

Electrodiagnostic Testing in the Diagnosis and Management of Carpal Tunnel Syndrome

To the Editor:

The May/June guest editorial¹ raised several issues regarding the use of electrodiagnostic testing in the diagnosis and management of carpal tunnel syndrome. In this guest editorial, Dr Fowler expressed concerns regarding the sensitivity and specificity of electrodiagnostic testing in carpal tunnel syndrome, the benefit of confirmatory electrodiagnostic testing, and the financial irresponsibility of such testing. However, Dr Fowler failed to take into consideration current literature and overlooked some of the benefits of confirmatory electrodiagnostic testing in carpal tunnel syndrome.

Recent efforts to optimize electrodiagnostic testing in carpal tunnel syndrome have yielded techniques including novel motor comparison studies, which have a diagnostic sensitivity and specificity of 93% and 97%, respectively.² Zis et al³ also recently described a motor comparison technique with a diagnostic sensitivity of 91% and a specificity of 93%. These methods for diagnosing carpal tunnel syndrome significantly outperform those referenced in the guest editorial. Dr Fowler's own research, using traditional nerve conduction study techniques, revealed a better diagnostic sensitivity and specificity than those reported in the references chosen for the guest editorial.⁴ These articles reveal that the sensitivity and specificity of electrodiagnostic studies in carpal tunnel syndrome are actually much higher than reported in the guest editorial.

In contrast to Dr Fowler's claim, there are data suggesting that electrodiagnostic testing can provide some information regarding prognosis after surgery. In fact, Dr Fowler has published on the role of preoperative electrodiagnostic testing in predicting symptom recovery after carpal tunnel surgery, concluding that severity on preoperative nerve conduction studies predicted the rate of postoperative symptom resolution.⁵ This contradicts the guest editorial and highlights some of the additional information provided by confirmatory electrodiagnostic testing in carpal tunnel syndrome.

In the guest editorial, Dr Fowler addresses the financial component of electrodiagnostic testing in carpal tunnel syndrome by stating that, "Numerous physicians have a large financial incentive to perform confirmatory electrodiagnostic testing." However, since 2013, Centers for Medicare & Medicaid Services reimbursement for electrodiagnostic testing has been cut by more than 50% on average, minimizing the "financial incentive"

for confirmatory electrodiagnostic testing. Conversely, according to the Centers for Medicare & Medicaid Services physician fee schedule, the national average for an open carpal tunnel release is nearly double that of a standard electrodiagnostic test for carpal tunnel syndrome.⁶ Anesthesia and facility fees further increase the surgical cost. One could make the argument that the elimination of confirmatory electrodiagnostic testing could lead to an increase in carpal tunnel release surgery. Perhaps the presence of confirmatory electrodiagnostic testing ultimately minimizes health care-associated costs in carpal tunnel syndrome management.

In this era of unprecedented medical advances, it is important to appreciate that established does not equal outdated or wrong. The literature regarding electrodiagnostic testing in carpal tunnel syndrome is sizeable. An analysis of the current literature supports the diagnostic utility and highlights the benefits of confirmatory electrodiagnostic testing in carpal tunnel syndrome.

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Reply:

I thank Drs Magnussen and Morren for their letter. I am glad that my guest editorial¹ has generated debate regarding this important topic. I appreciate the opportunity to reply to some of their comments.

I find it interesting that the authors quote a high sensitivity and specificity for the median-lumbrical and ulnar-interossei latency comparison. However, the diagnostic accuracy of a simple distal motor latency actually had a higher area under the curve in the referenced study by Lee et al.² The proponents of electrodiagnostic testing continue to devise increasingly complicated tests in an attempt to increase the “value” of the testing. Lee et al² found a sensitivity of 100% and a specificity of 96% for a prolonged distal motor latency in their retrospective study of control patients and patients with “clinically suspected carpal tunnel syndrome.” My interpretation of these results is not that electrodiagnostic tests are better than ever and should be used more often but rather that if electrodiagnostic test results match clinical examination results nearly 100% of the time, why are we conducting these tests?

Sensitivity and specificity are highly dependent on study population. Although I agree with the authors that I “cherry-picked” some studies with low diagnostic accuracy, I think it is important to examine the population in which those studies were performed. Atroshi et al³ surveyed a large number of subjects and then asked a portion to undergo examination and electrodiagnostic testing. This work demonstrates that, in the general population, the definition of “normal” nerve conduction may not be as narrow as one might think. This is an important point, as many patients are referred to me with “carpal tunnel syndrome” based on electrodiagnostic tests ordered by other physicians. Often, these patients have no numbness and tingling in the hand and their chief complaint is “hand pain.” What do we do with “asymptomatic median nerve slowing”? Proponents of electrodiagnostic testing dismiss these situations and may insist that the patients actually have carpal tunnel syndrome but are simply asymptomatic. I would argue that a positive result on electrodiagnostic testing does not define carpal tunnel syndrome and that many of these asymptomatic slowings are actually normal variants within the population. The authors state that by not conducting electrodiagnostic testing, it is possible that surgeons may perform more surgery, thus increasing costs. I think the reality is exactly the opposite—patients will not be convinced that they have carpal tunnel syndrome based on electrodiagnostic testing and therefore won’t surgeon shop until they find someone willing to perform the surgery.

The authors and proponents of electrodiagnostic testing continue to cling to the “sizeable” literature surrounding the use of these tests for carpal tunnel syndrome. Having a large number of

studies and having quality studies with high levels of evidence are two very different scenarios. A recent review by Chen et al⁴ to determine normal values for electrodiagnostic tests identified more than 7500 studies and found that only 10 studies were of sufficient quality to be included. Only 1 study was of sufficient quality for the median nerve. I encourage proponents of electrodiagnostic testing to design and complete studies with high methodological quality to support their use of electrodiagnostic testing for carpal tunnel syndrome.

Finally, I am not arguing that there is no utility for electrodiagnostic testing. As the authors mention, there is some evidence that electrodiagnostic testing may be helpful in predicting recovery after carpal tunnel release and may be helpful with prognosis. I stand by my opinion that routine use of electrodiagnostic testing for confirmation of a clinical diagnosis of carpal tunnel syndrome is simply not indicated. Most patients I evaluate for carpal tunnel syndrome have a “classic” history and physical examination findings; no useful additional information would be gained by performing electrodiagnostic testing. Clearly there are patients with atypical symptoms or medical conditions (eg, neuropathy, renal disease, thyroid disease) who may benefit from electrodiagnostic testing to more clearly define the presence or absence of changes in the median nerve. However, these patients represent a small portion of my practice. Electrodiagnostic testing should be reserved for these uncommon cases.

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