days before becoming bloated and dying. On necropsy, there was approximately 10-15 litres of blood-tinged fluid free in the abdomen. Only one kidney could be identified. The remaining kidney was surrounded by haemorrhage and adhesions. It was misshapen and enlarged measuring approximately 30x15cm. It was polycystic, dilated, and fluid filled. The bladder contained no urine and the bladder wall was thickened. The heart was enlarged and the lungs were oedematous. *Listeria monocytogenes* was cultured from the kidney. On histopathology, the renal medulla was partially replaced by a large fluid-filled space lined intermittently by epithelium. In the adjacent remaining medulla, fibrosis separated the ducts and tubules. Multifocally in the cortex, tubules were ectatic (dilated) and multifocally there were foci of lymphocytes and macrophages indicating chronic nephritis. There are a number of mechanisms by which cystic kidneys can develop, including obstructive lesions (hydronephrosis), a change to the tubular basement membrane or the disordered growth of tubular epithelial cells (dysplasia). As this animal had one kidney due to a congenital defect, it appeared that compensation for lack of function was not possible ultimately causing renal failure.

Figure 7: Polycystic kidney in a two-year-old bullock. Photo: Aideen Kennedy.

MASTITIS

Kilkenny RVL received a 34-month-old cow with a history of having aborted a calf one month previous, and being sick since. On gross post-mortem, all four quarters of the mammary gland had severe mastitis, this ranged from purulent with copious pus on incision to inspissated pus and hard mammary tissue. Histopathological examination of the mammary gland showed a severe chronic active suppurative mastitis with abscessation, necrosis and fibrosis. *Mycoplasma bovis* was detected in the mammary gland by immunohistochemistry. *Streptococcus dysgalactiae* and *Trueperella pyogenes* were also isolated.

It was recommended that samples of further cases of mastitis should be submitted for PCR testing and that mastitic milk should not be fed to calves. Mastitic animals should be milked last. *Mycoplasma bovis* infection is also associated with lameness and respiratory disease among other syndromes.

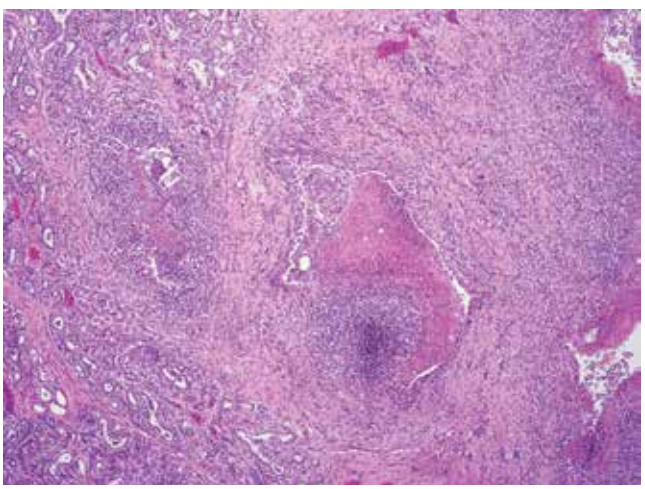

Figure 8: Purulent mastitis with caseous necrosis, *Mycoplasma bovis*, *Streptococcus dysgalactia* and *Trueperella pyogenes* isolated. Photo: Maresa Sheehan.

Figure 9: *Mycoplasma bovis* detected by immunohistochemistry in a mammary gland. The dark brown/purple areas show detected Mycoplasma bovis. Photo Maresa Sheehan.

CARDIOVASCULAR SYSTEM

Septic pericarditis

A 21-month-old Charolais heifer that had died suddenly was submitted to Kilkenny RVL. On external examination, there was submandibular oedema and pale mucous membranes. On opening the carcase, there was approximately two litres of purulent fluid in the thorax. There was a severe pericarditis. There was a very large blood clot in the abdomen adjacent to the liver. The liver was enlarged and rounded with a prominent pattern. A sharp, narrow piece of wire approximately 5cm in length was found in the reticulum and traumatic reticulo pericarditis was diagnosed.

Figure 10: Pericarditis in a case of traumatic reticulo-pericarditis. Photo: Aideen Kennedy.

