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Reply:

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REPLY:

We would like to thank Dr Luijten et al at Erasmus MC University Medical Center for their interest in our article titled "Evaluation of Artificial Intelligence–Powered Identification of Large-Vessel Occlusions in a Comprehensive Stroke Center" and for their insightful comments.

In their letter, the authors suggested that distal occlusions should be considered positive cases for the purpose of evaluating the performance of artificial intelligence (AI) algorithms for detection of large-vessel occlusion (LVO) strokes. Indeed, recent studies suggest that endovascular treatment for these patients is safe and effective. These occlusions were even dubbed "MVOs" or middle-vessel occlusions to differentiate them from LVOs.[1]

We agree that this population is of great interest. As stated in our article, the potential clinical utility of a detection algorithm does not rely on its sensitivity alone. Although aiding radiologists in early detection is of great value, there is paramount importance for the positive predictive values of such systems. Avoiding an unacceptable burden on the application end-users due to multiple alerts is essential. While recent publications suggest the utility of treating MVOs, only the treatment of ICAs and M1 LVOs with endovascular techniques is currently supported by level 1 evidence from multiple randomized controlled trials.[2] As such, cutting-edge centers may choose to treat such patients, whereas many centers around the world might choose to strictly adhere to the American Heart Association and American Stroke Association guidelines. Typically, the less advanced and experienced centers stand to benefit the most from AI-driven detection and the triage of LVOs.[3] Any study of AI software should keep this audience in mind.

One of the great powers of neural network algorithms is the ability to improve in time as more data are used to train the algorithm. The study was performed 2 years ago, and as such, it is relevant to the version used at that time. Our study was conducted on a system intended to identify and alert LVOs, including ICA and M1. Therefore, identification of such occlusions was defined as the study's primary outcome. The identification of more distal occlusions is indeed of interest and was presented as a secondary outcome.

As more evidence for the safety and efficacy of endovascular treatment in M2 segment MCA occlusions becomes available, our recommendation to anyone considering or performing similar studies would be to report both the overall sensitivity and specificity of the investigated device, as well as provide estimates of the sensitivity stratified by occlusion location. In addition, as various AI systems are being installed in different centers, studies reporting the effects on time, cost, or patient outcome before and after implementation of AI software[4] could be of great significance when evaluating the true benefit of such systems.

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