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Case Report

MR Imaging of Polymicrogyria-A Malformation of Cortical Development

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Abstract

Polymicrogyria (PMG) is a malformation of cortical development disorder characterized by excessive small and prominent convolutions separated by shallow sulci, giving the cortical surface and cortical–white matter junction an irregular appearance. We present a case of 13 year boy with history of generalised tonic clonic seizures since birth and MRI brain showed the three characteristics findings of PMG i.e. abnormal gyral pattern, increased cortical thickness, and irregularity of the cortical-white matter junction due to packing of microgyri. Purpose of this case presentation is to present a rare entity liable to missed on routine scan which is important cause of seizures in children and young adults.

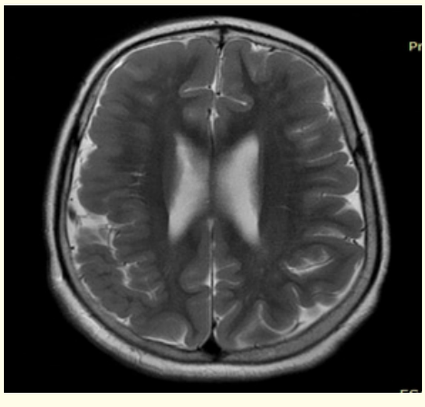
Keywords: MR Imaging; Polymicrogyria; Malformation

Introduction

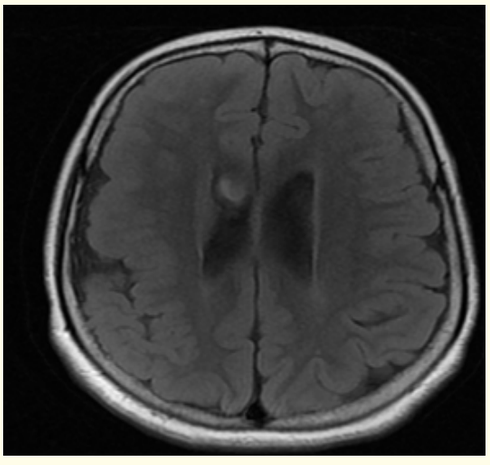
Polymicrogyria is a malformation of the cerebral cortex secondary to abnormal migration and postmigrational development [1]. It is characterized by an excessive number of abnormally small gyri separated by shallow sulci, associated with fusion of the overlying molecular layer of the cerebral cortex2. This combination of features produces a characteristic appearance of irregularity at both the cortical surface and cortical–white matter junction. Neuroimaging shows the characteristics findings of Polymicrogyria as abnormal gyral pattern, increased cortical thickness, and irregularity of the cortical-white matter junction in the form of microgyria [2-4].

Case Report

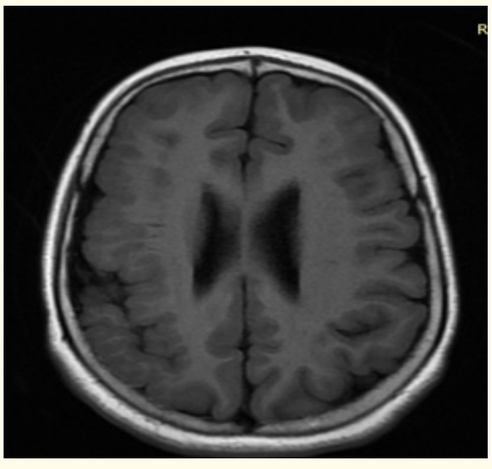
A 13 year old boy presenting with history of generalised tonic clonic seizures since birth on anti-epileptic drugs. MR imaging of brain was done showing excessive small and prominent convolutions separated by shallow sulci, giving the cortical surface and cortical–white matter junction on right cerebral hemisphere with an irregular appearance in right fronto-parietal lobe in the form of microgyri.



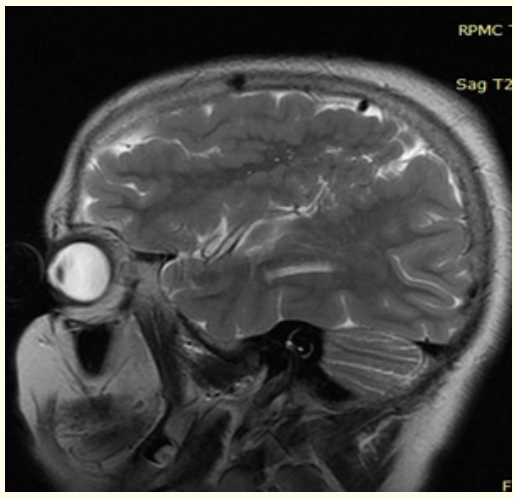
(a)



