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Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, July to September 2014

- Parasitic pneumonia in adult cattle
- Abomasal adenocarcinoma in a bull
- Meningitis in lambs
- Pyometritis in sows
- Greasy pig disease
- PMV-1 wild type infection in pigeons

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for July to September 2014

CATTLE:

Respiratory diseases

Respiratory disease was identified in 67 cattle post mortem submissions between July and September 2014. The most common pathogens identified included parasitic broncho pneumonia, *Pasteurella multocida* (eight cases), *Mycoplasma bovis* (seven cases), *Mannheimia haemolytica* (six cases) and *Trueperella pyogenes* (three cases).

A total of twenty instances of *Dictyocaulus viviparus* infection in cattle herds were described during the reporting period. In August an instance of pre-patent parasitic pneumonia was diagnosed on the basis of gross findings and histology in a group of three-year-old heifers. A further two cases of patent lungworm infection in adult dairy cows of age range four-to-six years were seen during August. Milk drop and respiratory signs were described but in one affected herd sudden death of seven adult cows occurred. During September two further cases of patent parasitic pneumonia were diagnosed (FIGURE 1), one in a five-year-old cow and the other in a four- month-old calf, which was one of a group showing pneumonia and clinical parasitic gastro-enteritis (PGE).

Figure 1

D. viviparus in the bronchi of a heifer.

Aspiration pneumonia was diagnosed in a five-year-old dairy cow which became pyrexic and inappetant after an episode of post – calving milk fever. Histological examination of the lung showed bronchial and bronchiolar epithelial necrosis, the bronchiolar lumens contained necrotic debris, fibrin, neutrophils, numerous bacterial clumps and plant material. The alveoli contained many neutrophils, bacterial clumps, fibrin deposits, oedema and some protozoa. The interlobular septae were expanded by distended lymphatics, neutrophils, fibrin, and oedema fluid. It was concluded that rumen contents had been aspirated due to recumbency as a result of the milk fever.

Alimentary diseases

BVD / Mucosal disease

Of 2256 blood samples that were tested for bovine viral diarrhoea virus (BVDV) by virus isolation or antigen capture ELISA 291 (12.9 per cent) were positive. In addition, 3 of 318 (0.9 per cent) submitted tissues and nasal mucus samples were positive by immunofluorescence. Four cases of mucosal disease were confirmed at post mortem examination during this period.

Abomasal adenocarcinoma

A five-year-old bull with a history of weight loss and diarrhoea was presented following euthanasia on welfare grounds. At gross post-mortem examination there was a haemorrhagic, necrotic, firm mass 10cm x 7cm x 5cm lying in the mural connective tissue close to the pyloric sphincter of the abomasum. There had been some local spread with plaques of neoplastic tissue present along the greater curvature. Histological examination showed the presence of a gastric gland adenocarcinoma (FIGURE 2); the neoplastic tissue comprised multiple acini, each with a well-differentiated epithelial-type lining and an open lumen. There was a low mitotic index and the nuclei of the epithelioid cells were heteromorphic, basally situated, and usually featured a prominent nucleolus. The overlying mucosal surface displayed focal full-depth ulceration and necrosis, with secondary inflammation. The submucosa was oedematous.

