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Efficacy of Magnetic Resonance Imaging in Diagnosis of Eclampsia with Clinical Correlation and Follow Up: A Prospective Study in A Tertiary Hospital

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Abstract
Aims and objectives: *1)To analyse the imaging features in eclampsia 2)To study the distribution and nature of cranial MRI findings in eclampsia. 3) To correlate the MRI findings with neurological symptoms and blood pressures.4) To predict the pathogenesis associated with abnormal MR imaging findings.*
5) Clinical follow up to see for the recovery from neurological deficits.
Summary: *In the present study, during the period of 12 months ,55 cases of eclampsia were evaluated with MRI brain.29 cases showed changes of Progressive Reversible Leuko Encephalopathy as T2 hyperintense signals with no restriction on DWI.*
Conclusion: *Cranial MRI is an important diagnostic tool in evaluation of intracerebral changes in cases with eclampsia.The posterior cerebral circulation is most commonly affected in cases of eclampsia.The posterior reversible encephalopathy lesions in eclampsia are reversible.*
Keywords: *Eclampsia, MRI(T2 and DWI),Progressive Reversible Leuko Encephalopathy.*

Introduction

Eclampsia is defined as seizure activity or coma unrelated to other cerebral conditions in an obstetric patient with hypertension. Majority occurs in third trimester or within 48 hours after delivery.

Preeclampsia, a disorder charecterised by hypertension, abnormal peripheral edema and proteinuria occurs in 4-5 %of pregnant women[1,2]. Many of the patients with preeclampsia present with headache, visual disorders, confusion and depression of the consciousness and ultimately seizures. The disease is refferred to as eclampsia when seizure is a component.

Eclampsia still remains one of the major complication of pregnancy in the developing countries of the world.The cause of preeclampsia/eclampsia,which threatens the lives of mother and fetus, has not yet been explained.Investigation of the clinical paramters associated with brain lesions detected in preeclampsia/ eclampsia cases might shed light to

the pathogenesis of the disease.CT imaging of brain shows symmetrical hypodensities.MRI brain shows characteristic changes in eclampsia.These include hyperintense lesions on T2 weighted and hypointense lesions on DW imaging affecting the white matter and adjacent grey matter of the occipital/ parietal lobes[3]. However,deep white matter structures ,basal ganglia and white matter of frontal and temporal lobes and brain stem can also be affected[4,5].

The purpose of this study was to determine the distribution and nature of cranial MR imaging in eclampsia and also to corelate with clinical data.

MRI scanning provides a sensitive and reproducible method for evaluating the suspected lesions in central nervous system .Its principle utility is when rapid information about the state of the central nervous system is desired and it is particularly important for decision related to emergency surgical versus medical mangement of patients with sudden onset of a neurological deficit.

MRI is becoming the modality of choice in investigating patients with acute neurological deterioration. It has higher specificity particularly for the demonstration of various intracerebral changes. MRI is more sensitive than CT scan in identifying the changes related to eclampsia.

MATERIALS AND METHODS

The present study group comprises of 55 cases referred from labour room, antenatal ward and postnatal wards of Gandhi hospital for a period of 1year and 10 months extending from September 2014 to June 2016.These cases were evaluated in the department of the Radiodiagnosis, Gandhi hospital.

In this study of 55 cases of eclampsia clinical and cranial MR imaging corelation has been done.

Clinical history includes age, parity, antepartum or intra partum or postpartum, previous history of eclampsia and epilepsy, record of blood pressures, symptoms of weight gain, edema ,headache, blurring of the vision, loss of consciousness.

Neurological examnination includes test for blurring of vision or blindness, mental status examination, reflexes power and sensory examination for any neurological deficit.

MRI brain was done with 1.5 tesla Avanto seimens machine using T_1W, T_2W, FLAIR &DWI sequences.

Most of the cases with seizure activity are evaluated with MRI brain within 4 days following seizures.

Most of them have subcortical whitematter hyperintensities in different parts of the brain predominantly in cerbral hemispheres involving occipital lobes.

Observation and Results

It is a prospective study of clinical and cranial MRI imaging in patients with eclampsia.The study extended for a period of 1year and 10 months from sepember 2014 to june 2016 on a sample volume of 55 patients with eclampsia.

