

Practical Neurology Head Tilts & Falling Down When is it Serious?

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Head Tilts and Falling Down

Etiology

- Vestibular Disease
- Cerebellar Disease
- Severe Conscious Proprioception Deficits
- Weakness

Vestibular & Cerebellar

Function of Vestibular System

- Maintains the animal's position in space
- i.e., Helps animal tell up from down, and how to deal effectively with gravity

Function of Cerebellar System

- Regulates rate and range of motion (?)
 - Unconscious proprioception
- Coordinates movement
- Regulates posture

Vestibular & Cerebellar

Signs of Vestibular Disease

- Abnormal Nystagmus
- Vestibular Ataxia, broad based stance
- Leaning, falling - ipsilateral
- Head Tilt
- Side to side head movement if bilateral
- Why??
 - Vestibular apparatus damaged on one side
 - Normal vestibular side continues to feed information to the vestibular nucleus
 - Imbalance interpreted by the brain stem as rotation of the body

Vestibular & Cerebellar

Signs of Cerebellar Disease

- Dysmetria/hypermtria
- Cerebellar Ataxia, broad based stance
- Intention Tremor
- Lack of Menace Response
- Side to side head movement
- Vestibular Signs

Decerebellate Rigidity

- opisthotonus
- Extension of thoracic limbs
- Flexion of the hips
- Consciousness not impaired
- Lesion – acute cerebellar (herniation)

Vestibular Disease

Central vs. Peripheral

Peripheral Vestibular Disease

- Lesion Locations
 - Outside the brain stem
 - Inner ear, middle ear, CN8
- Signs
 - Horner's Syndrome
 - Facial Paralysis
 - Hearing Loss
 - Horizontal or Rotary Nystagmus
 - Horizontal fast phase away from lesion
 - Head tilt away from lesion

Vestibular Disease

Central vs. Peripheral

Central Vestibular Disease

- Location Inside the brain stem
- Signs
 - Vertical or Positional nystagmus
 - Can also have rotary or horizontal nystagmus
 - Fast phase toward or away from the lesion
 - Head Tilt toward or away from the lesion

Paradoxical Vestibular Disease

- Head tilt away from the lesion

Vestibular Disease

Central vs. Peripheral

Central Vestibular Disease

- More likely to show other brain stem deficits
 - other than CN VII and CN VIII
 - altered level of consciousness (RAS)
 - CP deficits are a big clue to vestibular disease that is central rather than peripheral
- Other CNS Signs may indicate multifocal CNS disease
 - Forebrain – seizures, behavior changes
 - Spinal cord lesions

Vestibular Disease

Central vs. Peripheral

Central Vestibular Disease

- DDx
 - Often more serious Disease
 - Any multifocal disease

Cerebellar Signs with Vestibular Signs Mean either:

- Central brain stem/cerebellar disease
 - Cerebellar dysfunction

Neurologic Exam

Mental Status and Behavior

- Normal for peripheral vestibular disease
- Possible decreased consciousness for central vestibular disease
- Normal for cerebellar disease
- Anything can happen with multifocal disease

Neurologic Exam

Eye & Ear

Normal Nystagmus

- Physiologic Nystagmus
 - Jerk nystagmus – has fast and slow phase
 - Move patient's head L, R, up, down
 - Fast phase toward the movement
- Siamese nystagmus
 - Pendular nystagmus - There is no fast and slow phase
 - In Siamese and Himalayan cats, and their mixes
 - Often goes along with congenital strabismus

Neurologic Exam

Eye & Ear

Abnormal Nystagmus

- Usually indicates vestibular disease
 - Or cerebellar disease sending false signals to the vestibular center
1. Abnormal Physiologic nystagmus
 - Moving head up, down, L or R stimulates abnormal eye movements
 - Central or peripheral vestibular dz

Neurologic Exam

Eye & Ear

2. Abnormal Spontaneous Nystagmus

- Involuntary eye movements present when in a normal standing position
- Horizontal, vertical, rotary
- Depends on which semicircular canal is affected

Neurologic Exam

Eye & Ear

- **Horizontal nystagmus**
 - Usually Peripheral vestibular disease
 - Can also be central vestibular disease
 - "fast away" from the lesion if peripheral
 - Fast phase either toward or away from lesion if central vestibular disease
- **Rotary nystagmus**
 - Either Central or peripheral vestibular disease
- **Vertical nystagmus**
 - Highly suggestive of Central vestibular disease

Neurologic Exam

Eye & Ear

3. Abnormal Positional nystagmus

- Involuntary eye movements when animal placed in an abnormal position
- Often in dorsal recumbency

Neurologic Exam

Eye & Ear

Menace Response

- **Absent with cerebellar disease**
- **Present with vestibular disease**
- **May not be present in puppies and kittens less than 12 weeks**
- **May not work well if there is middle ear disease**
 - Peripheral vestibular nerve and facial nerve run together here
 - May be deficient with peripheral vestibular disease due to ear problems

Neurologic Exam

Attitude, Posture and Gait

Attitude

- position of the eyes and head with respect to the body

Posture

- position of the body with respect to gravity

Gait

- Movements when walking or running

Neurologic Exam

Attitude

- **Head tilt (one ear lower)**
 - Unilateral vestibular lesion
 - Either central or peripheral
 - Secondary association with cerebellar dz
 - Head tilt toward the lesion with peripheral vestibular disease
 - Head tilt can be toward or away with central vestibular disease
- **Dropped eye – when head lifted**
 - Aka Positional Strabismus
 - Vestibular disease
 - Disconjugate Strabismus – deviation of both eyes in different directions
 - Rare, but when it happens – central dz

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Posture

- No CP deficits with peripheral vestibular disease or cerebellar disease
- Single strongest sign of central vestibular disease is CP deficits

