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Research Article

ROLE OF MRI IN EVALUATION OF CEREBRAL VENOUS THROMBOSIS WITH CLINICAL CORRELATION- A PROSPECTIVE STUDY

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ABSTRACT

Cerebral venous thrombosis is an important cause of stroke especially in peripartum settings and stroke in young. It often affects young to middle aged patients, and more commonly women. Objective of the study was to study the parenchymal changes and pattern of distribution of cerebral venous thrombosis on MRI and MR Venography with clinical correlation. It is a prospective cohort study conducted on 50 patients admitted as suspected case of CVT clinically to Bapuji hospital and Chigateri general hospital, attached to JJM Medical College, Davangere between June 2015 to December 2016.Results obtained were; majority of the patients belong to the group of 20 – 29 years 30 (60%), most common symptom was headache 40 (80%), most common presentation was subacute onset seen in 27 (54%) patients, majority showed T2 hyperintense (23) and T1 hyperintense (23) signal intensities within thrombus, parenchymal involvement was seen in 29 (58%) patients out of which 15 (53%) patients showed diffusion restriction and contrast enhanced MRV showed filling defect in all 50 patients. Hence MRI with MRV is the current diagnostic modality of choice. Contrast enhanced MRV is 100% diagnostic modality.

INTRODUCTION

Cerebral venous thrombosis is an important cause of stroke especially in peripartum settings and stroke in young[1]. It often affects young to middle aged patients, and more commonly women. CVST presents with a wide spectrum of symptoms and signs. Headache is the presenting symptom in 70-90% of cases[2, 3, 4] focal deficits such as hemiparesis and hemi-sensory disturbance, seizures, impairment of level of consciousness and papilledema occur in one third to three quarters of cases[2,4].CVST most commonlyinvolves superior sagittal sinus (72%) followed by lateral sinus (70%). In 30-40% of cases more than one sinus is involved[5]. Imaging modalities of choice in CVSTare CT scan and MRI with MR venogram. CT scan may be normal in 10-30% cases but MRI with venography is almost 100% diagnostic[6].CVST has an acute case fatality of less than 5% and almost 80% of patients recover without sequelae[7].Early diagnosis and treatment prevent morbidity and may even be lifesaving. Therefore, a prospective observational study has been undertaken to describe the clinical profile and diagnosis, of CVST in young.

Objectives of the Study

- To study the pattern of distribution of superficial and deep cerebral venous thrombosis on MR Venography.
- To study the parenchymal changes associated in CSVT and signal intensities within the thrombus on MRI.
- To correlate clinically in diagnosed Cerebral venous thrombosis.

METHODOLOGY

Source and Method of Collection of Data

It is a prospective cohort study conducted on 50 patients aged 18 -45 years admitted as suspected case of CVT clinically to Bapuji hospital and Chigateri general hospital, attached to JJM Medical College, Davangere, Karnataka between June 2015 to December 2016. The clinical features at admission were analysed concentrating on Clinical symptoms and signs. All the 50 patients were subjected to MRI on Philips MRI ACHIEVA of 1.5 tesla field strength for confirmation of the diagnosis of CVT. For MR venogram, phase contrast venogram (venobold sequence) protocol was used. Pre contrast images were taken followed by post contrast images after administration of 0.1 mmol/kg of body weight of gadolinium intravenously. The standard imaging protocol was used.

Inclusion criteria

1. All female patients aged >18 years and aged <45 years with minimum of 20 females with pregnancy and puerperium.

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2. An acute or subacute neurological illness in a patients under appropriate clinical condition whose features are suggestive of cerebral venous thrombosis or patients who are initially subjected for CT and diagnosed with CVT

Exclusion Criteria

1. Patients aged <18 years and aged > 45 years
2. Radiological features inconclusive of CVT
3. Hemorrhagic arterial stroke.
4. Metabolic encephalopathies.
5. Claustrophobia.
6. Renal failure with creatinine >3

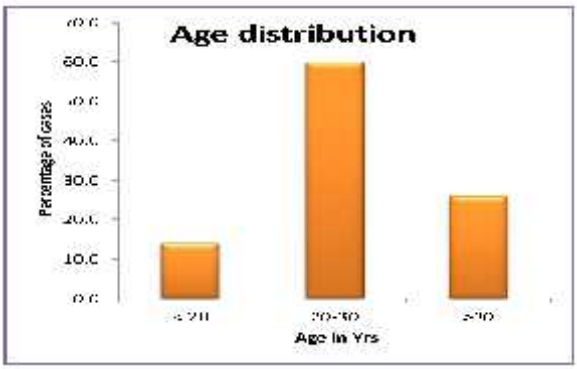
Stastistical analysis

Statistical analysis for this study was performed using IBM SPSS version 20 for Windows.