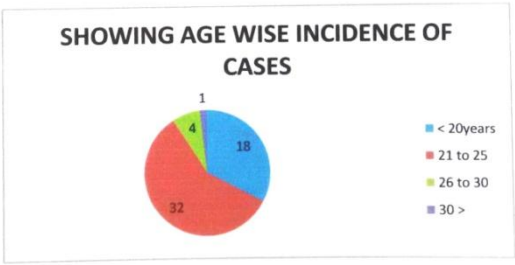
Age wise incidence

The majority of the cases in our study are in between 21 to 25 years (table 1)

Table 1: Age wise incidence of eclampsia.

AGE WISE INCIDENCE

Age - Years	Cases	Percentage
Less than 20 years	18	32.72%
21 to 25 years	32	58.18%
26 to 30 years	04	07.28%
31 years and above	01	01.82%



Time of onset of eclampsia

Onset of eclampsia is most common in antepartum period in our study.(table 2)

TIME OF ONSET OF ECLAMPSIA

Time of on set of eclampsia	Cases	Percentage
Antepartum	35	63.64%
Intrapartum	5	9.09%
Post partum	15	27.27%

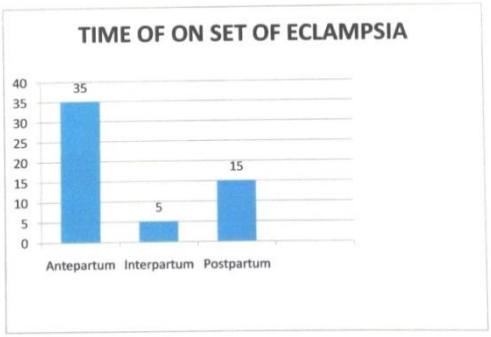


Table 2 : showing time of onset of eclampsia

Symptoms of eclampsia:

Most common presentation in patients with eclampsia in our study is seizures.(table 3

SYMPTOMS

SYMPTOMS	No. of Cases	percentage
Headache	50	90.9
Blurring of vision	35	63.64
Seizures	55	100
Altered Mental status & irritability	20	36.36%
Ataxia	1	1.8%
Neurological deficit	2	3.6%
Decreased level of consciousness	8	10.4%

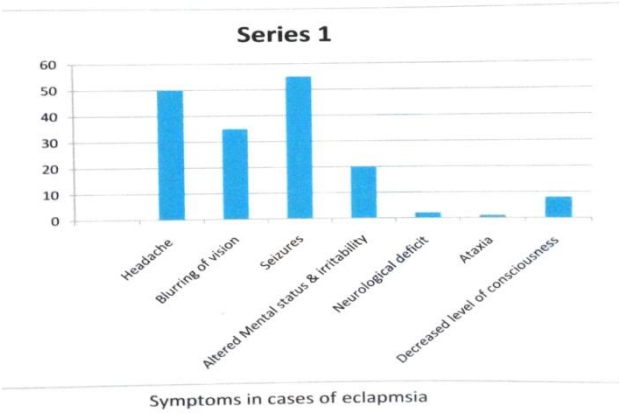


Table 3: showing the frequency of symptoms in patients with eclampsia.

Incidence of PRES changes in relation to blood pressure:

80-90% of patients presented with PRES even with mild increase in systolic and diastolic blood pressures. (table 4)

INCIDENCE OF PRES CHANGES IN RELATION TO BLOOD PRESSURE

Blood pressure		No. of Cases	percentage
Systolic	140 – 160	24	82.76
	160-180	05	17.24
Diastolic	90-110	20	98.96
	Above 110	09	1.04

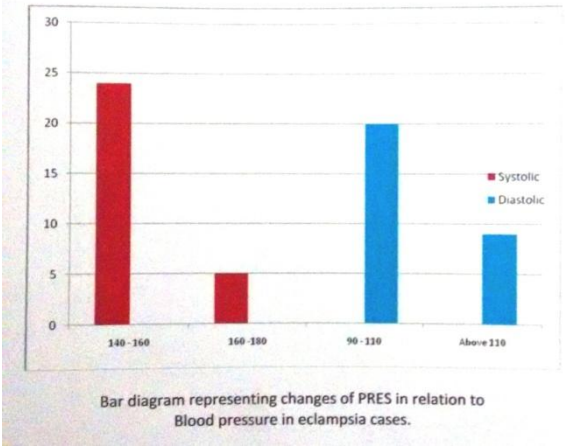


Table 4 : showing range of blood pressures in cases of PRES.

