



CASE OF INTEREST

Splenic Pathology of Canines

By Lucy Genovese & Trevor Whitbread, Veterinary Pathologists

Recently here at Abbey we began a survey on splenic tumours in dogs. To all those practices that returned questionnaires – thank you very much. Splenic tumours are rather problematic lesions for vets and diagnostic path laboratories. They are often very large which creates problems with fixation and sampling. Haemangiosarcoma is the principle tumour of the spleen in dogs and the disease that practitioners most want to rule in or rule out. But what other conditions do we see in the spleen? It is useful for description purposes to divide splenomegaly into 4 groups.

If the spleen is uniformly enlarged and very congested or bloody in consistency then the main differentials are:

Congestion: torsion, barbiturates, anaesthesia
Acute hyperaemia: inflammation, anthrax, bacterial septicaemia
Acute haemolytic anaemia

If the spleen is uniformly enlarged with a firm or meaty consistency then consider:

Bacteraemia and low grade septicaemia
Chronic infectious disease
Prolonged haemolytic anaemia
Lymphoid hyperplasia
Neoplasia
Stored or deposits of material
Extramedullary haematopoiesis
Splenic myeloid metaplasia, histiocytosis and hypersplenism

If there are nodules with a bloody consistency consider:

Haematoma
Vascular neoplasia
Incompletely contracted areas of spleen
Acute splenic infarction

If there are nodules with a firm, meaty consistency consider:

Nodular hyperplasia
Neoplasia
Granulomas
Abscesses

So what do we see frequently at Abbey? Below is a pie graph showing the frequency/ distribution of splenic disease in dogs. Hamangiosarcoma is the most prevalent tumour. It is worth remembering that haemangiosarcoma in the spleen can cause a diffuse splenomegaly as well as nodular masses. It may also be quite solid and white (depending on its degree of differentiation). A firm pale mass may still be haemangiosarcoma.

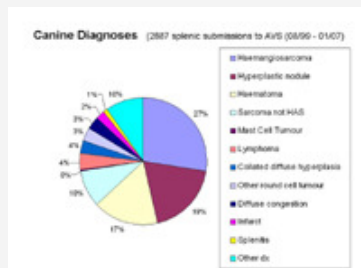


Figure 1. Pie graph showing the frequency/ distribution of splenic disease in dogs

Nodular hyperplasia is also very common and can be quite variable in their gross appearance. These lesions may be composed of predominantly lymphoid hyperplasia or a mixture of EMH, lymphoid hyperplasia and reactive histiocytes. Any lesion that interferes with normal sinusoidal flow may predispose to haemorrhage, ischaemia or haematoma formation and haemorrhage from some of these can be marked.

A recently described variant of nodular hyperplasia is the fibrohistiocytic nodule³. These cases show a combined nodular lymphoid and fibrohistiocytic proliferation with some nodules showing a continuum between benign hyperplasia and malignant splenic stromal neoplasia (malignant fibrous histiocytoma). 93/98 dogs had complete 12 months follow up information with 48% alive and 52% dead. Of the 52% that died 44% died from causes linked to their splenic disease, 35% from competing causes and 21% from unknown causes.

A high proportion of lymphoid to fibrohistiocytic cells was associated with increased long term survival, whereas lower lymphoid: fibrohistiocytic proportions and higher mitotic index indicated a probability of higher short-term mortality.

Another recently described condition that is associated with a diffuse splenomegaly is Splenic myeloid metaplasia, histiocytosis and hypersplenism³. These dogs show severe, diffuse, sustained and progressive splenomegaly. Clinical signs, haematology and serum chemistry were not found to be useful diagnostically. Histologically there was myeloid metaplasia, histiocytosis, erythrophagocytosis, thrombosis and infarction. Only the presence of histiocytic giant cells were prognostically useful and predictive of fatal outcome. In this paper 30% dogs survived 12 months. 53% of dogs with complete post mortem showed multiorgan involvement with histiocytic neoplasia. 47% dogs with complete post mortem only splenic pathology present and a specific cause of death was often not evident. It seems likely that this is a splenic reaction pattern, that may be triggered by more than one clinical condition. Further clinical and pathological correlation will be required.

