INTRODUCTION
High resolution magnetic resonance imaging of the temporal lobe shows most cases of mesial temporal lobe sclerosis, the most common cause of temporal lobe epilepsy (TLE). In combination with EEG it yields lateralizing results in approx. 90% of the patients. Several clinical studies on adult patients as well as on children (1,2,3) have demonstrated that proton magnetic resonance spectroscopy can contribute to localize the seizure focus. The aim of this study was to evaluate whether metabolic changes in the temporal lobe does already occur while the morphological images still appear to be normal, a common situation in young children. We therefore have studied children between 2 and 14 years with temporal lobe epilepsy using single voxel proton magnetic resonance spectroscopy and analyzed the asymmetric behavior of metabolism in the temporal lobe.

METHODS
17 children (9 boys, 8 girls) with clinical diagnosis of temporal lobe epilepsy at an age from 2 to 14 years (median 9y 1m) were investigated using high resolution MRI and MRS. Lateralization was based on an asymmetry index (AI) (4) reflecting abnormal ratios of the detected metabolites N-acetylaspartate (NAA) to total creatine (Cr) plus Choline (Cho). Studies regarding the metabolic changes of the developing brain (5) indicate no significant dependencies of the AI on the age of the patient. In order to establish a level of confidence we therefore examined 7 healthy adult subjects and found asymmetry indices between –0.05 and 0.05. Values beyond this limit were regarded as abnormal.

All experiments were performed on a 2 T whole body system (Medspec 5200, Bruker, Ettlingen) using a standard quadrature head coil. Spectra were acquired in the left and right temporal lobe. We used PRESS at echo times of 30 and 70 ms, a TR of 3s and a voxel size of (1.5)³ cm³.

RESULTS
In 6 out of 17 cases the high resolution image showed a temporal sclerosis and the EEG was indicating a clear lateralization. In all these cases the asymmetry index of MRS was significant and consistent with EEG and MRI (AI>0.30). In 11 cases the images appeared to be normal whereas the EEG indicated a lateralization. Here the asymmetry indices were in the region between 0.07 and 0.21.

In 6 out of these 11 cases the AI was significant and consistent with EEG findings. In 4 cases the AI was not significant and in one child the AI was significant but contradictory to the lateralization indicated by the EEG. One of these patient spectra indicating a modest asymmetry index of 0.09 is shown in Fig.2.

DISCUSSION
We found good correlation in children between MRS and MRI in all cases of mesial temporal sclerosis. We achieved good quality spectra with specific results, although the EEG does often not provide a clear localization of the seizure focus at a younger age. Our results indicate, that metabolic modifications might precede the morphological changes towards a mesial temporal sclerosis in children.

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