Response to "Comment on *State-of-the-Art Imaging in Pulmonary Embolism: Ventilation/Perfusion Single-Photon Emission Computed Tomography versus Computed Tomography Angiography—Controversies, Results, and Recommendations from a Systematic Review*"

Søren Hess, MD[1,2,3] Evan C. Frary, esq, BSc[1] Oke Gerke, MSc, PhD[2,4] Poul Henning Madsen, MD[5]

[1] Department of Radiology and Nuclear Medicine, Hospital South West Jutland, Esbjerg, Denmark
[2] Department of Nuclear Medicine, Odense University Hospital, Odense C, Denmark
[3] Department of Clinical Research, University of Southern Denmark, Odense C, Denmark
[4] Centre of Health Economics Research, University of Southern Denmark, Odense M, Denmark
[5] Division of Respiratory Medicine, Department of Medicine, Lillebælt Hospital Vejle, Vejle, Denmark

Address for correspondence Søren Hess, MD, Department of Radiology and Nuclear Medicine, Hospital South West Jutland, Finsensgade 35, 6700 Esbjerg, Denmark (e-mail: soeren.hess@rsyd.dk).

Semin Thromb Hemost 2017;43:904–906.

Thank you for the opportunity to reply to the correspondence from Drs. Bajc and Grüning.[1] We thank the authors for their interest in our recent article,[2] and as the title implies, controversies remain central in pulmonary embolism (PE) imaging and as such we acknowledge and welcome every opinion.

Regardless of type, the literature selection in a review is always debatable. Our systematic review was based on rather strict inclusion and exclusion criteria, for example, all patients should be subjected to ventilation/perfusion (V/Q) scan, computed tomography angiography (CTA), and follow-up. Those studies mentioned by Bajc and Grüning[1] were not included in our analysis,[2] as they did not meet our criteria per se. In the study by Bajc et al,[3] the diagnosis was based on single-photon emission computed tomography (SPECT) and follow-up, but not CTA in the bulk of patients. However, we do acknowledge that a selected subset of 152 patients had both modalities performed and could have been included in our meta-analysis,[2] but the study was excluded in the initial screening as this subset was not explicit from the abstract.[3] In the study by van Strijen et al,[4] only planar scintigraphy was employed; patients with a normal perfusion scintigraphy (47%) did not undergo further evaluation, and conventional pulmonary angiography was an integral part of the gold standard. In the study by Grüning et al,[5] most diagnosis was based on V/Q SPECT, as less than 10% of included patients underwent CTA. Nonetheless, although not included in our meta-analysis, we acknowledge the quality of these studies on their own accord and they present important results and relevant findings.

We agree that the choice of interpretation criteria may impact the results, and we addressed this in our discussion[2] of differences in the two perfusion-only studies by Bajc et al[3] and Gutte et al,[6] respectively. Clearly, this may also be the case in combined V/Q scans, but nonetheless, the specificity and false-positive rate improved with the addition of low-dose CT, and as described by the authors, the reasons for false-positive findings on V/Q SPECT were interlobar fissures and parenchymal infiltrates, readily visible on V/Q SPECT/CT but not necessarily recognizable by different interpretation criteria.

We agree that caution is advised whenever ionizing radiation is employed medically, a subject we also covered as one of the major concerns with the use of CTA. We should stress that the CT we advocate is not full-dose, contrast-enhanced CTA in addition to V/Q SPECT but low-dose scans without contrast. Thus, in our opinion, the additional radiation dose of less than 1 mSv is more than justifiable,

published online March 27, 2017

Issue Theme Recent Advances in Thrombosis and Hemostasis—Part II; Guest Editors: Sam Schulman, MD, PhD, and Md. Shahidul Islam, MD, PhD.

DOI http://dx.doi.org/10.1055/s-0036-1598007.
ISSN 0094-6176.

considering the seriousness of PE, if it can provide important differential diagnostic information or help reduce the number of false-positive scans which have always been the unfortunate trademark of radionuclide PE imaging.

In conclusion, as we state in the article, all presented modalities have a place and controversies remain, but we maintain that V/Q SPECT/CT in our opinion has a slight edge in most clinical settings.

References

1 Bajc M, Grüning T. Comment on state-of-the-art imaging in pulmonary embolism: ventilation/perfusion single-photon emission computed tomography versus computed tomography angiography—controversies, results, and recommendations from a systematic review. Semin Thromb Hemost 2017;43(08): 902–903

2 Hess S, Frary EC, Gerke O, Madsen PH. State-of-the-art imaging in pulmonary embolism: ventilation/perfusion single-photon emission computed tomography versus computed tomography angiography—controversies, results, and recommendations from a systematic review. Semin Thromb Hemost 2016;42(8):833–845

3 Bajc M, Olsson B, Palmer J, Jonson B. Ventilation/Perfusion SPECT for diagnostics of pulmonary embolism in clinical practice. J Intern Med 2008;264(4):379–387

4 van Strijen MJ, de Monyé W, Kieft GJ, et al. Diagnosis of pulmonary embolism with spiral CT as a second procedure following scintigraphy. Eur Radiol 2003;13(7):1501–1507

5 Grüning T, Drake BE, Farrell SL, Nokes T. Three-year clinical experience with VQ SPECT for diagnosing pulmonary embolism: diagnostic performance. Clin Imaging 2014;38(6):831–835

6 Gutte H, Mortensen J, Jensen CV, et al. Detection of pulmonary embolism with combined ventilation-perfusion SPECT and low-dose CT: head-to-head comparison with multidetector CT angiography. J Nucl Med 2009;50(12):1987–1992