

Wet Lungs, Varicose Veins and Thoracic Cysts : Pathological titbits from Batchelar Animal Health Laboratory



by A C Johnstone
Batchelar Animal Health Laboratory
P O Box 1654, Palmerston North

The disease entities presented in this paper have been chosen for their interesting and unusual pathological features. Included is a form of acute interstitial pneumonia usually of sporadic incidence and of unknown aetiology, but which has pathological similarities to the bovine form of acute interstitial pneumonia associated with tryptophan toxicosis; a chronic form of malignant catarrhal fever; and a previously undescribed syndrome of intrathoracic cystinosis.

Cervine Acute Interstitial Pneumonia

Acute interstitial pneumonia (AIP) has been reported in several domestic animal species, (notably cattle), in response to a diverse group of aetiological agents. The best characterized syndrome is that associated with pulmonary toxicosis following the grazing of pasture which has undergone an abrupt change from dry to lush and green condition. The probable pathogenesis is the metabolism of L-tryptophan in the pasture to 3-methylindole in the rumen. This is in turn altered to a pneumotoxic compound in the Clara cells of the lung and induces the characteristic gross and microscopic lesions of AIP⁽²⁾. This report describes a pathological syndrome of deer in New Zealand resembling this form of bovine AIP.

Clinical and Post-mortem Observations

Since 1984 histological material from lungs of 12 deer with lesions consistent with acute to sub-acute AIP of cattle have been referred to the NZ Registry for Animal Pathology at the Batchelar Animal Health Laboratory, Palmerston North, from the Invermay, Lincoln and Batchelar Animal Health Laboratories. All were aged between four and seven months except one four year old red deer. With the exception of the older animal which died in January, all deaths occurred from April to July. Ten of the affected animals were red deer while the other two were wapiti cross and fallow deer respectively. The material examined was submitted from separate outbreaks on eight properties with single deaths in four of these. On the other properties a total of 22 deer had died, however in all but three of these, tissues from only single animals were submitted for diagnostic testing. The properties affected represented a wide geographical spread which included Otago, Central Otago, West Coast of the South Island, Nelson, Wanganui, Taranaki and Southern Hawke Bay regions.

In most cases the deer were reported to die either suddenly or following a short course of acute respiratory distress.

The post-mortem appearances of affected lungs varied, but most were described as being diffusely reddened, oedematous and firm, fleshy or turgid in consistency. Many had air bubbles in interlobular tissue and beneath the pleura. Lungworms in the air passages were recorded in four cases, but in two of these they were present only in small numbers.

Histopathology

Most lungs had inflamed lobules alternating with more normal lobules. The former had diffusely thickened alveolar walls, often with type II alveolar cell proliferation and effusion of protein-rich fluid and hyaline membranes. In the more acute lesions there was necrosis of type I alveolar cells. Interlobular septae were congested or oedematous and emphysematous. The cells in the inflammatory exudate varied in type, but in most cases mononuclear histiocytes were prominent. Multinucleated histiocytes and neutrophils were frequent in some lung sections.

Discussion

The histological lesion of acute to subacute interstitial pneumonia in the lungs of the deer represents a pathological syndrome which has not previously been described in this species. The similarities between this condition and that described in AIP of cattle is striking and it is tempting to propose a common pathogenesis and aetiology. However such an interpretation requires a careful assessment, especially in view of the lack of completeness of the case histories and the recognition that a diverse group of aetiological agents can produce lesions of interstitial pneumonia similar to those described here. Agents which at times may produce these changes include acute viral pneumonias, acute hypersensitivity states and a group of endogenous metabolic and toxic conditions resulting in acute alveolar injury with inflammatory oedema or more severe necrotizing processes.³

In some of the deer concomitant disease problems were identified. These included copper deficiency, chronic interstitial nephritis caused by leptospirae and parasitic bronchitis due to lungworm infestations. It is unknown whether or not any of these conditions were related causally to the acute and subacute interstitial pneumonia. In one respiratory disease outbreak in which 7 of 49 deer died in a 24-hour period, mature lungworm were reported not to be present. This was confirmed histologically. Four weeks later additional deaths were diagnosed in this same group of animals due to severe *Dictyocaulus* infestation. The fact that the earlier deaths could have coincided with a heavy *Dictyocaulus* larval challenge is an intriguing observation which may be of aetiological significance. Sudden deaths associated with heavy *Dictyocaulus* infestation is common in deer⁴, however the cause of death in such cases is attributed to blockage of the trachea and bronchi by adult and larval nematodes and the accompanying inflammatory response. Acute interstitial pneumonia has not been recorded in such cases⁵

Other conditions reported to cause lung lesions of deer include parasitic pneumonias due to *Muellerius capillaris*, *Elaphostrongylus cervi*, tuberculosis, pasteurellosis, aspiration pneumonia, bluetongue, lung abscesses caused by *Actinomyces pyogenes* and *Staphylococcus aureus*, aspergillosis and malignant catarrhal fever.⁵⁻⁷ None of these conditions should be confused pathologically with the AIP disease described here. In conclusion, it is clear that additional investigation of the prevalence, distribution, clinical and pathological features, and causal factor(s) is required to better define this condition.

