

Texture analysis of high-resolution FLAIR images for TLE

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ABSTRACT

This paper presents a study of the texture information of high-resolution FLAIR images of the brain with the aim of determining the side of hippocampal abnormality in cases of medial temporal lobe epilepsy considered for surgical resection. Intensity and volume features of the hippocampus from FLAIR images of the brain have been shown to be useful in detecting the site of epileptogenicity. However, the small size of the hippocampus may limit such textural information. High-resolution FLAIR images show greater detail of the abnormal intensity variations of the hippocampus and therefore are more suitable for texture analysis. We studied and compared the low and high-resolution FLAIR images of 10 epileptic patients. Two experts (neuroradiologist and neuro-anatomist co-investigators) segmented the hippocampi manually from T1-weighted MR images. The segmented regions were mapped onto the corresponding FLAIR images for texture analysis. The 2-D and 3-D wavelet transforms of the hippocampi were employed for texture feature extraction. We compared the ability of the texture features extracted from low- and high-resolution FLAIR images to distinguish normal and abnormal hippocampi. Intracranial EEG results as well as surgical outcome were used as gold standards. Experimental results show that the intensity variations of the hippocampus in FLAIR images correlate strongly with the side of epileptogenicity.

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