Original Article

ROLE OF MRI BRAIN IN POSTPARTUM CONVULSIONS

Fatima Imran[*], Zonia zaman[**]
[*]Assistant professor, Department of radiology, Aziz Fatimah Hospital, Faisalabad
[**]Assistant professor, Department of Obstetrics and Gynecology, Aziz Fatimah Hospital, Faisalabad

Abstract:

Objective: To assess the role of brain magnetic resonance imaging in evaluation of the causes of postpartum convulsions.

Setting and Duration of Study: This cross sectional study was conducted in Department of Radiology and Obstetrics & Gynecology, Aziz Fatimah Trust Hospital and Medical and Dental College Faisalabad, from April 2015 to March, 2016 in a period of one year.

Methodology: All the women visiting to the OPD or admitted for postpartum seizers having age from 23 to 38 years, delivered after a term pregnancy were included in the study. Brief history of hypertension and any other comorbid disease was taken. All the patients fulfilling inclusion criteria based on clinical assessment and obstetric history were referred for brain MRI in the radiology department. Supine position was used to execute MRI examination in all patients. Head coil was used to get images in axial, sagittal and coronal planes in whole study sample.

Results: The mean age was noted to be 29.77 ± 2.380 years. There were 43 (78.18%) patients who were ≤ 30 years old. The mean gestational age in this study was 37.40 ± 0.875 weeks and 44 (80.0%) were nulliparous. MRI scan of the brain was observed positive in 32 (58.18%) women and 23 (41.82%) had negative MRI findings. Among the women having positive MRI the commonest finding in 15 (46.88%) patients was Dural sinus thrombosis followed by Posterior reversible encephalopathy in 8 (25%) patients and Intra cerebral hemorrhage was observed in 5 (15.63%) patients. Subarachnoid hemorrhage was noted in 3 (9.38%) and pituitary apoplexy was found in 1 (3.13%) patient.

Conclusions: There are several causes of seizures in the post-partum period like dural sinus thrombosis was found in (46.88%) patients followed by Posterior reversible encephalopathy (25%) and Intra cerebral hemorrhage was observed in (15.63%) patients. Early diagnosis of the cause of postpartum seizers on the basis of brain MRI will help in proper management of the patient and avoiding damaging complications or permanent neurologic damage.

Key words: Postpartum Seizers, MRI, Convulsions, Dural Sinus Thrombosis

INTRODUCTION:

Due to different aetiological dynamics postpartum seizers is still considered as an immense challenging problem. The key challengingaspects include eclampsia, puerperal cerebral thrombosis, encephalitis, meningitis, cerebral malaria, Posterior reversible encephalopathy syndrome and intracranial tumour etc. [1]Usually when pregnant women face any abnormal symptoms, these are considered as part of pregnancy and ignored.[2] Seizers during pregnancy or in postpartum period most likely diagnosed as eclampsia, which may not be true in all cases. There might be many other reasons of postpartum seizers including eclampsia. The other causes

Corresponding Author:
Dr. Fatima Imran
Assistant professor, Department of radiology, Aziz Fatimah Hospital, Faisalabad
Cell # 03334068598
Email: dr.fatimaimran@gmail.com

