INTERESTING IMAGE

Value of ^{99m}Tc -Technegas SPECT/CT for Localization of Alveolar-pleural Fistulas

Thorsten Derlin¹ · Johannes Salamon² · Azien Laqmani²

Received: 20 February 2015 / Revised: 24 March 2015 / Accepted: 25 March 2015 / Published online: 17 April 2015
© Korean Society of Nuclear Medicine 2015

Fig. 1. A 77-year-old male with a history of recent resection of pulmonary metastasis from rectal cancer underwent ventilation single-photon emission computed tomography/computed tomography (SPECT/CT) for further evaluation of a persistent alveolar-pleural fistula resulting in pneumothorax and extensive soft tissue emphysema. ^{99m}Tc -Technegas SPECT (a), fused coronal (b) and axial SPECT/CT (c, d, e) demonstrated marked tracer deposition in the apical right upper lobe (arrow) due to focal trapping of ^{99m}Tc -Technegas particles and visualized ^{99m}Tc -Technegas transport via the chest tube (arrowhead). Axial CT images (f, g) demonstrated soft tissue emphysema. Wedge resection was performed and confirmed an alveolar-pleural fistula, and the pneumothorax resolved completely after surgical therapy. Prolonged parenchymal air leak, defined as air leak persisting over 5 days, is the most frequent complication after lung resection and is reported to occur in 16–18 % of cases [1, 2]. It has been reported to be associated with incomplete interlobar fissures,

emphysematous lungs, upper lobe resections and pleural adhesions [1]. It frequently leads to a more complicated and protracted hospital course [3–5]. In persistent air leaks, surgical re-exploration must be considered after failure of conservative treatment [6]. ^{99m}Tc -Technegas ventilation scintigraphy is an established and well-studied tool for imaging of lung ventilation [7], and combined SPECT/CT has been shown to improve overall diagnostic accuracy in many areas of pulmonary nuclear medicine [7, 8]. Precise localization of air leaks is desirable for newer interventional treatment options including endobronchial valves [6] to guide valve placement and may facilitate the surgical approach. Ventilation SPECT has been suggested to be useful for localization of air leaks before [9, 10], but focal ^{99m}Tc -Technegas deposition in the lungs has not been evidenced to represent an actual fistula by either transport via the chest tube or surgical resection, for the previous reports relied on conservative treatment. This is a case of persistent alveolar-pleural fistula following thoracic surgery correctly detected on ^{99m}Tc -Technegas SPECT/CT.

This manuscript has not been published before and is not under consideration for publication anywhere else. It has been approved by all co-authors.

✉ Thorsten Derlin
Derlin.Thorsten@mh-hannover.de

¹ Department of Nuclear Medicine, Hannover Medical School, Carl-Neuberg-Str. 1, 30625 Hannover, Germany

² Department of Diagnostic and Interventional Radiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Conflict of Interest Thorsten Derlin, Johannes Salamon and Azien Laqmani declare that they have no conflict of interest.

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from the patient for being included in the study.

References

1. Brunelli A, Monteverde M, Borri A, Salati M, Marasco RD, Fianchini A. Predictors of prolonged air leak after pulmonary lobectomy. *Ann Thorac Surg.* 2004;77:1205–10.
2. Isowa N, Hasegawa S, Bando T, Wada H. Preoperative risk factors for prolonged air leak following lobectomy or segmentectomy for primary lung cancer. *Eur J Cardiothorac Surg.* 2002;21:951.
3. DeCamp MM, Blackstone EH, Naunheim KS, Krasna MJ, Wood DE, Meli YM. Patient and surgical factors influencing air leak after lung volume reduction surgery: lessons learned from the National Emphysema Treatment Trial. *Ann Thorac Surg.* 2006;82:197–206.
4. D'Andrilli A, Andreetti C, Ibrahim M, Ciccone AM, Venuta F, Mansmann U, et al. A prospective randomized study to assess the efficacy of a surgical sealant to treat air leaks in lung surgery. *Eur J Cardiothorac Surg.* 2009;35:817–20.
5. Tan C, Utley M, Paschalides C, Pilling J, Robb JD, Harrison-Phipps KM, et al. A prospective randomized controlled study to assess the effectiveness of CoSeal® to seal air leaks in lung surgery. *Eur J Cardiothorac Surg.* 2011;40:304–8.
6. Mueller MR, Marzluf BA. The anticipation and management of air leaks and residual spaces post lung resection. *J Thorac Dis.* 2014;6: 271–84.
7. Roach PJ, Bailey DL, Harris BE. Enhancing lung scintigraphy with single-photon emission computed tomography. *Semin Nucl Med.* 2008;38:441–9.
8. Roach PJ, Gradinscak DJ, Schembri GP, Bailey EA, Willowson KP, Bailey DL. SPECT/CT in V/Q scanning. *Semin Nucl Med.* 2010;40:455–66.
9. Ceulemans G, De Meirleir L, Keyaerts M, Smets D, Verdries D, Vincken W, et al. Air leaks localized with lung ventilation SPECT. *Clin Nucl Med.* 2012;37:1182–3.
10. Duncker D, Beutel G, König T, Krüger M, Haense C, Berding G, et al. Localizing the air vents: functional imaging-guided diagnosis in extensive multilocal subcutaneous emphysema. *Circ Cardiovasc Imaging.* 2013;6:1115–6.