Pain Fiber NERVE CONDUCTION STUDIES (pfNCS) Significantly Improve the Diagnostic Accuracy and Effectiveness of Treatment for Spinal Pain

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BACKGROUND: Based on Long and Apuzzo's Theory(1), finding a test that accurately and effectively documents the cause of spinal pain represents the first step in treating a patient scientifically and successfully. In 2002 Dr. Cork and his colleagues studied the nerve conduction of pain fibers (pfNCS) with a device that had a 94.6% sensitivity in detecting lumbar nerve-root pathology(2). However, because no clinical studies verify that pfNCS improves the management and clinical outcomes of patients with spinal pain, the CMS in 2004 concluded that devices, which relied on the patient's psycho physiological assessment (perception of a sensation) were unacceptable for Medicare coverage because: "there continues to be insufficient scientific and clinical evidence to consider …(such tests)…. as reasonable and necessary".(3) The pfNCS uses an electrical voltage applied at predetermined points that correspond to areas innervated by a specific nerve root(4) thus allowing it to determine if that nerve root has a normal response to the current, a hyper response (increased sensitivity), or a hypo response (impaired sensitivity). A potentiometer precisely records from the nerve an objective increase of 20 milli-volts or more a second or two before the patient feels a sensation generated by the pfNCS(5). Thus theoretically, the pfNCS gives more than just a "psycho physiologic assessment" as to whether or not a given patient perceives pain.

OBJECTIVE: This study attempts to verify the effectiveness of the pfNCS in improving outcomes of patients suffering from cervical and lumbar pain. The Sensitivity of the test in determining which nerve generates a given patient's pain and the Treatment Specificity of that test in reducing both the patient's pain and improving function will demonstrate whether or not the use of the pfNCS is "reasonable and necessary." METHODS: For one year 124 different patients had 151 individual pfNCSs performed on them. They were then followed for at least one month after receiving treatment. The patients' age, sex, and clinical diagnoses as determined by history, physical findings and x-rays/MRIs/CT scans were recorded as were the results of the pfNCS. All patients had their visual analog scale (VAS) and Oswestry Disability Index (ODI) measured and recorded before and after they received treatment.

The pfNCS results demonstrated that a given nerve root had one of six responses; a normal, mild, moderate, marked, severe or very severe reaction.

-Normal results occurred in patients with back or neck pain suggested a myofascial or other cause of the patient's pain.

-Mild, moderate or marked abnormalities suggested a facet origin to the pain.

-Severe or very severe nerve root abnormalities suggested a discogenic pain generator.

The treatment a patient received depended on what the pfNCS showed to be the cause of the patient's pain.

-If the results were normal the patient received conservative measures including physical therapy, medication and counseling where indicated.

-If the results showed mild, moderate or marked nerve root abnormalities then diagnostic medial branch facet joint blocks (MBB) were performed at the appropriate level according to ISIS Guidelines(6,7) and medial branch facet rhizotomies performed when indicated.(8,9)

–If the results showed severe or very severe nerve root abnormalities then transforaminal lumbar epidural steroids injections (TF/LESI), lumbar epidural steroid injections (LESI) or cervical epidural steroid injections (CESI) were performed at the appropriate level.-Some patients received other interventional techniques such as Sacroiliac (S/I) joint injections, pyriformis injections, percutaneous Disc DekompressorsTM, or vertebroplasties.

In addition the patients were divided into those who had pfNCS of either the lumbar or cervical spinal regions and evaluated in terms of the treatment given to them and their response to treatment.

RESULTS: The outcomes from the 151 pfNCS produced three categories: 1.) pfNCS results that changed the treatment given to patient. (56% of the tests #84 tests.)

2.) pfNCS results that confirmed what the clinical findings suggested should be done. (35% of the tests - #53.)

3.) pfNCS results that did not influence the treatment given to a patient. (9% of the tests #14.)

This documents a 91% DIAGNOSTIC SENSITIVITY

Patients were "helped" if the patient's VAS was reduced by at least two points or 25% and/or the ODI was less than 40 and improved by at least 25%.(10) The average patient receiving a pfNCS done had a decrease in their VAS score of 49% and a functional improvement in the ODI of 44%. One hundred and nineteen tests (79%) resulted in helping the recipient of the test reduce on average their VAS by 74% and improve their function by 44% for a TREATMENT SPECIFICITY OF 79%. Thirty two of the tests (21%) did not help the recipients who had an average increase in their VAS of 5% with an improvement in their function of only 7%.

If other studies confirm these findings then an important diagnostic tool will be available to greatly improve the surgical, interventional and medical treatment of spinal pain.

Bibliography:

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