Same-Day Acquisition Protocol for Imaging with Technetium-99m-Sestamibi

TO THE EDITOR: I read with interest the recent informative article by Leppo, DePuey and Johnson on cardiac imaging with sestamibi and teboroxime (*1*). I thought it would be of interest to the readers of the *Journal* to include the reference where the same-day acquisition protocol for imaging with sestamibi, which appeared in Table 3, was originally published (*2*). This article describes in detail the experiments and arguments which led to the acquisition parameters chosen. This protocol resulted from an extensive collaborative effort between Emory University in Atlanta and Cedars-Sinai Medical Center in Los Angeles.

REFERENCES

1. Leppo JA, DePuey EG, Johnson LL. A review of cardiac imaging with sestamibi and teboroxime. *J Nucl Med* 1991;32:2012–2022.
2. Garcia EV, Cooke CD, Van Train KF, et al. Technical aspects of myocardial SPECT imaging with technetium-99m-sestamibi. *Am J Cardiol* 1990;66:23E–31E.

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REPLY: Thank you for pointing out our oversight in failing to give proper citation to your previously published recommendations. Our Table 3 failed to note the suggested sestamibi protocol as coming from your prior publication. Clearly, as done with the teboroxime recommendations, the sestamibi protocol should be attributed to Garcia et al. (*Am J Cardiol* 1990:66, 23E–31E). Our apologies.

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Cardiolite® Vials and the Microwave Boiling Procedure

TO THE EDITOR: A recent letter to the editor (*1*) by Drs. Gibbons and Hung highlighted a concern about two Cardiolite® vials breaking during the microwave boiling procedure utilized at the Mayo Clinic to quickly prepare Cardiolite® (^{99m}Tc-sestamibi) for acute myocardial patients. We share the concern expressed and understand the benefits Cardiolite® can bring to this patient population if prepared in a rapid and reliable procedure as published by Gagnon et al. (*2*) and Hung et al. (*3*). We are grateful to Drs. Gibbons and Hung for their communication with us and to the community on this method and the safety considerations for its use.

Since Cardiolite® was introduced in the United States early this year, we have been made aware of a few random instances of similar problems in both the boiling bath method described in the package insert (*4*) and in the microwave procedure in use at a few centers in the country.

This led us to explore two possible causes, the packaging of the two- and five-vial kits and the quality/integrity of the vial itself. For background, we have had no complaints of vial breakage in Europe in more than four years' experience and several hundred thousand vials. In the U.S., customers have told us that in some cases, the vials had shaken loose from their shipping tray when opened in the laboratory. We immediately addressed this packaging issue. We reengineered the two-vial and five-vial kits to provide additional security and cushioning for the vials. All five-vial kits are now being shipped with a foam insert inside the box. Although it has been a relatively short time, as yet there have been no reports of breakage since we instituted this action.

Additionally, we have worked with the glass manufacturers to determine if the glass itself may have been a contributing factor to breakage. Tubing vials only from the two largest manufacturers, Kimble Glass, Inc. and Wheaton, are used for Cardiolite®. Both manufacturers produce vials with a wall thickness of approximately 1.3 mm. By nature of the process used to manufacture tubing vials, the bottom is normally thinner than the sides; usually in the range of 0.76 to 1.02 mm. In either case, the glass material used is of the "Pyrex®" type and is able to withstand the boiling necessary to reconstitute the product. Pressure tests done in our laboratories on randomly selected vials indicate that the vials take up to 100 PSI.

The boiling technique is, however, critical. Although not an issue in the Hung et al. experience, it should be noted that small differences in a variety of microwave ovens, or energy level used, may cause vials to be over pressured. For this reason, the acrylic-plastic container designed by the Mayo Clinic certainly seems to be an appropriate safety measure. We do not have additional data validating this microwave technique other than that presented by Gagnon et al. (*2*) and Hung et al. (*3*).

Based on the extensive customer experience in Europe and our own development experience where no Cardiolite® vials broke during the several years prior to U.S. introduction, we believe that the primary contributor to this problem was the initial commercial packaging. Not only would this have caused breakage during shipment, but it may also have introduced microscopic impact flaws that made some vials more susceptible to cracking during heating. Now that the packaging has been significantly modified, we believe the problem has been addressed. We will, however, continue to monitor the situation and quickly inform our customers of any issues about which they should be aware.

We are interested in learning very quickly about the nuclear medicine community's experiences with Cardiolite® and will ensure prompt resolution to any concerns that do occur. We have established a Nuclear Cardiology Hotline (800-343-7851) to facilitate communication of these experiences or to assist with any other questions on the use of our nuclear cardiology products.

REFERENCES

1. Hung JC, Gibbons RJ. Breakage of technetium-99m-sestamibi vial with the use of a microwave oven [Letter]. *J Nucl Med* 1992;33:176–178.
2. Gagnon A, Taillefer R, Bavaria G, Leveille J. Fast labeling of technetium-99m-sestambi with microwave oven method. *J Nucl Med Technol* 1991:19:90–93.
3. Hung JC, Wilson ME, Brown ML, Gibbons RJ. Rapid preparation and quality control method for technetium 99m-2-methoxy isobutyl isonitrile (^{99m}Tc-sestamibi). *J Nucl Med* 1991;32:2162–2168
4. Cardiolite® package insert. E.I. duPont de Nemours & Co., N. Billerica, MA. December 20, 1990.

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