

Case Report: Cortical Dysplasia

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Patient history

12-year-old girl presented after inconclusive scan at an outside institution. The patient was scheduled for a standard Epilepsy scan on our 1.5T MAGNETOM Avanto using a standard Head Matrix coil. The patient was then referred to the 3T MAGNETOM Trio and examined using the 32-channel Head Matrix coil.

Sequence details

The images obtained are from a 1.5T MAGNETOM Avanto with software version *syngo* MR 13 (MPRAGE 0.7 mm isotropic voxels) and from a 3T MAGNETOM Trio with software ver-

sion *syngo* MR B15 (MPRAGE 0.7 mm isotropic, 0.9 mm isotropic voxels using Water Excitation (WE), DarkFluid 3D SPACE and lipid suppressed 135 ms TE single voxel MR spectroscopy – MRS)

Image findings

The patient presented with migraines and 1.5T MR demonstrated a left frontal lesion possibly a cortical dysplasia or developmental tumor (DNET).

3T MR demonstrates a focally thickened cortical ribbon with blurring of the grey/white matter interface. The MR appearances are that of a cortical malformation.

Discussion

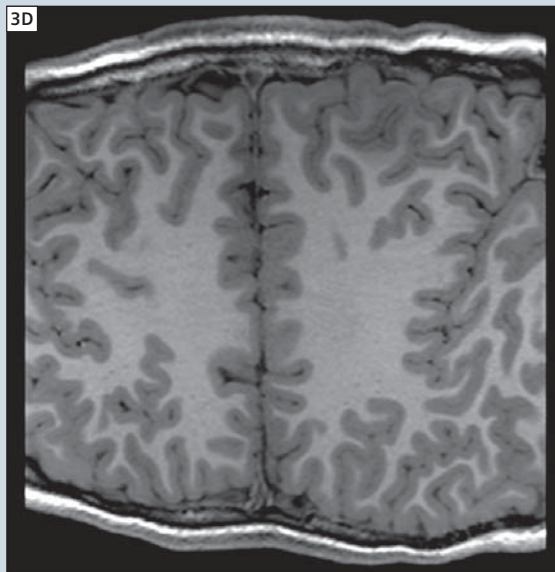
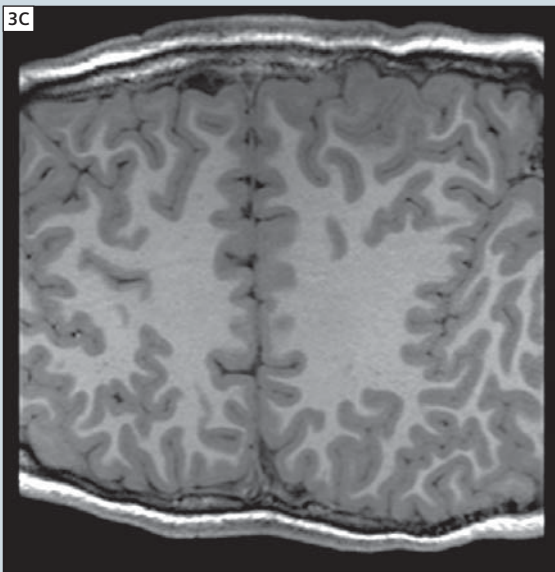
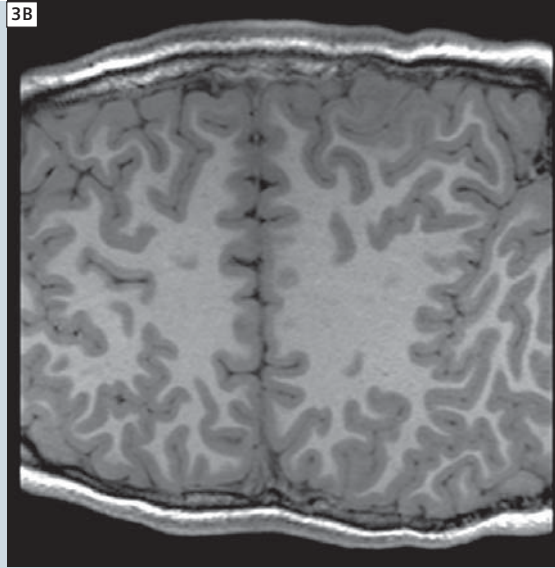
The images obtained using the 1.5T MAGNETOM Avanto clearly show the lesion but the increased signal-to-noise ratio (SNR) of the 32-channel Head Matrix coil and 3T (MPRAGE and 3D SPACE) provide the radiologist with a level of anatomical detail that enables a diagnosis with a higher degree of sensitivity and specificity.



1 MPRAGE image with 0.7 mm isotropic voxel, acquired using a 1.5T MAGNETOM Avanto system, demonstrating the left frontal lesion.



2 Corresponding MPRAGE image acquired using a 3T MAGNETOM Trio and the 32-channel Head Matrix coil. The focally thickened cortical ribbon and the blurring of the grey/white matter interface are clearly visible.



3 The acquisition of a highly resolved 3D dataset also enables the radiologist to perform a detailed retrospective interactive multiplanar evaluation of the whole brain. In figures 3A–D the reformatted DarkFluid 3D SPACE images are shown, displaying the disorganization of the left frontal cortical layer in detail.