Sligo RVL received a 4.5-year-old cow, which had been depressed and anorexic for approximately 10 days prior to death. The attending PVP diagnosed a heart issue as well as an intestinal problem. The animal died, despite treatment efforts. On post-mortem examination there was diffuse, chronic pericarditis with sequelae. *E. coli* was isolated from the lesions. The cause of the pericarditis could not be established. A foreign body could not be ruled out.

Figure 11: Pericarditis in a cow. Photo: Colm Ó Muíreagaín.

NERVOUS SYSTEM

Thrombo-embolic meningo-encephalitis

Sligo RVL diagnosed thrombo-embolic meningo-encephalitis (TEME) in two weanlings. One animal, a nine-month-old weanling heifer, which had been found recumbent, was pyrexic and unresponsive to treatment, and presented at post-mortem examination with meningoencephalitis and extensive arthritis of the occipital joint. The other, a 7.5-month-old weanling, was one of two affected animals

on the farm. Both were treated for meningitis, but only one animal recovered. Post-mortem examination revealed diffuse meningitis with multifocal encephalitis. *Histophilus somni* was detected on PCR from brain tissue in both cases.

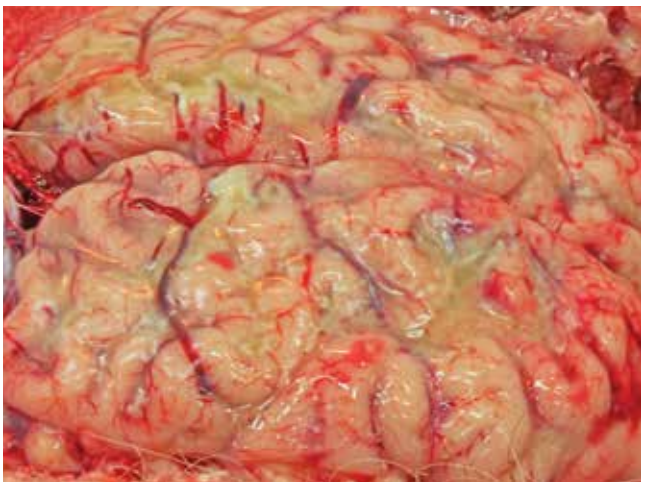

Figure 12: Purulent meninges in a case of thrombo-embolic meningo-encephalitis. Photo: Colm Ó Muíreagaín.

Pituitary abscess

Athlone RVL examined a 19-month-old heifer with a history of recumbency and not responding to treatment. On gross post-mortem examination there was marked subcutaneous oedema from the lower jaw extending down along the ventral neck and marked oedema around the larynx. There was an abscess in the pituitary fossa extending into the midbrain. The liver was enlarged and very congested. There was pulmonary congestion and oedema. *T. pyogenes* was isolated from the brain abscess. Histopathology of the midbrain showed a large focal area of necrosis with neutrophil infiltration, haemorrhage and copious bacterial colonies. A diagnosis of a brain abscess, most likely pituitary abscess extending into midbrain, was made.

Pituitary abscesses commonly develop via a haematogenous spread of the infectious agent. The causative pathogen may infect the rete mirabile (a complex of vessels surrounding the pituitary) and spread from there to the pituitary gland and the surrounding brain tissue. A pyogenic infection elsewhere in the body/head may predispose to pituitary abscesses. The disease is most commonly seen in yearlings and older stock and has been associated with nose rings.

SYSTEMIC

Septicaemia

An eight-day-old Charolais calf with a history of dehydration and depression was submitted to Limerick RVL. The animal died within 24 hours of detection, despite treatment and deteriorating with vague nervous signs. Other deaths in calves had been recorded from the unit. On gross post-mortem examination there was thickening, abscessation of the navel and the liver appeared enlarged. There was diffuse fibrinous pleuritis and pneumonia. There was polyserositis with fibrin tags visible in multiple joints. *E. coli* was isolated from liver, lung and navel abscess. A diagnosis of bacteraemia was made.

Figure 13: Opened joint of a calf with polyserositis. Photo: Alan Johnson.

Figure 14: Thoracic view of a calf with polyserositis. Photo: Alan Johnson

MISCELLANEOUS

Diagnostic samples

Two milk samples were submitted to Limerick RVL from dairy cows on one farm yielded a growth of *Klebsiella* sp. The cows were housed on cubicles, and sawdust had recently been introduced to bed the cubicles. This was considered to be a risk factor.

