Carpal tunnel decompression in spite of normal electromyography

Thirty-two hands of 26 patients had a surgical decompression of the carpal tunnel in spite of a normal electromyographic study. In 31, the symptoms of carpal tunnel syndrome were relieved. The incidence of false-negative electromyographic studies in this group of patients with carpal tunnel syndrome was 8%. (J HAND Surg 8:348-9, 1983.)

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The role and effectiveness of electromyography in the diagnosis of carpal tunnel syndrome is still being debated.1-5 Electromyography, strictly speaking, refers to the measurement of action potentials caused by depolarization of muscle fibers. In popular use, it refers to nerve conduction studies as well. In this study, sensory and motor latency, motor conduction velocity, motor-evoked potentials, and electromyography of the appropriate muscles were measured and all were normal.

Answers to two questions were sought: (1) Is electromyography a sensitive indicator of carpal tunnel syndrome? (2) Can the diagnosis of carpal tunnel syndrome be competently made in spite of normal electromyography?

Material and methods

From 1972 through 1979, 292 patients had an electromyography for suspected carpal tunnel syndrome and then had a carpal tunnel decompression. In this group there were 33 patients who had normal electromyographic results and yet a carpal tunnel decompression was done because on clinical grounds they had carpal tunnel syndrome. It is these patients that make up the study group. Of the 33 patients a follow-up at least 12 months later was possible in 26. Of the 26 patients, six had bilateral carpal tunnel syndrome for a total of 32 hands in the group. There were 22 female and four male patients. The median age was 41 with a range of 22 to 74 years of age. Eight of the 26 patients had symptoms that started while on the job.

History and physical examination. The most common symptoms were numbness and tingling and pain in the hand, and these were present in all of the 32 hands. Night pain was present in 28 and in 18 patients weakness was present. In eight there was radiation of pain from the hand to as far as the shoulder, and sometimes as far as the neck and back of the scapula.

Decreased sensibility was present in 18 of the 32 hands on examination. However, often it involved only a part of the median nerve distribution. Usually this was the long finger. Results of Phalen's test were positive in 26 hands, negative in two hands, and the test was not done in four hands. Results of a test for Tinel's sign were positive in 20 hands, negative in nine. and was not tested for in three. Grip strength, measured in six hands, was surprisingly weak; it was reduced 58% on the average. Pinch strength was tested in five hands and was reduced an average of 30%.

Electromyography. The electromyographic studies were done by six individuals; two were neurologists and four specialized in physical medicine and rehabilitation. Results were reported for sensory latency, motor latency, motor conduction velocity, and motor-evoked potentials and electromyographic studies of the appropriate muscles were done. The method of electromyography and the ranges of normal were as described by Melvin et al.6 in 25 of 33 hands. All of these studies were reported as normal in all of the 26 patients in this group.

Operative findings. At the time of operation no compression was seen in the median nerve in 22 hands. There was mild compression in eight hands and moderate compression in one hand. In one hand no report was made of the degree of compression.

Results

All the patients were questioned about their symptoms in person or by telephone. The length of time until
follow-up varied from 12 to 34 months, with an average of 16 months. Thirty hands were considered to be cured of their carpal tunnel syndrome. Of these, two had mild intermittent numbness and tingling and four had mild pain in the wrist on strenuous effort.

Two patients were not relieved of their symptoms at all. In one, the result of a subsequent electromyographic study for carpal tunnel syndrome was positive. The operation was repeated and revealed compression of the median nerve by a band in the distal portion of the flexor retinaculum. It was not clear whether this was due to reactive fibrosis or whether a portion of the flexor retinaculum was missed initially. This patient has subsequently been relieved of her symptoms. The other patient had no relief of symptoms, the reason is not clear.

Discussion

This study shows that electromyography sometimes is not a very sensitive indicator of carpal tunnel syndrome. Symptoms of the syndrome were present for an average of 26 months in 26 of the patients followed, but the electromyographic study results were normal. In one case, symptoms had been present for 10 years. The incidence of false-negative electromyography was 8%. False-negative electromyography has been noted by other authors.2, 5, 7

The most sensitive electrical indicator of carpal tunnel syndrome is the sensory conduction velocity.8 Errors in measuring conduction velocity can be introduced by the temperature of the extremity, poorly calibrated equipment, and age.9 These factors can be controlled by care, but there are other factors that cannot be controlled. For instance, the exact length of the median nerve that is being stimulated cannot be measured7, 10 and the thickness of skin can alter distal latency.9

Initially there was great reluctance to operate in the face of a normal result of an electromyographic study. As confidence was gained in making the diagnosis clinically, the number of operations has increased. Thus, although the incidence of false-negative electromyographic study results in the group was 8%, the incidence is probably much higher.

Although there is a significant incidence of false-negative results, it should not be assumed that electromyography is not useful; when the result is positive in the face of a confusing clinical picture it is helpful. The test is also useful after operation in patients that recover slowly. In these cases a repeat electromyograph that shows improvement in conduction velocity can reassure the patient and the physician that recovery will take place.

The diagnosis of carpal tunnel syndrome can often be made with confidence in spite of a normal electromyographic study on clinical grounds.

REFERENCES
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