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Comparison of planar and SPECT perfusion lung scintigraphy in the diagnosis of pulmonary embolism

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Aims and objectives

Introduction Pulmonary embolism (PE) is a severe and potentially fatal disease and therefore needs to be diagnosed as early as possible [1]. PE is caused when an embolus travels to the lungs, and gets lodged within the arteries in the lungs, resulting in lack of blood supply to the area supplied by that blocked artery [2]. A lung scintigraphy scan is performed to diagnose PE. There are two parts to a lung scintigraphy scan: ventilation and perfusion. A ventilation scan is performed to assess the...

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Methods and materials

The study was approved by the University of Malta Research Ethics Committee (UREC no. 079/2013) and all participating patients gave written informed consent. This study consisted of the evaluation of images obtained from adult patients (n=40) who had undergone a lung perfusion scan with an acute onset of new or worsening shortness of breath or chest pain with any apparent cause; ^{99m}Tc with a positive D-dimer test ($>0.5\text{mg/l}$); ^{99m}Tc with a request for a perfusion lung scan by their referring doctor, together with a chest x-ray reported by a radiologist....

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Results

Reliability Intra-observer reliability was 100% for both nuclear medicine physicians when assessing planar data. When assessing SPECT data, one nuclear medicine physician had a reliability of 60%, whereas the other

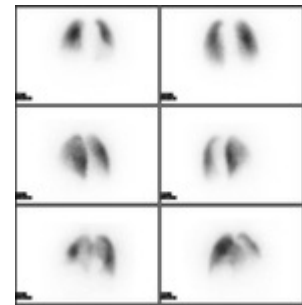


Fig. 1: Normal planar perfusion lung scan

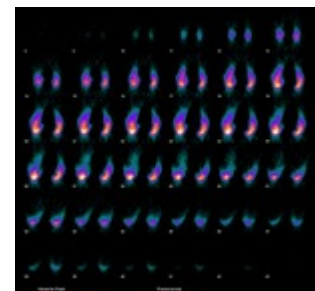


Fig. 2: Normal Transverse SPECT perfusion lung scan

physician had a reliability score of 90%, indicating excellent internal consistency for each observer. Inter-observer reliability using Pearson's correlation (r) ranged from 0.63 to 0.83, indicating a strong correlation of inter-observer reliability. Paired samples t-test was also performed which concluded that the mean rating scores provided by the two nuclear medicine physicians for the same lobe images...

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Conclusion

Since currently, planar perfusion lung scintigraphy is the mode of detection of PE within the local nuclear medicine department, a protocol was set up prior to the start of the study for the acquisition of SPECT perfusion lung images requiring changes to processing and display protocols on the gamma camera. From the results obtained it was concluded that SPECT perfusion lung scintigraphy has an overall higher sensitivity and specificity in comparison to planar imaging for both lungs. Based on SPECT images, more decisive reports were issued by the nuclear...

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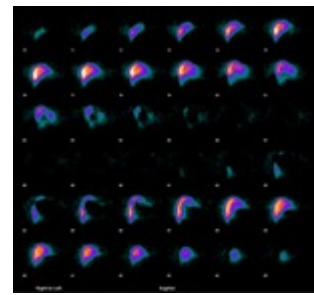


Fig. 3: Normal Sagittal SPECT perfusion lung scan

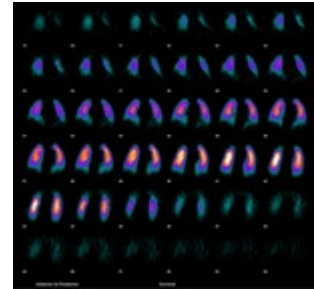


Fig. 4: Normal Coronal SPECT perfusion lung scan