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Utility of mobile devices in the computerized tomography evaluation of intracranial hemorrhage

Dear Sir,

With reference to the comments on our article[1] published in Indian Journal of Radiology and Imaging (IJRI), we appreciate the additional perspective provided by this letter and would like to respond to some of the points raised.

Regarding the matrix size of the desktop monitor, we would like to state that our article is written in the context of the review of scans in the teleradiology environment, as mobile devices are essentially used in this environment. Medical imaging monitors specification guidelines state that a minimum of 1.3 megapixel monitor is deemed sufficient for remote diagnostic interpretation.[2] It is worthy of note that the US Food and Drug Administration (FDA) has already approved mobile applications for mobile devices for the purpose of preliminary interpretation of radiologic images.[3]

We would like to point out that the American College of Radiology's (ACR) recommendations that the aspect ratio of diagnostic monitors should be of 3:4 or 4:5 are with reference to the evaluation of radiographs.[4] Our monitors can be rotated between portrait and landscape mode depending on the modality that is to be reviewed. To view CT (as in our study) and other small matrix images in a teleradiology environment wherein the thumbnails of the various series are displayed by convention to the left of the screen, it is more optimal to have an aspect ratio of 4:3. We do agree that to view plain film radiographs, an aspect ratio of 3:4 or 4:5 would be desirable; however in our study, radiographs were not being evaluated.

We accept that the interobserver variability was not evaluated in our study. However, the purpose of our study was to compare mobile versus desktop device for an individual radiologist and we would submit that interobserver variability is not of relevance in this comparison. However based on the comments of our respected colleagues, we have retrospectively analyzed the data with a focus on interobserver variability. We found that the unweighted Kappa value for the iPad was 0.8963 with the lower and upper limits 0.95 confidence interval of 0.8154 and 0.9772. This shows that there was almost complete interobserver agreement.

With reference to the comments on contrast ratio, there is variability between the ACR and the monitor vendors in this regard. The ACR states, "The perceived contrast characteristics of an image depend on the ratio of the luminance for the maximum gray value (Lmax) to luminance for the minimum gray value (Lmin). This is the luminance ratio (LR), which is not the same as the contrast ratio often reported by monitor manufacturers." In our article we have chosen to adhere to the ACR specified luminance ratio. As per the ACR guidelines stated in the ACR technical standard for Electronic Practice of Medical Imaging, "The ratio of the maximum luminance to the minimum luminance of a display device for images other than mammography should be at least 50".[5]

Again, we appreciate the observations made and look forward to more academic discourse on this clinically relevant subject.

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