

Degenerative Myelopathy

(a Spinal Cord Disease)

Basics

OVERVIEW

- “Degenerative” refers to degeneration; “degeneration” is the decline or loss of function or structure of a tissue or organ; “myelopathy” is a disorder of the spinal cord
- “Degenerative myelopathy” is a disease of the spinal cord that begins in adult dogs and progresses to extreme weakness and finally paralysis
- Occurs in many breeds

GENETICS

- Recently has been shown in many dog breeds to be the result of a mutation in the *SOD 1* gene (encoding for the super oxide dismutase enzyme that repairs cells and reduces free radical damage); in people mutation of this gene is associated with some forms of Lou Gehrig’s disease
- Most commonly inherited as an autosomal recessive trait with incomplete penetrance, the gene variant has been found in 124 dog breeds while the condition has been confirmed by tissue biopsy in 25 purebred and mixed breed dogs.
- A familial (runs in certain families or lines of animals) inheritance currently is suspected due to the number of purebred dogs affected
- Those dogs that have two copies of the gene (“homozygous”) are most likely to develop the clinical signs of disease, but not all dogs with two copies will develop signs



SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs

Breed Predispositions

- Breeds confirmed to have degenerative myelopathy include the German shepherd dog, Pembroke Welsh corgi, Cardigan Welsh corgi, Chesapeake Bay retriever, Rhodesian ridgeback, boxer, Siberian husky, Bernese mountain dog, miniature poodle, standard poodle, Kerry blue terrier, golden retriever, wirehaired fox terrier, American Eskimo, soft-coated Wheaten terrier, pug, and mixed-breed dogs
- Bernese mountain dogs are the only breed found to have a second mutation of the SOD1 gene
- Other breeds suggested to have degenerative myelopathy include the Irish terrier, Labrador retriever, Kuvasz,

collie, Belgian shepherd, giant schnauzer, and Great Dane

Mean Age and Range

- Mean—9 years of age in large dogs; in Pembroke Welsh corgis, mean age is 11 years of age
- Range—8-14 years of age

Predominant Sex

- Males and females equally affected

SIGNS/OBSERVED CHANGES IN THE PET

Early Signs

- Deterioration of the nerve cells of the spinal cord that control the muscles leading to progressive weakness of the hind limbs (known as “upper motor neuron paraparesis”)
- Subtle (insidious), progressive asymmetric wobbly, incoordinated or “drunken”-appearing gait (known as “ataxia”)
- Gait will show long-strided, spastic weakness or partial paralysis (paraparesis)
- Loss of proprioception; “proprioception” is the normal subconscious awareness of the location of the limbs and movement
- Spinal reflexes usually present or exaggerated
- Decrease of “knee-jerk” reflex (known as the “patellar reflex”) may be seen
- Lack of sensitivity to touch or pain along the spine (known as “paraspinal hyperesthesia”) is a key clinical feature

Later Signs

- Hind-limb weakness or partial paralysis (paraparesis) leading to paralysis, eventually progressing to weakness or partial paralysis of all four limbs (known as “tetraparesis”) or paralysis of all four limbs (known as “tetraplegia”)
- Mild to moderate loss of muscle mass (known as “muscle atrophy”) in the hind limbs
- Reduced spinal reflexes in the hind limbs
- May or may not have lack of control of urination (known as “urinary incontinence”) and/or control of bowel movements (known as “fecal incontinence”)

End Stage Signs

- Paralysis of all four limbs (tetraplegia) characterized by weakness or loss of muscle tone (condition known as “flaccid tetraplegia”)
- Difficulty swallowing and moving tongue
- Absence of spinal reflexes in all four limbs
- Severe, widespread muscle wasting
- Lack of control of urination (urinary incontinence) and loss of control of bowel movements (fecal incontinence)

CAUSES

- Genetic disease
- Hypothesized causes include immune-mediated disease, metabolic deficiencies, toxic-related disorder, and oxidative stress

RISK FACTORS

- Genetic disease; inheritance of gene with SOD 1 gene mutation
- Other factors may be involved (immune system, metabolic deficiency, toxic); studies are underway to learn more about the disease and potential risk factors

Treatment

HEALTH CARE

- Supportive care
- Breeds of small size may survive longer with degenerative myelopathy because the pet owner is able to give appropriate care more easily
- When the dog is unable to walk (known as being “non-ambulatory”), it should be kept on a well-padded surface to prevent “bed sores” (known as “decubitus ulcers”) over bony prominences
- Keep hair trimmed, and skin clean and dry to prevent skin lesions (known as “urine scald”) that develop due to

contact with urine, when the hair and skin remain damp, secondary to inability to control urination (known as “incontinence”)

- Physical therapy using range-of-motion and isometric exercises may help maintain limb mobility and muscle strength

ACTIVITY

- Exercise is encouraged to slow loss of muscle mass (disuse atrophy) of hind limbs, must monitor closely for fatigue
- Water-based physical therapy (known as “hydrotherapy”) can involve use of an under-water treadmill set up
- A wheel cart may assist with pet mobility

DIET

- Maintain a balanced diet
- Prevent weight gain

SURGERY

- None

Medications

- No medication has been proven to be effective in slowing or halting disease progression

Follow-Up Care

PATIENT MONITORING

- Repeat nervous system examinations
- Ensure that the pet is urinating to prevent urine retention
- Monitor urine for odor and color change, which may indicate a urinary tract infection
- Urinalysis and urine culture to check for urinary tract infection

PREVENTIONS AND AVOIDANCE

- Use of a well-padded surface to prevent “bed sores” (decubitus ulcers)
- Ensure that the pet is urinating to prevent urine retention and urinary tract infection
- Keep hair trimmed, and skin clean and dry to prevent skin lesions (urine scald) that develop due to contact with urine, when the hair and skin remain damp, secondary to inability to control urination (incontinence)
- Prevent weight gain

POSSIBLE COMPLICATIONS

- Urine retention may increase the likelihood of urinary tract infections
- Local skin infections from “bed sores” (decubitus ulcers)
- Death

EXPECTED COURSE AND PROGNOSIS

- Paralysis of the hind limbs (known as “paraplegia”) occurs within 6–9 months from time of onset of signs
- Weakness or partial paralysis of all four limbs (tetraparesis) may be evident within 1–2 years from time of diagnosis
- Long-term prognosis is poor

Key Points

- “Degenerative myelopathy” is a disease of the spinal cord that begins in adult dogs and progresses to extreme weakness and finally paralysis
- Long-term prognosis is poor
- Meticulous nursing care is crucial to preventing secondary complications in a recumbent pet