

Computer Assisted Diagnosis System for the Interpretation of DMSA images

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Purpose

Interpretation of ^{99m}Tc-dimercaptosuccinic acid (DMSA) images can be difficult especially for less experienced nuclear medicine physicians. Computer Assisted Diagnosis (CAD) systems are available for the interpretation of other types of medical images and have shown to increase the physician's performance and also to reduce intra- and inter-observer variation. The purpose of this study was to develop a CAD system for the automated interpretation of DMSA images.

Methods

A total of 95 patients, 1 month to 18 years of age, who had undergone a DMSA examination at Queen Silvias Childrens Hospital, Gothenbourg, Sweden, were studied retrospectively. The interpretation of the images by an experienced nuclear medicine physician were obtained from the clinical reports. Training and test of the CAD system was performed using a cross validation.

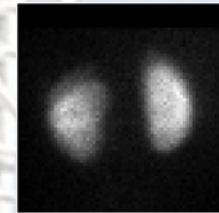
The completely automated CAD system for image processing, quantification and interpretation of DMSA scans consisted of the steps indicated to the right.

Results

The CAD system classified DMSA images as normal or abnormal based on an analysis of lesions. The performance, measured as the area under the receiver operating characteristics curve, was 0.96.

Conclusion

A completely automated CAD system can be used to interpret DMSA images. Application of the method as a clinical decision support tool appears to have significant potential.



DMSA scan

CAD system

Motion Correction

Segmentation

Background subtraction

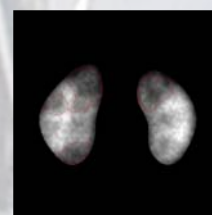
Quantification

Comparison to Normal

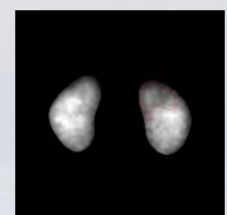
Detection of Lesions

Classification of Lesions

CAD advice



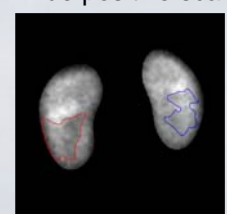
True positive scan



True positive scan



True negative scan



False positive scan