Skin samples were submitted to Limerick RVL from scratching pregnant dairy heifers. There had been a poor response to pour-on treatment for lice. The first scrapings did not reveal any ectoparasites, but repeat samples revealed many live *Psoroptes mites.*

Figure 15. Typical lesions of psoroptic mange in cattle. Photo: Donal O'Connell PVP.

Figure 16: Typical lesions of psoroptic mange in cattle. Photo: Donal O'Connell PVP.

Figure 17: Photomicrograph of *Psorptes sp.* Psoroptes mites recovered from bovine skin scrapings. Photo: James O'Shaughnessy.

Figure 18: Photomicrograph of *Psorptes sp.*. Psoroptes mites recovered from bovine skin scrapings. The long-jointed pedicle (sucker stalk) is characteristic of this genus. Photo: James O'Shaughnessy.

SHEEP

Gastrointestinal Tract

Fasciolosis

Sligo RVL diagnosed 13 cases of fasciolosis in sheep, including chronic and acute forms. In one case an eight-months-old lamb was submitted which had been noticed slightly dull, but was unresponsive to treatment. On post-mortem examination there was severe dehydration and large amounts of adult fluke (*Fasciola hepatica*) in the liver were noted. On histopathology of the brain there was multifocal vacuolation at the junction of grey and white matter in the cerebrum, medulla and cerebellum. The liver presented with chronic-active parasitic hepatitis. Hepatic encephalopathy due to chronic liver failure secondary to chronic fasciolosis was diagnosed as the cause of death.

Respiratory Tract

Ovine pulmonary adenocarcinoma (OPA, Jaagsiekte)

A four-year-old ewe with a history of bloat was submitted to Sligo RVL. On necropsy, the lungs presented with 80% consolidation and lighter coloured areas. *Bibersteinia trehalosi, Mycoplasma ovipneumoniae* and *Pasteurella multocida* as well as *Jaagsiekte sheep retrovirus* were detected in the lung tissue. Histopathology of the lung revealed diffuse, chronic, severe, necro-purulent pneumonia with masses of neutrophilic debris and proteinaceous fluid present in bronchi and alveolae. Focally, there were neoplastic areas with proliferating cuboidal epithelium forming papillary projections into alveolar lumens. OPA with secondary bacterial pneumonia was diagnosed as caused of death.

Urinary/Reproductive Tract

Pregnancy toxaemia

A six-year-old ewe, which had been noticed slightly dull and then became anorexic was submitted to Sligo RVL for necropsy. On opening the carcase, a very large uterus containing large triplet lambs was noted within the abdomen. The reticulo-rumen appeared shrunken and empty. Beta-hydroxybutyrate concentrations were raised. Pregnancy toxaemia or 'Twin-lamb Disease' was diagnosed as cause of death.

Pregnancy toxaemia affects ewes during late gestation. Clinical signs include listlessness, aimless walking, muscle twitching, opisthotonos, and teeth grinding. Over a number of days this can progress to blindness, ataxia, and finally recumbency and death. Ewes in poor body condition score (BCS ≤2) or that are overfat (BCS ≥4) and carrying multiple foetuses are most at risk of developing pregnancy toxaemia. The primary predisposing cause is inadequate nutrition usually because of inadequate energy density of the ration and/or decreased rumen capacity as a result of compression from a gravid uterus and growing foetuses. In late gestation, gluconeogenesis in the liver increases to facilitate glucose availability to the foetuses. Mobilisation of fat stores is increased to facilitate adequate energy for the increased demands of the developing foetuses and the approaching lactation. However, in a negative energy balance, this increased mobilisation may overwhelm the liver's capacity

and result in hepatic lipidosis, with subsequent impairment of function. Both fat and thin ewes are susceptible. Ewes in poor body condition develop ketosis because inadequate nutrition is offered or because other diseases limit intake (eg. lameness, dental disease). Overfat ewes may have depressed appetites (or decreased capacity of the rumen due to foetuses taking up space), and adipose mobilisation quickly overwhelms the liver's capacity, resulting again in hepatic lipidosis.

Sub-clinically affected animals can become clinical under stressful situations such as adverse weather, transport, handling for shearing or dosing, or other concomitant disease (footrot, pneumonia, etc). The condition usually occurs one to three weeks before parturition. Onset of clinical signs earlier than day 140 of gestation is associated with a higher risk of mortality.