may include cerebral venous thrombosis, posterior reversible encephalopathy syndrome, encephalitis, meningitis, and tuberculoma, etc. The diagnosis and treatment may be difficult in patients who present with overlapping of these conditions. [3]
Preeclampsia is not necessary to be present in many of the patients having seizers in postpartum period. According to the literature a large portion (40%) of the patients having postpartum convulsions will not experience preeclampsia so a proper diagnosis and awareness is required for appropriate treatment and care of the patient. [4]
In patients who have eclampsia endothelial cell get damaged and extensive impairment of these cells cause the seizers. Initial symptoms and signs due to eclampsia are based upon site ofimpairment and intensity of the damage of endothelial cells.Seizers can be the consequence of hypertension or proteinuria. Risk of thrombosis also increases considerably during pregnancy and postpartum period. The changes inhydration, vessel walls, blood flow and coagulability provide grounds for thrombosis. [5]
Postpartum seizers is a familiar presentation in patients who visit the hospital for any obstetric emergency. Most of the time these patients are treated as eclampsia till the patients have any other contraindication like absence of hypertension and proteinuria or the patient does not respond to the anti-eclamptic treatment. In this situation the patient is further investigated through CT or MRI for other possible causes of convulsions. [6]
Seizers in postpartum period can be consequences of delayed eclampsia or other neurological conditions having many variable causes and these causes can be identified and differentiate through MRI. Therefore MRI scan is highly recommended in women presenting with postpartum seizers. [7]
The findings on MRI of brain in posterior reversible encephalopathy are normal diffusion weighted imaging and reversible white matter hyperintensities in T2-weighted images, demonstrating a vasogenic edema. Usually the parietooccipital lobes are involved as disturbed area on MR imaging. The other areas like frontal and temporal lobes or the basal ganglia are areas found to be affected with fewer frequency. [8]
In a study conducted to find out the role of MRI in women presented with postpartum seizers it was noted that MRI examination of the brain was positive in (56.3%) patients. Dural sinus thrombosis was the most frequently encountered finding in (44.4%) patients. Intra cerebral hemorrhage was noted in (22.2%) patients. Posterior reversible encephalopathy and subarachnoid hemorrhage were diagnosed causes of seizers in (18.5%) and (11.1%) patients respectively. Only one patient had pituitary apoplexy (3.7%). [9]
MRI is a great tool to identify and differentiate the causes of postpartum seizers including eclampsia or other neurological disorders. An early intervention of MRI scan of the brain is strongly recommended in the women presenting with postpartum seizures to identify the cause of seizers. So this present study has been designed to evaluate the role of MRI of the brain in women with postpartum convulsion and correlate them with clinical data.

Methodology:

In this cross sectional study a total of 55 patients presented with postpartum seizers were included. This study was carried out at the departments of obstetrics and gynecology and Radiology, Aziz Fatimah Hospital, Faisalabad. Duration of this study was from Aprail 2015 to March 2016. The sample size was calculated by using WHO sample size calculator on the basis of frequency of cause having minimum prevalence of 3.7% in patients presenting with seizers,95% confidence level and 5% absolute precision level. The study was started by taking approval form hospital ethical committee. Informed written consent was taking from all patients in the study by briefly describing about the study.
All the women visiting to the OPD or admitted for postpartum seizers having age from 23 to 38 years, delivered after a term pregnancy were included in the study. Brief history of hypertension and any other comorbid disease was taken. All the patients fulfilling inclusion criteria based on clinical assessment and

obstetric history were referred for brain MRI in the radiology department. Supine position and head coil was used to execute MRI examination in all patients. 6mm thickness was taking of the following sequences, Axial and sagittal T1W, axial and coronal T2W, axial FLAIR and DWI. MRA and MRV were done according to the requirement. All the information was collected on a predesigned performa. Statistical package for social sciences (SPSS v. 20) was used to analyze the data. Qualitative variables were presented in the form of frequency and percentage and Quantitative variables were presented in the form of mean and standard deviation. Chi-square test was applied to find out any association of outcome variable with demographic characteristics. P-value < 0.05 was considered significant.

RESULTS:

In this study the mean age was 29.77 ± 2.380 years with minimum and maximum age of 22 and 37 years. There were 43 (78.18%) patients who were ≤ 30 years old and rest of 12 (21.81%) patients was > 30 years of age with age range of 15 years. The mean gestational age was 37.40 ± 0.875 weeks with range 0f 4 weeks (36 – 40 weeks). According to parity 44 (80.0%) were nulliparous and 11 (20%) had parity of one or two.

According to the results of MRI scan of the brain in women who presented with postpartum seizers it was noted that MRI was positive in 32 (58.18%) women and 23 (41.82%) had negative MRI findings as shown in fig 1.

