Charcot Joints

Charcot Joints or Neuropathic Arthropathy

Charcot arthropathy, or neuropathic arthropathy, is a condition that affects some diabetic patients with peripheral neuropathy (loss of sensation). This usually occurs after the neuropathy has been present for eight to 10 years. Jean Martin Charcot was a French physician who in 1868 described neuropathic arthropathy primarily in patients with advanced syphilis. At that time, people with diabetes did not live very long because insulin was unavailable. Once insulin was available and diabetes treatable, it was in the 1930s that neuropathic arthropathy was recognized in diabetics. It may also occur with several other diseases that affect the sensory nervous system (alcoholism, leprosy, syphilis, Charcot-Marie-Tooth Disease to name a few). In the United States, diabetes is the number-one cause.

So what do all these terms mean?

Neuropathy is a term used to describe problems with the nervous system. In diabetics this is called peripheral neuropathy and affects the sensory nervous system to the peripheral, or farther, points of the body (i.e. feet and hands) causing loss of feeling or numbness. Diabetic neuropathy also involves the autonomic (involuntary) nervous system which controls regulation of blood vessels and may result in increased blood flow to the limb, contributing to swelling and osteoporosis of the bones and this causes the Charcot process to occur. Arthropathy is a term used to describe a problem with a joint. Therefore, neuropathic arthropathy is used to describe problems with joints related to abnormal nerve system input. It is believed that as the peripheral neuropathy progresses in long-standing diabetes, the joints are unable to recognize the forces put across them and the relative positions of the various joints, sustaining microtrauma or microfractures because the body does not adjust to these forces and positions. It would therefore be reasonable to assume that most cases of neuropathic arthropathy would occur in the lower extremities, with their weight-bearing function. This is indeed the case, although on occasion other joints can be involved.

When does neuropathic arthropathy occur?

Most patients who develop neuropathic arthropathy have peripheral neuropathy after being diabetic about 10 years or longer. So a patient with juvenile-onset diabetes (as a child) may develop this in his 20s or 30s. However, most patients with Charcot arthropathy are in their 40s or older, as more patients have adult-onset diabetes.

What are the signs and symptoms of Charcot arthropathy (or neuropathic arthropathy)?

There are three stages to Charcot arthropathy. The first stage is a fragmentation or destruction stage. During this stage, as the process begins, the joint and surrounding bone is destroyed. The bone fragments and the joints become unstable and in some cases the bone is completely reabsorbed. This stage is clinically identified by significant swelling (often with little pain to the patient), erythema (redness), and warmth or heat to the area. It is easy to see why this is often confused with an infection, especially as there is often no history of injury or trauma. As the bones and joint are affected, fractures and instability develop and the joints can dislocate or shift the bones in relationship to each other. This can lead to severe deformity of the foot and ankle. Often the midfoot joints are affected and the result is a very flat foot which is wide where the normal foot narrows in the arch. Bony prominences often develop on the plantar (bottom) surface of the foot. Diagnosis and early treatment at this stage is important to try to minimize the bone destruction and deformity. This process may last as long as six to 12 months.

The second stage is termed coalescence. During this stage the acute destructive process slows down and the body begins to try and heal itself. The swelling and heat begin to disappear. Once the acute process is resolved and the healing on-going, the third stage begins. This is a consolidation or reconstruction phase during which the bones and joints heal. Unfortunately, the foot is often deformed, and if there has been enough destruction, there may be residual instability. Fitting shoes may be very difficult, and prescription footwear and diabetic orthotics (shoe inserts) are important to help prevent ulcer formation over deformed areas.

How is Charcot arthropathy treated?

Once the diagnosis is made (for most patients in the first stage) there are several important treatment goals. The first is to get the heat and swelling under control. The second is to support or stabilize the foot to minimize deformity. A total contact cast is applied by trained personnel. This cast has more padding than a standard cast and is often applied with the toes completely covered to prevent foreign objects (gravel, stones, etc.) from getting in the cast. The cast will need to be changed frequently initially as it will get loose very quickly as the swelling is controlled. Once the initial swelling is controlled and the patient is tolerating the casts without skin problems, the cast change interval may be lengthened to two to four weeks. Another alternative is fabrication of a custom walking boot for diabetics. The foot must be supported until all heat and swelling has resolved. This may occur in several months but more commonly requires six to 12 months. Minimizing weight-bearing on the affected foot/ankle is also important. Realistically this is extremely difficult for the patient with diabetic neuropathy because of the lack of significant pain, but should be encouraged. Assistive aides such as a wheelchair, rollabout, walker or cane are recommended. During this period the patient will be seen frequently in the office. Continued education about diabetic foot care and Charcot arthropathy is necessary. Also, support of the various stages of anger and denial concerning this rather profound change is necessary. After the first stage is completed, molds for appropriate diabetic footwear, orthotics and braces (if needed) are made. During treatment it is important to check the noninvolved foot and protect it, as that foot is doing much more work. For patients who develop deformities that are unshoeable or bracable, or who develop unbracable instability, surgery should be considered. The timing for this surgery is important. Surgery done during stage one has a high complication rate, but may have to be performed due to joint instability to prevent even worse problems from occurring. Another option for severe deformity/instability is amputation and prosthetic fitting. Patients often have multiple medical problems which must be taken into account in consideration for any surgery.

Long-term management of patients with Charcot Arthropathy is important. Once the patient is stable, periodic checkups (six to twelve month intervals) with a qualified foot and ankle specialist is important to identify early complications, address footwear, orthotic and brace issues, and continue patient education regarding the care of diabetic feet and the special needs of the patient with Charcot arthropathy. Patients should be counseled to seek medical care if they develop any redness, selling, or heat in their feet, as this could be the start of another Charcot process.