Response to Letter by Nederkoorn and van der Graaf

Response:

We appreciate the opportunity to respond to Drs Nederkoorn and van der Graaf in regards to our recent paper entitled “Diagnostic Accuracy of Magnetic Resonance Angiography (MRA) for Internal Carotid Artery Disease: A Systematic Review and Meta-Analysis.” In agreement with their statement, we believe that a critical analysis of the existing literature and a pooled estimate of the data are a necessary and beneficial addition to this field.

More than 11 000 abstracts were screened for the selection of potential articles to be included in this meta-analysis, which investigated the diagnostic accuracy of both time-of-flight (TOF) MRA and contrast-enhanced (CE) MRA. Of these abstracts, a total of 96 articles were selected for thorough examination. Of these 96, Drs Nederkoorn and van der Graaf, along with their colleagues, had published 3 articles in the period of 2002 to 2003 addressing this issue. Though it is not stated in any of the three papers that similar data involving an overlap of study subjects and shared methods was published elsewhere, it became clear to our reviewers during article selection that this overlap did exist. In their letter to the editor, Drs Nederkoorn and van der Graaf state that they believe that inclusion of their 2002 article published in Stroke would have been a more appropriate selection for our meta-analysis than the article we selected, published in the same year in the Journal of Vascular Surgery. Though both articles present data that agree with the finding of our meta-analysis, namely that TOF MRA appears highly accurate in the diagnosis of internal carotid artery stenosis when compared to the gold standard of digital subtraction angiography, during our review of the articles, we decided to only include one, to not bias our results because of duplicate data.

The included article, published in the Journal of Vascular Surgery, presented a total of 354 screened arteries from 203 patients, compared to the 281 arteries from 350 subjects screened in the Stroke article. Assuming that the subjects in the former article were included in the total of the latter, because of overlapping enrollment dates (February 1997 to December 1999 versus January 1997 to November 2000), we immediately recognized that a decision regarding inclusion of only one article was necessary. We chose the article with the greater number of screened arteries, because these numbers were used to complete the 2×2 tables from which our pooled analysis was performed. A larger number of arteries therefore equates to a larger amount of pooled data. Additionally, the included article scored stronger quality measures in the methods section during our qualitative review. For this article, two radiologists evaluated the digital subtraction angiography and MRA examinations independently, whereas the excluded paper states that these results were interpreted by one observer at each hospital site.

In their letter, the authors state that their belief that “only stenosis measurement of the vessel considered for treatment should be used to obtain results reliable for clinical decisions.” We agree that the importance of a screening test for the detection of disease in a symptomatic vessel is obvious; however, we disagree with the authors’ claim that assessing diagnostic accuracy in symptomatic arteries carries greater weight than screening of asymptomatic arteries. Carotid disease is largely subclinical, and a high percentage of patients with carotid stenoses are asymptomatic. Therefore, we believe it is equally important, particularly in the research setting, for diagnostic tools to have optimal accuracy in both assessing the presence and the absence of disease. Though we presented our data in terms of sensitivity and specificity, looking at the results according to positive predictive values (PPVs) and negative predictive values (NPVs) also provides important information. When assessing these values, changing the prevalence of disease will alter the positive and negative predictive values, with strictly symptomatic studies leading to an increased PPV and a decreased NPV. Moreover, because the majority of our included studies did not assess accuracy in only symptomatic arteries, including this data, instead of the article we decided on, would introduce greater heterogeneity into our results, which is already a challenge for any meta-analysis.

In conclusion, we appreciate that the work of Drs Nederkoorn and van der Graaf has substantially contributed to the literature. We stand by our article as an accurate portrayal of the current available data on the topic of carotid artery angiography. Our conclusions regarding a greater need for additional MRA data remain. Though the articles mentioned in this response used TOF MRA in comparison to DSA, our meta-analysis results exhibit a particular need for more studies investigating the use of CE MRA. Furthermore, studies using all three imaging techniques possess the unique ability to directly assess accuracy of CE versus TOF MRA in the same study population, thereby eliminating potential sources of bias, including study time period, access to improved technology, patient factors, and operator reliability.

Disclosures

None.

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