



Steroid Responsive Meningitis Arte-what's?!

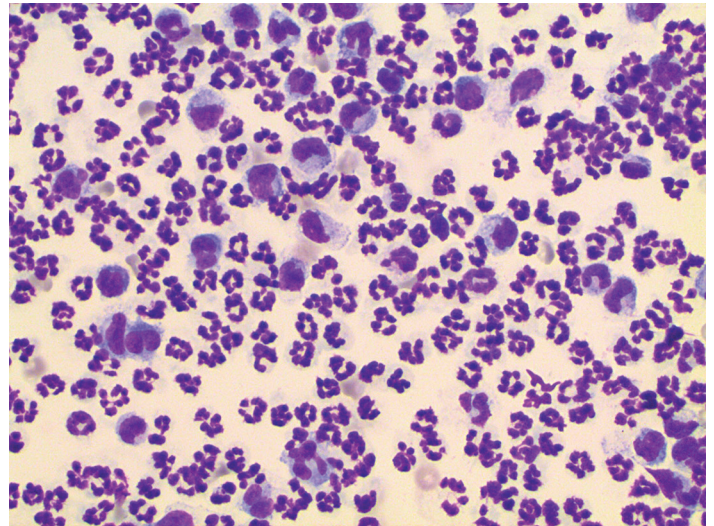
Yes, that phrase. Steroid Responsive Meningitis Arteritis (SRMA) is quite a mouthful, but it is also quite easy to understand. SRMA is a systemic inflammatory disease of young dogs.¹ It is also referred to as a vasculitis of the meninges or inflammation of the blood vessels of the meninges.

In this issue of the Neurotransmitter 2.0, we're going to delve into the components that make up this specific disease. We will explain what SRMA entails, the causes, clinical signs, diagnostics, and recommended treatment options.

Mark Lowrie, a European Veterinary Specialist in Neurology, wrote a thesis based on a study about the potential disease markers of SRMA. He states that *"inflammatory CNS disease can be grouped into two broad categories; those of known infectious etiology and those causing meningoencephalomyelitis of unknown etiology"*.² SRMA is the latter. Although it is an inflammation, most often it is not associated with a bacterial cause.¹

SRMA is most commonly described as an auto-immune disease. In this case, it's important to know that in the immune system, T-cells attack foreign cells or cells that should not be within the body such as viruses, diseases, or bacteria. They have the ability to differentiate between "good" and "bad" cells due to Major Histocompatibility Complex. This complex gives the body's cells the markers along their protein coat to be classified as "good" cells; these markers are also called antigens. In humans, the antigens that classify the "good cells" are known as Human Leukocyte Antigens (HLA). In canines, they are known as Dog Leukocyte Antigens (DLA).³ In this case, SRMA dogs do not have the correct DLA markers; therefore, those cells are classified as "bad" cells. For these dogs, their immune systems, specifically T-cells, are inappropriately attacking the meningeal tissue cells.

In SRMA there is an increased amount of Immunoglobulin A (IgA) within the blood and cerebrospinal fluid. IgA is the most



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abundant antibody isotype in mucosal secretions.⁴ It has also been found to be elevated in the serum and cerebrospinal fluid of other inflammatory and non-inflammatory canine CNS diseases.⁵ The specific cause for an increase in IgA in SRMA dogs is unclear, but genetic predisposition combined with environmental factors seems to be highest on the list. SRMA is susceptible to mostly medium to large breed dogs such as the Boxer, Bernese Mountain Dog and the Beagle; most of you will recognize this as "Beagle Pain Syndrome". Although those breeds seem to be overrepresented with SRMA, it can affect almost any breed of dog. Most clinical signs are observed at approximately 6 to 8 months of age, but dogs up to 3 years old can also show clinical signs.