Post-mortem changes can include a pale 'fatty' liver and often include multiple foetuses in a state of decomposition indicating premortem death. These signs alone are not pathognomonic. Post-mortem samples of ocular fluid can be analysed for BHB. Concentrations >2.5 are consistent with a diagnosis of pregnancy toxaemia; however, samples need to be fresh. Histology of the liver is also of benefit.

Ante-mortem diagnostics include urinary ketone levels, increased serum BHB levels. Hypoglycaemia is not a consistent finding. Nonesterified fatty acids can also be increased, indicating likely hepatic lipidosis, resulting in impaired hepatic function. Hypocalcaemia is often found in cases of pregnancy toxaemia, and it should also be considered as a differential for periparturient CNS disease or recumbency. Other CNS diseases to be considered in differential lists include polioencephalomalacia (CCN), pulpy kidney disease, progressive pneumonia, lead poisoning, chronic copper toxicity, listeriosis, etc.

Nervous System

Listeriosis

Athlone RVL examined a two-year-old ram that had been found recumbent and kicking a lot. He was treated for meningitis but there was no response and he died. It was the second similar case. Gross post-mortem examination findings were unremarkable. Histopathology of brain revealed marked multifocal microabscessation in the spinal cord, hindbrain, midbrain and cerebellum and perivascular lymphocyte cuffing. The changes seen are consistent with a diagnosis of listerial encephalitis caused by *Listeria monocytogenes.*

Systemic

Cysticercosis and brain abscess

A two-year-old ram with a history of dullness and finally recumbency was submitted to Sligo RVL. On post-mortem examination, there were diffusely distributed numerous granulomatous cysts present multifocally in the omentum, approximately 3cm in diameter. There also was a pituitary abscess. *T. pyogenes* was isolated from the brain abscess. *Taenia hydatigena* was identified from the cysts by PCR technique. Histopathology found a diffuse, subacute, fibrino-purulent meningitis and encephalitis in sections of the brain. Examination of the granulomatous cysts and surrounding areas revealed parasitic granulomas in the mesentery. They had a necrotic centre, partially mineralised, and calcareous corpuscles present. The brain abscess was considered the cause of death. The most likely aetiology in rams is fighting injuries. The parasitic cysts (*T. hydatigena*) are considered a coincidental finding. A review of parasitic control was advised, particularly the access of dogs and cats to carcasses and/or to feed material should be reviewed.

Sligo RVL received a submission of ovine hearts and diaphragms from the Veterinary Public Heath Inspection Service collected from condemned material in a factory for further investigation. Grossly, there were numerous multifocal small, round lesions. Histopathology revealed multifocal variably sized and coalescing granulomas in heart and diaphragm muscle. Large numbers of sarcocysts were present in some sections. PCR and histopathology indicated both *Sarcocystis tenella* and *Cysticercus ovis* were present in material supplied. The two organisms are frequently observed together due to similarity in life cycles. In general, it would be expected that *Taenia ovis* will produce the larger cysts (cysticercus) which may form granulomas as they degenerate while sarcocysts may produce smaller granulomas.

These conditions share an epidemiological link with carnivores (cats, dogs, foxes), where they ingest the parasites from poorly controlled carcass material, and contaminate livestock feed with faeces.

Poisonings

Plant poisoning

Sligo RVL diagnosed several cases of plant poisonings in sheep. The most commonly found plants were cherry laurel (*Prunus laurocerasus)* and *Pieris japonica*.

In one case, two five-year-old ewes had been respectively found dead or recumbent. Three further ewes had died in that group at the same time. Leaves of *Pieris japonica* were readily recovered from the ruminal contents of both ewes. *Pieris japonica* is an ornamental plant and belongs, same as Rhododendron, to the heath family (*Ericacaeae*). It contains andromedatoxin, which is highly poisonous for sheep.

Figure 19: *Pieris* leaves recovered from the ruminal contents of a sheep. Photo: Colm Ó Muíreagaín.

Figure 20: *Pieris japonica*, an ornamental plant widely available in Irish garden centres. Photo: Colm Ó Muíreagaín.

MISCELLANEOUS

Epidermolysis bullosa/Epitheliogenesis imperfecta

Two Suffolk new-born lambs from a different set of triplets and sharing the same ram were submitted to Cork RVL after being euthanised due to a severe skin condition. The other offspring and cohort lambs did not exhibit any apparent skin lesions, and they all appeared healthy. The submitted lambs displayed sharply demarcated red areas (dermis) devoid of epidermis and adnexa and had a similar body distribution: lower extremities and ears (Figure 21).