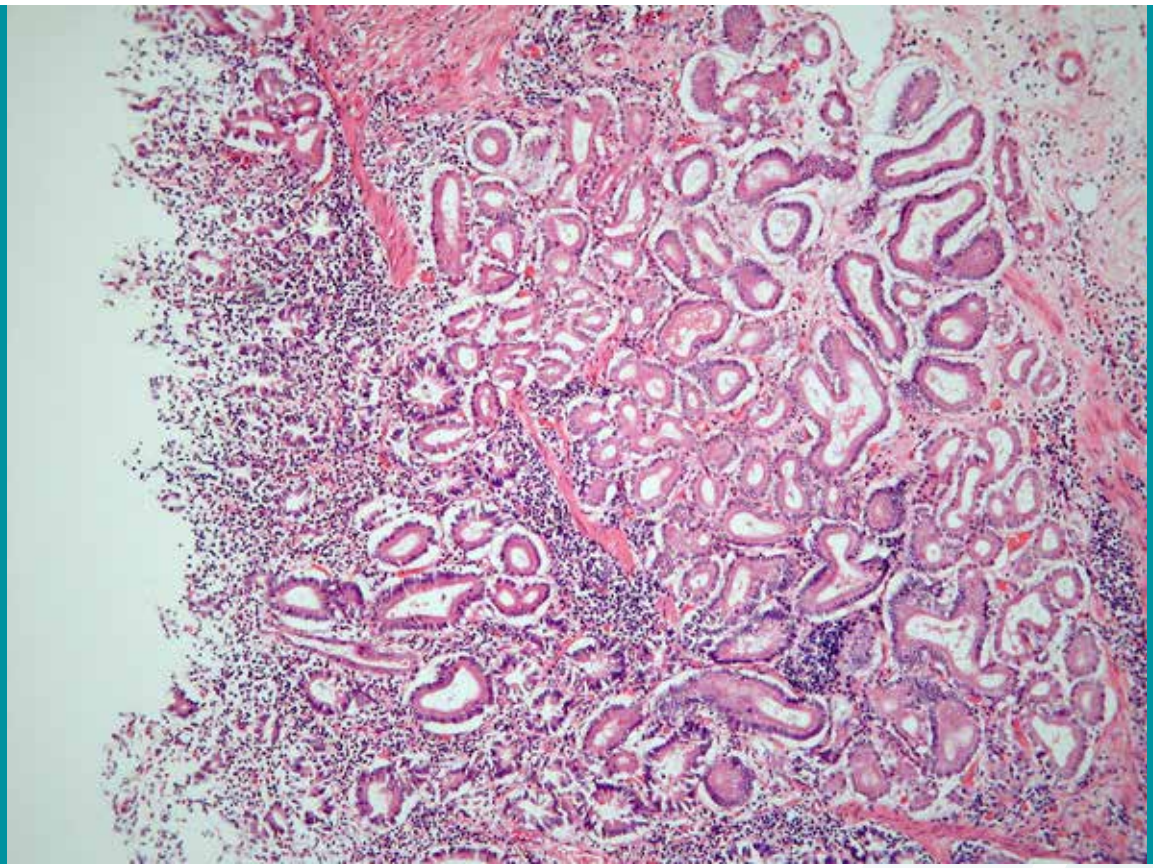

Figure 2
Abomasal adenocarcinoma in a bull, the multiple acini of neoplastic tissue can clearly be seen.

Torsion of the abomasum and omasum was detected in a three-year-old Holstein cow which had presented for several days with profuse diarrhoea and widespread pings on auscultation and percussion of the right flank.

Figure 3
Impaction in a heifer caused by a large amount of plastic in the rumen and reticulum.

Severe impaction of the rumen and reticulum with a large amount of plastic wrapping was seen in a heifer submitted with a history of sudden death (FIGURE 3). It was considered that the severity of the impaction which involved around 80% of the fore-stomach volume could have caused the death of this animal.

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in Table 1. Overall, *Cryptosporidium* species and rotavirus were the most common pathogens identified.

Table 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, July to September 2014

Pathogen	Number	
	Tested	Positive (per cent)
Cryptosporidium species	155	36 (23.2%)
Rotavirus	153	33 (21.6%)
Coronavirus	151	8 (5.3%)
Escherichia coli K99	38	1 (2.6%)

Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in Table 2.

Table 2: Endoparasitic infections in ruminants in Northern Ireland, July to September 2014.

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	943	804	91	30	9	9	14.7%
Ovine	348	321	17	9	0	1	7.8%
Paramphistome							
Bovine	942	613	97	135	48	49	34.9%
Ovine	369	343	12	8	3	3	7.1%
Coccidia							
Bovine	1045	824	180	23	7	11	21.2%
Ovine	408	103	242	49	7	7	74.8%

Strongyle worm egg count	Total	<500 epg	≥500 epg	% Positive
Bovine	1034	953	81	7.8%
Ovine	407	324	83	20.1%

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance
+ Low, ++ Moderate, +++ High, ++++ Very high

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 221 bovine faecal samples. 10 samples (4.5 per cent) contained acid-fast organisms typical of MAP. Of 3251 bovine blood samples that were tested for antibodies to MAP 296 (9.1 per cent) were positive.

