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Polymicrogyria - A Case Report

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Abstract:

Introduction: Polymicrogyria is a malformation of cortical development in which the process of normal cerebral cortical development is disturbed late in the stage of neuronal migration. Deeper layers of the cerebral cortex develop abnormally and multiple small gyri form within the cortex**.[1]** Polymicrogyria (PMG) is a cortical malformation characterized by supernumerary, small gyri with abnormal cortical lamination**.[2]** Malformations of cortical development (MCD) comprise a large group of disorders resulting from defects in formation of the cerebral cortex that involve all major stages of cortical development including neurogenesis, neuronal migration, and postmigrational development**.[3]**

Case report: During routine dissection in the department of anatomy, Gauhati Medical College & Hospital Gauhati, we found a specimen of brain with extra small and large gyri other than the normal anatomical gyri. They are found in all the lobes of brain frontal near sylvian fissure below the inferior frontal gyri, parietal lobes, occipital lobes, temporal lobes. There are places where we have found some fused sulci **.**

Conclusion: From the above case report we can come to a diagnosis of delayed mental development as well as cause of seizure episodes in patients when there found to be no predisposing etiological factors other than presence of structural brain changes**.**

Keywords: malformations, migrations, defects, mental, seizure, gyria.

Introduction- Polymicrogyria is a malformation of cortical development in which the process of normal cerebral cortical development is disturbed late in the stage of neuronal migration. Deeper layers of the cerebral cortex develop abnormally and multiple small gyri form within the cortex**.[1]** Polymicrogyria (PMG) is a cortical malformation characterized by supernumerary, small gyri with abnormal cortical lamination**.[2]** Malformations of cortical development (MCD) comprise a large group of disorders resulting from defects in formation of the cerebral cortex that involve all major stages of cortical development including neurogenesis, neuronal migration, and postmigrational development**.[3].**Friede in 1989 first described the diagnostic criteria for PMG. They are- abnormal arrangement of cell layers, Intracortical fiber plexus, extensive foldings of cortical upper layers, fusion of gyral surfaces. There are many extrinsic factors which if present during development of cerebrum, may lead to this cortical maldevelopment PMG, those are , cytomegalovirus infection during pregnancy, fetal cerebral ischemia due placental perfusion deficiency, twin -twin transfusion syndrome, loss of twin in utero, maternal drugs ingestion**.** The junction between microgyric cortex and underlying white matter is slurred or sharp. The meninges over polygyric cortex is thickest as compared to other sites**.[4]**PMG is mostly bilateral (60%) and unilateral in (40%) cases.Cortex around the sylvian fissure is mostly involved (80%)

followed by parietal lobe(63%) ,temporal (38%), occipital (7%).Anomalous venous drainage is found in areas of PMG**.[5]** In diffuse PMG there is generalized hypotonia, thin corpus callosum, supratentorial ventriculomegaly, pontine and cerebellar hypoplasia, small basal ganglia**.[6]**

Case report:

During rutine dissection in the department of Anatomy, Gauhati Medical College and Hospital, We had found a specimen of brain with cortical maldevelopment called Polymicrogyria. It means presence of more than one gyrus along with other normal gyri.

The condition is bilateral involving frontal lobe, temporal lobe and parietal lobes mainly. Occipital lobe is spared. With the help of the vernier calliper the accessory gyri were shown. In image-2 We had shown the extra gyrus below the inferior frontal gyrus with the help of vernier calliper. In Image -3 we had shown the inferior temporal gyrus and the extra gyrus involving temporal lobe with the yellow arrow mark. Both the accessory gyri are present around the sylvian fissue. In image-1 we had shown the extra gyrus in parietal lobe. Thickness of extra gyri around the sylvian fissure is more as compared to the other gyri around the all lobes. On both sides of the cerebrum thickness are equal.The brains are neither microcephalic nor megaloencephalic. At some places gyri are found to be fused shown by the yellow arrow mark in image-4. Thickness of meninges over polygyric areas are found to be normal.