RESULTS

Table 1 Age distribution of Patients

Age	No of Cases	percent
<20	7	14
20-30	30	60
>30	13	26
Total	50	100



Graph 1 Age distribution of Patients

Table 2 Distribution of pregnant and non pregnant women

Pregnancy	Frequency	Percent
Yes	42	84
No	8	16
Total	50	100

Table3 Duration after delivery

No of days after delivery		
Days	Frequency	Percent
<1 wk	8	19
1-3 wks	26	61
> 3 wks	8	19
Total	42	100

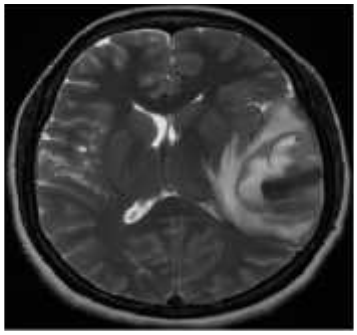
Table 4 Mode of onset of CVT

	ONSET	
	Frequency	Percent
Acute	15	30
Subacute	27	54
Chronic	8	16
Total	50	100

Table 5 Signal Intensity Within The Thrombus on T1 and T2 weighted images

Signal Intensity Within The Thrombus				
	T1		T2	
	Frequency	Percent	Frequency	Percent
Hyperintense	29	58	27	54
Hypointense	2	4	15	30
Isointense	19	38	8	16
Total	50	100	50	100

CASE-1



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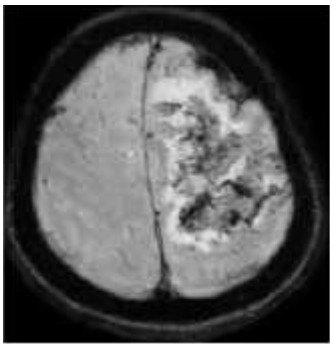

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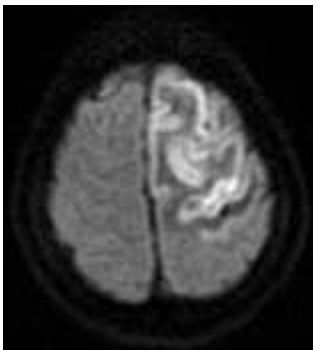

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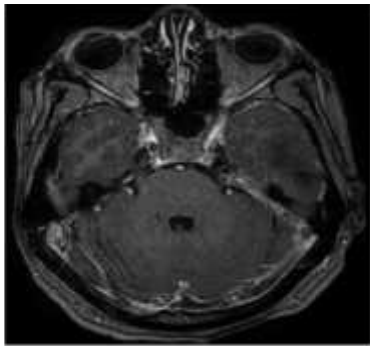

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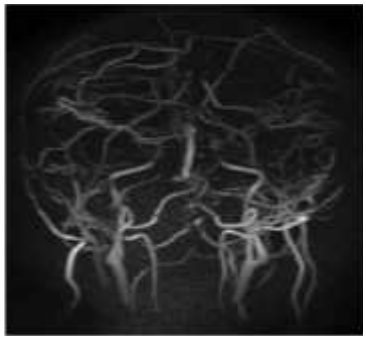
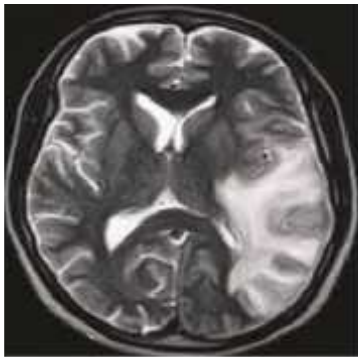


e

Case-1 Axial T2 Weighted image (a) Shows heterogenous signal intensity with hypointensecentre with perilesionalvasogenic edema in the left frontoparietal lobe ,SWI(b) sequence shows blooming artefacts and DWI(c) sequence shows true restriction in the corresponding areas in keeping with acute left fronto parietal hemorrhagic infarct.
Contrast enhance MR Venogram(e) shows non visualization of superior sagittal sinus and bilateral transverse sinus corresponding areas showing filling defects in the contrast enhanced images(d) s/o SSS and bilateral transverse Sinuses Thrombosis.