Incidence of MR brain changes in eclampsia:

Abnormal findings are noted in 67% of cases in our study.(table 5)

INCIDENCE OF MRI BRAIN CHANGES IN ECLAMPSIA

	No. of Cases	percentage
Normal	18	32.73
Abnormal	37	67.27

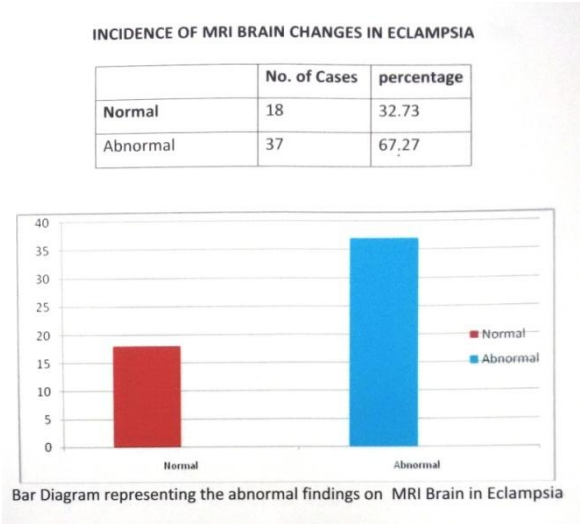


Table 5: showing incidence of MRI brain changes in eclampsia patients

Incidence of PRES in various regions of brain:
Occipital lobes are most commonly affected in our study.(table 6)

INCIDENCE OF PRES IN VARIOUS REGIONS OF BRAIN

	No. of Cases	percentage
Frontal	17	58.62
Parietal	21	72.41
Occipital	22	75.82
Temporal	12	41.37
Internal Capsule	1	3.44
External Capsule	1	3.44
Pons	1	3.44
Basal Ganglia	4	13.79
Corpus callosum	5	17.24
Corona radiata	1	3.44
Cerebellum	1	3.44

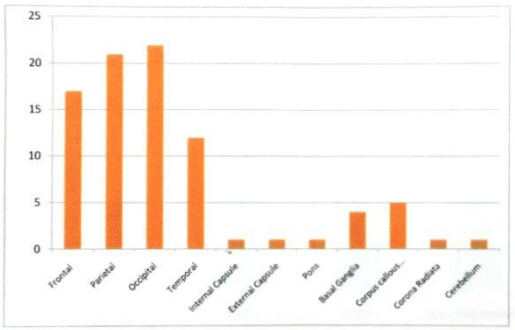


Table 6 & bar diagram showing the incidence of PRES in various regions of brain.

Appearance of PRES in different MRI sequences:(tables 7 & 8)

Appearance of PRES in different MRI sequences

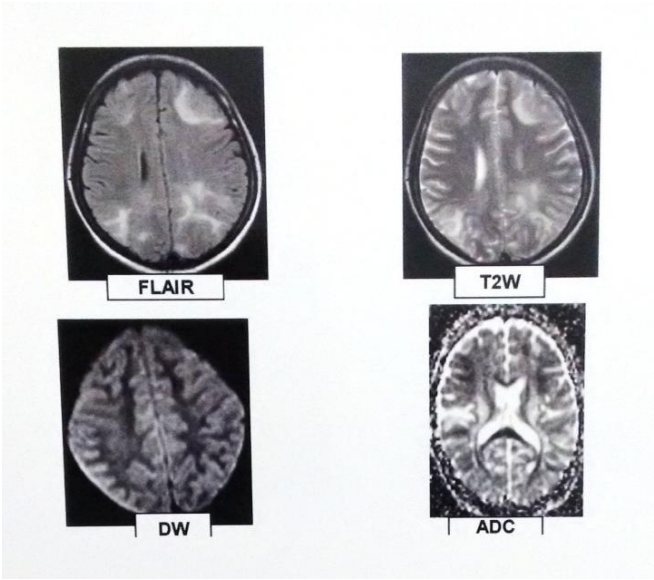
Sequences	MRI Changes	No. of cases
T1W	Iso intense	29
T2W	Hyperintense	29
FLAIR	Hyperintense	29
DWI	Hypointense	20
ADC	Hyperintense	20

