
**SFoV Imaging Using a Hybrid Optical-Gamma Camera (HGC): Specifications and First Clinical Result**

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***Aim/Introduction:*** A portable small field of view (SFoV) high resolution gamma camera designed for small organ has been developed. Four integrated pinhole collimators (1, 2, 3 and 5 mm diameter) can be software selected in seconds to optimise image resolution and acquisition speed. A microcolumnar CsI(Tl) crystal scintillator converts gamma to optical photons for detection by a semi-conductor. An in-built optical camera with the same field of view, allows real-time display of gamma image acquisition streaming mapped to surface anatomy.

***Materials and Methods:*** Following characterisation and performance measurements, pilot studies were undertaken in the clinical setting as part of research ethics committee (REC) approved clinical studies. Imaging was undertaken in patients undergoing standard of care imaging and the investigational images compared with the standard gamma camera images.

***Results:*** Characterisation results indicate that spatial resolution, spatial linearity, and uniformity values exceed those of large field of view (LFoV) gamma cameras. Sensitivity and count rate capability were comparably lower, due to the smaller size of the device. This is partially compensated by the ability to position the small camera head (< 15 cm diameter) very close to the region of interest. A range of patients have been studied and images from the first clinical investigations will be presented. The compact nature of the camera allows use with the patient in a small-sized room. A 60° field of view allows the operator to assess larger or smaller regions by altering the camera distance from the region of interest. Automated pinhole collimator change allows rapid change between 'higher sensitivity' and 'higher resolution' settings. These studies demonstrated that the camera is highly suited to SFoV imaging applications such as thyroid and parathyroid using Tc-99m and I-131, sentinel node localisation studies and bone spot views. However there is a learning curve for the operator to establish the optimum combination of camera positioning and collimator selection for each case. Investigation of further clinical applications using different radionuclides are underway to determine how the fusion of the gamma and visible images can be used to best effect.

***Conclusion:*** Use of a hybrid SFoV camera complements the LFoV imaging and in some applications may provide a solution for small organ imaging without the use of the larger, more expensive systems. The portability of the device offers the potential to integrate scintigraphy within clinical pathways outside of the nuclear medicine department such as surgical and intensive care settings.