

Newsletter literature review and commentary

It's pleasing to note the resurgence in interest in V/Q imaging for PE as portrayed in three papers in the March issue of the European Journal of Nuclear Medicine and Molecular Imaging (EJNM vol 36, #3), closely following on the heels of the November issues of the Journal of Nuclear Medicine (JNM vol 91 #11) and Seminars in Nuclear Medicine (vol 38 #6). The focus of the EJNM papers was an IAEA overview of PE by an invited group of 5 Specialists who titled their report "Is the lung scan alive and well? Facts and controversies in defining the role of lung scintigraphy for the diagnosis of pulmonary embolism in the era of MDCT."ⁱ Although there seemed to be a strong bias towards the value of the PISAPED perfusion only study, this most comprehensive review formed the consensus finding that recommended the continuous use of scintigraphy for diagnosis of thromboembolic disease. This report was preceded by an "Editorial Commentary" from Len Freeman and Linda Haramati "V/Q scintigraphy: alive, well and equal to the challenge of CT angiography"ⁱⁱ. Their commentary ranged across many topical issues such as after hours availability, the radiation dose to the patient, interpretation competency of V/Q encompassing a proposal for a binary type report 'positive for PE', 'no evidence of PE', or 'nondiagnostic study', the dilemma posed by detection of ever smaller lesions, and finally planar vs SPECT where they look forward to the advent of *Technegas* in the USA.

The final paper in this EJNM trilogy was another review in the journal's "Focus on" series entitled "Diagnosing pulmonary embolism: clinical problem or methodological issue?" written by Lucignani and Pistoletti from Italy.ⁱⁱⁱ The authors had surveyed recent literature concluding "...nuclear medicine physicians need to be more available to intervene on a 24/7 basis, more accustomed to reading chest x-rays, and more prepared to give clear succinct answers, best reduced to just three possibilities: 'PE present', 'PE absent' and in doubtful cases, 'non-diagnostic examination'. The diagnosis of PE currently seems to be not so much a clinical problem as a question of commitment to the implementation of the use of the available and proper methodologies".

November 2008 was a big month for V/Q literature. The JNM presented an interesting and coincidentally related triplet of articles. One was Alex Gottschalk's obituary to John MacAfee^{iv}. The second was Gottschalk's own group's backward looking paper "Sensitivity and Specificity of Perfusion scintigraphy combined with chest radiography for acute Pulmonary Embolism"^v, and the third was the excellent and forthright invited commentary it provoked from Patrick Reinartz, "To PIOPED or not to PIOPED"^{vi}. They are linked, because Gottschalk had managed to write a detailed obituary leaving out John MacAfee's great interest in V/Q imaging, and especially his enthusiasm for *Technegas*, of which he once said [when adopted in the USA] "It would instantly become the gold standard" (J Nucl Med: 1991, 32:(11); p24N-32N).

John was so excited about *Technegas* - having witnessed its operation in our unit at Canberra Hospital in 1986 during his Presidency of the SNM - a machine was adapted for the USA electrical system and shipped over to him at his hospital in Syracuse, New York (SUNY) soon after, and he immediately began to use it under 'trial conditions'. After he moved to

George Washington University, his successor at SUNY, F. Deaver Thomas, who was equally as enthusiastic, continued to use Technegas until the FDA ordered it to be stopped some years later. By then a second machine had been in use by William F. (Bill) Ashburn in San Diego, again on a 'trial basis', until that too was shut down. In that same Newline report in JNM, Bill Ashburn enthused about Technegas "it would do away with the use of Xenon and aerosol DTPA, its so superior". Needless to say, if MacAfee and Ashburn's enthusiasm, carried on by their respective successors Thomas and Benezuolli had translated into action via the Society of Nuclear Medicine, the PIOPED story would have long ago decayed like Xenon-133 into history.

Yet once again, and through the same authors, PIOPED gets a new lease of life – can you believe, PIOPED III? The November issue of "Seminars in Nuclear Medicine" (vol 38 #6) is devoted entirely to Pulmonary Embolism diagnosis, with Alex Gottschalk's authorship in two review papers, PIOPED III - a proposed trial invoking MRI - and another push for PISAPED^{vii}. At least some balance is restored with Paul Roach's group presenting a very comprehensive account of SPECT V/Q using Technegas^{viii}.

One paper "The Role of Multidetector Computed Tomography Angiography for the Diagnosis of Pulmonary Embolism" by Paul Cronin, John G. Weg, and Ella A. Kazerooni^{ix}, claimed that "From a radiological point of view, computed tomography pulmonary angiography (CTPA) has effectively become the de-facto first-line imaging test for the evaluation of pulmonary embolism (PE), as patients with a high-quality negative CTPA do not require further examination or treatment for suspected PE." But they at least acknowledge what they euphemistically term "questions or issues remain, including strategies for further imaging when CT is inconclusive or contraindicated, issues regarding radiation exposure, the prevalence of PE in specific populations, best tests and pathways in specific patient groups, including patients with specific co-morbidities such as oncology patients or patients with chronic obstructive pulmonary disease. Also, the question whether all PE patients need anticoagulation, the clinical effect of follow-up imaging, and the accuracy of different clinical prediction rules, remains."

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ⁱ Reid JH, Coche EE, Inoue T et al. Is the lung scan alive and well? Facts and controversies in defining the role of lung scintigraphy for the diagnosis of pulmonary embolism in the era of MDCT. *Eur J Nucl Med Mol imaging* 2009; 36:505-521.

ⁱⁱ Freeman LM, Haramati LB. V/Q scintigraphy: alive, well and equal to the challenge of CT angiography. *Eur J Nucl Med Mol imaging* 2009; 36:499-504.

ⁱⁱⁱ Lucignani G, Pistolesi M. Diagnosing pulmonary embolism: clinical problem or methodological issue?" *Eur J Nucl Med Mol imaging* 2009; 36:522-528.

^{iv} Gottschalk A. John G. McAfee, MD 1926–2008. *J Nucl Med* 2008 49: 16N-24N

^v Sostman HD, Miniati M, Gottschalk A, et al. Sensitivity and Specificity of Perfusion Scintigraphy Combined with Chest Radiography for Acute Pulmonary Embolism in PIOPED II. *J Nucl Med* 2008 49: 1741-1748

^{vi} Reinartz P. To PIOPED or not to PIOPED. *J Nucl Med* 2008;49:1739-1740.

vii Miniati M, Sostman HD, Gottschalk A, et al. Perfusion lung scintigraphy for the diagnosis of pulmonary embolism: a reappraisal and review of the prospective investigative study of acute pulmonary embolism diagnosis methods. *Semin Nucl Med* 2008; 38:450-461.

viii Roach PJ, Bailey DL, Harris BE. Enhancing lung scintigraphy with single photon emission computed tomography. *Semin Nucl Med* 2008; 38:441-449.

ix Cronin P, Weg JG, Kazerooni EA. The role of multi-detector computed tomography angiography for the diagnosis of pulmonary embolism. *Semin Nucl Med* 2008;38:418-431.