Gait (4 parts)

- Lameness & Stride Length
- Ataxia
- Paresis/paralysis
- Abnormal movements

Neurologic Exam

Gait (4 parts)

- Lameness & Stride Length
 - Increased stride length with cerebellar disease
- paresis/paralysis
 - No weakness with cerebellar or vestibular disease

Neurologic Exam

Gait – Ataxia

Cerebellar Ataxia

- Inability to regulate unconscious proprioception
 - Rate and range of movement
- Signs of cerebellar ataxia:
 - Dysmetria, hypermetria
 - Hypermetria – exaggerated goose-step type gait
 - Broad based stance

Neurologic Exam

Gait – Ataxia

Vestibular Ataxia

- Inability to tell up from down (assess and respond to gravity)
- Signs of unilateral vestibular ataxia:
 - Head tilt (ipsilateral or contralateral)
 - Abnormal nystagmus
 - Falling in one direction
- Signs of bilateral vestibular ataxia:
 - Crouched position
 - Reluctant to move
 - Side to side head movement
 - Can look very much like cerebellar disease, but not hypermetric & no intention tremor

Neurologic Exam

Cranial Nerves

CN 8 – vestibulocochlear

- Vestibular portion – balance
 - Ipsilateral head tilt
 - Vestibular ataxia – ipsilateral lean
 - Abnormal nystagmus
 - Broad based stance
 - Positional nystagmus
 - Dorsal recumbency produces spontaneous nystagmus
 - “bed spins”
 - Lesion localization – vestibular disease
 - Brain stem, inner ear, middle ear, peripheral nerve

Neurologic Exam

Spinal Nerve Reflexes

- Should be normal with vestibular disease
- May seem exaggerated with cerebellar disease due to hypermetria
- But there will be no clonus

Neurologic Exam

Palpation & Pain

Neck

- Brain stem lesions can be associated with neck pain
 - Possible central vestibular disease

DDx Vestibular Disease

DDx Peripheral Vestibular Disease

- Congenital Vestibular Disease
- Hypothyroidism
- Neoplasia – primary and metastatic
- Idiopathic
- Otitis Media/Interna
- Drug Toxicity
- Trauma

Prognosis generally good for all but neoplasia

DDx Vestibular Disease

DDx Central Vestibular Disease

- Multifocal CNS Disease
 - Prognosis variable
 - Sometimes poor
- Metronidazole toxicity
 - With dose > 50-60 mg/kg/day
 - Central vestibular signs
 - Sometime also cerebral signs
 - Altered mental status
 - Seizures
 - opisthotonus
 - Prognosis Good
 - Signs resolve within 1-2 weeks of stopping metronidazole
 - >30 mg/kg/day rarely needed

Peripheral Vestibular Disease

Hypothyroidism

- Acute onset, non-progressive
- Head tilt and positional strabismus
- Some will have decreased menace and decreased palpebral
 - Facial paralysis
- Vestibular Ataxia
- Sometimes circling
- Signs actually suggest central vestibular disease
- Make sure you rule out hypothyroidism before giving Dx of central vestibular disease & probably poor prognosis

Peripheral Vestibular Disease

Neoplasia

- Include the many neoplasias discussed under spinal cord disease
- Also ear neoplasias
 - Ceruminous gland carcinoma
 - Squamous Cell carcinoma
 - Chondrosarcoma
 - Osteosarcoma
 - fibrosarcoma

Peripheral Vestibular Disease

Idiopathic Vestibular Disease

- Cats of any age
- Geriatric dogs
- Confused with vascular accident or “stroke”
- No detectable structural, metabolic or inflammatory disease
- Acute or peracute onset
- Mild head tilt to severe imbalance and rolling
- No proprioceptive deficits or other signs of central disease

Peripheral Vestibular Disease

Idiopathic Vestibular Disease

- Often improves rapidly (72 hours)
- Recovery may take up to 2-3 weeks
- Some have a persistent head tilt
- Condition can be relapsing
- Supportive treatment

Peripheral Vestibular Disease

Otitis Media/Interna

- 50% of peripheral vestibular disease in older dogs is due to otitis
- Less common in cats
- Dx – PE and radiographs
- Tx
 - Myringotomy to get C&S and clean middle ear cavity
 - Systemic antibiotics
 - Local antibiotics – quinolones, Timentin
 - Bulla osteotomy may be required for inner ear infection
 - Commonly needed for cats with polyps

Peripheral Vestibular Disease

Drug Toxicity

- Systemic – furosemide
- Local
 - Aminoglycosides
 - Ear cleaners

Treatment

Symptomatic Tx of Vestibular Disease

Motion Sickness

- Chlorpromazine
 - 0.2-0.4 mg/kg SQ TID
- Diphenhydramine (Benadryl)
 - 2-4 mg/kg PO or IM TID
- Dimenhydrinate (Dramamine)
 - 4-8 mg/kg PO TID
- Meclizine (Antivert)
 - 25 mg PO SID – medium to large dogs
 - 12.5 mg PO SID – small dogs and cats

Cerebellar Disease DDX

- Cerebellar Abiotrophy
- Cerebellar Dysplasia
- Neoplasia
- Trauma

Cerebellar Abiotrophy

- Degeneration of the cerebellum beginning after birth
- Onset 3-12 weeks of age
- Slowly progressive over weeks to months to years
- Some will stabilize and plateau

Cerebellar Hypoplasia

- Panleukopenia infection or MLV vaccine
- Canine Herpesvirus
- Present at Birth
- Non-progressive
- Sometimes animal improves as it ages - compensates

Cerebellar Trauma

- Trauma to the back of the head
- Brain stem herniation
 - Head trauma
 - CSF tap with high CSF pressure
- Non-progressive