Nutritional and metabolic disease

Poisoning due to pyrrolizidine alkaloids following ingestion of ragwort (*Senecio jacobaea*) was diagnosed in an eight-year-old cow, which had died following a period of dullness and lethargy. At gross post-mortem examination left displacement of the abomasum was noted. The liver was observed to be firm, pale, and fibrous. Histologically there was hepatic fibrosis and marked megalocytosis, characteristic of pyrrolizidine poisoning.

Hepatic necrosis and hepatopathy

A bull which had become suddenly and uncharacteristically aggressive was found dead and was submitted for post-mortem examination. The history indicated that a cow in the same herd had been similarly affected a short while previously. Histologically there was massive hepatic necrosis, the underlying cause of which could not be determined. Advice was given to remove the cattle from the rough pasture on which the cases had occurred and no further cases were reported following this move. Phytotoxicity was thus considered to be a potential cause of the liver necrosis.

Similarly severe lesions of liver necrosis and haemorrhage consistent with a toxic insult were seen in an eleven-month-old calf from another unrelated herd which died suddenly whilst at grass. No significant organisms were recovered from routine and liver cultures and a toxic aetiology was suspected but no causal agents were identified.

Reproductive and mammary diseases

Abortion

Specimens from 85 bovine abortions and stillbirths were examined during the 3rd quarter. Significant pathogens were detected in 34 cases (40 per cent). Of these, *Salmonella* Dublin (7 cases, 8.2 per cent) was the most commonly identified pathogen. Other pathogens identified included *E.coli* (6 cases, 7.1 per cent), *T pyogenes* (6 cases, 7.1 per cent), *Neospora caninum* (5 cases, 5.9 per cent), BVDV (3 cases, 3.5 per cent), *Bacillus licheniformis* (3 cases, 3.5 per cent) and *Leptospira* (2 cases, 2.4 per cent).

Mastitis

A total of 474 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 58 (12.2 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 101 samples. *E.coli* was the most frequently isolated organism and accounted for 23.0 per cent of isolates cultured.

Other frequently identified organisms included, *Streptococcus uberis* (21.1 per cent), *Staphylococcus aureus* (9.1 per cent) and *Streptococcus dysgalactiae* (3.6 per cent).

Urinary tract diseases

Urolithiasis in a bull

Urolithiasis was diagnosed in a two- year- old bull. A hard pea-sized calculus obstructed the distal penile urethra about twelve inches proximal to the urethral opening. Proximal to the obstruction the urethral mucosa was haemorrhagic. The bladder was ruptured with leakage of urine into the peritoneal cavity. A history of concentrate feeding could not be confirmed but was considered to be likely.

Acute renal infarction was detected in an adult cow which had previously been treated for milk fever. On gross examination the abomasum was seen to be distended with semi – solid contents and the rugae were oedematous with marked petechial haemorrhage. The kidneys were enlarged, pale in colour and showed cortical haemorrhage. On histological examination of the abomasum there was extensive mineralisation in the neck regions of the gastric glands, with necrosis of the parietal cells (FIGURE 4). Examination of the kidney showed lesions of pre-existing membranous glomerulonephropathy and acute infarction. The changes seen in the abomasum were considered to be consistent with an ongoing nephropathy.