CASE-2



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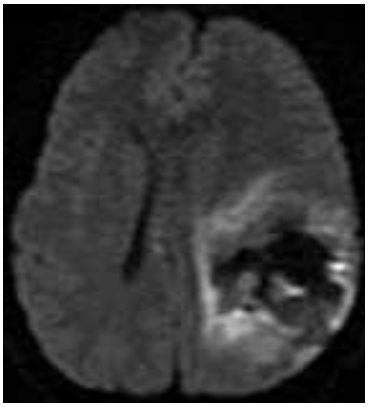

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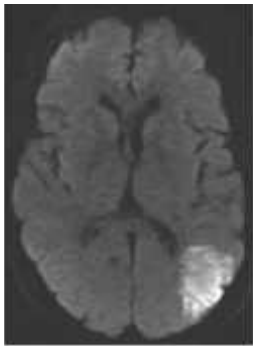

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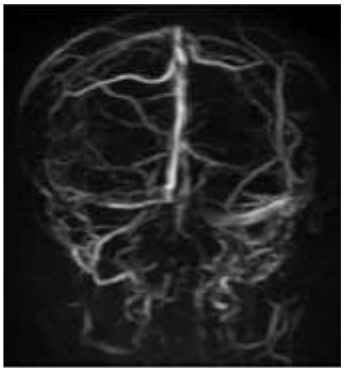
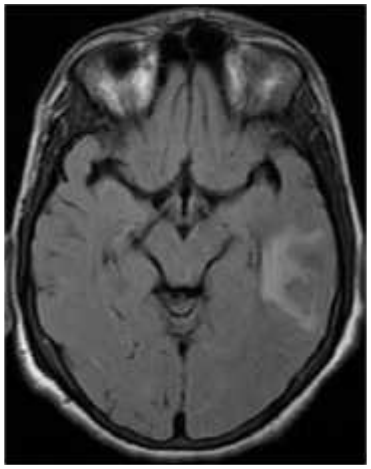


e

Case-2 Axial T2 weighted image (a) shows heterogenous signal intensity with hypointensecentre and peripheral hyperintense rim and vasogenic edema with corresponding blooming areas on SWI (b) with true restriction on DWI (c) in the left temporoparietal cortex s/o early subacute venous hemorrhagic infarct
MR VENOGRAM (d & e)-Non visualisation of the left transverse and sigmoid sinus suggestive of thrombosis.

CASE – 3



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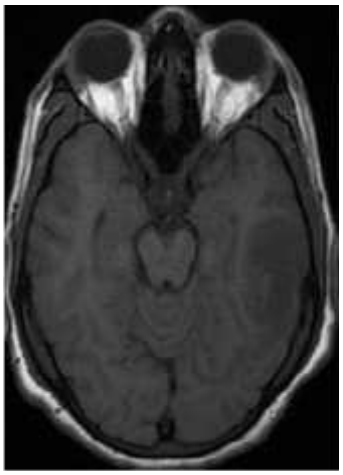

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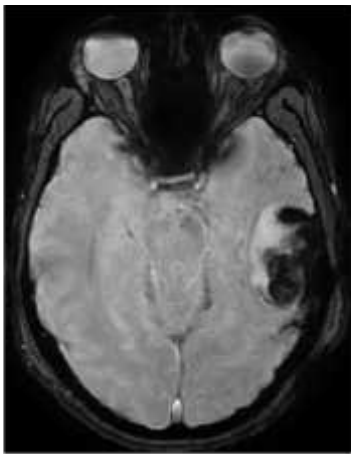

