

SPECT/CT: Pitfalls and Artefacts

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The advent of combined SPECT/CT scanners has opened up many new diagnostic possibilities in nuclear medicine. In this talk we will examine a number of image artifacts and potential pitfalls that technologists and radiologists need to be aware of when running a SPECT/CT service.

Poor image registration accounts for many of the artifacts associated with SPECT/CT imaging. Recognition of this possibility is of crucial importance before image reconstruction and analysis. In particular, this can be a particular problem when attenuation correction is derived from the CT map. We will discuss this problem and how to avoid or ameliorate it with clinical examples.

Depending on the type of CT scanner there are a wide variety of CT protocols that may be performed with the SPECT images. A key pitfall is to choose the wrong CT protocol, either in image acquisition or display. There is also a trade off between image quality and patient radiation dose. We will discuss how to choose between different scanning protocols. We will also examine the use of oral or intravenous contrast and when it can lead to difficulties in image interpretation.

Both SPECT and CT data may be reconstructed and displayed in a variety of ways. Referring clinicians may be unfamiliar with the modality and choosing how to display the images is of great importance for correct interpretation and a number of imaging artifacts may occur. We will discuss this with advice on the best choice of image display in a number of clinical scenarios.

References

1. O'Connor, M and Kemp, B, 2006. Single-Photon Emission Computed Tomography/ Computed Tomography: Basic Instrumentation and Innovations. *Seminars in Nuclear Medicine* 36(4), p256-266.
2. Schillaci O, Danieli R, Manni C, Simonetti G, 2004. Is SPECT/CT with a hybrid camera useful to improve Scintigraphic imaging interpretation? *Nuclear Medicine Communications* 25(7): p705-710.
3. Mariani G, Bruselli L, Kuwert T, Kim EE, Flotats A, Israel O, Dondi M, Watanabe . A review on the clinical uses of SPECT/CT. *N.Eur J Nucl Med Mol Imaging*. 2010 Oct;37(10):1959-85.
4. Gnanasegaran G, Cook G, Adamson K, Fogelman I. Patterns, variants, artifacts, and pitfalls in conventional radionuclide bone imaging and SPECT/CT. *Semin Nucl Med*. 2009 Nov;39(6):380-95.
5. Ka Kit Wong, Natalia Zazhevsy , John M. Cahill , Kirk A. Frey, Anca M. Avram. Incremental Value of Diagnostic ¹³¹I SPECT/CT Fusion Imaging in the Evaluation of Differentiated Thyroid Carcinoma. *American Journal of Roentology*. December 2008 vol. 191 no. 6 1785-1794

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