Peripheral Nerve Sheath Tumors

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BASIC INFORMATION

Description

Nerves travel from the brain and spinal cord to various parts of the body. Some nerves are involved in muscle movements (motor nerves), whereas others (sensory nerves) are involved in transmitting information such as touch, temperature, pain, and position sense of the legs. Nerves referred to as *peripheral nerves* are located outside the brain and spinal cord.

Nerves are surrounded by supporting cells that protect and insulate them. Tumors (cancers) that develop from these cells are called *peripheral nerve sheath tumors* (PNSTs). These tumors usually grow along the nerve but do not typically spread to other sites in the body.

Causes

This type of cancer most commonly occurs in dogs; however, cats can also develop PNSTs. Affected animals are typically middle-aged to older. The cause of these tumors is unknown.

Clinical Signs

Clinical signs depend on the nerve involved. Usually a chronic, progressive lameness of one leg develops, although a sudden onset of lameness is sometime seen. Early in the disease, pain or muscle loss (atrophy) may be the only clinical sign. These tumors affect a front leg most often but can occur in a hind leg. As the tumor grows, the animal may be unable to use the leg, and adjacent nerves may be affected. If the cancer develops close to the spinal cord and grows into the spinal canal, weakness and an uncoordinated gait can occur in other legs.

PNSTs can also affect the nerves of the head and face. There are 12 pairs of these *cranial nerves*, and they are numbered I through XII. The fifth cranial nerve (V) is the one most commonly affected. It activates the muscles involved in chewing and transmits information on sensation (feeling) in the face. A PNST of this nerve causes shrinkage (atrophy) of the muscles on the top and side of the head. Consequently, the bony prominences of the skull may become more conspicuous. Other signs (such as inability to blink) may occur if the tumor arises in one of the other cranial nerves.

Diagnostic Tests

Because these tumors are not as common as other condition that can cause lameness, especially orthopedic problems, investigation of affected animals first by x-rays and laboratory tests is usually done. A PNST may be suspected if these tests are normal, the signs continue to worsen despite symptomatic medications, and the neurologic examination reveals a weak limb with atrophy of the muscles.

Establishing a diagnosis requires imaging studies, of which magnetic resonance imaging (MRI) is the best. MRI can identify which individual nerve is affected, may also show the extent of involvement of the nerve, and can determine whether the tumor has invaded the spinal cord. Other diagnostic imaging studies, such as ultrasound studies, computed tomography (CT scan), and myelography, can also be used to evaluate affected animals.

A definitive diagnosis is obtained through biopsy of the tumor. X-rays of the chest are usually performed to look for spread of the cancer (metastasis).

TREATMENT AND FOLLOW-UP

Treatment Options

Treatment may involve surgery to remove the tumor, which is often accomplished by amputation of the affected leg. If the cancer extends into the spinal canal, spinal surgery may be recommended. If the tumor cannot be completely removed or if surgery cannot be performed, radiation therapy may be recommended. If none of these treatments are pursued, then medications may be considered to keep the animal comfortable and mobile for as long as possible (palliative therapy).

Follow-up Care

Follow-up visits are needed to monitor progression of disease and response to treatment. Long-term monitoring is also required, because this tumor is difficult to remove or kill.

Prognosis

Prognosis depends on the location and severity of changes caused by tumor and the treatment chosen. The closer the tumor is to the spinal cord, the worse the prognosis. Animals with tumors close to the spinal cord may live only a few months, whereas those with tumors outside the cord may live up to 1 year. Affected animals are rarely cured with surgery unless the tumor arises far down on the leg and can be completely removed with amputation. Postoperative radiation therapy may improve the prognosis for animals with tumors close to the spinal cord.

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