Addendum to ASNC/AHA/ASE/EANM/HFSA/ISA/SCMR/SNMMI expert consensus recommendations for multimodality imaging in cardiac amyloidosis

Dorbala, Sharmila; Ando, Yukio; Bokhari, Sabahat; Dispenzieri, Angela; Falk, Rodney H; Ferrari, Victor A; Fontana, Marianna; Gheysens, Olivier; Gillmore, Julian D; Glaudemans, Andor W J M

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Addendum to ASNC/AHA/ASE/EANM/HFSA/ISA/SCMR/ SNMMI Expert Consensus Recommendations for Multimodality Imaging in Cardiac Amyloidosis: Part 1 of 2—Evidence Base and Standardized Methods of Imaging

SHARMILA DORBALA, MD, MPH, FASNC,1 YUKIO ANDO, MD, PhD,2 SABAHA T BOKHARI, MD,3 ANGELA DISPENZIERI, MD,1 ROYDE H. FALK, MD,1 VICTOR A. FERRARI, MD,5 MARIANNA FONTANA, PhD,6 OLIVIER GHEYSSENS, MD, PhD,7 JULIAN D. GILLMORE, MD, PhD,6 ANDOR W.J.M. GLAUDEMANS, MD, PhD,8 MAZEN A. HANNA, MD,9 BOUKE P.C. HAZENBERG, MD, PhD,10 ARNT V. KRISTEN, MD,11 RAYMOND Y. KWONG, MD, MPH,1 MATHEW S. MAURER, MD,3 GIAMPAOLO MERLINI, MD,12,13 EDWARD J. MILLER, MD, PhD,14 JAMES C. MOON, MD,6 VENKATESH L. MURTHY, MD, PhD,15 C. CRISTINA QUARTA, MD, PhD,16 CLAUDIO RAPEZZI, MD,16 FREDERICK L. RUBERG, MD,13 SANJIV J. SHAH, MD,15 RIEMER H.J.A. SLART, MD,17 HEIN J. VERBERNE, MD, PhD,19 AND JAMIESON M. BOURQUE, MD, MHS, FASNC20

Boston, Japan; New York, Cleveland, and Boston, the Netherlands; Heidelberg, Germany; Pavia, and New Haven, Italy; and Charlottesville, Virginia

The Need for an Addendum

There are 2 primary reasons for an addendum. The first is that the document reviewer list is being updated to include Dr Richard Cheng and Dr Roy John, who have critically reviewed the document, but were inadvertently not listed as reviewers. In addition, since the publication of this document and the introduction of approved therapies for transthyretin cardiac amyloidosis, the clinical use of bone tracer cardiac scintigraphy has been extended to populations with a lower prevalence of transthyretin cardiac amyloidosis. Numerous observations have raised concerns about (1) incorrect diagnosis of transthyretin cardiac amyloidosis based on 99mTc-pyrophosphate (PYP) planar imaging and heart-to-contralateral lung (H/CL) ratio without confirmation of diffuse myocardial uptake on single photon emission computed tomography (SPECT) imaging at some sites; (2) excess blood pool activity on the 1-hour planar and SPECT images being interpreted as positive scans; and (3) missed diagnosis of light chain amyloidosis, as serum-free light chain studies and serum and urine immunofixation electrophoresis studies may not be recommended in the 99mTc-PyP/-3,3-diphosphono-1,2-propanodicarboxylic acid/hydroxy-methylene diphosphonate (99mTc-PYP/-D/P/HMDP) report. Incorrect diagnosis leads to inappropriate therapy and worse patient outcomes. SPECT and planar imaging performed at 3-hour maximize specificity.1–3 Additionally, technical parameters have been updated.

Accordingly, we are issuing this addendum to clarify the protocols, interpretation, and reporting of 99mTc-PYP imaging.

1 Acquisition (Table 4)
a. The time between injection of 99mTc-PYP and scan is revised: 2- or 3-hour imaging is recommended, and 1-hour imaging is optional (Table 4). If excess blood pool activity is noted, 3-hour imaging is recommended. The timing between injection and scanning is now consistent for 99mTc-PYP, -DPD, and -HMDP. We recognize some experienced centers that have...
become proficient at 1-hour scanning; the recommendation for 2- or 3-hour imaging is particularly important for centers starting new 99mTc-PYP programs.

b. SPECT imaging is required in all studies (regardless of the time between injection and scan) to highlight the importance of directly visualizing tracer uptake in the myocardium.

c. One-hour planar-only imaging is not recommended.

d. Emerging literature suggests that cadmium zinc telluride SPECT can also be used for 99mTc-PYP/DPD/HMDP imaging.4,5

2 Interpretation (Table 5)

a. Planar imaging and H/CL ratio alone are insufficient for the diagnosis of ATTR cardiac amyloidosis. SPECT imaging is necessary to identify myocardial uptake of 99mTc-PYP/DPD/HMDP.

b. Repeat imaging is recommended at 3 hours if excess blood pool activity is noted.

c. The steps in Table 5 clarify that visual grading on planar and SPECT imaging is the primary method for diagnosis of ATTR cardiac amyloidosis.

d. Recommendations are clarified for ease of interpretation.

3 Reporting (Table 6)

a. Diffuse myocardial uptake should be visualized to report a positive scan.

b. The criterion for an H/CL ratio of greater than 1.5 as strongly positive has been removed (consistent with diagnostic criteria listed in the ASNC/AHA/ASE/EANM/HFSA/ISA/SCMR/SNMMI Expert Consensus Recommendations for Multimodality Imaging in Cardiac Amyloidosis: Part 2 of 2—Diagnostic
Table 5. Recommendations for Interpretation of $^{99m}$Tc-PYP/DPD/HMDP for Cardiac Amyloidosis

<table>
<thead>
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<tr>
<td>Methods</td>
<td>Imaging technique, radiotracer dose and mode of administration, interval between injection and scan, scan technique (planar and SPECT) (required)</td>
</tr>
<tr>
<td>Findings</td>
<td>Image quality</td>
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<td>Ancillary findings</td>
<td>Whole-body imaging if planar whole-body images are acquired (optional)</td>
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<td>Conclusions</td>
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*Fig. 6 and 7 refer to figures in the original document.

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Table 6. Recommendations for Standardized Reporting of $^{99m}$Tc-PYP/DPD/HMDP Imaging for Cardiac Amyloidosis

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Criteria and Appropriate Utilization, where H/CL ratio was not listed).
c. Conclusions have been clarified.

References


