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Ultrasound as a First-line Test in the Diagnosis of Carpal Tunnel Syndrome:

A Cost-effectiveness Analysis

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Abstract This CORR Insights™ is a commentary on the article “Ultrasound as a first line test in the diagnosis of carpal tunnel syndrome: a cost effectiveness analysis” by John R Fowler and colleagues available at DOI [10.1007/s11999-012-2662-3](https://doi.org/10.1007/s11999-012-2662-3).

Where Are We Now?

Carpal tunnel syndrome (CTS) is a major public health problem and has important consequences in terms of patient morbidity, disability, and loss of work hours. Patients clinically suspected of CTS usually have initial nonoperative treatment, and then surgery in the event of failure of the nonoperative treatment. However, unnecessary surgery should be avoided and diagnostic confirmatory tests are essential, especially in patients with purely sensory symptoms or in the early stage of the disease process. Several diagnostic test options are available including noninvasive imaging studies, such as ultrasound (US) or

magnetic resonance neurography, or invasive studies, such as electrodiagnostic testing (EDX) or a percutaneous diagnostic anesthetic injection. The choice of individual test depends on physician preference, patient comfort, diagnostic accuracy, and observer skill. Fowler and colleagues used the Monte Carlo method to predict the cost effectiveness of commonly used diagnostic methods of US and EDX, incorporating the published range of sensitivity and specificity of these methods in general practitioner and specialist settings. Knowing the limitations of this simulated study, the findings show substantial cost savings and low false negative results using US. However, the severity of CTS was not factored into the study and it should be remembered that EDX is more sensitive than US during the early stages of the disease. Other issues of patient preference, test reproducibility, selection bias, observer skill (dependence), and appropriate reference standard also need to be addressed when one prefers one diagnostic test over the other.

Where Do We Need To Go?

To further validate the question posed above, a multipayer modeling study or preferably, a sufficiently large randomized real clinical study needs to be performed, which should include a well-defined subpopulation of patients undergoing US and EDX for suspected CTS. The populations should be free of referral bias and the individual test should also be independently interpreted by multiple readers to avoid observer bias. The patients should undergo a standard clinical examination and complete pretreatment and posttreatment surveys, such as the DASH and quality-of-life surveys at defined intervals to evaluate the impact of the treatment, since no true reference standard test exists. The failure rate of the test attributable to patient discomfort

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(compliance), coagulation problems, and confounding comorbidities, such as hereditary or metabolic neuropathy, should also be documented among different diagnostic tests before any such results are used for making treatment recommendations or policy decisions.

How Do We Get There?

Patient selection for surgery varies in academic and private settings as well as among different physicians and

surgeons. Pooled data from multiple institutions for a simulated study or a multicenter randomized controlled study is necessary to validate these interesting results. To maximize success, a team approach appears to be optimal and should include the physician, radiologist, electrodiagnostic specialist, and statistical consultant. Additionally, similar imaging and EDX techniques using uniform clinical diagnostic criteria should be employed. The study may lend important results that could change treatment guidelines as well as result in conclusions that would be generalizable to different populations.