

Gated Myocardial Perfusion SPECT

TO THE EDITOR: Thank you for publishing the nice review article by Paul and Nabi (1), which has educational benefits. There was, however, an important omission that would significantly impair a reader's understanding of the principles of gated myocardial perfusion SPECT. More detail was required on strategies for dealing with "bad beats" and the consequences of bad beats. Although the authors discussed the impact that including bad beats would have on functional information, they failed to outline the deleterious impact on the perfusion dataset or to indicate alternatives for dealing with bad beats.

The first rule of performing gated myocardial perfusion SPECT is that although the functional data are valuable, their collection should not compromise the perfusion data. Rejecting bad beats using a narrow window means that data are lost. Paul and Nabi (1) recommend a 20% acceptance window, and DePuey (2) indicated that 25%–35% is typical in clinical practice. The American Society of Nuclear Cardiology (3), however, recommends a 100% window so that the functional information is not acquired at the expense of the perfusion data. That is, a 100% window will accept all beats. Interestingly, Nichols et al. (4) reported that only 26% of 379 gated myocardial perfusion SPECT patients had datasets free of gating errors.

Paul and Nabi (1) suggested that a narrow window will prolong data acquisition. The implication, although not stated, is that the time per projection is governed by total counts or total accepted beats. The difficulty that arises is in deciding on the acquisition parameters: Should each projection be acquired for a fixed time, total counts, or fixed number of beats, and what are the ramifications for interprojection count uniformity?

The gated acquisition should also be able to adjust to changing heart rates. Fixed temporal resolution framing is probably the most common method used and results in gate intervals of the same

length that are fixed regardless of the actual duration of the cardiac cycle (5). This result will clearly become problematic in patients whose heart rate does not remain stable throughout the acquisition—not an infrequent problem given the length of the procedure, the possibility of pain, psychological stress (e.g., claustrophobia), or that patients may fall asleep; and the fact that 50% of studies are performed after exercise or pharmacologic stress.

The perfusion data should not be compromised by the functional information. All "rejected" counts need to be acquired in an additional ninth bin or interval, so they can be summed into the ungated dataset (5). If a rejected-counts bin is not possible, a wide acceptance window (100%) should be used to ensure perfusion data are not compromised (5,6). This wide-window strategy may lead to unreliable gated information but will maintain the integrity of the perfusion information.

REFERENCES

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