Clinical Signs

SRMA can be an acute or chronic condition. Patients present with a moderate to high grade fever. They often exhibit pain on different levels from waxing to waning to severe acute pain. A majority of patients will have neck pain, particularly when trying to touch their chin to their chest.⁶ They may be

hypersensitive to touch and frequently cry out at the slightest bit of touch or even when anticipating being touched. This reaction is normally deemed hyperesthesia. These animals' appetites may or may not be decreased and they often are reluctant to exercise as this will exacerbate their soreness. Patients will typically have a short choppy gait when they walk. When attempting to diagnose this disease, we have to take into consideration the clinical signs and symptoms mentioned by owners that have brought them in for examination; however, signs and symptoms will only tell us half of the pet's story. We need to look further to get a better idea of what else, if anything, could be causing this problem.

Diagnosis

The diagnosis of SRMA is usually completed in 3 steps: an MRI, spinal tap and blood samples. Many neurologists will recommend an MRI of the cervical spine to rule out a herniated disc or neoplasia and to make sure there are no malformations. The MRI is non-invasive, but does require general anesthesia to keep the patient still and comfortable during the procedure. During the MRI, the neurologist looks for signs of infection or inflammation. If inflammation is found, it can provide vital clues as to where the inflammation is and how severe it might be. If the MRI is normal, it can still be useful as it can also reveal the overall health of the spinal cord and ensure a spinal tap is safe to perform.

The next and most important step is a cerebrospinal fluid analysis or CSF tap. Once CSF is collected, a cytology along with a protein level and a hemocytometer count would be conducted. The diagnosis of SRMA is usually made by cytology as there will be an increase in WBC, predominantly neutrophils. "A marked neutrophilic pleocytosis is characteristic of this disease, provided it has not been attenuated by therapy".⁷

To help confirm the diagnosis of SRMA, the veterinarian will usually send out a C-Reactive Protein (CRP) sample to check for the amount of inflammation in the body. CRP is a substance

that is produced by the liver in response to inflammation in the body. A patient with SRMA will almost always have a high CRP level. This test is also a great tool to monitor how a patient is responding to treatment and to identify if they are relapsing.

Treatment

Once the patient is diagnosed with SRMA, steroid treatment is started. Because SRMA is an immune mediated disease, steroids are used to suppress the immune system and reduce inflammation. The steroids primarily used are prednisone or prednisolone, starting with a high dose and tapered down over a long period of time. Side effects of steroids may include increased eating and drinking, behavior changes, gastrointestinal upset, and weight gain. Routine bloodwork is recommended during treatment of SRMA as steroids may cause elevated liver values. Cyclosporine can also be used to help with immune suppression when tapering the steroid dose. Cyclosporine has fewer side effects than the prednisone and is usually tolerated better long term.

Treatment lasts about 6 months depending on the patient's response. If CRP levels show any signs of relapse once steroids have been tapered, the veterinarian will likely restart the higher dose of that steroid. Spinal taps following initiation of steroid treatment show a marked decrease in cell counts, but as expected, pleocytosis can increase during signs of relapse.⁸

Prognosis

SRMA can be very scary when initially presented, but tends to have an excellent prognosis. Usually within the first 24-48hrs of steroids, the patient is already feeling better. A high dose of steroids are administered for up to 6 months, then weaned. SRMA has an overall good prognosis, though there are instances of relapse in some cases, this can be treated with a longer secondary treatment plan.



REFERENCES

- ¹ http://vetbook.org/wiki/dog/index.php/Steroid-responsive_meningitis-arteritis
- ² <https://core.ac.uk/download/files/48/9655522.pdf>
- ³ <http://www.akcchf.org/canine-health/your-dogs-health/major-histocompatibility.html?referrer=https://www.google.com>
- ⁴ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3062538>
- ⁵ <https://www.vetstream.com/canis/Content/Disease/dis02559>
- ⁶ <http://www.fitzpatrickreferrals.co.uk/neurology/steroid-responsive-meningitis-arteritis-srma>
- ⁷ http://www.ivis.org/proceedings/scivac/2005/Vernau5_en.pdf?LA=1
- ⁸ <http://www.ncbi.nlm.nih.gov/pubmed/10976624>