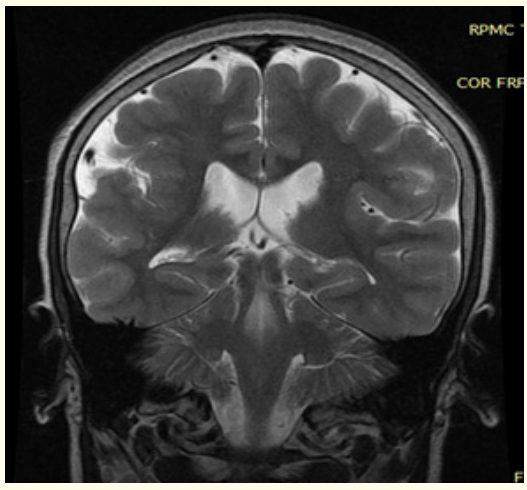
(b)



(c)



(d)



(e)

Figure: Axial, sagittal and coronal and T2WI (a, d, e), axial FLAIR (b) and T1WI (c) MR images of the patient shows excessive small and prominent convolutions separated by shallow sulci, giving the cortical surface and cortical–white matter junction an irregular appearance in right fronto-parietal lobe.

Discussion

Polymicrogyria is a malformation due to abnormality in late neuronal migration and cortical organization neurons reach cortex but distribute abnormally, forming multiple small undulating gyri. It Result is cortex containing multiple small sulci that often appear fused on gross pathology and imaging [1,2,4,5].

Clinically it presents as developmental delay, and seizure with unilateral polymicrogyria presenting with hemiparesis [6-8].

Key Diagnostic Features:

1) Excessively small gyri and prominent convolutions with Predilection for perisylvian regions when bilateral and is often syndromic [1,5].

2) Small irregular gyri, but cortex looks normal or thick and may appear as deep infolding of thick cortex [1,5].

Conventional imaging sequences like TIW, T2W etc. are adequate for the diagnosis of this entity and no additional benefit is obtained from MR spectroscopy of MR perfusion imaging except for research purpose.

Differential Diagnoses include Microcephaly with simplified Gyral Pattern-it is a disorder of stem cell proliferation, head circumference less than 3 SDs below mean MSG has normal cortical thickness, smooth inner cortical margin, normal primary and secondary sulci [9,10]. Another differential diagnosis is hemimegaloencephaly-it is a disorder of neuronal proliferation, migration, and differentiation. In HME, affected hemisphere is large; in unilateral. Treatment is symptomatic and particularly aimed at controlling epilepsy [6,9,10].

Conclusion

Conventional MR imaging of the brain is an important tool in the diagnosis and characterisation of various cortical developmental disorder including polymicrogyria. Polymicrogyria is a rare entity and is liable to missed on routine scan which is important cause of seizures in children and young adults.

Bibliography

1. Barkovich AJ., *et al*. "Syndromes of bilateral symmetrical polymicrogyria". *American Journal of Neuroradiology* 20.10 (1999): 1814-1821.

2. Leventer RJ., *et al*. "Clinical and imaging heterogeneity of polymicrogyria: a study of 328 patients". *Brain* 133.5 (2010): 1415-1427.

3. Barkovich AJ. "MRI analysis of sulcation morphology in polymicrogyria". *Epilepsia* 51.1 (2010): 17-22.

4. Barkovich AJ., *et al*. "A developmental and genetic classification for malformations of cortical development". *Neurology* 65.12 (2005): 1873-1887.

5. Barkovich AJ., *et al*. "Correlation of prenatal events with the development of polymicrogyria". *American Journal of Neuroradiology* 16.4 (1995): 822-827.

6. Guerrini R., *et al*. "Bilateral parasagittal parietooccipital polymicrogyria and epilepsy". *Annals of Neurology* 41.1 (1997): 65-73.

7. Guerrini R., *et al*. "Multilobar polymicrogyria, intractable drop attack seizures, and sleep-related electrical status epilepticus". *Neurology* 51.2 (1998): 504-512.

8. Guerrini R., *et al*. "Bilateral frontal polymicrogyria: a newly recognized brain malformation syndrome". *Neurology* 54.4 (2000): 909-913.

9. Barkovich AJ. "Morphologic characteristics of subcortical heterotopia: MR imaging study". *American Journal of Neuroradiology* 21.2 (2000): 290-295.

10. Wieck G., *et al*. "Periventricular nodular heterotopia with overlying polymicrogyria". *Brain* 128.12 (2005): 2811-2821.

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