**Fowler JR, Gaughan JP, Ilyas AM. The Sensitivity and Specificity of Ultrasound for the Diagnosis of Carpal Tunnel Syndrome: A Meta-analysis. Clin Orthop Relat Res 2011; 469:1089–1094**

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Design: meta-analysis of studies of the accuracy of a diagnostic test

Purpose of study: to estimate the sensitivity and specificity of ultrasound for the diagnosis of CTS

Results and reasons not to cite as evidence:

* The authors identified 19 articles with a total sample size of 3131 wrists for a meta-analysis of the diagnostic sensitivity and specificity of sonography for CTS
* Three groups were created: a composite of all studies, a composite of studies using clinical diagnosis as the reference standard, and a composite of studies using electrodiagnostic studies as the reference standard
  + For the composite of all studies, the pooled sensitivity was 77.6% and the pooled specificity was 86.8%
  + For clinical diagnosis as the reference standard, the pooled sensitivity was 77.3% and the pooled specificity was 92.8%
  + For electrodiagnostic studies as the reference standard, the pooled sensitivity was 80.2% and the pooled specificity was 78.7%
* The pooled sensitivity and specificity was based on studies which used several different median nerve cross-sectional cutoffs (from 6.5 mm2 to 15 mm2 ), resulting in substantial heterogeneity in the measured diagnostic accuracy estimates; for both sensitivity and specificity, there are wide ranges of estimates from different studies, and under such circumstances, it is not considered appropriate to quote an average value (Deeks 2001)
* In addition, the selection of studies is quite problematic; a very substantial fraction of them were designed as case-control studies, in which patients with CTS symptoms were compared to healthy people without CTS symptoms; this creates spectrum bias, which is a major threat to the validity of sensitivity and specificity estimates
* Even with the pooled sensitivity of 77.6% and the pooled specificity of 86.8% from the composite of all studies, the likelihood ratio for a positive test (true positive rate/false positive rate) is 0.776/(1-.868) which equals 5.88, which falls short of the hoped-for likelihood ratio of 10 or greater for a diagnostic test, and is of only modest efficacy in discriminating between patients with and without CTS
* Similarly, the likelihood ratio for a negative test a negative test (false negative rate/true negative rate) is 1-0.776/0.868, which equals 0.26, also having only modest discrimination between patients with and without CTS
* Although the values of the likelihood ratios are consistent with a test which could provide useful additional information, the biases in the selection and analysis do not support this conclusion with the studies compiled in this review

Reference:

Deeks JJ. Systematic reviews of evaluations of diagnostic and screening tests. BMJ 2001;323:157-162.