HEAD TILT

BASICS

OVERVIEW

- Tilting of the head to one side, away from its normal orientation with the body and limbs
- Usually associated with disorders of the vestibular system, which maintains the animal's normal sense of balance

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Dogs and cats

SIGNS/OBSERVED CHANGES in the ANIMAL

- Tilting of the head to one side
- Short, rapid movements of the eyeball (known as "nystagmus")
- Drooling, nausea, vomiting
- "Drunken" or incoordinated gait (known as "ataxia")
- Disorientation
- Rolling
- Other signs depend on underlying cause of the head tilt

CAUSES

Peripheral Nervous System Disease

- Anatomic abnormality—congenital (present at birth) head tilt
- Metabolic—inadequate levels of thyroid hormone (known as "hypothyroidism"); pituitary gland tumor (pituitary chromophobe adenoma); disease related to the presence of cancer somewhere in the body (known as "paraneoplastic disease")
- Tumors or cancer—nerve sheath tumor of the vestibulocochlear nerve (also known as "cranial nerve VIII;" the cranial nerves are the nerves that originate in the brain); cancer of the bone and surrounding tissue (types of cancer include osteosarcoma, fibrosarcoma, chondrosarcoma, and squamous cell carcinoma)
- Inflammatory disease—infection/inflammation of the middle and inner ear (known as "otitis media" and "otitis interna"); primarily bacterial infection but also parasitic (such as ear mites, *Otodectes*), mycotic or fungal infections; foreign body; inflammatory masses that develop from the middle ear or eustachian tube (known as "nasopharyngeal polyps") in cats
- Unknown cause (so called "idiopathic disease")—canine geriatric vestibular disease; feline idiopathic vestibular disease
- Immune-mediated disease—disorder of the cranial nerve (known as "cranial nerve neuropathy"); the cranial nerves are the nerves that originate in the brain
- Toxic—aminoglycosides, lead, hexachlorophene
- Trauma—fracture of bones near the ear; ear flush

Central Nervous System Disease

- Disease leading to loss of function (known as "degenerative disease") of nervous tissue—inherited metabolic diseases in which harmful levels of materials accumulate in the body's cells and tissues (known as "storage diseases"); disease in which myelin (a white material that covers certain nerve fibers) is lost (known as "demyelinating disease"); loss of nervous tissue due to a disruption in blood flow to the area (known as a "vascular event")
- Anatomic abnormality—build-up of fluid in specific areas of the brain (known as "hydrocephalus" or "water on the brain")
- Tumor or cancer—types of tumors or cancer include glioma, choroid plexus papilloma, meningioma, lymphoma, nerve-sheath tumor, medulloblastoma, skull tumor (such as osteosarcoma); spread of cancer (known as "metastasis," such as spread of hemangiosarcoma or melanoma into the central nervous system)
- Nutritional disorders—thiamine (a B vitamin) deficiency
- Inflammatory, infectious disease—viral (such as feline infectious peritonitis [FIP], canine distemper); protozoal (such as toxoplasmosis, neosporosis); fungal or mycotic (such as cryptococcosis, blastomycosis, histoplasmosis, coccidioidomycosis, nocardiosis); bacterial (such as extension into the central nervous system from infection/inflammation of the middle and inner ear [otitis media and interna]); parasitic (such as migration of *Cuterebra* larvae); rickettsial (such as ehrlichiosis); algae (protothecosis)
- Inflammatory, noninfectious—inflammation of the brain and spinal cord and the membranes covering them (known as "meninges") characterized by nodular, inflammatory lesions (known as "granulomatous meningoencephalomyelitis"), breed-specific inflammation of the brain and the membranes covering the brain (known as "meningoencephalitis," such as Yorkshire terrier necrotizing encephalitis—inflammation of the brain characterized by the destruction and death of nervous tissue)
- Trauma—fracture of the bone near the ear, with brainstem injury
- Toxic—metronidazole

RISK FACTORS

- Inadequate levels of thyroid hormone (hypothyroidism)
- Administration of medications or products that are toxic to the ear (known as "ototoxic drugs")

- Thiamine (vitamin B)-deficient diet (such as seen when cat is fed exclusively fish diet)
- Infection/inflammation of the outer ear, middle ear, and inner ear (otitis externa, media, and interna)

TREATMENT

HEALTH CARE

- Inpatient versus outpatient—depends on severity of the signs (especially severity of "drunken" or incoordinated gait [vestibular ataxia]), size and age of the patient, and need for supportive care
- Supportive fluids—replacement or maintenance fluids (depend on clinical state); may be required in the sudden (acute) phase when disorientation, nausea, and vomiting prevent the animal from drinking and eating; especially important in senior patients

