

Isolated Nonsyndromic Hemimegalencephaly Presenting at Neonatal Age - A Case Report.

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ABSTRACT

Hemimegalencephaly (HME) is a relatively rare sporadic brain malformation characterized by enlargement of one cerebral hemisphere. It has a variable presentation and may include partial seizures to epileptic encephalopathy, hemiparesis and psychomotor retardation. Epilepsy associated with HME is usually refractory to antiepileptic drugs and requires surgical intervention. Diagnosis of HME may be delayed in the absence of detailed examination and high index of suspicion giving rise to poor quality of life prior to surgery. We report, a case of a male neonate, with radiological features of HME picked up within seven days after birth. This was possible as antenatal ultrasonography was showing dilatation of the right lateral ventricle of the fetus. Baby had macrocephaly at birth and refractory convulsions from day two of life. Convulsions were managed successfully. Baby was discharged on necessary treatment and parents were given appropriate counseling. Careful examination and high index of suspicion can help in early diagnosis and better outcome. Our review of the literature did not yield any reports of patients with isolated non-syndromic HME presenting with refractory seizures as initial presentation in the neonatal age group. To our knowledge, this is the first report of its kind.

Keywords: Hemimegalencephaly, Convulsions, macrocephaly.

INTRODUCTION

Hemimegalencephaly (HME) is a relatively rare congenital malformation of the brain characterized by overgrowth of any one of the hemisphere.^[1-3] It has a variable presentation and may include partial seizures to epileptic encephalopathy, hemiparesis and mental retardation. Epilepsy associated with HME is usually refractory to antiepileptic drugs and requires surgical intervention.

We report a neonate who presented with refractory seizures without any focal neurological deficit. Examination findings suggestive of macrocephaly with abnormal antenatal ultrasonography findings helped in early diagnosis of HME in this case leading to better understanding prior to surgical intervention.

macrocephaly. General examination was normal and there were no neurocutaneous markers. The central nervous system showed depressed sensorium and decreased tone, power and reflexes. There was no evidence of raised intracranial pressure. The rest of the examination system was normal.

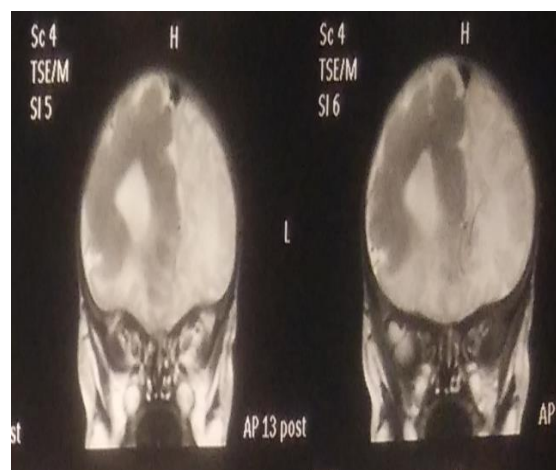
Investigations including complete hemogram, C reactive protein, blood sugar, serum electrolytes, renal and liver function tests were normal. Lumbar puncture tests results were within normal limits ruling out possibility of intracranial infection. In view of Antenatal ultrasonography showing dilatation of Right lateral ventricle and the presence of macrocephaly CT scan brain was done which showed gyral thickening with hyperdensity involving right frontoparietal lobe. MRI brain revealed focal dysplastic thickened cortex with associated pachygyria and ventriculomegaly in right frontoparietal lobe suggestive of Hemimegalencephaly [Figure 1].

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CASE REPORT

A 2 days old male neonate presented with multiple episodes of multifocal clonic convulsions, lethargy and refusal to feed progressing to altered sensorium at the time of presentation. Antenatal ultrasonography of mother done in the last trimester revealed dilatation of Right lateral ventricle of the fetus. Birth history was normal and the baby cried immediately after birth. His birth weight was 2.8 kg and Head circumference was 39 cm (> 99 percentile for the age) suggestive of



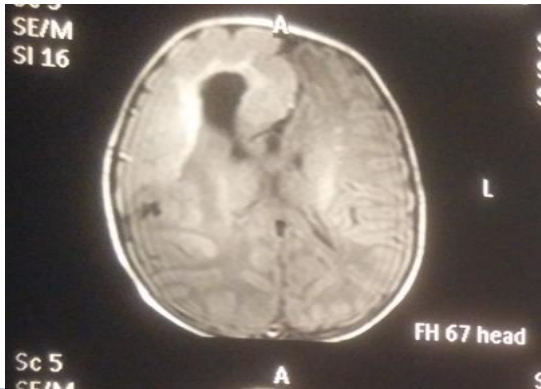


Figure 1: MRI brain showing focal dysplastic thickened cortex with associated pachygyria and ventriculomegaly in right frontoparietal lobe suggestive of hemimegalencephaly.

After stabilization of the vital parameters as per the guidelines by National Neonatology Forum baby was started on Injectable phenobarbitone (loading and reloading dose)^[4]. As seizures persisted after one hour baby was started on second line antiepileptic drug (AED) i.e. Injectable phenytoin (loading and reloading dose). Seizures could not be aborted in spite of maximum therapeutic doses of two AEDs hence continuous infusion of intravenous midazolam was added in the recommended doses. Injectable levetiracetam was also started in view of intermittent subtle seizures. Clinical improvement was obtained after 48 hours and slowly the AEDs were tapered and maintenance doses of three AED namely phenobarbitone, phenytoin and levetiracetam were continued. At the time of discharged patient was able to take breast feeds, but had abnormal neurological findings such as hypotonia, weak cry and depressed activity. Parents were counselled about the diagnosis of the child and the need for frequent multidisciplinary follow up at regular intervals.