References

1. Yates W D G, 1988 : The Respiratory System. In *Special Veterinary Pathology*, 1st ed, Thomson R G. B C Decker Inc, 100-101.
2. Dungworth D L, 1985 : The Respiratory System. In *Pathology of Domestic Animals*, Third Ed, Jubb K, Kennedy P C, Palmer N. Academic Press Inc, 530-532.
3. Schiefer B, Jayasekara M U, Mills J H L, 1974 : Comparison of naturally occurring and tryptophan-induced bovine atypical interstitial pneumonia. *Veterinary Pathology* 11: 327-339.
4. Wilson P R, 1984 : Diseases relevant to deer farming. In *Deer Refresher Course*, Proceedings No 72, University of Sydney Post Graduate Committee in Veterinary Science.
5. Monro R, Hunter A R, 1983. Histopathological findings in the lungs of Scottish red and roe deer. *Veterinary Record* 112: 194-197.
6. Presidente, P J A, 1984 : Parasites of farmed and free ranging deer in Australia. In *Deer Refresher Course*, Proceedings No 72, University of Sydney Post Graduate Committee in Veterinary Science.
7. Borg K, 1986 : Aspiration pneumonia in game animals. *Svensk-Veterinartidning* 38:608.

Chronic Malignant Catarrhal Fever

The usual syndrome of malignant catarrhal fever (MCF) observed in deer in New Zealand is an acute or peracute syndrome characterised by haemorrhagic enteritis and sudden death. Chronic MCF has been described in this country by Wilson *et al*⁽¹⁾ and Orr and Mackintosh⁽²⁾ as a rare sporadic form of this disease. A similar case is presented in this report.

Case report

A Red deer hind aged three years showed progressive loss of condition over a 5-6 week period which led eventually to its death. At necropsy there was extensive perirenal haemorrhage and the blood vessels of the kidneys, uterus and mesentery were described as enlarged.

Blocks of kidney, liver, spleen, intestine and mesentery were submitted for histological examination. In each tissue the nodular swellings identified grossly consisted of organising vascular thrombi associated with irregular proliferative inflammatory and degenerative medial and perivascular changes. The lesions progressed from acute fibrinoid necrosis of arterial media typical of acute MCF to granulation tissue and fibrosis accompanied by lymphocytic, plasmacytic and histiocytic cellular inflammatory infiltrates and mineralisation.

Discussion

There is little information published on the pathogenesis of these "periarteritis nodosa-like" lesions in cervine MCF, the assumption being that the lesions are the natural progression of acute change in animals which survive the normally fatal form of the acute disease⁽¹⁾.

References

- (1) Wilson PR, Alley MR, Irvine AC (1983). Chronic malignant catarrhal fever. A case in Sika deer (*Cervus nippon*). *New Zealand Veterinary Journal* 31:7-9.
- (2) Orr MB, Mackintosh C (1988). Two unusual cases of Malignant catarrhal fever. *Surveillance* 15(5):26.

Intrathoracic cystinosis of deer

In 1992 cystic lesions were submitted fresh and formalin fixed from the thoracic cavity of eight otherwise normal adult deer examined at a slaughter plant in the Manawatu. The cysts were thin walled, filled with clear fluid and situated in the mediastinum, most often within or at the hilus of bronchial and mediastinal lymph nodes or in the subaortic mediastinal reflection. In most cases cysts were multiple, sometimes extending from the thoracic inlet to the diaphragm. The masses varied in size from barely visible to the naked eye to multilocular structures with individual cysts up to 30 mm diameter.

Histologically the lesions were characterised as non-inflammatory cysts lined by squamoid to low cuboidal cells. In smaller cysts the lining cells were occasionally of a low columnar epithelial type with a brush border at the apical surface.

Discussion

The situation and histological features of the cysts suggest a congenital origin, probably of bronchial tissue. Enquiries made of veterinarians at several North Island slaughterhouses indicate these lesions are common in deer. Biliary cysts are also commonly recognised in material submitted as suspect echinococcal cysts and a case in which multiple congenital cysts involving renal, biliary and mediastinal sites has also been identified. Multiple cystinosis syndromes are recognised in several species of animals and man and it is probable that the mediastinal cysts of deer represent a component of a similar syndrome in this species.

References

- (1) Jubb, KVF (1993) Anomalies of the pancreas. In Pathology of Domestic Animals ed KVF Jubb, PC Kennedy and NC Palmer 4th edit, p409. Academic Press, London.
- (2) Robbins, SL (1974) Congenital cystic liver disease. In Pathologic Basis of Disease 1st edition p994. WB Sanders, Philadelphia London Toronto.