



## IMPORTANCE OF ELECTRODIAGNOSTIC TESTING

### An example using distal symmetric polyneuropathy

- Peripheral neuropathy is a common neurological disorder, affecting 2% to 8% of the population.<sup>1-3</sup>
  - The nervous system is divided into two parts – the central nervous system (CNS: the brain and spinal cord) and the peripheral nervous system (PNS), which includes 43 motor and sensory nerve pairs that connect the CNS to the body. The PNS controls sensations, movements, and motor functions.
  - A neuropathy is damage or disease to a PNS nerve or nerves, typically resulting in numbness, tingling, weakness, and/or pain.
- In 1999, 8.6% of Medicare beneficiaries were diagnosed with neuropathy. The cost of treatment was estimated at \$3.5 billion (CPI adjusted to 2013 is \$4.9 billion). This amount does not include the cost of medications.<sup>4</sup> Adjusting this based on the increased Medicare population brings the estimate closer \$9 billion dollars.
- Distal symmetric polyneuropathy (DSP) is the most common type of peripheral neuropathy and often is seen in patients with diabetes impacting 15-37% of all diabetic patients.<sup>5,6</sup> DSP refers to a neuropathy of multiple nerves in extremities (hands or feet) on the left and the right side.
- DSP can result in weakness, sensory loss, pain, autonomic dysfunction, gait impairment, falls, disability, and impaired quality of life.<sup>7,8</sup>
- DSP is a chronic, high-cost disease that leads to significant impairment to quality of life and increased mortality.<sup>9</sup> Diabetic neuropathy leads to hospitalization more frequently than other complications of diabetes. Early identification and treatment of DSP is important to prevent additional nerve damage or delay irreversible nerve damage.
  - Up to 50% of patients with DSP may have no symptoms and, therefore, are at risk for feet injuries.<sup>10</sup> Early diagnosis is important because great than 80% of amputations follow a foot ulcer or injury. Early recognition may reduce the likelihood of ulceration and amputation.<sup>9,10</sup>
  - Costs are not only direct medical costs but loss of the patient and the caregivers' ability to work and the possibility for institutionalization or assistance for living.<sup>10</sup>
- Accurate diagnosis of DSP is made using electrodiagnostic (EDX) testing along with a history and physical examination of the patient.<sup>11</sup> Nerve conduction studies (NCS), a key component of EDX testing, are used to identify the root cause of the neuropathy.<sup>3,12</sup> The goal is to treat it before there is partial or complete loss of movement leading to disability.

The severe cuts in EDX reimbursement will result in fewer qualified physicians performing the EDX studies which could reduce the early detection of DSP at a time when the incidence of diabetes has increased by 68% from 1999-2011. The delay in diagnosis will likely increase treatment costs, impairments to quality of life, and greater disabilities including amputations. Assuming 1 out of 5 Medicare beneficiaries have increased costs of \$20,000 because of delayed diagnosis, this will result in increased costs to Medicare of \$7.2 billion, a 75% increase in costs. The increased costs goes beyond the Medicare system because these patients may no longer be working and need to rely on state or federal funds, including disability payments.

In an era of skyrocketing healthcare costs, it is imperative that actions be taken so that neurologists and physical medicine and rehabilitation (PMR) physicians may continue to accept Medicare patients and diagnosis neurological disorders such as DSP early in the course of the disease.

#### CASE STUDY

The following real case study demonstrates the importance of electrodiagnostic (EDX) testing and also demonstrates the waste that occurs with unnecessary surgery when the appropriate test is not performed.

A 55-year-old man was evaluated for a 2-year history of “numbness” and pain in the toes of both feet. The symptoms began in his left foot, but over the course of several months also involved his right foot. He had not noticed weakness or difficulty with balance; however, walking had become increasingly limited because of the pain in his toes.

He had seen his primary care physician (PCP) who diagnosed him with bilateral Morton’s neuroma. He was sent to an orthopedic surgeon, who concurred with the diagnosis and underwent surgery to remove the “neuromas”. Although there were no surgical complications, he had no symptom relief but instead continued to worsen. After several more months, the patient returned to his PCP, who then referred him to a neurologist.

Neurological exam and EDX studies were performed and he was diagnosed with distal symmetric polyneuropathy (DSP). No evidence of Morton’s neuroma was found in either foot. Screening laboratory tests resulted in a diagnosis of type 2 diabetes mellitus.

Treatment of the diabetes with diet and an oral medication resulted in rapid improvement. Over the course of several months, the patient’s symptoms lessened and he was no longer limited by pain. The patient is

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