

Primer of Painful Sensory Neuropathy

General: Peripheral neuropathy refers to conditions that affect nerves primarily in the feet and legs and occasionally in the hands or arms. There are many types of peripheral neuropathy and many causes. Neuropathies that primarily cause discomfort in the feet and lower leg are perhaps the most common type.

Clinical features: Peripheral neuropathies generally affect longest nerves first and thus symptoms are initially described in the feet. Symptoms can progress and affect the lower leg. There are two types of peripheral nerves: 1) sensory nerves that bring information to the brain enabling one to determine what is touching the skin, and 2) motor nerves that bring information to muscles to command them to carry out intended movements. Both types of nerves are intermixed. However, some neuropathies preferentially affect sensory nerves.

There are two categories of symptoms that can occur with sensory neuropathies: 1) negative symptoms causing a lack of sensory perception, and 2) positive symptoms causing discomfort.

- Negative symptoms reduce the ability to feel what one is standing on (rough, smooth, cold, warm). At times it may be severe enough to prevent the feeling of pain. Another negative symptom is lack of proprioceptive information. Proprioception refers to the ability to know what muscles are doing (contracting or relaxing) and what joints are doing (bending one way or the other). Normally, this information reaches lower (subconscious) parts of the brain and one is not aware of this information which is used to maintain balance. When proprioceptive information is lacking one naturally compensate by substituting visual information to determine where the body is in space. However, when sight is temporarily lost (such as when eyes are closed in the shower) or reduced (such as walking in the dark) there can be a marked feeling of unsteadiness.

NEGATIVE SENSORY SYMPTOMS
<ul style="list-style-type: none">• Reduced or absent touch perception• Reduced or absent pain perception• Instability when standing with eyes closed

- Positive symptoms are caused by nerves discharging spontaneously on their own causing one to “feel” things that

are not truly occurring. For example, there may be a feeling of burning pain or a sensation of walking on ground glass, or feeling knife-like jabs in the legs when these are not actually occurring at the skin. Sensory neuropathies can also cause an increased sensitivity to light touch to the skin when contact is made to the feet and lower leg resulting in discomfort and lingering pain (allodynia and hyperpathia). Painful sensations are frequently worse at night and after walking longer distances.

POSITIVE SENSORY SYMPTOMS
<ul style="list-style-type: none">• Burning sensations• Stabbing sensations• Squeezing or band-like sensations• Hypersensitivity to touch

Genetics: Painful sensory neuropathies are very rarely hereditary. Thus they are considered to be acquired although the cause is not commonly determined.

Diagnosis: Sensory peripheral neuropathy is suggested by descriptions of negative and positive symptoms affecting feet and lower legs. The specific diagnosis of a painful sensory neuropathy is based on descriptions of positive symptoms and few negative symptoms.

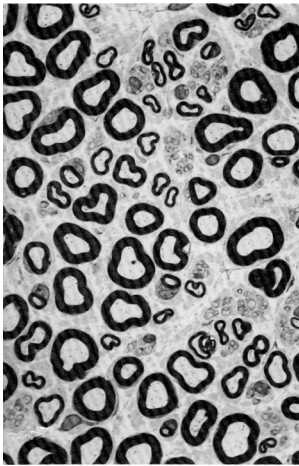
Neurologic examination usually shows some degree of negative signs with reduced perception of light touch to the foot or reduced ability to sense the vibration of a tuning fork applied to the toe. There can be reduced ability to sense the sharpness of a safety pin applied to the foot. However, sometimes there are no sensory abnormalities. Tendon reflexes may be reduced or absent at the ankles. Nerve conduction studies may show reduced sensory nerve responses. However, sometimes these studies are normal.

While the diagnosis of a painful sensory neuropathy comes primarily from descriptions of positive symptoms, the diagnosis also relies on consideration for many other factors because not all positive and negative symptoms are due to problems in peripheral nerves.

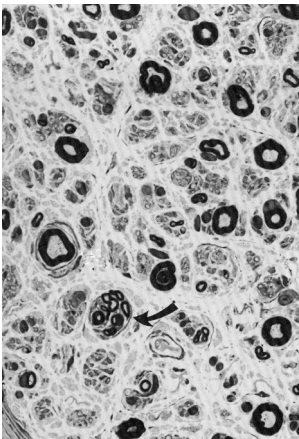
Pathogenesis: When the cause of a painful sensory neuropathy is not obvious from routine laboratory tests it is rare to find a cause even after more detailed tests are run. When no cause is found the neuropathy is called “idiopathic” or “cryptogenic”.

Peripheral neuropathy indicates damage to nerves and nerve endings. This accounts for

negative symptoms. Sometimes only the smallest nerve endings in the skin are affected. The nerve endings die back and a neuropathy can progress over time with shorter lengths of nerves affected. Unfortunately, the cause of nerve damage is rarely found.



Normal:
Many myelinated fibers.



Neuropathy:
Few fibers.
Arrow shows regenerating fibers.

Spontaneous discharges in nerves likely occur because there are tiny channels in nerve fibers that open when they should be closed and cause nerve to fire on their own without being stimulated. These spontaneous firings reach

the brain and are perceived as burning, stabbing, and so forth (similar to a loud noise being painful).

Treatment: Few types of peripheral neuropathy can be stopped with treatment. Unfortunately, painful sensory neuropathies are rarely treatable. Thus, most medications are to reduce positive symptoms.

Since the cause of positive symptoms is felt to be spontaneous nerve discharges due to open channels, many drugs are designed to reduce or block these channels.

Medications include gabapentin (Neurontin®) and pregabalin (Lyrica®). Other medications were initially designed as antidepressants but have been found to be effective at lower doses for positive symptoms. These medications include amitriptyline (Elavil®), imipramine (Tofranil®) and duloxetine (Cymbalta®). These drugs are quite effective when used optimally.

Management: Choosing comfortable shoes can help reduced pain while walking. When there are negative symptoms it is important not to walk barefoot or wear open-toe shoes to prevent injury. Perhaps the most

important issue is foot inspection on a daily basis to identify cuts, blister and sores. It is wise to have a podiatrist cut toenails to prevent inadvertent nicks to the skin.

Clinical Course: Painful sensory neuropathy can progress up the leg but rarely beyond the knee. The exceptions are those caused by diabetes. Painful sensations generally reach a maximum and do not increase further.

Increased pain after walking a long way does not mean that the neuropathy is getting worse nor does walking further damage nerves. Painful sensory neuropathies do not affect strength and will not result in the need for a wheelchair. With the exception of diabetes painful sensory neuropathy, where there is also decreased blood flow, non-diabetic painful sensory neuropathy does not lead to loss of a toe or limb.

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