The results of analysis shows that there was no significant (p-value > 0.05) association between MRI findings and age of the patients. Among the women who were found to have positive MRI the commonest finding in 15 (46.88%) patients was Dural sinus thrombosis followed by Posterior reversible encephalopathy in 8 (25%) patients and Intra cerebral hemorrhage was observed in 5 (15.63%) patients. Subarachnoid hemorrhage was noted in 3 (9.38%) and pituitary apoplexy was found in 1 (3.13%) patient as elaborated in table 1.

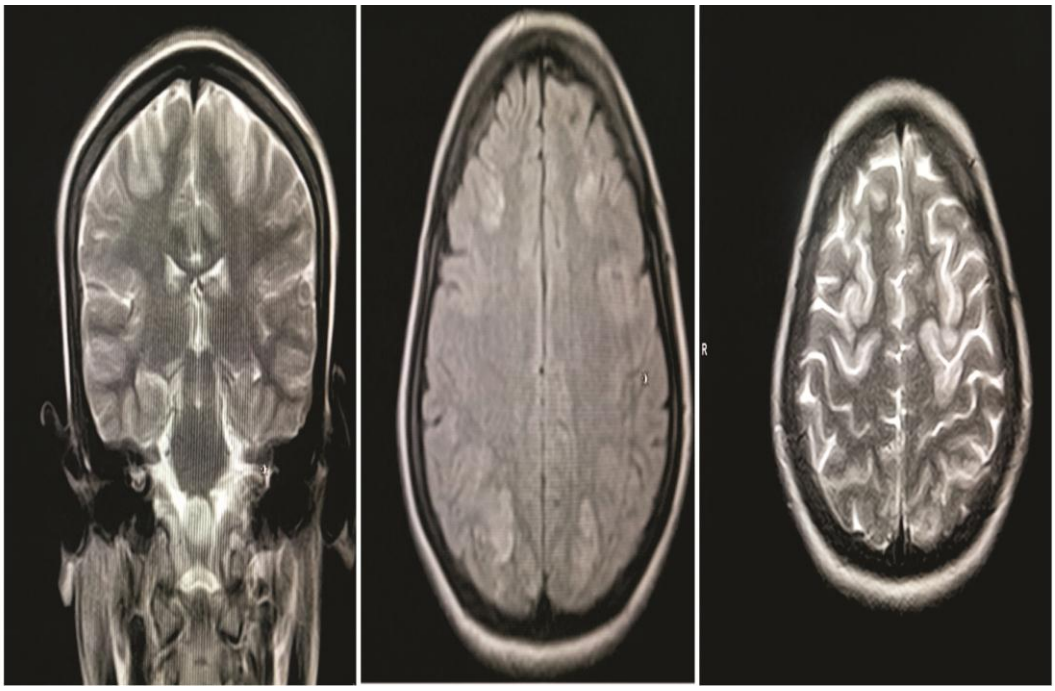


Figure 1: MRI brain coronal T2 and axial T2 and FLAIR images revealed hyperintensities in bilateral parieto-occipital lobes suggesting PRES—posterior reversal encephalopathy syndrome