Clinical and MRI correlation

Symptoms	MRI Positive	MRI Negative
Head Ache (50)	37	13
Visual Disorders (35)	22 showed altered signal intensities in occipital lobes.	13
Depression of consciousness (8)	04 showed changes in Basal gangia	04
GTCS (55)	37	18
Altered Mental Status and irritability (20)	17 showed altered signal intensities in frontal lobes	03
Ataxia (1)	01	00

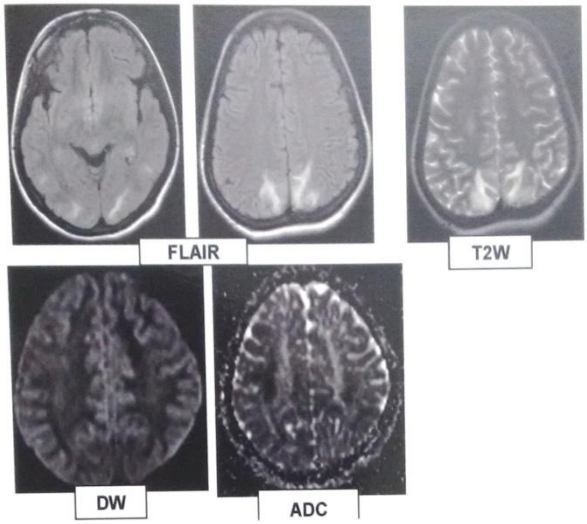
Tables 7 & 8 showing the clinical and MRI corelation of altered signal intensities in brain.

Case1



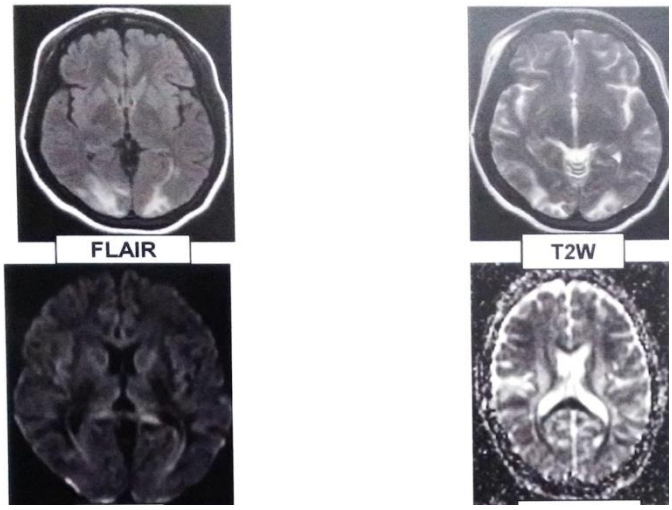
Case 1: Symmetrical sub cortical white matter hyperintensities on T2W and FLAIR sequences in bilateral parietal and frontal lobes with no significant changes on DWI and ADC.

Case2



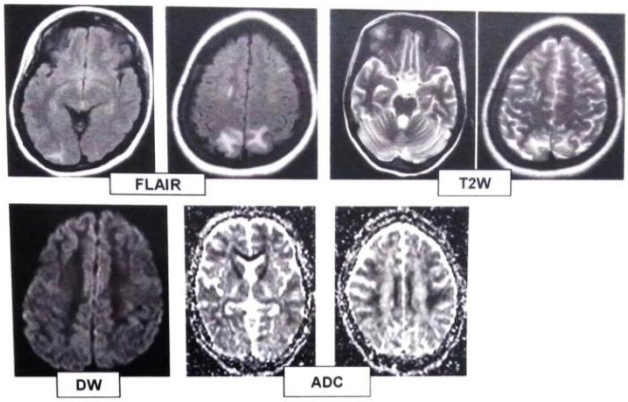
Case 2: Symmetrical sub cortical white matter hyperintensities on T2W and FLAIR sequences in bilateral parietal and occipital lobes with no significant changes on DWI and ADC .

Case3



Case 3: Symmetrical sub cortical white matter hyperintensities on T2W and FLAIR sequences in bilateral occipital lobes.

Case 4



Case 4 : Sub cortical white matter hyperintensities on T2W and FLAIR sequences in bilateral parietal and right occipital lobes.

