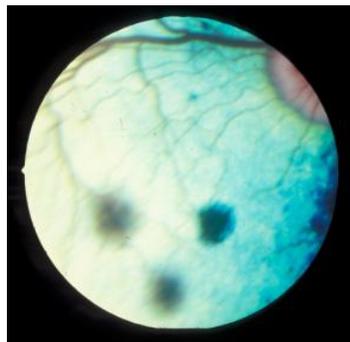




Ophthalmic Emergencies Mini Series

Session Three: Blindness – Ocular and Systemic Causes

David Gould BSc (Hons) BVM&S PhD DVOphthal
DipECVO MRCVS
RCVS and European Veterinary Specialist in
Ophthalmology



SUDDEN ONSET BLINDNESS

Blindness may be classified in a number of ways including:

- Aetiology
- Unilateral or bilateral presentation
- Origin: Ocular, retrobulbar or central
- Sudden onset or gradual onset
- Reversible or irreversible

This session will focus on sudden onset bilateral blindness, which is more typically an emergency presentation.

INITIAL CASE WORK-UP

Initial work-up in all cases of blindness should include the following:

- Clinical history
 - Signalment; vaccination status; environment; worming and anti-parasiticide history; diet; travel history; access to toxins; health status of other pets in household; current or recent medications; current or previous clinical disease; weight gain or loss
 - Body system history: gastro-intestinal, cardiovascular, neuromuscular, skin, teeth, ears, urogenital, CNS
- Ophthalmic examination to identify any obvious ocular cause
- General physical examination
 - Including chest auscultation, abdominal palpation; palpation of superficial lymph nodes
- Neurological examination especially if suspicion of central disease

FURTHER CASE WORK-UP

If an ocular cause for the blindness is not obvious, then seek specialist advice and / or referral. Further investigations will depend on your differential diagnosis list (identified by thorough history-taking and clinical examination):

- If a systemic disease suspected, a typical work-up may include
 - Haematology & serum biochemistry
 - Clotting profile
 - Blood pressure, urinalysis
 - Chest/abdominal imaging
- If an infectious aetiology is suspected (eg for uveitis), targeted virology/ serology/antigen testing/ PCR testing is indicated
 - Dogs: distemper, toxoplasma, Neospora (+ others if non-UK, or imported)
 - Cats: Coronavirus, FeLV, FIV, toxoplasma (+ others if non-UK, or imported)
- If there is doubt as to whether the blindness is ocular or central, referral for electroretinography (ERG) and advanced imaging (MRI or CT) is indicated.

- CSF sampling may be performed in cases of suspected optic neuritis or meningitis. CSF samples should undergo cytological analysis (if performing CSF sampling yourself, contact your local lab and ask them how they would like the sample preserved). If infectious causes are suspected, PCR testing of CSF samples is possible

Ocular causes of sudden onset bilateral blindness

Globe

Bilateral proptosis (severe head trauma) is the most common cause. Urgent globe replacement is indicated.

Globe rupture is of course a cause of sudden onset blindness but is unlikely to be bilateral unless severe trauma.

Cornea

Acute corneal oedema (eg CAV-1 infection, CAV-2 vaccination reaction, 'blue eye') can cause acute onset blindness. Treatment is symptomatic (topical corticosteroids and atropine to treat the anterior uveitis) and it usually resolves over the course of days/ weeks.

Corneal rupture is unlikely to be bilateral in presentation unless severe trauma. Referral for urgent surgical repair is indicated.

Anterior segment

Hyphaema

Hyphaema may present bilaterally in cases of severe head trauma. Treatment is symptomatic, and in many cases the hyphaema will resolve quickly as the blood drains via the iridocorneal drainage angle.

Non-traumatic bilateral hyphaemia is indicative of a systemic bleeding disorder. Detailed history-taking, clinical examination and further tests are indicated (e.g. blood pressure measurement, haematology/ serum biochemistry, clotting times, urinalysis, A. vasorum testing, diagnostic imaging)

- Uveitis, glaucoma and lens luxation require prompt diagnosis and treatment, otherwise permanent blindness may result. Seek urgent advice or ophthalmic referral for any eye presenting with reduced vision, corneal clouding, episcleral redness and abnormal pupillary light reflex
- Treatment and prognosis of retinal detachment depends on the cause. Retinal detachment associated with retinal tears (rhegmatogenous detachments) may be amenable to laser retinopexy. Serous detachments (eg due to systemic hypertension) may re-attach once the underlying cause is treated. Total retinal detachments are seldom amenable to treatment
- Optic neuritis may be idiopathic or due to underlying disease (eg meningitis, toxoplasmosis, GME, neoplasia). Further investigations may include electroretinography (ERG), serology/ virology, advanced imaging and CSF sampling

Anterior uveitis

This seldom causes acute blindness unless it is very severe, or associated with posterior uveitis. See previous notes for work-up of anterior uveitis.

Lipid aqueous

This is seen in systemic lipid disorders, and can mimic corneal oedema (thus is often mistaken for glaucoma). It resolves once blood lipids levels are reduced.

Glaucoma

Acute glaucoma usually presents unilaterally, but rarely bilateral glaucoma can occur. See previous notes for details of work-up and treatment.

Lens

Diabetic cataract is a common cause of sudden onset bilateral blindness, due to osmotic disruption within the lens leading to precipitation of the soluble lens proteins. It is often associated with lens induced uveitis. Referral for cataract surgery is indicated.

Anterior lens luxation usually presents initially unilaterally, but bilateral presentation can occur. See previous notes.

Vitreous

Vitreous haemorrhage can develop secondary to trauma, systemic bleeding disorders or intraocular disease (eg neoplasia, retinal detachment, uveitis). It takes many months to resolve, and can lead to formation of vitreal traction band which in turn may cause retinal detachment.

Retina

There are many retinal causes of sudden onset blindness. Examples include:

- Retinal detachment secondary to systemic hypertension (especially cats)
- Sudden Acquired Retinal Degeneration Syndrome (SARDS) in dogs
- Drug toxicity (eg enrofloxacin toxicity in cats, ivermectin poisoning in dogs)
- Severe posterior uveitis
 - Infectious causes (viral, bacterial, protozoal, mycotic/ fungal, parasitic)
 - Immune-mediated/ autoimmune
 - Work-up of these cases can be complex, and specialist advice is advised
- Optic neuritis may show as a swollen, reddened optic nerve head, often with adjacent peripapillary oedema. Optic neuritis causes blindness, in contrast to papilloedema.
- There are a number of causes of optic neuritis, including
 - Distemper
 - GME
 - Toxoplasma
 - Neospora
 - Meningitis
- Typical work-up would include MRI scanning and CSF sampling, and treatment will depend on the cause

Retrobulbar

Retrobulbar optic neuritis can be a diagnostic challenge, since the optic nerve head itself may look normal, yet the retrobulbar portion of the nerve is inflamed. Diagnosis is made by MRI and CSF sampling.

Central

Central causes of sudden onset blindness include:

- Brain trauma
- Cerebral hypoxia
 - e.g post-anaesthetic blindness in cats
- Hepatic encephalopathy
 - Due to toxaemia, usually presenting an hour or so following feeding
- Raised intracranial pressure
 - eg hydrocephalus
- Meningitis
- Encephalitis
- Systemic toxins
- CNS infarct
- CNS bleed
- CNS neoplasia

SUMMARY

Sudden onset blindness presents a diagnostic challenge due to the large differential diagnosis list. A rigorous and systematic clinical approach is required. Prompt referral is indicated in many cases due to the potentially complex and serious nature of the condition, and to maximize the chance of recovery of vision.