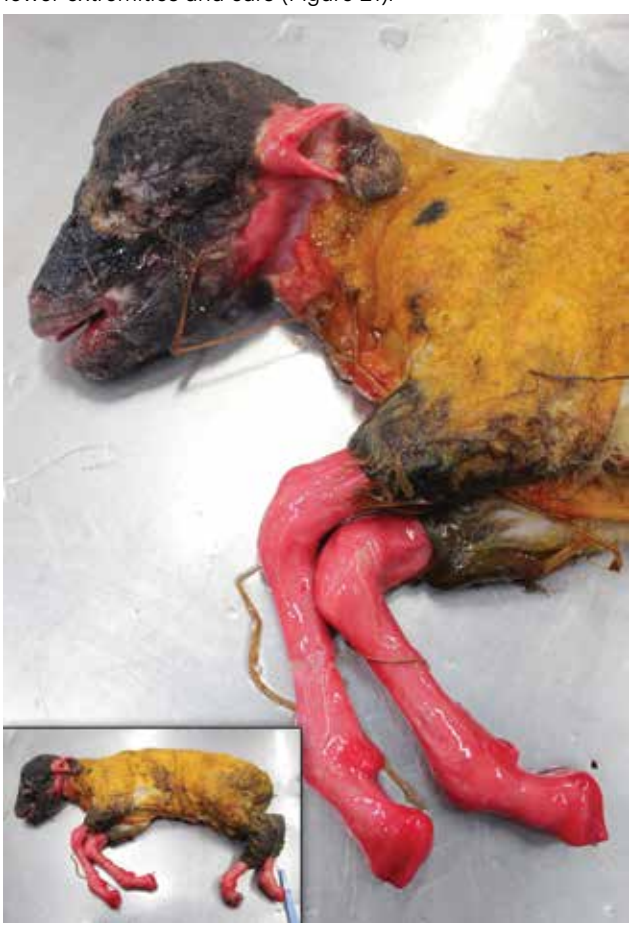

Figure21: Photograph demonstrating the distribution of skin lesions in a lamb with epitheliogenesis imperfect (Epidermolysis bullosa) (Photo Cosme Sánchez-Miguel).

Based on the location of the lesions, gross appearance, and histological lesions (Figure 22), the disorder was diagnosed as epidermolysis bullosa/ epitheliogenesis imperfecta.

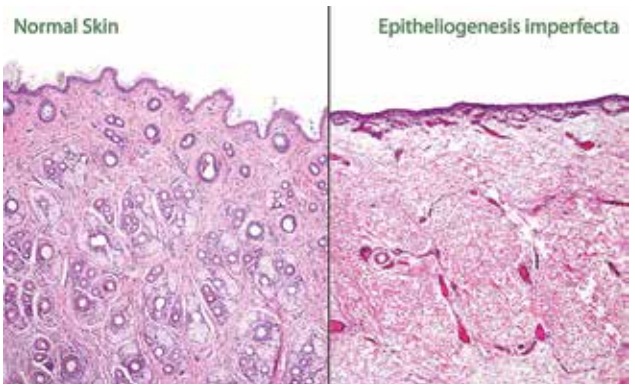

Figure 22: Photomicrograph demonstrating a comparison between tissue sections with normal (left) and affected skin (right) in a lamb with epitheliogenesis imperfecta (Epidermolysis bullosa). Note the lack of adnexa (hair and glands) and epidermis in the affected skin. (Photo Cosme Sánchez-Miguel).

Epidermolysis bullosa/Epitheliogenesis imperfecta is a congenital defect characterised by a failure of the stratified squamous epithelium and adnexa (hair and glands) to develop. This condition is the result of inherited genetic mutation in some species causing a defect at cell junctions. Small skin lesions can heal with scarring, but animals with extensive lesions will usually die from infection and dehydration and euthanasia is advisable in most of these cases as further injuries will likely occur.

Dosing gun injury

A ewe that 'bled out the nose and dropped dead' was submitted to Kilkenny RVL. The ewe was in poor nutritional condition. There was a columnar opening running parallel to the oesophagus that was infected. The opening extended approx 4cm parallel to the oesophagus. The lymph nodes were enlarged in the surrounding area. There were multifocal haemorrhages in the lungs and the lungs had a meaty consistency. There was haemorrhage in the nasal chonchae and the rumen and reticulum content appeared bloody, likely a result of swallowing blood. *Bibersteinia trehalosi* was cultured from the lung. A traumatic pharyngeal laceration ('dosing gun injury') was considered likely as the cause of trauma. Review of dosing technique and examination of equipment was recommended.