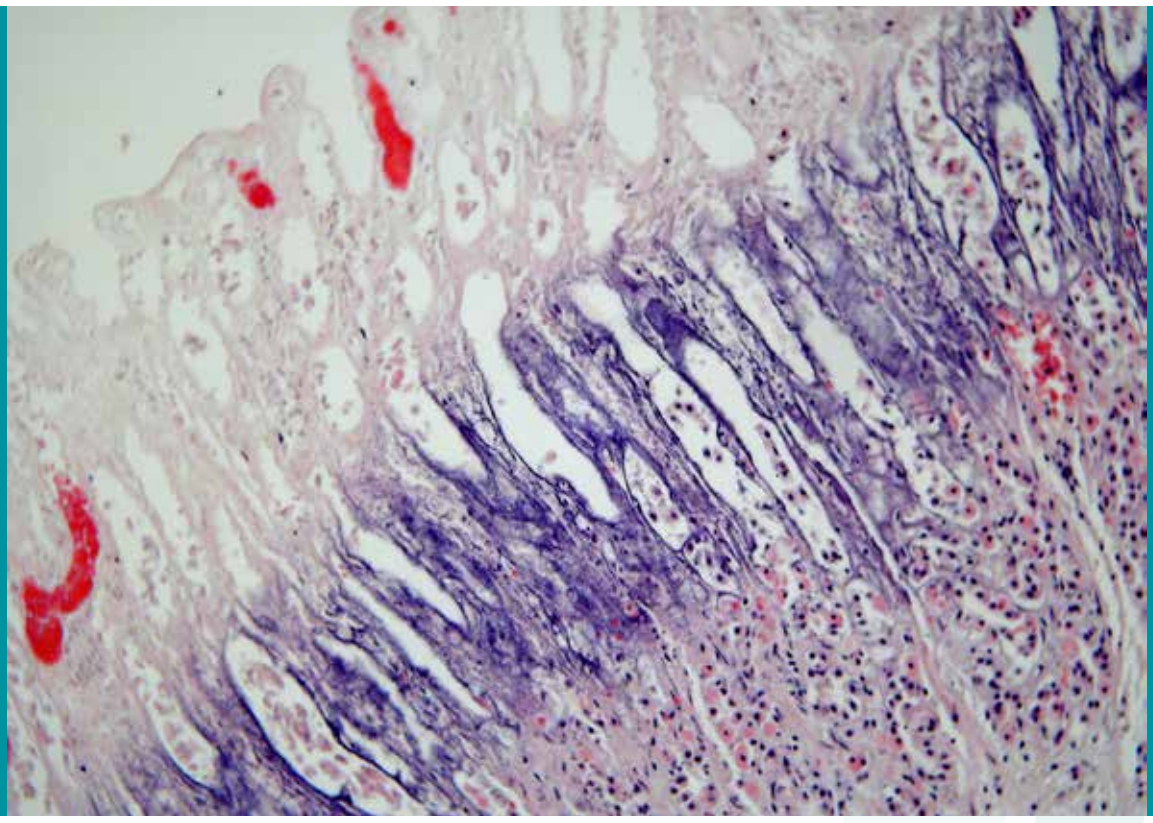

Figure 4

Mineralisation of the neck region of the gastric glands and necrosis of the parietal cells in the abomasum of a cow with glomerulo-nephropathy

Neurological diseases

Clostridium botulinum type C / D toxin was diagnosed in 2 cases during the 3rd quarter of 2014. In only one of these cases could a definite association with the spreading of broiler house litter on pasture be confirmed. In one further case, Cl. botulinum C/D toxin was detected by ELISA following culture of small intestine contents, indicating that organisms capable of elaborating these toxins were present. In this case there was a Black disease lesion in the liver and this may have been the cause of death.

Two yearling heifers out of a batch of five presented with blindness and excessive salivation ten days after being moved onto new pasture. Small flakes and pieces of non-magnetic metal were present in the reticulum of one heifer which was euthanased on welfare grounds. Kidney lead levels were elevated (40 ug/g). Interestingly on histological examination of the brain there were lesions typical of polio-encephalomalacia similar to those present in cases of thiamine deficiency induced polio-encephalomalacia and sulphur related polio-encephalomalacia. It was noted that histological lesions of polio-encephalomalacia related to lead toxicity are an uncommon finding, and are more likely to be observed in cattle with longer survival times.

Halogenated salicylanilide toxicosis was diagnosed on the basis of characteristic histological findings in a thirteen -month -old heifer which presented with nervous signs one day after treatment with a closantel containing product and died a further day later.

