How to Work Up a Patient with Polyneuropathy

Abstract:

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Abstract
Undiagnosed and untreated neuropathy may lead to disability and poor quality of life. Ordering every possible test to find the cause of polyneuropathy can waste time and resources. In this study, we investigated what could be used as a routine neuropathy screen. A retrospective audit of all charts of patients diagnosed to have polyneuropathy by nerve conduction studies from November 2001 to November 2002 were carried out. Demographics, background history, type of neuropathy and investigations done were documented. The charts of 61 patients were audited. 12 patients had a background history of diabetes mellitus. 2 patients had history of alcohol abuse. 23 patients presented with paraesthesia and 33 with weakness of limbs. We found a cause of polyneuropathy in 79% of cases. In most patients with polyneuropathy where a cause can be identified, this can be achieved by the medical history, neurological examination, nerve conduction studies and the baseline blood tests. We suggest a 3-step approach to the diagnostic workup of polyneuropathy.

Introduction

Polyneuropathy is a common neurological disorder. It is important to determine the accurate cause of polyneuropathy as it can lead to considerable disability. Diagnosing and classifying polyneuropathies is made difficult by the fact that there are numerous causes of polyneuropathy. The most important parts of the investigation of suspected polyneuropathy are the taking of an accurate history and the performance of a careful clinical examination.[1] Many diagnostic tests and procedures have been developed and are used for the evaluation of patients with polyneuropathy.[2] An increased incidence of idiopathic polyneuropathies has been reported in recent studies.[3] Valuable time and resources can be wasted if these tests are not used appropriately. In our setting, patients suspected of having polyneuropathy are referred to the neurophysiologist for nerve conduction studies to confirm or exclude the diagnosis of polyneuropathy. Characterising neuropathy is helpful in differential diagnosis of polyneuropathy.[4] Clinicians do blood tests and sometimes invasive tests like lumbar puncture or nerve biopsy as part of their evaluation of polyneuropathy. We did not know if these tests were being used appropriately for the investigation of polyneuropathy in our setting. There are no national guidelines for evaluating such patients in Ireland. An effective algorithm should therefore be developed for each neurology centre. The aim of our audit was to develop an algorithm for the most efficient diagnostic workup of polyneuropathy in our setting.

Methods
We did the study in a major university hospital in Cork, which is one of the large cities in Ireland. Our hospital is a tertiary neuroscience referral centre with departments of neurology, neurophysiology, neurosurgery and neuropathology. We get neurophysiology referrals for nerve conduction studies from our hospital as well as from other hospitals in the region. Most of these referrals are from clinicians in specialities. Only a few General Practitioners refer patients directly to us for neurophysiological tests. We identified all patients with a diagnosis of polyneuropathy during the period of 1st January 2002 to 1st January 2003 from the database of the neurophysiology department. We retrospectively audited all the patient records from our hospital. We do not have access to the patient records from other hospitals. We recorded the demographics, background medical history, examination findings, type of neuropathy and results of investigations including invasive tests in a standardised fashion. The diagnosis of neuropathy was based on nerve conduction studies.

Polyneuropathy was classified as primarily axonal or primarilydemyelinating neuropathy. The criteria for demyelination that we used was as defined by the ad hoc subcommittee.[6,7] We defined the following as â baselineâ tests: Full blood count, ESR, C-reactive protein, renal profile, liver profile, bone profile, serum glucose, serum HbA1C, thyroid function tests, serum B12, serum folate, autoimmune screen, serum protein electrophoresis and chest Xray. We defined the following as â specialised testsâ : anti-nerve antibodies, genetic tests, tumour markers, HIV, cryoglobulins, VDRL, porphyria screen, serum complement, lumbar puncture and nerve biopsy. Descriptive statistics were used to analyse the data.

Results
Sixty one patients with a diagnosis of polyneuropathy during the study period were identified. Of the 61 patients, 36 were male and 25 were female. The mean age was 60.9 years. The predominant symptom was weakness of limbs in 33 patients and paraesthesia in 23 patients. Forty-nine (80%) were axonal and twelve (20%) were demyelinating neuropathies. Twenty three had predominantly sensory neuropathy, 1 had predominantly motor neuropathy and 37 had both motor and sensory neuropathy. There were 16 patients referred from other hospitals. Table 1 shows the cause of polyneuropathy on these referrals.

However, the cause of the neuropathy was found in 8 of them based on history, examination and nerve conduction studies. Of these 8 patients, 4 had diabetic neuropathy, 1 had GBS (Guillain- Barre syndrome), 1 had critical illness neuropathy, 1 had HMSN (Hereditary motor sensory neuropathy) and 1 had MMN (multifocal motor neuropathy). There was no cause found on 8 patients. There were 45 patients referred from within our hospital with a diagnosis of polyneuropathy. Table 2 shows the cause of polyneuropathy in these patients.

