Prevalence of Carpal Tunnel Syndrome in Motorcyclists

To the Editor:

I enjoyed reading the article “Prevalence of Carpal Tunnel Syndrome in Motorcyclists” by Manes.1 This article provides insight into a possible new association of symptoms with or the diagnosis for carpal tunnel syndrome due to motorcycle riding. The article makes recommendations for possible risk reduction (ie, prevention), which should be encouraged.

However, problems with this case series should be emphasized. First, this study was a case series. Case series are considered low on the study design quality pyramid.2 Therefore, case series can generate hypotheses or theories that require further evaluation using studies of higher methodologic quality.

Second, this study is subject to selection bias. Selection bias means that those with carpal tunnel syndrome may have volunteered to be tested, whereas those without carpal tunnel syndrome did not volunteer. Only 50 of 100 patients surveyed were tested. Adding another 50 to the statistics (denominator) could drop the prevalence rate from 42% to 24%. It is unclear whether the 8% of patients with bilateral carpal tunnel syndrome were included in those with either left- or right-side disease. Granted, this is higher than the general population prevalence rate of 5% quoted in the article.1

The cohort was unusual. Finding a group of 100 adults with an average age of 48 years and excluding only 2 because of the presence of “diabetes mellitus, kidney disease, obesity, arthritis, alcoholism, hypothyroid, rheumatoid arthritis, and fracture” would be difficult. This severely limits the generalizability of the results of this study to the general population.

Third, the Materials and Methods section provided no information on the specific inclusion criteria (ie, what was required to make the diagnosis of carpal tunnel syndrome). The article says “based on physical examination, history, and EMG [electromyography] results” citing the Robinson study, which probably means the definition of an “abnormal” nerve conduction test was to add together 3 nerve comparison differences. Unfortunately, this method probably has many more false positives than originally suggested. It would be possible to be classified as having nerve conduction documented carpal tunnel syndrome with median nerve latencies that are on the 50th percentile for the population as long as the ulnar and radial nerve latencies are somewhat faster than average. This would be like saying that if the left eye has 20/20 vision but the right eye has 20/10 vision, then the left eye is diseased.

Atroshi et al4 reported a prevalence study in 1999. A survey was sent to 3000 patients and had 2466 responders, of which 354 reported symptoms consistent with carpal tunnel syndrome, for a prevalence rate of 14.4% (95% confidence interval [CI], 13.0%-15.8%), of which 66 symptomatic patients had clinically and electrophysiologically confirmed carpal tunnel syndrome (prevalence rate, 2.7%; 95% CI, 2.1%-3.4%). Of interest, 23 of 125 asymptomatic controls also had electrophysiologically abnormal median nerve conduction studies (prevalence rate, 18.5%; 95% CI, 12.0%-26.3%). The finding by Atroshi et al4 that 1 in 5 asymptomatic patients had abnormal nerve conduction tests suggestive of carpal tunnel syndrome based on having a less than 0.8-msec difference between the median nerve and the ulnar nerve latency suggests how prevalent false-positive tests are with the nerve-to-nerve comparison criteria.

To decrease the risk for false positives, the American Medical Association Guides to the Evaluation of Permanent Impairment5 established criteria for the electrodiagnosis of conduction delay in carpal tunnel syndrome that do not compare latencies of the nerve in question to other nerves. These criteria minimize false positives.

Fourth, Silverstein et al6 quoted as activities that can cause carpal tunnel syndrome is a cross-sectional study, not a prospective cohort study. Therefore, it can suggest a hypothesis for testing but cannot prove causation. The National Institute for Occupational Safety and Health Surveillance definition of carpal tunnel syndrome used a study by Silverstein et al6 was suggestive symptoms and either a positive Phalen or Tinel sign. The sensitivity and specificity of this definition and the accuracy of this definition in screening a population with a 15% prevalence of carpal tunnel syndrome was determined by Katz et al.7

In screening workers in a high-risk factory like the Silverstein et al6 study did, 22% of those who meet the National Institute for Occupational Safety and Health Surveillance definition of carpal tunnel syndrome would actually have carpal tunnel syndrome, but 100% of those who meet the definition would be diagnosed as having carpal tunnel syndrome. Thus, the study cited by Manes8 does not prove the cited exposures can cause carpal tunnel syndrome.

Causation was addressed nicely in study at Massachusetts General Hospital designed to evaluate the quality and strength of scientific evidence supporting an etiologic relationship between carpal tunnel syndrome and proposed risk factors using a scoring system based on the Bradford Hill criteria for causal association.8 After evaluating 117 articles, the authors found a moderate association among personal biological risk factors compared with a poor association for occupational risk factors, such as vibration.8

A 21-year longitudinal cohort study reported that nerve conduction measurements of peripheral hand nerves revealed no exposure-response association between hand-arm vibration exposure and distal neuropathy of the large myelinated fibers in a cohort of male office and manual workers.9 In a 5-year prospective study in Stockholm, Sweden, the relative risk ratio for
prolonged latency time when participants exposed to vibration were contrasted with those not exposed to vibration was 1.05 (95% CI, 0.66-1.65) for the right hand and 1.23 (95% CI, 0.75-2.01) for the left. The authors concluded that most changes could be related to age alone; latency times were of the same magnitude for the right and left hands regardless of unequal physical work and vibration exposure loads, and the results from this prospective study of nerve conduction over the carpal tunnel indicate no exposure-effect relations between cumulated vibration of approximately the acceleration level investigated here and prolonged latency time.10

Fifth, the Richmond11 study regarding bicycling provided no prevalence data. A newer article found 1 hand with carpal tunnel syndrome in 28 hands.12

Finally, we agree that future studies may demonstrate an association or risk between vibration activities and the development of carpal tunnel syndrome. Although this study generated hypotheses, it did not meet that scientific threshold.

I am grateful to Dr Manes for being the first to research this interesting population.

REFERENCES

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