Other diseases of cattle

Aortic thrombosis in a heifer

Focal arteritis of the aorta continuous with a necro-haemorrhagic mediastinal mass, which communicated with the oesophagus, was detected on postmortem examination of a sixteen- month- old heifer which had been found dead. Haemorrhage from the lesion into the distal oesophagus had resulted in a large volume of blood being present the fore-stomachs. Extensive fibrous adhesions in the anterior abdomen were considered to be consistent with the involvement of a reticular foreign body in the development of these lesions, but no foreign body was detected on examination.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 19 ovine post mortem submissions during this quarter. Jaagsiekte (seven cases), *Mannheimia haemolytica* (six cases) and laryngeal chondritis (two cases) were the most common diagnoses.

Jaagsiekte was diagnosed in a five-month-old lamb based on typical gross and histological findings (FIGURE 5).

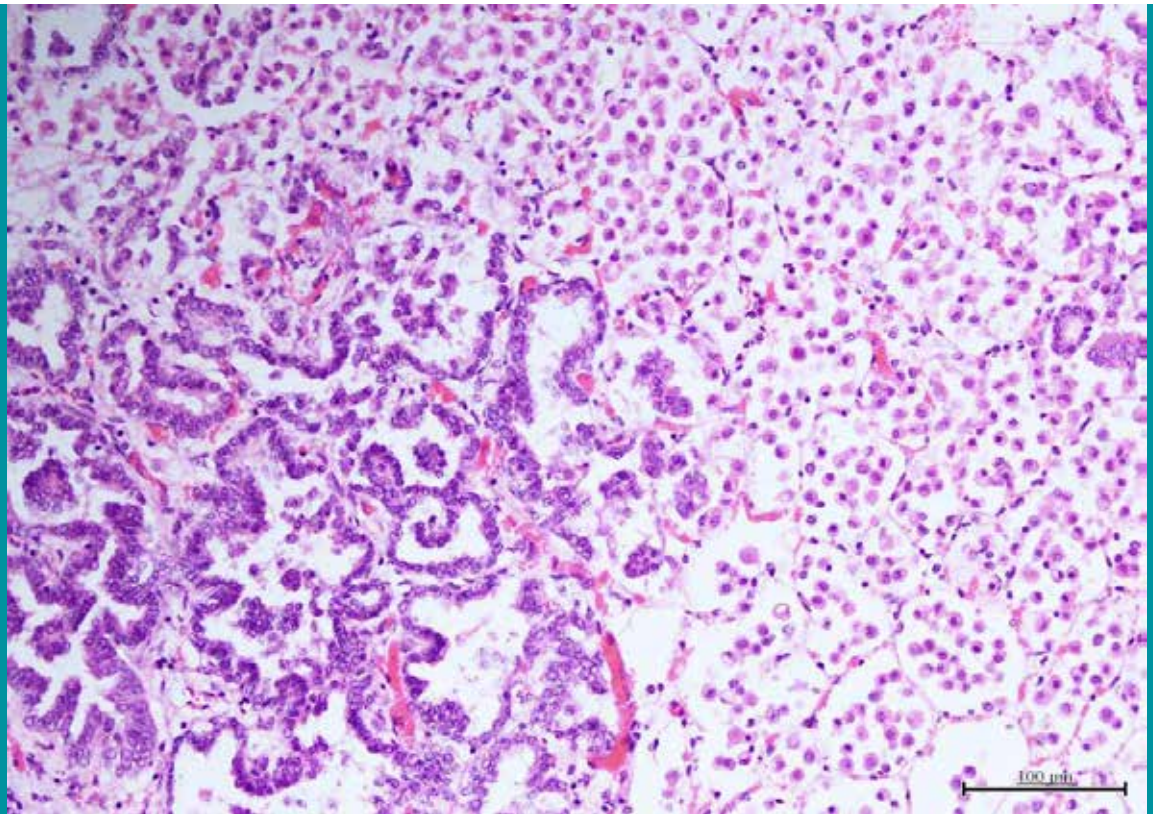

Figure 5

Jaagsiekte in a lamb, tumour nodule with columnar cells lining the alveolar walls and forming papillae within lumina.

Secondary bacterial pneumonia was also present and *Mannheimia haemolytica* was cultured from the lung. Jaagsiekte had not previously been diagnosed in the flock. Whilst Jaagsiekte is usually seen in sheep two- to four- years old it may be seen in lambs as young as two months. A further case of Jaagsiekte with secondary *Pasteurella pneumonia* was seen in an adult ewe in an unrelated flock. This sheep had been vaccinated against pasteurellosis and it was noted that sheep with Jaagsiekte remain vulnerable to pneumonic pasteurellosis despite vaccine use.