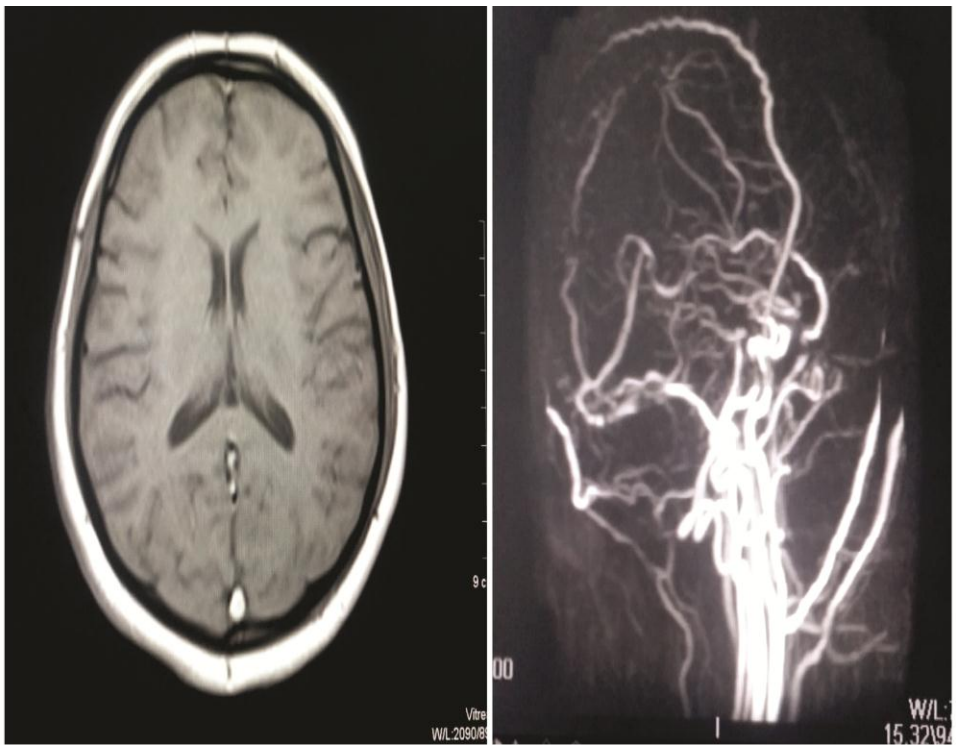


Figure 1: MRI TI image shows loss of signal void in sigmoid sinus and cerebral venous thrombus on MRV.

Table 1: Association of MRI findings with age in the patients

MRI Finding	No. of patients	Age of Patient		P-value
		<30 years	> 30 years	
Dural sinus thrombosis	15 (46.88%)	6	9	0.9543 *
Posterior reversible encephalopathy	8 (25%)	3	5	
Intra Cerebral Hemorrhage	5 (15.63%)	2	3	
Subarachnoid Hemorrhage	3 (9.38%)	1	2	
Pituitary Apoplexy	1 (3.13%)	0	1	
Total	32	12	20	

* Insignificant at 5% level of significance

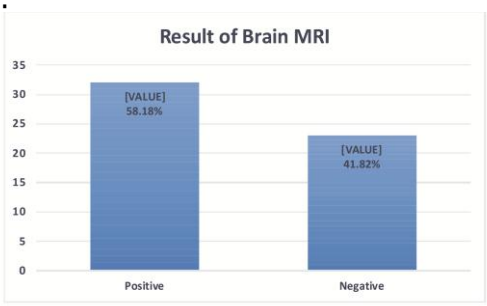
DISCUSSION:

During pregnancy any presentation of abnormal symptoms is considered relevant to pregnancy and are usually ignored at initial stage. [10] Seizers during pregnancy or at the start of postpartum period are usually considered as eclampsia, which is not true in all cases. There might be several other reasons of seizers in postpartum period including cerebral venous thrombosis, posterior reversible encephalopathy syndrome, encephalitis, meningitis and tuberculoma etc. These causes might be overlapping in patients presenting with

seizers, which can complicate the diagnosis and treatment. [11]

Eclampsia in postpartum period is an unusual complication of hypertension but it can be serious problem for the patient. Normally in patients who develop postpartum eclampsia acquire it within 48 hours of the delivery. The seizers occurring after days and weeks post delivery are rare but they require very prompt and precise clinical evaluation. [12]

Fig 1:



It is not necessary to have hypertensive disorder during pregnancy for the patients who develop it in postpartum period. It may start after delivery and it get highest level of blood pressure at 3-6 days post-delivery. This can be the result of mobilization of extracellular fluid accumulation through pregnancy. [13] So it is very essential to monitor the blood pressure in postpartum period at least in first week, even in the women who do not have any hypertension disorder during pregnancy. It has been noted that one third of the women who develop eclampsia, they do not have any history of hypertension, proteinuria or edema. Two retrospective reviews showed that, for 44%–79% of patients with late postpartum eclampsia, pre-eclampsia was not diagnosed before the onset of seizures. [14, 15]It is difficult to identify the proper cause of the seizers in postpartum period. It can have various causes. [16]

For the accurate diagnosis and identification of exact cause of postpartum seizers MR imaging can be a useful tool. Usually in the practice the proper diagnosis get delayed because seizers are considered as eclampsia at the start, since this patient has many common presentations with eclampsia and we do not go for imaging study. It is necessary to have diagnosis as early as possible because it will help in improvement of prognosis and outcome in the patients. 17 The imaging modalities like CT and MRI have very important rule in identification and categorization of these lesions and will be helpful for future management.

