SOUTHEAST VETERINARY NEUROLOGY

Subarachnoid Diverticulum (SAD)

A subarachnoid diverticulum (SAD), also known as a spinal arachnoid diverticulum, is a relatively uncommon cause of spinal cord compression seen mostly in dogs. This *diverticulum*, or pocket, is formed when cerebrospinal fluid accumulates on the outside of the spinal cord within the subarachnoid space, situated between the protective layers called meninges. As the pocket enlarges with fluid, it compresses the spinal cord, disrupting communication between the brain and the body and resulting in neurological signs.

Signs

Subarachnoid diverticula can form at any age and along any segment of the spinal cord, although they usually occur in areas of high mobility. In larger breeds, such as the Rottweiler, they typically manifest in young adulthood in the neck region, whereas in smaller breeds, such as the pug and French bulldog, they tend to appear in middle age along the mid-back.

Symptoms depend on what part of the spinal cord is being compressed by the SAD. If the SAD forms in the neck, all four legs may be affected. However, if it develops in the mid-back, only the hind legs will show signs of dysfunction.

Clinical signs commonly associated with a subarachnoid diverticulum include:

- Slowly progressive limb weakness and lack of coordination
- Urinary and/or fecal incontinence

While not typically painful, symptoms tend to gradually worsen over time.

Causes

Rottweilers, pugs, and French bulldogs are most commonly affected by subarachnoid diverticula. The exact cause remains unclear, though factors such as genetic predisposition; congenital malformations such as instability; or secondary complications from spinal problems like inflammation, degenerative disease, or trauma are considered possible contributors. The answer is most likely multifactorial.

Diagnosis

Diagnosing subarachnoid diverticula relies on advanced imaging techniques, with MRI being the preferred method due to the level of detail that its images provide. This extra information also aids in excluding other spinal cord abnormalities that may be contributing to the condition or even mimicking it.

Once the SAD has been diagnosed, additional testing may be necessary to identify any underlying abnormalities that could have contributed to its formation. Diagnostics might include a CSF analysis to check the cerebrospinal fluid surrounding the spinal cord for signs of inflammation and a CT scan to assess any bone or joint abnormalities. It is important to note that CT scan alone is not typically successful in diagnosing subarachnoid diverticula.

Treatment

Though the diagnosis of subarachnoid diverticula is becoming more frequent with advanced imaging techniques, no standardized treatment protocol has been determined. Management typically involves either surgical intervention to decompress the spinal cord or medical intervention aimed at reducing cerebrospinal fluid production and inflammation.

Surgery is complex and involves removing the spinal cord's protective covering to release the accumulated fluid from the SAD and alleviate compression. If an underlying cause for the SAD formation has been identified, such as spinal instability, and it's possible to address it during surgery, doing so can help prevent recurrence. In cases where surgery is not feasible, anti-inflammatory medications and physical therapy may be employed to slow disease progression.

Prognosis

Prognosis for a subarachnoid diverticulum varies, but recent studies suggest that surgical intervention offers a more favorable long-term outcome. Although many dogs initially improve post-surgery, there is a risk of recurrence, underscoring the importance of identifying and addressing predisposing factors. For some patients, medical management alone may be an option, with variable long-term outcomes.