Discussion:

1. J Anna C , R Yves ,H Mrinalini et.al, in 2016 found that the small gyri are fused with extensive foldings.This is in accordance to findings in image -3.
2. . A. James Barkovich in 2010 found that PMG involves both sides in 60% of cases as compared to unilateral cases (40%).This is also in accordance with the present findings as shown in image -1B.
3. S Waney and J Anna during 2014 found in their study that PMG most commonly occur around perisylvian fissure , base of the brain and medial temporal cortex are spared**.[6]**This is similar to our present findings.
4. G Anand K. , M Ranoji Shivaji, K Ashok in 2021 mentioned in his article that after perisylvian fissure it is dorsolateral surface of frontal lobe , temporal lobe ,parietal lobe and rarely occipital lobes where we get PMG **.[7]** This is according to our present finding.

Conclusion:

From the above case report we can come to a diagnosis of delayed mental development as well as cause of seizure episodes in patients when there found to be no predisposing etiological factors other than presence of structural brain changes

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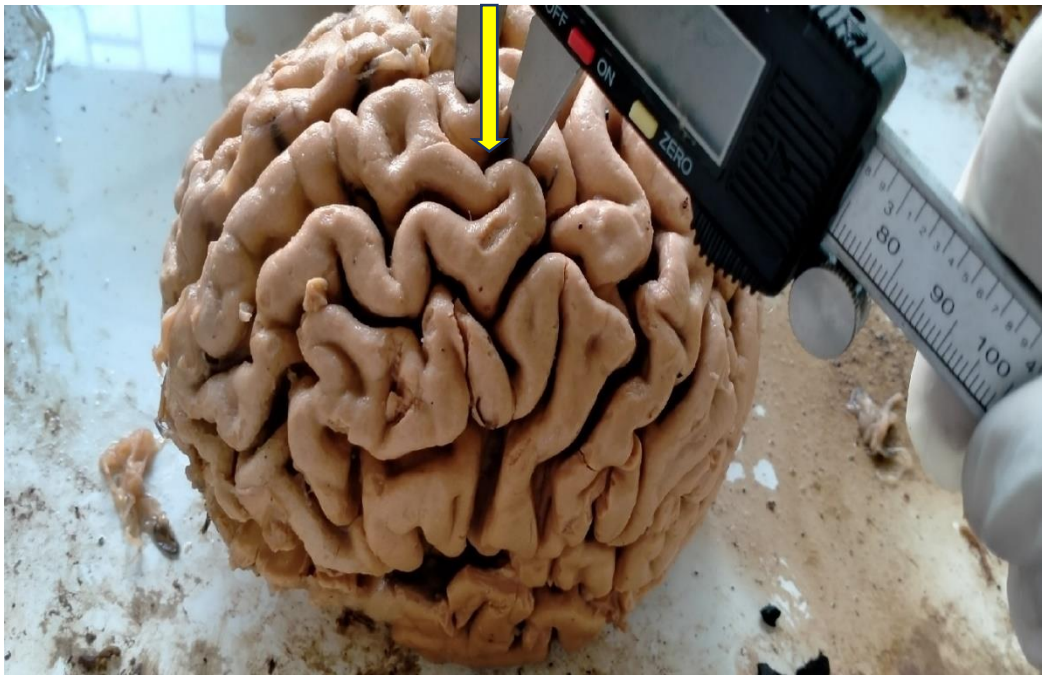

Image-1 accessory gyrus in parietal lobe (yellow arrow)

