Ultrasound versus MR Neurography in Peripheral Nerve Diseases: Complimentary Rather than Competitive!

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We read with great interest the research article by Nischal et al.[1] Their study embarks upon a very important clinical question with regard to choosing ultrasound (US) or MR neurography (MRN) in the diagnosis of peripheral nerve diseases. The authors reported that US was better in detecting nerve discontinuity and caliber change as well as evaluating tiny superficial nerves. MR better detected nerve/muscle edema, had better overall sensitivity and higher predictive value to rule out nerve pathology. We wish to humbly present a few observations regarding the article and highlight certain important points regarding the imaging evaluation of peripheral nerve injuries.

The accuracy of MRN is highly dependent on the technical parameters and the signal-to-noise ratio (SNR) and resolution may vary highly between 1.5 and 3 T scanners.[2–4] The authors rightly acknowledge this as a limitation of their study. In addition, they used a 4-channel flex coil for the extremities, which can be a potential reason for the poorer sensitivity in detecting more superficial nerves. Better optimization with higher channel frequency coils and/or dedicated coils for different joints can potentially improve the accuracy of MRN.

In the methodology section, the authors wrote that image interpretation was done using a scoring system (score 0–3 confidence level). We think that is a typographical error because later it is stated that the lowest confidence level was denoted by score 1. Further, Table 2 shows the accuracy of MRN and US, rather than the diagnostic confidence. There are some questions that are inherent to the observational study design, including the spectrum of diseases. An inherent operator bias is also likely to occur in such a study design

as the radiologists interpreting the MR were different from the one doing the ultrasound. It is difficult to remain blinded to the clinical findings if the study was done in a prospective manner (as described); especially while doing the ultrasound. A retrospective unbiased blinded review of the imaging records and assessment of inter-observer agreement could have potentially ameliorated this bias. Also, it would be interesting to know the exact conditions and the number of patients where one modality was found to be better than the other. In future studies, it would be important to see how these discrepancies have an impact on the clinical management.

Despite the limitations, the authors have done a good job in evaluating the diagnostic accuracy of US and MRN with regard to the different types of nerve injury which is crucial in the initial diagnosis and follow-up of such patients.[5,6] Because electrodiagnostic tests may not be able to differentiate the different grades of injury, imaging is of paramount importance to guide the management.[3] US can provide the highest resolution to assess the nerve morphology and depending on how superficial/deep the nerve is located; optimal frequency may be selected in the machine. The grading of nerve injury depends primarily on the structural assessment of different parts of the nerve, and thus may be better done on high-resolution US.[7] US also aids in marking the site of injury preoperatively. MRN is more objective and reproducible; however, it requires a thorough assessment of DICOM images on a workstation. Secondary denervation changes are better assessed on MR and may prove useful in ambiguous cases.[8] MRN may prove superior in the case of deeply located nerves such as the proximal portion of the

sciatic nerve or in obese/muscular patients.[9] However, susceptibility artifacts from the orthopedic implants may result in the obscuration of relevant anatomy, as also suggested by the authors.[1,10]

Overall, this prospective study does offer important insights into the US versus MRN dilemma. We believe that both high-resolution US and an optimized MRN are better used as complementary tools on a case-to-case basis along with electrophysiological studies.[10]

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Conflict of Interest
None declared.

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