Parasitic gastro-enteritis and low liver copper levels were considered to be possible precipitating factors for *Pasteurella pneumonia* in a first season lamb which died in late September. In this case the *Pasteurella* vaccination programme was incomplete with only the first injection of the primary course having been given three weeks previously.

Alimentary diseases

Johne's disease

9 ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. 1 sample (11.1 per cent) contained acid-fast organisms typical of MAP.

Of 4 ovine blood samples that were tested for antibodies to MAP 2 (50 per cent) were positive.

Reproductive diseases

Abortion

One specimen from an ovine abortion and stillbirth was examined during the 3rd quarter. No significant pathogens were detected.

Neurological diseases

Listeria monocytogenes was recovered from brainstem cultures of a five-month-old lamb which was presented for post-mortem examination following lateral recumbency. Two other lambs in the group had died following similar clinical presentation over the previous four weeks. The lambs were at grass and there was no history of silage feeding. Histological examination showed perivascular cuffing of lymphocytes and neutrophils with associated micro- pyogranulomas and spongy change of the neuropil considered consistent with listerial encephalitis.

Pasteurella meningitis in a lamb

Suppurative meningitis was diagnosed in a six-month-old lamb which presented clinically with a high temperature. On gross pathology there was thick grey-green exudate over the brainstem, at the base of the cerebellum and in the lateral ventricles. *M. haemolytica* was recovered from brain cultures. Meningitis due to *M. haemolytica* is a sporadic form of ovine pasteurellosis.

Skin diseases

No cases were examined for sheep scab during the 3rd quarter of 2014.

Other diseases of sheep

Valvular endocarditis and haemopericardium in a ewe

Valvular endocarditis and haemopericardium were diagnosed as the cause of death in a three–year-old ewe which presented dull for several days. There were lesions of vegetative endocarditis on the right atrio-ventricular and aortic heart valves. Histological examination showed endocarditis associated with neutrophil infiltrate, fibrin, haemorrhage and intra-lesional bacteria. *Fusobacterium necrophorum* was recovered from heart valve cultures.

HORSES:

4 swabs were examined for the presence of *Taylorella equigenitalis* during this quarter, all of which were negative. 5 swabs were cultured from horses with a history suggestive of strangles during this quarter, 1 of which was positive.

PIGS;

Two cases of pyometritis in sows were recorded during the reporting period, in each case the uterus was distended with thin liquid pus. *E. coli* was recovered from uterine pus in both cases with *Nocardia* sp being also cultured in one case. *Nocardia* is an unusual isolate from these cases.

Toxic mastitis due to *E. coli* infection was diagnosed in a recently farrowed sow. On gross examination the caudal mammary glands on the right and left sides were oedematous and haemorrhagic with large necrotic foci present within the parenchyma of the glands. *E. coli* was recovered from the mammary glands and in septicaemic distribution.

Greasy pig disease

Severe crusting dermatitis with scabs over the head, face, ears, neck and ventrum, grossly suggestive of exudative epidermitis of pigs (greasy pig disease) was present in a one-week-old male pig. Numerous coccoid bacteria were present in histological sections. *Staphylococcus hyicus* was not recovered on bacteriology however *Staphylococcus sciuri* was cultured. *S. sciuri* has previously been described as a cause of greasy pig disease. It is considered that skin trauma is important in the development of greasy pig disease. Other predisposing factors include agalactia of the sow, concurrent infections and nutritional deficiencies. Several litters had been affected on this farm over the previous months with poor response to amoxycillin therapy.

BIRDS: Cage and aviary

PMV-1 Wild – type infection in a pigeon

A live pigeon with head tremor was presented for examination. Three other birds had also developed nervous signs during the previous fortnight. Gross postmortem findings were unremarkable. Histologically there was mild perivascular lymphocytic cuffing in brain sections and mild neuronal necrosis (FIGURE 6).

