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Role of MRI in Evaluation of Cerebral Venous Thrombosis

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***Abstract**: To evaluate the MR findings of cerebral venous sinus thrombosis using T1W, T2W, FLAIR, DWI, SWI and MR Venogram . A study of 70 patients were carried in the Department of Radio-diagnosis, Deccan college of medical sciences, Hyderabad. Patients from all the age groups including both men and women & confirmed by MRI & MRV were included. Patients who were initially diagnosed as CVT but MRI,MRV were normal, with MR incompatible devices or implants ,with claustrophobia were excluded.*
In my study Of 70 cases , higher age of occurrence is 25-32,more commonly seen in females in puerperal period with 25 cases ,with common clinical presentation headache , seizure , focal neurological deficit . In my study common sinus thrombosis in combination occurred are superior sagittal thrombosis 40 cases , transverse sinus thrombosis 26 cases , followed by sigmoid sinus thrombosis 20 cases. parenchymal haemorrhage better detected in T1/T2 flair , SWI evaluated additional findings venous congestion , micro haemorrhages , MRV detected all cases in my study.
MRI with MRV is extremely helpful in accurate detection of CVT. It also differentiates from cytotoxic and vasogenic oedema . swi helps in detecting micro haemorrhages , clot. Acute stage venous thrombus is iso intense or hypo intense on T1WI and hypo intense on T2WI may be difficult to diagnose on conventional MR imaging . MRV is useful in this stage with pronounced thrombosis detection.
MRI with MRV is a very helpful imaging modality in detection of cerebral venous sinus thrombosis. MRI features of superficial T2 hyper intense lesions, intra parenchymal haemorrhage has highest accuracy . SWI useful during the acute phase of CVT. Venous hypertension can be detected at an early stage in CVT showing venous congestion . MRV has the highest accuracy in diagnosing Cerebral venous thrombosis.
***Key words**-MRV,DWI,SWI,FLAIR,cerebral venous thrombosis , cerebral sinuses.*

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I. Introduction

-Cerebral (dural) venous sinus thrombosis is an uncommon condition but become more common than previously thought, its clinical presentation is varied and often dramatic and may occur with headache and cranial nerve palsies. It often affects young-to-middle-aged patients, and more commonly women. -The most common causes and risk factors associated with CVT are due to: genetic prothrombotic conditions: antithrombin deficiency, protein C and protein S deficiency. Acquired prothrombotic states: nephrotic syndrome, pregnancy, and puerperium. Infections: otitis, mastoiditis, sinusitis and meningitis. Collagen-vascular diseases: systemic lupus erythematosus, sarcoidosis and Behc¸et syndrome. Hematologic conditions: polycythemia, leukemia, anemia and sickle cell disease. Drugs: oral contraceptives. -The imaging characteristics of MRI include: (1) Imaging of the brain parenchyma that appears in the form of non-specific lesions, such as intracerebral hemorrhages or infarcts, edema, isolated or associated with infarcts or hemorrhages, and it can even be normal in up to 30% of patients. (2) Imaging of the cerebral venous system (veins and sinuses thrombus) by direct visualization of a thrombus within the vessel.8 MRV features include non-visualization of the vessel (i.e. no flow), flow defect and presence of collaterals at the site of occlusion.

II. Materials and Methods

The study was carried out at the Department of Radio diagnosis Deccan College of Medical Sciences,Hyderabad comprising of Owaisi Hospital & Research Centre(OHRC) and Princess Esra Hospital. All the 70 patients were subjected to MRI & MRV. MRI was performed using 1.5 Tesla super conducting(SIEMENS MAGNETOM ESSEZA)&0.35Tesla MRI (Siemens Magnetom C)Symphony using head coil.

Method
The patient is placed in supine position in the MR gantry with head coil positioned.

MR Techniques
Multiplanar scout sections obtained for planning the sequences. Whole brain MR from vertex to the foramen magnum including the base of skull are taken using axial,coronal and sagittal sections.

The sequences used were.
T1WI Sagittal
TR - 500 msec S/G - 5/1.5
TE - 14 msec
FLAIR Axial
TR - 9000 msec S/G - 5/1.5
TE - 105 msec

DWI Axial
TR - 4300 msec S/G - 5/1.5 TE - 123 msec
b=0,500,1000
MRV - 2D TOF
TR - 30 msec
TE - 6.5 msec

T2WI Axial
TR - 4000 msec S/G - 5/1.5 TE - 93 msec
T2WI Coronal
TR - 4000 msec S/G - 5/1.5 TE - 93 msec

GRE T2* Axial

TR - 839 msec S/G - 5/1.5 TE - 27 msec

MRA - 3D TOF
TR - 41 msec
TE - 6.8 msec
SWI Axial
TR-49msec
TE-40msec

Inclusion Criteria
All patients confirmed by MRI & MRV as cerebral venous thrombosis.
Males and females are included.
All age groups included.

Exclusion Criteria
Patients who were initially diagnosed as CVT but MRI,MRV were normal excluded.
Patients with MR incompatible devices or implants.
Patients on life support systems.
Patients with claustrophobia.

