Breed predisposition of animals to ocular diseases

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Introduction

The spectrum of inherited ocular disease in the world of the pedigree dog involves many breeds and all parts of the eye. In the UK some 44 of the 188 breeds currently Kennel Club registered are involved in 9 proven primary ocular disease conditions. These include defects of the uveal tract, the lens and retina. The possibility of hereditary disease is being investigated in a further 50 breeds and the spectrum of ocular tissue additionally involved includes the cornea and the optic nerve. Although there are noteworthy exceptions, most of the ocular diseases of dogs which are presumed to be hereditary have not been adequately documented. The main reasons for this are:

* related animals are not always available for examination
* controlled breeding trials often impose an economic burden.

The situation is even more difficult when an entity is not present at birth or in the early postnatal period. If an ocular disorder manifests clinically at later age, it is often impossible to examine an adequate number of closely-related animals. The cost of maintaining a breeding colony for an extended time is often beyond the financial scope of our teaching and research institutions.

Until the genetic basis of an ocular disorder is defined, we must satisfy ourselves with informed opinions and terms like “probably hereditary” and “suspected to be hereditary.”

When do we suspect that an entity is inherited?
* when the frequency is greater than in other breeds
* when the frequency increases in a given breed
* when the frequency in a subpopulation of dogs that are interrelated is greater than that noted in unrelated dogs
* when it has a characteristic appearance and location
* when it has a characteristic age of onset and a predictable course (predictable stages of development and time

for each stage to develop)
* when it looks identical to an entity which as been proven to be hereditary in another breed

Currently it is regular clinical examination which represents the most effective way of attempting disease control. The changes in the dog’s retina (i.e. the part of the eye which receives light and converts it into an image in the brain which we “see”) are very subtle in the initial stages. For this reason examinations and opinions of this area must be performed:

a. By a Specialist Veterinary Ophthalmologist – there are two in New Zealand.
b. Done on a yearly basis in order that changes can be monitored for progression if certain diseases are suspected.

By collating the information gained dog breeders are thus able to eliminate undesirable traits from their breed by not using animals suspected or proven to be carriers of these undesirable genes.

Currently in New Zealand, information on the incidence of eye disease in most breeds is largely based on overseas material although I do now have a very good idea of the incidence in New Zealand from data we have accumulated. This year’s launch of the NZKC Eye Scheme will provide an excellent vehicle for the collation of a lot of this data for the future benefit of all dog breeds in New Zealand. It then follows that breeders will be better informed and can thus try to avoid undesirable characteristics in a breed, and owners will benefit by having pets which will fulfil all their expectations.
The following is a complete listing of currently known ocular abnormalities to which certain breeds are predisposed. As clinical research continues, additions and revisions will be made. Familiarity with these predispositions is important to the veterinarian in the recognition and differentiation of ocular disease. It behoves the practitioner to stay abreast of these developments through professional journals and current literature in order to better serve the animal-buying public.

D = autosomal dominant inheritance R = autosomal recessive inheritance * = seen by author in New Zealand

If not specified it can be assumed there is a strong breed association with the problem and there is strong suspicion of inheritance.

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DOGS

Beagle (continued)

Central (PRA) (2yrs+)

Distichiasis

- * Ectropion
- * Hypertrophy (prolapse) of the gland of the third eyelid Iris cysts

Optic nerve hypoplasia

- * Oval corneal opacities (corneal dystrophy)

PPMS

R Primary glaucoma (open angle, narrow angle)

- * Progressive retinal atrophy (PRA) (3–5yrs)
- * Retinal dysplasia – mild lesions, multifocal

VKH syndrome

Bedlington Terrier

Cataracts
Entropion
Distichiasis
Lacrimal puncta atresia (lower) Microphthalmia

Progressive retinal atrophy (PRA)

Retinal dysplasia

R Retinal dysplasia and detachment Belgian Shepherd
PRA

Bernese Mountain Dog

Cataracts
Cataracts/Retinal detachment Entropion
Progressive retinal atrophy (PRA)