DISCUSSION

Eclampsia, the hypertensive disorder of pregnancy occuring after 20 th week of gestation is characterised by hypertension, peripheral edema, proteinuria and seizures.

Majority occurs in 3rd trimester or within 48 hours after delivery. Most of the patients presented with headache,visual disturbance, confusion, decreased level of consciousness, altered mental status. Clinical and radiological signs in patients with eclampsia are due to the effects of increased systemic blood pressure on the autoregulation of cerebral vasculature.

Cranial MRI is the most valuable investigation in eclampsia for the demonstration of various intracerebral changes, it is particularly important to take decision related to emergency v/s surgical management of patients with sudden neurological deficit. The most common findings are subcortical white matter hyperintensities on T2 and FLAIR. DWI and diffusion coefficient(ADC) mapping are new techniques to evaluate acute cerebral ischemia and on DWI, in these patients there was no restriction and it is considered as vasogenic edema. Thus MRI in combining T2 and DWI, ADC images can be very useful to determine the extent of likely permanent cerbral injury[6].

The sensitivity of detection of brain changes with CT are very low. Hence we have done MRI of brain in cases of eclampsia.In our study of 55 cases of eclampsia underwent MRI brain with in 4 days of onset of seizures and after termination of pregnancy.

It was a prospective study for a period of 1year 10 months extending from September 2014 to June 2016. Each patient fullfilled the diagnostic criteria for eclampsia with generalised seizure, hypertension (more than 140/90mmhg), proteinuria and peripheral edema. None of them had previous history of seizures. MRI was done using 1.5 tesla Avanto Seimens machine.T_1W,T_2W, FLAIR and DWI sequence were done in each case. Axial, coronal and saggital images were obtained.

In our study youngest was 18 yrs old and eldest was 34 yrs old.The peak age group is between 21 to 25 yrs. The incidence was more common in primigravida (90.9%) and in third trimester (85.72%). The most common symptoms in our study are headache(90.9%), blurring of vision (63.64%), altered mental status and confusion (36.36%), loss of consciousness (5.4%), neurlogical deficits(3.6%) and ataxia(1.8%).

MRI brain showed abnormal changes in 37 cases out of 55 cases. 29 of them showed hyperintensities in subcortical white matter of occipital, parietal, frontal and temporal lobes on T_2W, FLAIR sequences. DWI showed hypointes-ities in 20 out of 29 cases of hyperintensities on T_2W,

FLAIR. ADC mapping showed hyperintensities in the lesions corresponding to hypointensities on DWI. These changes are suggestive of reversible vasogenic edema.

In patients presenting with blurring of vision, the changes were seen involving occipital lobe, with altered mental status changes seen in frontal lobe, with decreased level of consiousness changes seen in basal ganglia and with ataxia changes in cerebellar hemispheres. All the cases which showed hyperintensities in subcortical white matter on T_2W and FLAIR recovered on follow up.

According to OZGUR DEMIRTAS et al(2005)[8], out of 39 cases, 21 were normal and 18 showed hyperintensities onT_2W. According to our study out of 55 patients, 37 showed abnormal MRI changes out of which 29 showed subcortical white matter hyperintensities.

According to Karuppannasamy, Divya et al.[11] study on 10 cases, Patients with higher degree of vasogenic edema of the posterior cerebral white matter presented with visual loss. According to our study, out of 35 cases with blurring of vision 22 cases (75.82%) showed T_2W white matter hyperintensities in occipital lobes.

According to Diego J. Covarrubias et al (2002)[12] study on 22 patients with eclampsia , MR imaging with diffusion-weighted sequences provides not only a powerful means of diagnosing PRES but also a wealth of prognostic information about the patient. The hallmark of this diagnosis is vasogenic edema in the territories of the posterior circulation, which can be reliably differentiated from cytotoxic edema in other etiologies by using DWI and by calculating the ADC map, which shows elevated ADC values. According to our study 29 cases of PRES showed hypointensities in 20 cases on DWI. Rest of 9 cases did not showed significant changes on DWI and ADC.

According to CHAKRAVARTY(2002) et al[7] , on their study on 19 patients of eclampsia found reversibility of MRI findings and clinical features. In our study all cases with PRES showed reversible clinical features with in 4 days.