3E standardized coronal and 3F sagittal reformation of the acquired T2-weighted *syngo* SPACE images.

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Patient history

10-year-old girl presented after inconclusive scan at an outside institution. The patient has a history of Epilepsy, developmental regression and autistic behavior. The patient was referred to the 3T MAGNETOM Trio and examined using the 32-channel Head Matrix coil utilizing our current high resolution Epilepsy protocol.

Sequence details

The images are from 3T MAGNETOM Trio with software version *syngo* MR B15 (MPRAGE 0.7 mm isotropic, 0.9 mm isotropic voxels using Water Excitation (WE), DarkFluid 3D SPACE, high resolution 2.5 mm coronal Turbo Spin Echo (TSE) T2 and lipid suppressed 135 ms TE single voxel MR Spectroscopy – MRS)

Image findings

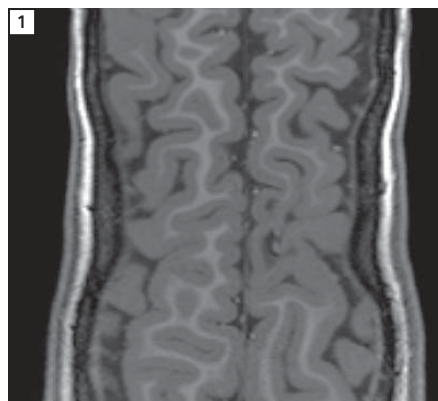
There is a cortically based lesion within the left frontal lobe containing cystic and solid components that do not enhance with contrast. There is a "tail" of increased signal that extends from the lesion to the anterior horn of the lateral ventricle. The MRS confirms appearance of a focal trans mantle cortical dysplasia.

Discussion

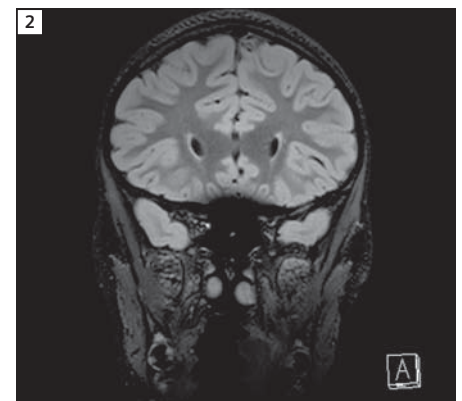
The high signal-to-noise ratio (SNR) afforded by the use of the 32-channel Head Matrix coil and 3T permits the technologist to run high-resolution isotropic 3D acquisitions in scan times that are conducive to high patient compliance. The reformatted images (MPRAGE 0.7 mm and 3D SPACE 0.9 mm) combined with the high-resolution T2 provide the radiologist with a level of anatomical detail that provides a diagnosis with a higher degree of sensitivity and specificity. The ability to use these 3D data sets to per-

form curvilinear reformations improves pre-surgical localization. The lipid suppression characteristics of the MRS

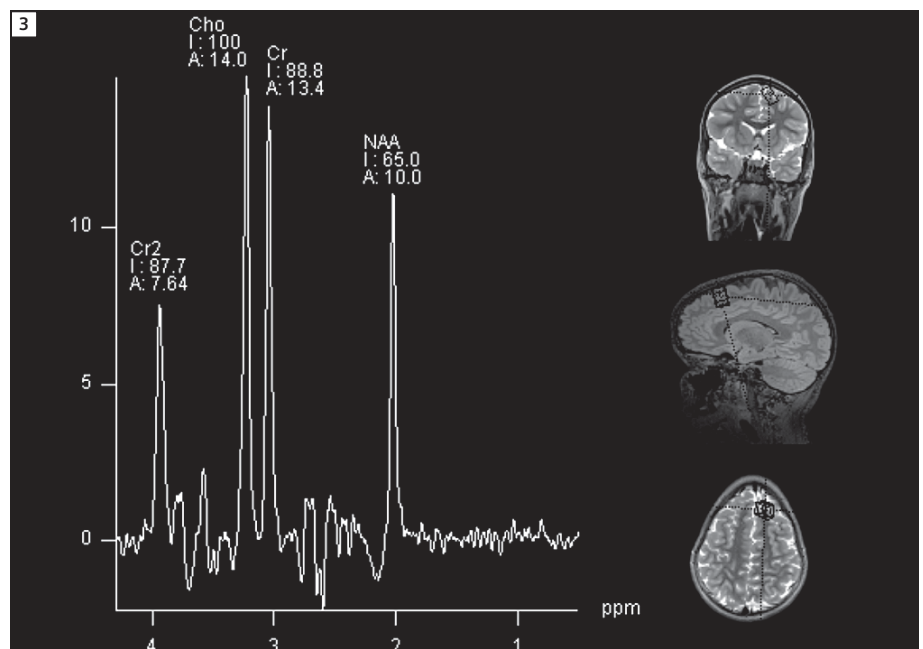
enable lesions close to the outer table of the skull to be evaluated.



1 The reformatted image from 0.7 mm isotropic voxel MPRAGE proves to increase the diagnostic specificity.



2 DarkFluid 3D SPACE shows the left frontal lobe lesion containing solid and cystic components.



3 Lipid suppressed 135 ms single voxel MR spectrum from the lesion of the left frontal lobe supports the diagnosis of a focal trans mantle cortical dysplasia.