In this present study it was noted that among the women who were found to have positive MRI the commonest finding in (46.88%) patients was Dural sinus thrombosis followed by Posterior reversible encephalopathy in (25%) patients and Intra cerebral hemorrhage was observed in (15.63%) patients. Subarachnoid hemorrhage was noted in (9.38%) and pituitary apoplexy was found in (3.13%) patients. These results have agreement with other studies like a study by Shah AK it was found that,among various causes eclamptic encephalopathy and cortical venous thrombosis were major causes for postpartum seizures.[18]

In another study by Hiremath R, it was observed that 70% of patients suffered from either eclamptic encephalopathy or cortical venous thrombosis, and eclamptic encephalopathy was second most common cause for peripartum seizures accounting for 27.5% patients. [19]

The most common finding among positive MRI patients in this present study was cerebral venous thrombosis (CVT) which is well established complication in pregnancy and puerperium, secondary to physiological changes in the coagulation system. [20]

In previous researches it has been found that incidence of CVT is 20% in pregnant patients with a great variation in mortality rate. The mortality rate due to CVT ranges from 4% to 33% in different studies. The cerebral venous thrombosis have several cause including mothers young age and cesarean section, which are considered as major risk factors for the development of cerebral venous thrombosis. This condition requires to be differentiated from other conditions which are considered as major risk factors for seizers including PRES and postpartum cerebral angiopathy. [21, 22]

MRI has higher sensitivity in diagnosing different kinds of lesions in contrast to CT. When a patients has CVT, the MRI findings show parenchymal changes which can be

further classified through DWI as parenchymal abnormalities along with cytotoxic oedema, and or vasogenicoedema or cytotoxic oedema without anyhemorrhages. [19]These patterns on MR imaging can be overlapping, the results can be even better with MR venography with use of contrast or without using contrast. [23]
MRI brain is considered very important for the management of these cases. On MRI every condition has its own distinguishing imaging findings which differentiate each cause from the other, which is very helpful in proper treatment decision.
A large number of maternal mortalities in these conditions are attributable to delayed diagnosis and delayed use of imaging modalities like MRI for proper diagnosis. So timely use of MR imaging for accurate diagnosis can help in reducing maternal mortality among the women who present with seizers in early postpartum period. Proper and timely diagnosis will help in treatment and management of these patients in a better way with better prognosis of women having seizers in postpartum period.

CONCLUSION:

The results of the study indicates that there are several causes of seizures in the post-partum period like dural sinus thrombosis was found in (46.88%) patients followed by Posterior reversible encephalopathy (25%) and Intra cerebral hemorrhage was observed in (15.63%) patients. Early diagnosis of the cause of postpartum seizers on the basis of contrast MRI will help in proper management of the patient and avoiding damaging complications or permanent neurologic damage. So proper use of imaging in these patients will support in a better prognosis and plummeting the maternal morbidity and mortality. On the basis of this study a multi-center study can be recommended to evaluate all main causes and development of an extensive protocol for the treatment and better prognosis of the patients having postpartum seizers.

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SR #	AUTHOR NAME	CONTRIBUTION
1	Dr. Fatima Imran	All authors contributed equally exclusively to the work presented in this paper
2	Dr. Zonia Zaman	Proof Reading

OFTEN YOUR UTTERANCES AND EXPRESSIONS OF YOUR FACE LEAK OUT THE SECRETS OF YOUR HIDDEN THOUGHTS.

Hazrat Ali (Karmulha Wajhay)