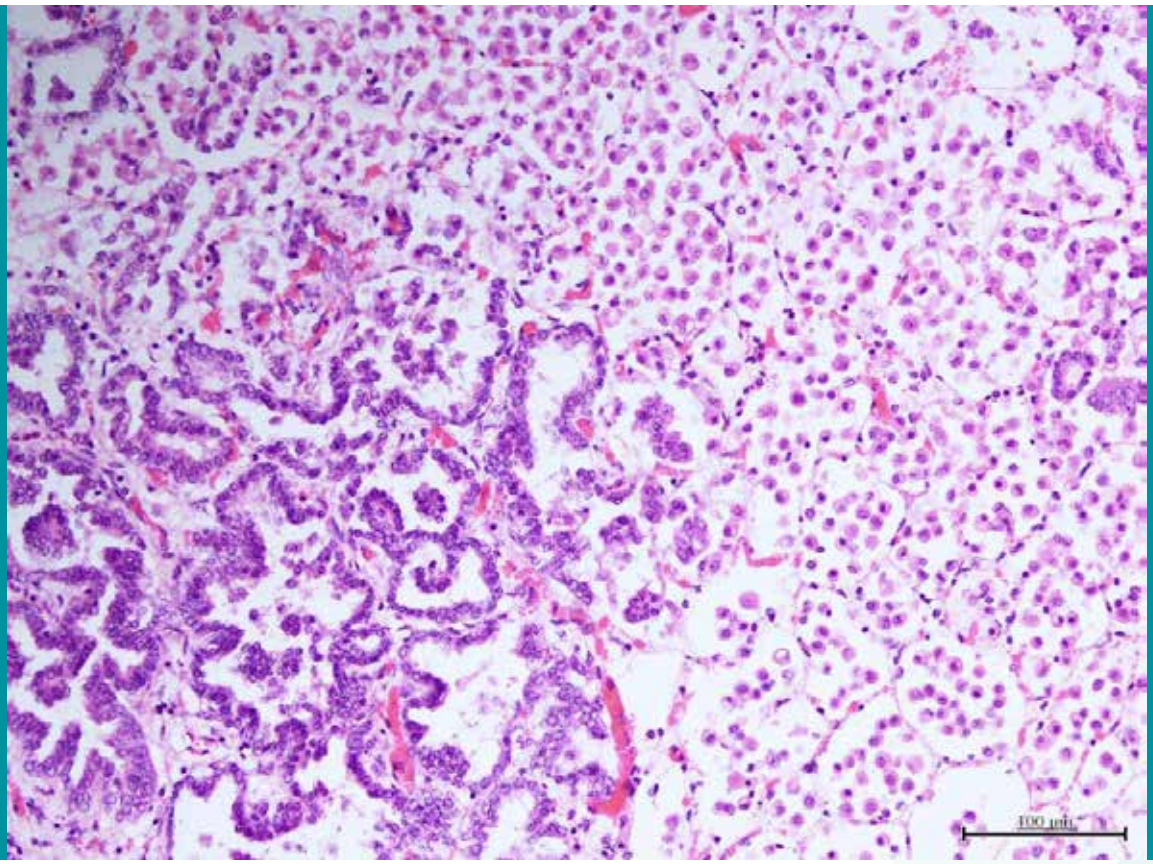

Figure 6

Perivascular lymphocytic cuffing and neuronal necrosis in the brain of a pigeon infected with wild type PMV-1

Nucleic acids for PMV-1 were detected by RT-PCR. Enzyme restriction analysis and sequencing the area of the fusion gene as recommended by the OIE to determine virulence were performed. Both restriction and sequencing analysis suggested that this APMV-1 was 'virulent' in nature.

Fungal pneumonia and air- sacculitis were diagnosed in a juvenile Gentoo penguin (*Pygoscelis papua*) submitted from a zoological collection. On gross examination there was massive fungal pneumonia and air sacculitis with involvement of the mediastinum and pleura. White/green coloured plaques of fungal colonies were present on the pleura and air sac membranes. There were pale white foci throughout the lung parenchyma. *Aspergillus fumigatus* was recovered in profuse growth from cultures of the lung and air-sacs.