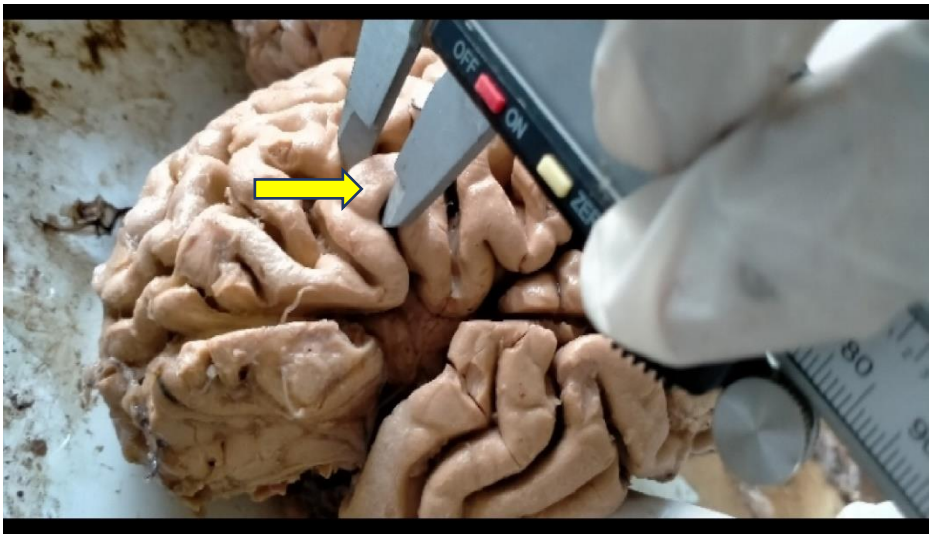

Image-2 accessory gyrus in frontal lobe.(yellow arrow)

Image-3 Accessory gyrus in temporal lobe.(yellow arrow)

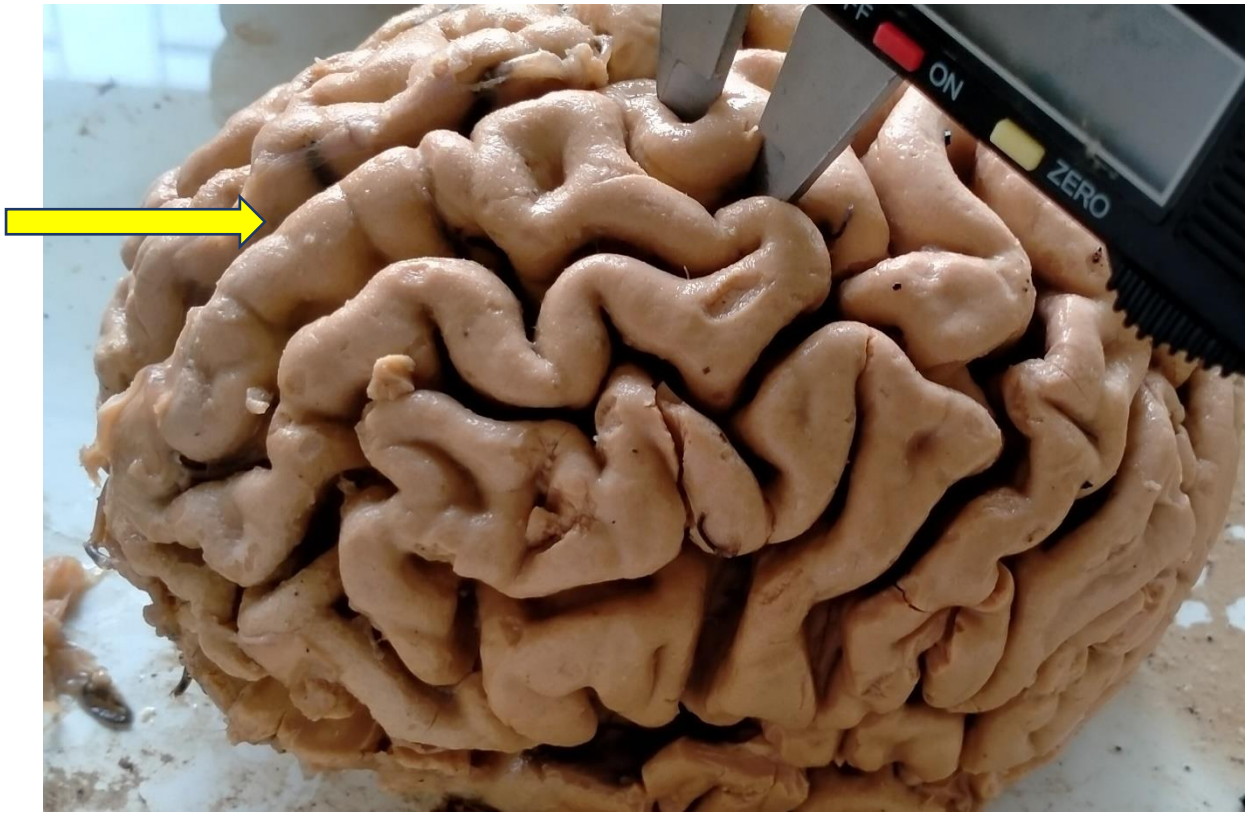

Image-4 fused gyrus in brain.(yellow arrow)