Figure 23: Extensive haemorrhages in caudal sinuses and around soft palate due to a dosing gun injury. Photo: Aideen Kennedy.

Jaw abscess

A seven-year-old ewe, which had been found dead after lambing was submitted to Sligo RVL. On post-mortem examination, reduced nutritional condition and severe dehydration were noted. There was hepatic lipidosis. There was a locally extensive, chronic-active, osteomyelitis of the right mandible which distorted alignment of molar teeth. *E. coli* was isolated from the lesion. Sepsis was concluded to be the ultimate cause of death, but the chronic jaw lesion had likely caused the loss of condition noted. This case highlights that examination of the oral cavity in older sick sheep may be warranted in many cases.

PIGS

Oropharyngeal injuries in piglets

Backweston Central Veterinary Research Laboratory (CVRL) assisted in the investigation of a sudden increase in perinatal piglet mortality over a weekend in a 500-sow commercial pig unit. The history indicated the sows and gilts were in good health, some piglet litters had been underweight at birth. Twenty litters were affected by increased mortality beginning on a Saturday, with dyspnoea being observed in some piglets prior to death. Ten piglets were submitted to Backweston CVRL for post-mortem investigation. All piglets weighed less than 1kg.

Four out of 10 piglets examined had submandibular oedema and linear, tubular necrotic tracts which began at the epiglottis and extended parallel with but dorsal to the oesophagus for between 2-6cm, through the soft tissues of the oropharynx and neck. On histological examination, the tracts were dorsal to the oesophagus and larynx and contained necrotic debris, myriad bacteria and impacted plant material surrounded by a thick band of neutrophils, and fibrinous oedema which extended in to the adjacent soft tissue and musculature.

Three out of 10 piglets examined had marked cranioventral lung consolidation, which on histological examination was confirmed as a pneumonia characterised by presence of foreign brown granular material and mixed morphology large bacterial colonies within the airspaces of the lung. The oropharyngeal lesion was consistent with traumatic oral injury secondary to attempted oral gavage or oral dosing. The pneumonia was determined to be anaspiration pneumonia, with the characteristic abundant foreign material and mixed bacterial colonies associated with this condition. Aspiration pneumonia is most commonly associated with poor oral gavage or oral dosing technique in young animals.

In consultation with the referring PVP, a review of perinatal dosing technique, age of administration and personnel training in the technique was implemented and perinatal losses were reduced on the farm. The welfare implications of the poor dosing technique were highlighted.

This case illustrates how appropriate training is necessary for farm workers, in particular for those workers charged with the care of the most vulnerable age group on any farm, perinates (animals less than 48 hours old). Many farm systems now have specialist techniques such as oral dosing or stomach tubing routinely carried out on perinates, the consequences of poor application of these techniques is potentially fatal in young animals as documented here.

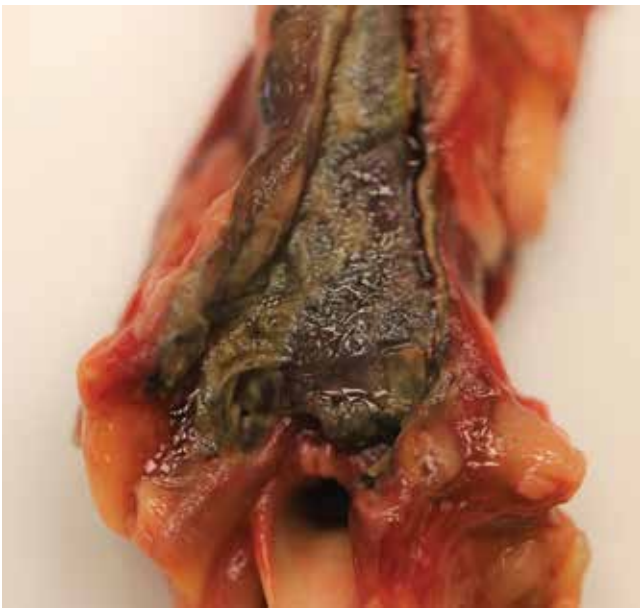

Figure 24: Necrotic tract along the oesophagus in a piglet due to trauma. Photo: Margaret Wilson.