Bichon Frise

* Caruncular “wicking”
* Cataracts (3–5 yrs)
* Corneal Dystrophy
* Lower Entropion (medial)

PRA

Strabismus

Bloodhound

* Ectropion
* Ectropion/Entropion

Eversion cartilage of third eyelid KCS
PPM

* Prolapse gland of third eyelid * Redundant forehead skin Bouvier des Flandres

Bouvier des Flandres

Cataracts (congenital)
Entropion
Glaucoma
Mesodermal dysgenesis glaucoma

* PPHV

Border Collie

* Cataracts (4–6 yrs)
D Central progressive retinal atrophy (CPRA) (1–4 yrs) * Collie eye anomaly
* Fibrous histiocytoma
* Glaucoma – primary

Lens luxation
* Progressive retinal atrophy (PRA) * Proliferative keratoconjunctivitis

R Primary lens luxation (4–7 yrs)

Border Terrier

* Cataracts PRA

Retinal dysplasia (folds)

Borzoi
Cataracts (posterior pole 1–4 yrs) Pannus
PRA – early onset (6 mths) Retinal dysplasia

Boston Terrier

Cataracts – congenital
* Cataracts (Juvenile) – diagnosed 8 wks total at 2 yrs
* Cataracts – late onset >4 yrs, slow progression, only

sometimes interferes with vision
* Corneal endothelial dystrophy – Av. 7.5 yrs * Distichiasis
* Glaucoma – primary – closed angle

Hypertrophy (prolapse) of the gland of the third eyelid KCS
Lens Luxation

Afghan Hound

• * Cataracts (4 mths–3 yrs)
  Congenital retinal detachment (complete dysplasia)
• * Corneal dystrophy Eversion of the third-eyelid
• * Medial canthal pocket syndrome
  Mesodermal dysgenesis angle (Iridocorneal angle
abnormality, Glaucoma)
Oversized palpebral fissure (eublepharon) Persistent pupillary membranes (PPMs) Progressive retinal atrophy (PRA)

Airedale Terrier

• * Corneal dystrophy Distichiasis
• * Entropion Pannus

Progressive retinal atrophy (PRA)

Retinal dysplasia (congenital retinal detachment)

Akita

Corneal dystrophy

R* Entropion

Eversion of cartilage of third eyelid
Glaucoma
Multiple ocular anomalies: microphthalmia, congenital

cataracts, posterior lenticonus, and retinal dysplasia Progressive retinal atrophy (PRA) (3–5 yrs)
Retinal dysplasia

* Uveodermatologic Syndrome (VKH)

Alaskan Malamute

• * Cataracts
  Coloboma of optic nerve
• * Corneal dystrophy
• * Glaucoma
R Hemeralopia (cone-dysplasia) * Indolent ulcers

Progressive retinal atrophy (PRA) (2–4yrs)

**Australian Cattle Dog (Queensland Blue Heeler)**

* Cataracts
* Lens luxation

Persistent pupillary membranes * PRA

PHPV

Retinal dysplasia

**Australian Shepherd**

Cataract – posterior cortical – progress to complete – usually 4 yrs or older

Chorioretinal hypoplasia

- * Coloboma/Staphyloma
- * Collie Eye Anomaly

Corneal dystrophy Microphthalmia/multiple defects PPM
Retinal Dysplasia/folds

**Australian Terrier**

* Cataract (6–9yrs) PRA

Retinal dysplasia (retinal folds)

**Basenji**

* Optic disc colobomas
D* Persistent pupillary membranes (PPMs) * Posterior segment colobomas

PRA – retinal detachment

**Basset Hound**

* Ectropion
* Entropion
* Eversion cartilage of third eyelid

Iris cysts
* Mesodermal dysgenesis glaucoma

Oversized palpebral fissure
Persistent pupillary membranes (PPMs) PRA

* Primary glaucoma (narrow/closed angle) * Redundant forehead skin

Secondary glaucoma (subluxation of the lens)
Beagle

Cataracts – Incomplete dominant – seen from 4 mths, posterior axial, non-progressive