ACTIVITY

- Restrict activity (such as avoiding stairs and slippery surfaces) to protect the animal, according to the degree of loss of equilibrium; "equilibrium" is the state or condition of being balanced

DIET

- Usually no need for modification of the diet, unless the cause of the head tilt is thiamine deficiency (such as a cat being fed exclusively fish diet without vitamin supplementation)
- Intake of food and/or water may need to be restricted in cases with nausea and vomiting
- Feed carefully, animals with severe head tilt and vestibular lack of equilibrium or brainstem dysfunction may be prone to aspiration secondary to abnormal body posture

SURGERY

- Surgery may be indicated in some cases of inflammation of the middle ear (otitis media) to drain the middle ear (procedure known as "bulla osteotomy")
- Surgery may be necessary to remove inflammatory masses that develop from the middle ear or eustachian tube (nasopharyngeal polyps) in cats and to remove tumors (if they are accessible surgically)
- Specific fracture repair or removal of accumulated blood (known as a "hematoma") is difficult
- Discuss the risks associated with biopsy, surgery, and radiation of a brainstem mass with your pet's veterinarian

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

- Infection/inflammation of the middle ear and inner ear (otitis media and interna)—broad-spectrum antibiotic that penetrates bone, while awaiting bacterial culture and sensitivity results; examples include trimethoprim-sulfa; first-generation cephalosporins, such as cephalexin; or amoxicillin/clavulanic acid; treatment often required for 4 to 6 weeks
- Inadequate levels of thyroid hormone (hypothyroidism)—thyroid hormone (T_4) replacement, such as levothyroxine in dogs; response varies, partly depending on the duration of signs (in some patients, the nervous system disorder [neuropathy] is not reversible)
- Medication adversely affecting vestibular function—discontinue use of the medication, as directed by your pet's veterinarian; signs are usually, but not always, reversible
- Infectious disease—specific treatment, if indicated; for bacterial diseases, antibiotic that penetrates the blood–brain barrier (such as trimethoprim-sulfa or metronidazole); for protozoal diseases, clindamycin; for fungal or mycotic diseases, itraconazole
- Inflammation of the brain and spinal cord and the membranes covering them (meninges) characterized by nodular, inflammatory lesions (granulomatous meningoencephalomyelitis)—usually initially treated with steroids: dexamethasone followed by prednisone; depending on progress, may need stronger medications to decrease the immune response (known as "immunosuppression")—azathioprine; cytosine arabinoside; or radiation therapy
- Trauma—supportive care (such as anti-inflammatory drugs, antibiotics, intravenous fluids)
- Canine geriatric and feline idiopathic vestibular disease—usually supportive care only
- Disorder involving several cranial nerves (cranial nerve polyneuropathy)—response to prednisone usually good, if the patient has a primary immune-mediated disorder
- Thiamine deficiency—diet modification and thiamine (a B vitamin) replacement

FOLLOW-UP CARE

PATIENT MONITORING

- Repeat the nervous system examination at a frequency dictated by the underlying cause of the head tilt

• Cases with inadequate levels of thyroid hormone (hypothyroidism)—measure thyroid hormone ($T_{4)}$ concentration 4 to 6 hours after administration of the thyroid hormone; should be measured at 3 to 4 weeks after initiation of thyroid therapy to evaluate dosage
• Repeat cerebrospinal fluid (CSF) tap and analysis and brain imaging—with some central nervous system vestibular disorders
• Monitor tear production (by doing a Schirmer tear test—technique to measure watery portion of tears) if treating with trimethoprim-sulfa antibiotic
• Monitor complete blood count (CBC), if treating with azathioprine or cytosine arabinoside

POSSIBLE COMPLICATIONS

• Progression of disease with deterioration of mental status
• Brain may push downward in the skull and herniate through the opening that leads to the neck (known as "tentorial herniation" or "brain herniation"), leading to death

EXPECTED COURSE AND PROGNOSIS

• Head tilt may persist
• Prognosis for central nervous system vestibular disorders is usually poorer than that for peripheral nervous system vestibular disorders
• Prognosis usually grave for protozoal, fungal, and viral diseases (such as feline infectious peritonitis [FIP] and canine distemper)

KEY POINTS

• Tilting of the head to one side, away from its normal orientation with the body and limbs
• Usually associated with disorders of the vestibular system, which maintains the animal's normal sense of balance
• Prognosis for central nervous system vestibular disorders is usually poorer than that for peripheral nervous system vestibular disorders