The next big question is how to sample and how certain can we be that the samples taken are truly representative. The capsule impedes penetration of the fixative and splenic tissue itself fixes poorly possibly because of the blood within the parenchyma. Large portions of splenic tissue in small amounts of

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JOURNAL Reviews(with e-links)

1. Diaz Espineira MM, Mol JA, Peeters ME, Pollak YW, Iversen L, van Dijk JE, Rijnberk A, Kooistra HS. **Assessment of thyroid function in dogs with low plasma thyroxine concentration.** J Vet Intern Med. 2007 Jan-Feb;21(1):25-32. [Link](#)
Trevor Whitbread BSc. BVSc. MRCVS Dipl ECVP

As bovine TSH is no longer available, diagnosis of primary hypothyroidism in dogs is commonly based on low total T4 and high TSH concentrations. However, in up to one-third of dogs with primary hypothyroidism, plasma TSH concentrations are within normal range making it impossible to differentiate primary hypothyroidism from low total T4 concentrations due to non-thyroidal illness. Histological examination of the thyroid, typically taking a biopsy of twenty-five per cent of one thyroid, is the gold standard for thyroid disease. This paper looks at a number of parameters comparing with biopsy results.

2. Shih JL, Keating JH, Freeman LM, Webster CR. **Chronic hepatitis in Labrador Retrievers: clinical presentation and prognostic factors.** J Vet Intern Med. 2007 Jan-Feb;21(1):33-9. [Link](#)
Trevor Whitbread BSc. BVSc. MRCVS DipECVP

Cases of chronic hepatitis appearing in middle-aged or older Labrador Retrievers is discussed. This is a progressive disease that eventually leads to hepatic failure. In a preceding study of European Labradors a strong association with copper was made, but that was not necessarily fully supported in this study. The cause is yet to be fully identified.

3. Ricklin Gutzwiller ME, Reist M, Peel JE, Seewald W, Brunet LR, Roosje PJ. **Intradermal injection of heat-killed Mycobacterium vaccae in dogs with atopic dermatitis: a multicentre pilot study.** Vet Dermatol. 2007 Apr;18(2):87-93. [Link](#)
Trevor Whitbread BSc. BVSc. MRCVS DipECVP

A single intradermal injection of mycobacterium vaccae was evaluated over a three month period in dogs with atopic dermatitis. A significant reduction in clinical signs was achieved in dogs with mild to moderate atopy, but in dogs with more severe atopy there was no apparent affect. The conclusion is that a significant clinical response was obtained in mild to moderate cases from a single injection and that possibly better responses could be obtained using different doses or different administration regimes. The rationale for this therapy (also used in man) is that administration of a saprophytic mycobacterium amplifies regulatory cytokines and hence can affect the severity of the atopic reaction.

formalin fix poorly. If the lesion is very large it is probably best to take large transverse 'bread slice' sections through relevant areas. Preferably keeping them less than 2 cm thick. Concentrate on acquiring marginal areas with normal spleen. If multiple nodules are present sample several and not just the large one. If nodules are present in the omentum, sample them too.

With a diagnosis of haematoma can we be certain there was no underlying haemangiosarcoma? The bottom line is that we cannot be certain of this. We cannot sample every area and there are financial constraints on how many sections we can take. This issue was examined in a study conducted at the University of Pennsylvania⁴. The epidemiologic, clinical, pathologic and prognostic characteristics of splenic haemangiosarcoma and splenic haematoma in 217 canine cases were examined. It was concluded that in most cases splenic haematoma could be differentiated from haemangiosarcoma by histologic examination. The follow up data we received from our recent questionnaire would also suggest that the prognosis for dogs with a diagnosis of haematoma is favourable particularly once beyond the post-operative period.

References

1. Disorders of the Spleen. M. M. Fry and M. D McGavin, (2007) in Pathologic Basis of Veterinary Disease 4th ed. Elsevier. pp809-821.
2. Splenic myeloid metaplasia, histiocytosis and hypersplenism in the dog (65 cases). W.L. Spangler and P.H. Kass. Veterinary Pathology (1999) 36:583-593.
3. Pathologic and prognostic characteristics of splenomegaly in dogs due to fibrohistiocytic nodules: 98 cases W.L. Spangler and P.H. Kass. Veterinary Pathology (1998) 35: 488-498.)
4. Epidemiologic, clinical, pathologic and prognostic characteristics of splenic haemangiosarcoma and splenic haematoma in dogs: 217 cases. Prymak C P et al. JAVMA 1988 193(6) pp 706-711.

