More on Bulls-eye Thallium Display

TO THE EDITOR: We would like to add some additional remarks to those of Johnson et al. (*1*) concerning the development of the bulls-eye program for quantification of thallium-201 myocardial perfusion scans. Presently, the General Electric Company markets the so-called "Emory Version" of the bulls-eye program which runs on their computer systems. Since many clinical facilities use this version, we would like to point out how this program was developed.

In 1982, while we were employed by GE, it was decided that we would undertake the development and distribution of a SPECT quantitative thallium program; we had previously developed a planar quantification program. As an initial step, we had discussions with the VA, Seattle (*2*), concerning the possibility of using a program they had been working on. From these discussions, we brought away the idea of displaying the final results in the format they were using, which was the so-called "bulls-eye" display. We then decided to develop our own program, but kept the idea of the bulls-eye display for the final results. Our program development consisted not only of the display methodology but also the more important aspects—the quantitation of the short axis slices, how to select slices, how to normalize the data, comparison against normal files, etc. We were aided in this development by interactions with our other clinical sites at St. Vincent's Hospital in NYC, Yale University, and Emory University. The initial version of the resulting program was sent to clinical evaluation sites in early 1983. When we both left GE and came to Emory, one of us (RLE) further developed the algorithm and made the program more "clinical". It is this program which is currently marketed by GE, and which formed the basis for our recent publication (*3*).

More important than who developed the bulls-eye display is that the clinicians who use the program understand it is not a panacea for all the problems associated with image degradation due to attenuation, resolution, and scatter (*4*). The bulls-eye approach displays the data in a unique and useful format. We stress that the clinician should not and cannot base his clinical evaluation of the thallium-201 acquisition and SPECT reconstruction entirely on the bulls-eye picture with blackened pixels. Along with bulls-eye displays the clinician must look at : (a) "rotating cine displays" of the view data to guarantee the integrity of data acquisition as well as to appreciate any abnormal attenuation (in particular, from females demonstrating large breast tissue attenuation); (b) slice data and appropriate quality control to guarantee correct short axis slice selection; (c) standard SPECT QC.

References

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REPLY: We appreciate Eisner and Malko's comments on the history of the "Bull's-eye" plot. These comments are consistent with the chronology established in our letter concerning the development of the plot for cardiac tomography (*1*). We concur with their statement regarding the "more important aspects" of the display and the absolute need for quality control measures: in fact, these ideas were discussed, refined, and incorporated into the original "Bull's-eye" code, and mentioned in some detail when the work was presented in 1981 (*2,3*). It is rewarding to see the "Bull's-eye" technique adopted by a wide audience in the nuclear medicine community, and to witness the work of others in extending its clinical utility.

References

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