According to Chang WN et al (1996)[10], only visual disturbances and MRI have good corelation showing occipital lobe involvement and no corelative findings with other symptoms. According to our study out of 35 cases with blurring of vision,22 cases showed occipital hyperintensities.

J.L. ELLWOOD AND MOODLEY et al (1998)[9] studied on 12 cases and concluded that MRI should be performed with in 48 hours to detect lesions.In our study of 55 cases only 37 showed abnormal changes and was concluded that 18 cases did not showed abnormality due to delayed scanning.

According to SENGAR A.R et al (1997) revised (2006), their study on 10 women with MRI, MRA &MRS concluded that in vivo proton MRS helps to differentiate cerebral edema from ischemia.But in our study we did not apply MRA & MRS as the study time takes long and patients were not cooperative.

SUMMARY

During the period of 22 months of study, 55 cases of eclampsia were evaluated with MRI. The maximum incidence was seen in age group of 21 to 25 yrs and in antepartum period(63.64%). The post partum cases presented with eclampsia within 48hours of delivery.Most of the patients presented with headache , blurring of vision , altered mental status irritability, seizures and loss of consciousness had hypertension more than 140/90 mm of Hg and hyper reflexia.All patients were subjected to MRI within 4 days of onset of seizures. 37 cases showed abnormal MRI changes and 29 showed PRES as hyperintensities in subcortical white matter on T_2W and FLAIR and did not showed hyperintensities on DWI. So they are due to reversible vasogenic edema. The maximum incidence of PRES is in parietooccipital lobes with blurring of vision, frontal lobes with altered mental status and irritability and in basal ganglia in patients with decreased levels of consciousness. The lesions in temporal lobe,pons and corpus callosum did not have clinical corelation. All 29

cases of PRES on followup did not showed any neurological deficits .

REFERENCES

1. Cunningham FG Macdonald PC, Grant NF. Hypertensive disorders of pregnancy. In: Cunningham FG Macdonald PC, Grant NF,eds. Williams" obstretics. 18th ed. Noerwalk, conn:Appleton&Lange, 1989 ; 653-694.
2. Lindheimer MD Katz Al. Preeclampsia: pathophysiology, diagnosis and management. Ann Rev Med 1989; 40:233-250.
3. Feske SK Spelling RA, Schwartz RB: Extensive reversible brain magnetic resonanace lesion in a patient with HELLP syndrome Neuroimaging 7: 247,1997.
4. Shah AK, Whitty JE. Brain MRI in peripartum seizures: usefulness of combined T2 and diffusion weighted MR imaging. J Neurol Sci. Jul 1 1999; 166(2):122-5.
5. Sengar AR, Gupta RK, Dhanuka AK, et al. MR imaging, MR angiography, and MR spectroscopy of the brain in eclampsia. AJNR AM J Neuroradiol. Sep 1997;18(8):1485-90.
6. Shah AK, Rajamani K, Whitty JE. Eclampsia : A Neurological perspective. J Neurol Sci. Aug 15 2008;271(1-2):158-67.
7. Chakravarty A, Chakrabarty S D. The neurology of eclampsia : some observations. Neurol India 2002;50:128.
8. OZGUR DEMIRTAS et al. Cranial MR imaging with clinical correlation in preeclampsia and eclampsia.. Diagn Interv Radiol. 2005 Dec;11(4):189-94.
9. L. ELLWOOD J. MOODLEY P. CORR, J. "Cerebral magnetic resonance imaging in eclampsia: a series of 12 cases." *Journal of Obstetrics and Gynaecology* 18.5 (1998): 412-418.
10. Chang WN, Lui CC, Chang JM. CT and MRI findings of eclampsia and their correlation with neurologic symptoms. Zhonghua Yi Xue Za Zhi (Taipei). 1996; 57: 191-197.
11. Karuppannasamy, Divya et al. "Cortical Visual Loss in Posterior Reversible Encephalopathy Syndrome in Late Postpartum Eclampsia: Case Series. "*Indian Journal of Ophthalmology* 62.5 (2014): 635–638. *PMC*. Web. 26 Sept. 2016.
12. Diego J. Covarrubias, Patrick H. Luetmer, and Norbert G. Campeau: Posterior Reversible Encephalopathy Syndrome: Prognostic Utility of Quantitative Diffusion-Weighted MR Images. AJNR Am J Neuroradiol June/July 2002, 23:1038–1048.