Neurologic Conditions In The Horse

There are a wide variety of neurologic diseases that can affect the horse. The nervous system consists of the brain, spinal cord and peripheral nerves. The autonomic nervous system controls all the involuntary activities such as breathing and intestinal function. Each part of the nervous system performs a specific job. The symptoms of neurologic disease depend on the part of the nervous system is affected.

**THE BRAIN**

The brain is the ‘control centre’ of the nervous system: it co-ordinates all voluntary and involuntary actions. Different regions of the brain control different functions, for example sight, sound, taste, memory, breathing, moving the forelimbs or hindlimbs. The brain can be compared to an incredibly complex computer. It receives data from the sensors around the body, processes the information and then sends out signals to ‘react’ to the information.

One of the most common symptoms of brain disease is depression or a reduced responsiveness to stimulation. Other symptoms depend on the area of the brain that is affected but include reduced vision, abnormal gait, abnormal sleep behaviour, and seizures (or fits).

**THE SPINAL CORD**

This spinal cord is a ‘cable’ of nerve tissue that runs from the brain to the tail protected by the backbone. It carries nerve signals from the brain to the limbs and other parts of the body. The nerves that supply the hindlimbs are positioned on the outside of the spinal cord. This explains why diseases of the spinal cord more commonly affect the hindlimbs than the forelimbs.

Disease of the spinal cord causes disruption to the transmission of nerve signals to and from the brain. Common symptoms include ataxia (or loss of coordination of the limbs), weakness and an abnormal gait. Spinal cord problems can also affect the nerve supply to other organs such as the bladder. This can lead to symptoms of bladder dysfunction.

**PERIPHERAL NERVES**

The peripheral nerves connect different parts of the body to the spinal cord or brain. They are responsible for transmitting signals to and from individual organs. There are thousands of different peripheral nerves in the body. Symptoms of peripheral nerve disease depend on which nerves are affected and can be very variable. Abnormalities in small nerves often cause very subtle problems such as wastage of a single muscle group. Damage to larger peripheral nerves can cause more dramatic signs.

**AUTONOMIC NERVOUS SYSTEM**

This controls all the involuntary functions of the body. These include the rate of breathing, heart rate, intestinal function etc.

**DIAGNOSIS OF NEUROLOGIC CONDITIONS**

The first step in the examination of a horse with suspected neurologic disease is a careful clinical examination. This is important to check for general health problems that may be causing neurologic signs. For example, severe liver disease can cause symptoms similar to those caused by primary brain disease. A blood sample can be necessary to rule out some of these underlying problems.

A full neurologic examination should then be performed. This includes a number of specific tests to evaluate the nervous system. Firstly the nerves in the head region should be tested. This includes assessment of the horse’s response to a bright light, facial sensation, eye position etc. The involuntary ‘skin-twitch’ reflexes along the neck and back are then tested. The neck and back should be checked for signs of pain and the tail tested for strength and

![Fig 1: This horse has a wide-based stance and it has reduced awareness due to head trauma.](image-url)
mobility. The horse should then be evaluated when standing outside to check for signs of abnormal body position or asymmetry of the muscles. The horse should then be evaluated at the walk and sometimes trot and canter. This part of the examination involves asking the horse to walk up and down a small hill, in small circles and backwards. A ‘tail-pull’ test is also usually performed to test the horse’s strength and co-ordination. These tests are designed to test the horse’s co-ordination. Many mild neurologic problems are not obvious at the walk but become more obvious when performing these tests.

After the examination a decision is made as to whether the horse is showing symptoms of neurologic disease. Horses that are ataxic (uncoordinated) are also assigned a score between 0 and 4. If the signs are very mild, or the horse has concurrent lameness problems it can be very difficult to be completely certain about the presence of neurologic deficits and in these cases it may be necessary to repeat the examination on a separate occasion. The most likely anatomical location for the problem is also decided based on the clinical signs.

After the neurologic examination further tests may be necessary. These vary depending on the likely cause of the problem. X-rays and ultrasound can be very useful to evaluate the head, neck and parts of the back. Blood tests can be submitted to look for evidence of specific diseases. A sample of spinal fluid sample can be collected to look for signs of inflammation in the central nervous system. More advanced diagnostic imaging can also be useful, especially when disease of the brain is suspected. In these cases, CT or MRI can be useful. Unfortunately, in some horses an exact diagnosis cannot be made. This is often related to the size of the horse that limits us from being able to perform a full spinal CT or MRI examination.