4. Cihocki LM, Divers TJ, Johnson AL, Warren AL, Schramme M, Rassnick KM, Scott DW. **A case of multiple epitrachial sweat gland ductal carcinomas in a horse.** Vet Dermatol. 2007 Apr;18(2):134-7.

This reports the presence of multiple small sweat gland carcinomas that developed in a horse over a two year period. Vessel invasion was never identified in any of the lesions and these could therefore have been metastases from a single lesion or multicentric development. The clinically interesting feature is the use of Imiquimod. Some lesions completely regressed, others remained static. The horse was fit throughout and remained fit five months after therapy being instigated. Imiquimod has also been used for the successful treatment of sarcoids. In man it has been used for melanomas, squamous cell carcinomas, vascular tumours and viral infections. This may be a very useful increase in our armory against neoplastic disease. [Link Trevor Whitbread BSc. BVSc. MRCVS DipECVP](#)

LATEST NEWS

Melamine and Cyanuric Acid Interaction May Play Part in Illness and Death from Recalled Pet Food in US.

Excerpt from JAVMA News

"Tests conducted on contaminated pet food and necropsies from affected animals have resulted in a new theory to explain how animals are being adversely affected by contaminated pet foods.

A chemical reaction between melamine and cyanuric acid is suspected of forming crystals and blocking kidney function resulting in acute renal failure.

The investigation into contaminated pet food has focused on melamine contamination of ingredients imported from China, such as wheat gluten, rice protein concentrate and corn gluten (imported into South Africa).

Analysis of the crystals in the kidneys of affected animals have revealed that they are approximately 70 percent cyanuric acid and 30 percent melamine, and are extremely insoluble. Furthermore, tests mixing melamine and cyanuric acid in samples of cat urine resulted in almost immediate formation of crystals that were identical to crystals found in the kidneys of affected animals. Two other melamine-related substances; ammelide and ammeline, may also play roles and are under investigation.

The most recent pet food recalls have been undertaken proactively, due to association with involved ingredients and suppliers rather than as the result of complaints that animals that have consumed the food and become ill.

Most affected cats and dogs are recovering through use of standard fluid therapy and supportive care. The AVMA in the US have urged all veterinarians who have seen animals they suspect have been affected by a contaminated pet food to submit their findings to an ongoing survey. This survey is being conducted by the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and is accessible at www.aavld.org.

SIDE STORY

Study shows cats can succumb to feline Alzheimer's disease.

Ageing cats can develop a feline form of Alzheimer's disease, a new study reveals. Scientists at the universities of Edinburgh, St Andrews, Bristol and California have identified a key protein deposited in neurons which develop mental dysfunction.

In humans with Alzheimer's disease, this protein creates 'tangles' inside the neurons which inhibit neurotransmission. The team says that the presence of this protein in cats is proof that they too can develop this type of disease.

Previous research had identified thick, gritty plaques on the outside of elderly cats' neurons which are similar to those found in humans. By pinpointing this second key marker, the Edinburgh-led team says we can be sure that cats can suffer from a feline form of Alzheimer's.

Dr Danielle Gunn-Moore, at the University of Edinburgh's Royal (Dick) School of Veterinary Studies, said: "This newly discovered protein is crucial to our understanding of the ageing process in cats. We've known for a long time that cats develop dementia, but this study tells us that the cat's neural system is being compromised in a similar fashion to that we see in human Alzheimer's sufferers. The gritty plaques had only hinted that might be the case - now we know.

More Information: [FAB CATS WEBSITE](#)

OUR DETAILS

Abbey Veterinary Services
89 Queen Street
Newton Abbot
Devon
U.K.
TQ122BG

email: admin@abbeyvetservices.co.uk

Tel: +44 (0)1626 353598
Fax: +44 (0)1626 335135

Where we are: [Multimap Link](#)

CYTOLOGY TIPS - Skin masses

- Use fine needles (21 to 25G), to harvest cells. Large needles often induce more bleeding and makes interpretation harder. cell deposits are often too thick.
- The blood smear technique is useful in aspirates from lymph nodes when deposits are thick. The squash technique with or without smearing (depends on quantity of deposit) is usually the routine method for spreading large amounts of deposit. This leaves a slightly thicker deposit at the middle which is not smeared.
- Make several slides with material from different locations within the same lesion to gain a representative sample.
- In cases of suspected neoplasia, aspiration of lymph nodes in the drainage area can be useful to indicate metastatic disease.

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