

Cat brain perfusion with multi-pinhole SPECT imaging.

A. Dobbeleir, K. Audenaert, K. Peremans

Department of Medical Imaging, Faculty of Veterinary Medicine

Department of Psychiatry and Medical Psychology, University Hospital

Purpose: HiSPECT is a small animal SPECT system. The system consists of pinhole apertures fixed on a multi-detector gamma camera. Normally this system and other micro-SPECT systems are used for mouse and rat studies. We tested the system on the brain of a middle-sized animal like the cat.

Methods: Pinholes with 6 apertures of 2.0 mm inner diameter each designed for rat studies (Bioscan Inc.) were mounted on a Trionix triple-head gamma camera. A Jaszczak phantom with hot rods ranging from 1.2 mm to 1.6 mm was scanned at varying detector radius from 180 mm to 220 mm. Cat brains were scanned at a radius of 199 mm. This radius is about 30 mm larger than a typical rat scan. Images are reconstructed using a dedicated OSEM algorithm (Scivis GmbH).

Results: The 1.2 mm rods of the phantom are clearly separated at a radius of 180 mm. The resolution loss was about 0.1 mm per 10 mm radius increase. The resolution of the cat brain scan can be estimated at 1.4 mm.

The quality of the cat brain scan is at least equal to the perfusion SPECT of humans using fanbeam collimators. The different cortical areas can be discriminated and (semi-)quantification of the regional activity is possible.

Conclusion: This system allows diagnostic brain perfusion imaging of the cat brain. This system can be used to evaluate the cat brain for research purposes.