After a background medical history and clinical examination, we found in cause in 24 of these patients; 8 had diabetes mellitus, 7 had history of GBS, 3 had history of paraproteinemia, 2 had critical illness neuropathy, 2 had alcohol-induced neuropathy, 1had CIDP (Chronic inflammatory demyelinating polyneuropathy) and 1 had Friedrichâ s ataxia. Doing nerve conduction studies in addition yielded a cause of neuropathy in 4 patients. All these 4 patients were diagnosed to have HMSN. Doing baseline tests and specialised tests further yielded a cause in 5 patients; 3 had paraproteinemia, 1 had oesophageal carcinoma and 1 had polyneuropathy secondary to disulfiram toxicity. There was no cause found in 11 patients after medical history, clinical examination, nerve conduction studies, baseline and specialised tests.

Of the 45 patients referred from within our hospital, 16 had lumbar puncture; 5 had GBS, 4 had CIDP, 3 had neuropathy secondary to paraproteinemia, 1 had diabetic neuropathy, 1 had HMSN and there was no cause found in 2 patients. Of the 2 patients who had sural nerve biopsy, 1 had evidence of vasculitis and the other was non-specific. Anti-nerve antibodies were done in 9 patients and all of them were negative. One patient with HMSN had genetic tests done.

Discussion
Of the 61 patients with polyneuropathy, we had data on 53 patients. The distinction between demyelinating and axonal neuropathies is of importance in directing the search for the cause of neuropathy. In our study 20% had predominantly demyelinating neuropathy. We found the cause of polyneuropathy in 42 out of 53 (79%) of the total cases. The commonest cause of polyneuropathy was diabetes mellitus.[8,9] With background medical history the cause was strongly suggested in 30 out of 53 (57%) of patients. All patients had baseline tests. It is important to note that in these patients, in whom the cause of neuropathy was identified based on the background medical history, the final diagnosis did not change even after all baseline tests and specialised tests were done. Nerve conduction studies contributed to the etiology in 6 patients, 5 with HMSN and one with MMN. With history and nerve conduction studies 68%had a cause identified. Paraproteinemia was discovered in 3 patients on baseline tests. After the baseline tests were done 74% had a cause identified. Another 5% had a cause identified after doing special tests. The number of tests in patients with polyneuropathy could be considerably reduced.[10] Idiopathic polyneuropathy was the final diagnosis in 11 out of 53 (21%) of patients. This figure is similar to those found in previous published studies.[11,12]

Lumbar puncture and sural nerve biopsy were both invasive tests used in the evaluation of polyneuropathy. 36% had lumbar puncture. Lumbar puncture aided in the diagnosis of demyelinating neuropathies. Elevated CSF protein is common in GBS and CIDP. It is interesting to note that patients with paraproteinemia, diabetes mellitus and HMSN had a lumbar puncture. We suggest that lumbar puncture is helpful only if a demyelinating or an infectious cause of polyneuropathy is suspected. Lumbar puncture is of no value in the evaluation of chronal axonal polyneuropathies. Two patients had sural nerve biopsy. Sural nerve biopsy is of questionable value. The most common polyneuropathies seen in our study and in clinical practice are of the chronic axonal type. The yield from biopsying chronic axonal polyneuropathies is

small. Therefore a sural nerve biopsy should be pursued only when a vasculitis, sarcoidosis or lymphoma is suspected as the cause of polyneuropathy.[13]

The results from out study suggest that in most patients with polyneuropathy where a cause can be identified, this can be achieved by the medical history, neurological examination, nerveconduction studies and the baseline blood tests.[14] Special tests as outlined in our study should only be done only if the above fail to identify a cause. Prudent use of invasive tests like lumbar puncture and sural nerve biopsy is advised.

We suggest a 3 step approach to the diagnostic workup of polyneuropathy. Figure 1 shows the proposed model for working up patients with suspected polyneuropathy.

Firstly the referral may be made directly to the neurophysiologist from the General Practitioner or from the non-neurologist. The referral form should include patient demographics (age, sex), relevant background medical history and neurologic exam findings. Secondly, when the patient is seen by the neurophysiologist, nerve conduction studies should be done and if polyneuropathy is confirmed, baseline blood tests should be done at the same time. Thirdly, if the results of these suggest HMSN, MMN, CIDP or paraproteinemia, or if no cause is found after baseline tests the patient should be referred for further evaluation by a neurologist. The order of specialised tests to be done including invasive tests may then be decided by the neurologist. If a cause is found after history, nerve conduction studies and baseline tests, the patient may be referred back to the referring clinician for further management.

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