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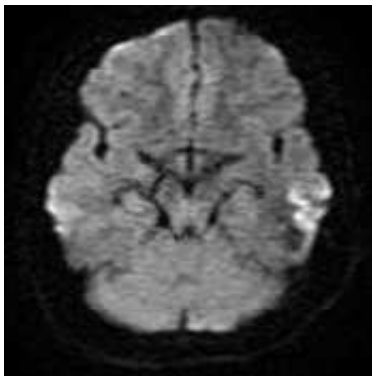

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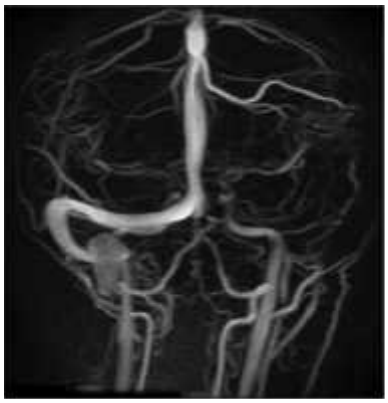

f

Case-3 Axial FLAIR and T1 images (a&b) shows heterogenous signal intensity with peripheral vasogenic edema with hypointensecentre on FLAIRand andisointensecentre on T1 in the lefttemporal cortex with blooming in GRE (c)sequences and true restriction on DWI(d)sequences s/o acute venous hemorrhagic infarct
MR Venogram(e & f)-Non Visualisation of the left Transverse and Sigmoid Sinus and IJV suggestive of thrombosis.

DISCUSSION

Cerebral venous thrombosis is a condition characterized by thrombosis of intracranial veins and sinus which results in parenchymal damage and rise in intracranial pressure. Radiological hallmark of this condition is thrombosis of intracranial sinuses and veins with haemorrhagic infarction and oedema with or without evidence of herniation. In this study total 50 patients with radiological features of cerebral venous thrombosis were evaluated.

Age Distribution

In our study most commonly involved patients were in the age group of 20-30years constitutes 60%.

Literacy Status

Majority of patients in our study were illiterates (68%) and this may be due to unhygienic heath practices like home delivery, local traditional practices of water restriction in the peripartum period etc more common in illiterates.

Socio Economic Status

Our study included 28(56%) patients from low socio economic status, 19(38%) patients from middle socio economic status and 3(6%) from upper socio economic status. Majority of the patients in the present study were in low socio economic group.

Distribution of Pregnant and Non Pregnant Women

In the present study, CVT was commonly seen in peripartum period (84%).

Clinical Symptoms and signs

Headache was the most common symptom in the present study accounting for 80% of patients.

In the present study, 24% of patients had altered level of consciousness, 34% focal deficits, 38% papilledema, 68%. Anaemia.

Mode of Onset

Acute as <48hours, subacute as longer than 48hours but less than one month and chronic as >1month.Most common

presentation was subacute which was seen in 27 (54%) patients. Acute onset of presentation was seen in 15(30%) patients. Chronic onset was seen in 8(16%) patients. In acute stage of thrombus formation, the signal is predominantly isointense on T1 weighted images and hypointense on T2 weighted images. In subacute mode of onset most common signal intensity that is seen in both T1 and T2 weighted images are hyper intense. In our study out of 50 patients, 29 (58%) patients had parenchymal involvement and 21(42%) patients did not have parenchymal involvement. Out of 29 patients of parenchymal involvement 15(51%) patients had true restriction on DWI.

CONCLUSION

In our study of 50 patients, which included diagnosed CSVT on MRI, most commonly involved age group in CVT was 20-30yrs and most of them were pregnant and puerperal females. Majority of these patients are illiterates and from low socio economic status. Most common presenting symptom was headache followed by vomiting, convulsions and fever. Subacute onset was the most common presentation.

Haemorrhagic infarcts were more commonly seen than non haemorrhagic infarcts. Majority of patients with subacute onset of presentation, had hyperintense intraluminal thrombi on both T1 and T2 weighted images. During acute onset of presentation majority intraluminal thrombi were isointense on T1 and hypointense on T2 weighted images. Multiple sinuses involvement was more common than single sinus involvement. Superior sagittal sinus was the most commonly involved sinus. however site of involvement of superficial sinus and mode of onset had no implications on outcome.

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