

Automatic 3D-segmentation of the prostate gland

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Aim:

Our long-term aim is to develop imaging biomarkers for the analysis of PET/CT as indicators of prognosis.

The aim of the present study is to develop an algorithm for automated segmentation of the prostate gland in CT images.

Materials and Methods:

Training group: 20 CT images from patients who had undergone FDG-PET/CT scans.

Test group: 50 CT images from consecutive PET/CT patients were used.

Manual prostate gland segmentations performed separately by two physicians were used as training data.

A multi-atlas registration based method was applied for completely automated segmentation of the prostate gland.

The Dice index was used to quantitatively evaluate the similarity between the automated and the manual prostate segmentations (1.0 indicates perfect agreement).

Results:

In the training group the mean Dice index comparing the automated versus manual segmentations was 0.73 (SD 0.09).

The automated segmentations were considered as optimal or acceptable by at least one of two radiologists 20/20 training cases and 35/50 test cases.

Conclusion:

This is the first step in the development of an objectively measured PET/CT imaging biomarker.

The CT segmentations will for example be used for automated quantification of choline uptake in the prostate gland.