**EXAMPLES OF NEUROLOGIC CONDITIONS**

**Epilepsy and seizures**

The term seizure means a sudden surge of electrical activity in the brain. The symptoms of a seizure vary from a short period of abnormal behaviour to a full convulsive fit. In a full seizure the horse will usually lose consciousness, fall to the ground, involuntarily gallop, defaecate and urinate. After a seizure most horses appear slightly confused for a short period of time. Seizures can occur for a variety of reasons. Horses with epilepsy have recurrent seizures caused by an abnormality within the brain that creates abnormal electrical activity. Other possible causes of seizures include trauma, meningitis, low blood glucose and rarely tumours.
In a horse that has had a seizure a number of tests will usually be performed to look for the underlying cause. These can include blood tests, evaluation of spinal fluid and diagnostic imaging of the head. MRI is often the best imaging tool to carefully evaluate the brain.

Seizures can be controlled with medication in some cases. However, it usually not considered safe to ride a horse that has recurrent seizures in case it has an episode whilst under saddle.

**Sleep deprivation or narcolepsy**

Narcolepsy is a disease characterised by a sudden onset of sleep behaviour and collapse. Episodes usually occur when a horse is excited. Narcolepsy is actually incredibly rare in horses. However, sleep deprivation or abnormal sleep behaviour is very common.

Horses with abnormal sleep behaviour will show symptoms when relaxed and quiet (unlike narcolepsy). The most commonly observed symptom is the horse falling asleep whilst standing. The head is usually dropped so that the lips are nearly touching the ground and the front knees then buckle so that the horse lurches forward. The horse will then usually wake up and lift the head up. This behaviour usually repeats over and over. Sometimes the horse will actually fall to the ground. If the behaviour is not actually observed then the horse may be found with unexplained wounds to the knees and head. It may also be observed that the horse is not lying down to sleep normally.

Sleep deprivation often occurs in horses that have a painful condition somewhere in the body that is stopping the horse from wanting to lie down. Examples of the types of conditions that can be seen include arthritis of the hocks or neck joints. The problem can often be resolved if the painful problem can be treated. A change in the horse’s social situation can also cause abnormal sleep behaviour. Examples of this include horses that have lost their companion, or changed herd groups. If the horse doesn’t feel safe, then it will not have normal episodes of recumbent sleep.

**Wobbler Syndrome and Arthritis of the Neck Joints**

Neck conditions are one of the commonest types of neurologic problems. The neck has facet joints either side of the spinal cord that allow the neck to be flexible. Disease of these neck joints can cause compression of the spinal canal. This causes signs of ataxia and incoordination. In severe cases, this can cause severe ‘wobbliness’ and even recumbency. The hindlimbs are usually more severely affected than the forelimbs. In these conditions, the horse often doesn’t have complete recognition of where their limbs are positioned. An example of this is seen in Figure 4 where this horse with neck disease is standing with its front legs placed in an abnormal position.

Fig 4: Abnormal placement or positioning of the limbs can be a sign of neck disease.

‘Wobbler syndrome’ is a condition that usually affects young horses and is caused by malformation of the neck. X-rays can usually be made to make a diagnosis. The vertebral bodies are often a slightly abnormal shape and the size of the spinal canal is reduced. As a result of the malformation, the neck is usually slightly unstable. This causes arthritis to develop at the neck joints in an attempt to stabilise the spine.

Fig 5: X-rays of the neck can be used to diagnose ‘wobbler syndrome’ or arthritis of the neck joints.

Thoroughbreds and Warmbloods may be slightly more likely to suffer from this disease and there are certain developmental factors that make the disease more likely to occur. Foals that are overfed or that suffer from nutritional imbalances may be more likely to develop the problem.

If the disease is recognised in a young foal, then careful dietary management and rest can improve the severity of the problem. If the problem is not recognised until the horse is older then it can be more difficult or impossible to correct the problem.

Arthritis of the neck joints is relatively common in older horses. Some horses will simply present with a stiff neck or signs of decreased performance. If the
arthritis is more severe then there may also be signs of ataxia. Arthritis of the neck joints can be treated with steroid injections directly into the joints. This is often very effective in milder cases.

**Equine Herpes Virus-1 Infection**

Equine Herpes Virus-1 (EHV-1) infection is very common. The majority of horses will have been exposed to the virus at some point during their lifetimes. EHV-1 usually only causes mild respiratory signs (slight fever, mild nasal discharge) and the horse will usually recover without treatment. However, occasionally a more active form of the virus is seen. When this happens the virus can cross into the nervous system and cause neurologic signs. Abortion can also occur in pregnant mares.

Signs of EHV-1 infection include weakness of the hindlimbs, depression, a high temperature and an inability to pass urine. In severe cases horses may be unable to get up. Many horses will have shown mild respiratory signs a few days before the neurologic signs occur. Treatment of the neurologic form of EHV-1 involves intensive veterinary care, in some cases involving support from a sling, but can be highly successful. Anti-viral drugs can also be used to help reduce the severity of the infection.

The neurologic form of the virus is highly contagious and it is essential that any horse suspected to have the condition is immediately isolated from others. Full guidelines about the management of this condition can be found in the HBLB codes of practice ([codes.hblb.org.uk](http://codes.hblb.org.uk)). Vaccination against EHV-1 can help reduce the risk of the disease.