Neonatal enteritis

Sligo RVL investigated an outbreak of neonatal enteritis in a commercial pig farm. Pigs developed diarrhoea and dehydration between two to four days of age. Morbidity rate was high. Mortality rate was variable between litters but was generally low when intervention occurred early in the course of the disease. However, there was significant impact in terms of management time and poor weight gain during the suckling period. Treatment consisted of electrolytes, and parenteral antibiotics, increased fostering and batching according to weight. In many cases there was a relapse of diarrhoea at 10-14 days of age.

Four piglets in acute stages of disease were sacrificed for necropsy. Gross findings indicated an acute enteritis. Intestine contents were liquid throughout, and segmental areas of the jejunum and ileum were described as translucent. Rotavirus A and C were detected from intestinal contents. Testing for porcine epidemic diarrhoea, delta coronavirus, transmissible gastroenteritis, *Isospora suis*, *Clostridium perfringens* and *Clostridium difficile* were negative. Routine culture of contents identified *Enterococccus hirae* and *Enterococcus durans*. Histopathology confirmed a severe atrophic enteritis in sections of jejunum and ileum with a crypt to villus ratio of 1:1 in the most severely affected areas. Additionally, in some pigs there were mats of entero-adherent cocci closely associated with sections of atropic gut. The pathologist was satisfied that the main finding in these pigs was the presence of rotavirus and associated pathology which is likely to have been responsible for the clinical signs observed. The presence of entero-adherent cocci forming a biofilm is frequently observed by the laboratory in cases of neonatal enteritis. These have been putatively identified as Enterococcus spp. It is not clear if they are primarily pathogenic in young pigs or occur as a result of intestinal dysbiosis following infection by

another agent or as a result of interventions such as increased antibiotic use in intensively managed farrowing houses.

Neonatal diarrhoea is a significant cause of morbidity and economic loss on Irish farms and necessitates the use of increased volumes of antibiotics to reduce the impact of disease in the highly vulnerable intensive production systems. Neonatal piglets have reduced capacity to produce hypertonic urine meaning that they are very susceptible to dehydration if the absorptive capacity of the gut is damaged. There are a wide number of agents implicated neonatal pig diarrhoea but most commonly encountered infectious agents identified in nursing pigs with diarrhoea are *Clostridium perfringens, Rotavirus, E. coli, Cryptosporidium, Isospora suis* and *Clostridium difficile*.
It is likely that the relatively low diagnostic rate in these cases is due to a mixture of the following factors inadequate availability of diagnostic tests, emergence of novel agents, multi-pathogen infections, or complex interactions between gut microbiome and environment stresses. Inability to determine the underlying cause has implications in terms of control and antibiotic treatment of the disease and subsequent economic costs to the farmer, reputational damage to agricultural industry, and decreased animal welfare. Absence of definitive etiological diagnosis and misunderstanding of the relative contribution of various pathogens to disease pathogenesis and subsequent clinical signs in the face of economic loss may lead to the use of inappropriate treatments, particularly antibiotics, which is likely to contribute to development of antibiotic resistance. Veterinary practitioners are encouraged to contact laboratories if they identify undiagnosed outbreaks of diarrhoea in pig herds to arrange support and advice on sampling and diagnostic investigations including detailed necropsy and histopathology that are available.

OTHER SPECIES

Goats

Two goats were submitted to Kilkenny RVL with a history of weight loss. Seven had died in total. Both animals appeared to be in poor nutritional condition. The abdominal viscera in each had a wet oedematous appearance and the abomasum wall was oedematous. One goat had pneumonia affecting approximately 10% of tissue. The second goat had multifocal white foci on the liver. In addition, there was a large volume of undigested grain in the rumen. An acidic rumen pH was recorded. Very high strongyle egg counts were recorded in both. *Fasciola hepatica* eggs were also identified. Other laboratory findings of note included culture of *Bibersteinia trehalosi* from the pneumonic lung.

Bibersteinia trehalosi (previously classified as *Pasteurella trehalosi)* is a commensal organism of the tonsil and upper gastrointestinal tract. It is postulated that under stressful conditions the bacteria multiply and rapidly spread to the lungs and other organs and causes acute systemic infection.