The child was readmitted again at two months of age with breakthrough seizures in the form of sudden jerky movements of the upper extremities with flexion of neck suggestive of infantile spasms. Electroencephalogram was done as per advise by a paediatric neurologist and was showing hypersarrhythmia. As per his advice, child was started on oral prednisolone along with readjusted doses of three AEDs given previously. Seizures were controlled by day seventh of hospital stay and hence child was discharged. Presently child is six months old on three AEDs with prednisolone and early intervention therapy. He shows mild delayed development in all domains.

DISCUSSION

Hemimegalencephaly is a relatively rare but clinically striking defect of congenital origin in which there is hamartomatous overgrowth of all or part of

a cerebral hemisphere. Hemimegalencephaly is a defect of cortical development categorized by marked cerebral asymmetry. The cause of HME involves mechanisms that impede with late cortico-neurogenesis with partial defect of post-neurogenesis apoptosis in the molecular layer. The affected hemisphere may have focal or diffuse neuronal migration defects, with areas of polymicrogyria, pachygyria, and heterotopias. In HME, only one-sided cerebral hemisphere is distended.^[5-8]

The etiology of this condition is unknown, though it is postulated that it involves abnormalities of neuronal differentiation and cell migration in a single hemisphere. The isolated form, as in our case, occurs as a sporadic disorder without hemicorporal hypertrophy or cutaneous or systemic involvement. The syndromic form is associated with other diseases and may occur as hemihypertrophy of part or all of the ipsilateral body. It has been described in patients with epidermal nevus syndrome, proteus syndrome, hypomelanosis of Ito. The third and least common type is total hemimegalencephaly, in which there is also enlargement of the ipsilateral half of the brainstem and cerebellum.^[9]

MRI is the imaging modality of choice. The characteristic finding is straightening of the ipsilateral frontal horn of the enlarged ventricle. At MR imaging, the white matter shows heterogeneous but frequently high signal intensity and there is often distinction of areas of agyria, pachygyria, and/or polymicrogyria. Our patient did have pachygyria and ventriculomegaly.

Our review of the literature did not yield any reports of patients with isolated non-syndromic HME presenting with refractory seizures as initial presentation in the neonatal age group. To our knowledge, this is the first report of its kind. Our patient had macrocephaly at birth and presented with an intractable seizure. Macrocephaly is often the first presentation at birth, which brought the child to our attention.

Hemispherectomy was first performed for treatment of refractory epilepsy in 1978 and is considered the best therapeutic choice for patients with intractable seizures. Anatomic or functional hemispherectomy has also been performed with improvement in quality of life. Nevertheless, there is a high mortality and morbidity rate associated with hemispherectomy.^[8-9]

Some author noticed several anatomic abnormalities outside the involved hemisphere such as an extension of the homolateral brainstem, cerebellum and left lateral ventricle, in analysis of maximum numbers of HME cases.^[10]

Some authors suggest that primary management of seizure is embolization and before doing any kind of invasive treatments, surgical or embolic, every effort must be made to establish seizure control medically.^[11]

CONCLUSION

Hemimegalencephaly is a major congenital malformation of the brain and MRI is the imaging modality of choice for the diagnosis showing unilateral cortical thickening involving all or part of the cerebral hemisphere as most notable characteristic. Early diagnosis and multidisciplinary management is a key step to improve the quality of life of these patients prior to surgery.

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REFERENCES

1. Kumar KR, Syeda GJ. Hemimegalencephaly: Report of a Rare Case. *Int J Adv Health Sci* 2015;2(3):7-10.
2. Youn Soo Lee, Eun Sun Jung, Sun Moo Kim, Byung Kee Kim. The Korean Journal of Pathology 2000;34(3): 243-247. Hemimegalencephaly: A case report.
3. Hemimegalencephaly: A case report. *J Pathol Transl Med.* 2000;34 (3): 243-247.
4. Thakre, Rhishikesh, Srinivas Murki, and S. Venkataseshan. "Evidence Based Clinical Practice Guidelines." In *NNF clinical practice guidelines 2011*. P 115-128.
5. Salamon N, Andres M, Chute DJ, Nguyen ST, Chang JW, Huynh MN, et al. Contralateral hemimicrencephaly and clinicalpathological correlations in children with hemimegalencephaly. *Brain* 2006;129:352-65.
6. Sato N, Ota M, Yagishita A, Miki Y, Takahashi T, Adachi Y, et al. Aberrant midsagittal fiber tracts in patients with hemimegalencephaly. *AJNR Am J Neuroradiol* 2008;29:823-7.
7. Lee JH, Huynh M, Silhavy JL, Kim S, Dixon-Salazar T, Heiberg A, et al. De novo somatic mutations in components of the PI3KAKT3-mTOR pathway cause hemimegalencephaly. *Nat Genet* 2012;44:941-5.
8. Barkovich AJ, Chuang SH. Unilateral megalencephaly: Correlation of MR imaging and pathologic characteristics. *AJNR Am J Neuroradiol* 1990;11:523-31.
9. Bastos H, da Silva PF, de Albuquerque MA, Mattos A, Riesgo RS, Ohlweiler L, et al. Proteus syndrome associated with hemimegalencephaly and ohtahara syndrome: Report of two cases. *European J Epilepsy* 2008;17:378-82.
10. Santana-Ramirez A, Farias-Serratos F, Sanchez-Corona J, Castañeda-Cisneros G, Farias-Serratos NM. Hemimegalencephaly with facial congenital infiltrating lipomatosis in a child. *Iran J Public Health* 2014;43:1702-9.
11. Mathis JM, Barr JD, Albright AL, Horton JA. Hemimegalencephaly and intractable epilepsy treated with embolic hemispherectomy. *AJNR Am J Neuroradiol* 1995;16:1076-9.