III. Results

This study included 70 patients with age range from 18 years to 70 years old and mean age of 33 years. 45 patients (64.28%) were females and 25 patients (35.71%) were males. The most common and earliest clinical presentation in this study was headache followed by convulsion, disturbed consciousness, weakness of one limb, blurring of vision and papilledema. -MRI features in our study were observed in the form of parenchymal changes and abnormal signals in thrombosed veins and sinuses in both T1 and T2, in addition to blooming of them in SWI. These changes were seen in the form of non-hemorrhagic infarction ,hemorrhagic infarction ,and edema . The commonest MRI findings were replacement of the signal void of sinuses or veins by abnormal signal intensity. It showed three patterns, the first was hyper intense in both T1 and T2 (i.e. late subacute stage) it was hyper intense in T1 and iso to hypo intense in T2 (i.e. early subacute stage) it was hypo intense in both T1

and T2 (i.e. chronic stage). Finally with equivocal signal in both T1 and T2 but was diagnosed by MRV. -The main MRV findings in our study were non-visualization of occluded veins or sinuses due to absent signal, flow defect intense in T1 and iso to hypo intense in T2 (i.e. early subacute stage) it was hypo intense in both T1 and T2 (i.e. chronic stage). Finally with equivocal signal in both T1 and T2 but was diagnosed by MRV. The main MRV findings in our study were non-visualization of occluded veins or sinuses due to absent signal, flow defect MRV successfully diagnosed all cases. The most common non-visualized sinus in this study was SSS that was noted in 57.84%, followed by transverse sinus 37.24.3%, sigmoid sinus 30% and straight sinus 25.13%. More than one occluded sinus could be found in some patients. Both cortical and deep veins could not be visualized in most of the cases.

IV. Discussion

The diagnosis of CVT is as difficult as its clinical manifestations are non-specific and may be subtle. Several factors combine to create an extremely elusive diagnosis of CVT: wide spectrum of clinical presentations, various predisposing factors, and the fact that it affects individuals of all age .Although most different modalities as DSA, CT, CTV and others help in diagnosis of CVT but each one has specific side effects and some have normal findings. Most of patients in this study were in the age groups of 18 year and 70 years. This agreed with similar literature reported that the most patients with this disease present in young-to middle- aged patients.Other literature reported that it is most common in the third decade while it may occur in all age groups. -45 patients in the current study were females (64.28%) and 25 patients were males (35.71%). This agreed same with literature that reported 75% of patients were females and had been suggested that the use of oral contraceptives in women is behind the disparity between the sexes. -most common age group in my study was 25-35 years. -headache was the common clinical symptom in my study followed by seizure,hemiparesis. -common sinus thrombosis seen in my study was sss thrombosis followed by TS thrombosis,ss thrombosis,sigmoid sinus thrombosis.

RESULTS-TABLE 1

SEX DISTRIBUTION

These are higher incidence seen in female patients.

SEX	NO OF CASES	PERCENTAGE
MALE	25	35.71
FEMALE	45	64.28

These are higher incidence seen in female patients.

Table 2 AGE DISTRIBUTION.

Higher occurrence of CVT observed between age interval of 25 -35 years.

AGE RANGE	NO.OF CASES	PERCENTAGE%
<25	10	14.28
25-35	32	45.71
35-45	11	15.71
>45	17	24.28
TOTAL	70	100

Higher occurrence of CVT observed between age interval of 25 -35 years.

Table 3 CLINICAL PRESENTATION – HEADACHE

48 (68.57%) out of 70 presented with complaint of headache.

	NO OF CASES	PERCENTAGE
NEGATIVE	22	31.42
POSITIVE	48	68.57

48 (68.57%) out of 70 presented with complaint of headache.

Table 4 MRI – COMMON SINUS THROMBOSIS

SINUS THROMBOSIS	NO OF CASES	PERCENTAGE
SSS THROMBOSIS	40	57.14
TS THROMBOSIS	26	37.14
SS THROMBOSIS	7	10
SIGMOID SINUS THROMBOSIS	5	7.14

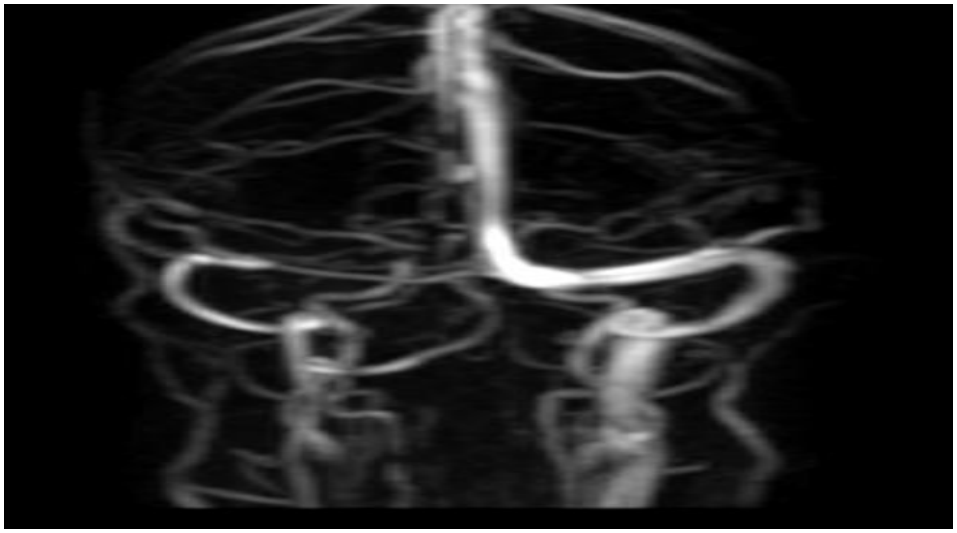
Superior sagittal Sinus thrombosis in combination with other sinus thrombosis is the highest percentage of occurrence observed followed by transverse Sinus Thrombosis , Straight sinus, sigmoid Sinus Thrombosis.

V. Conclusion

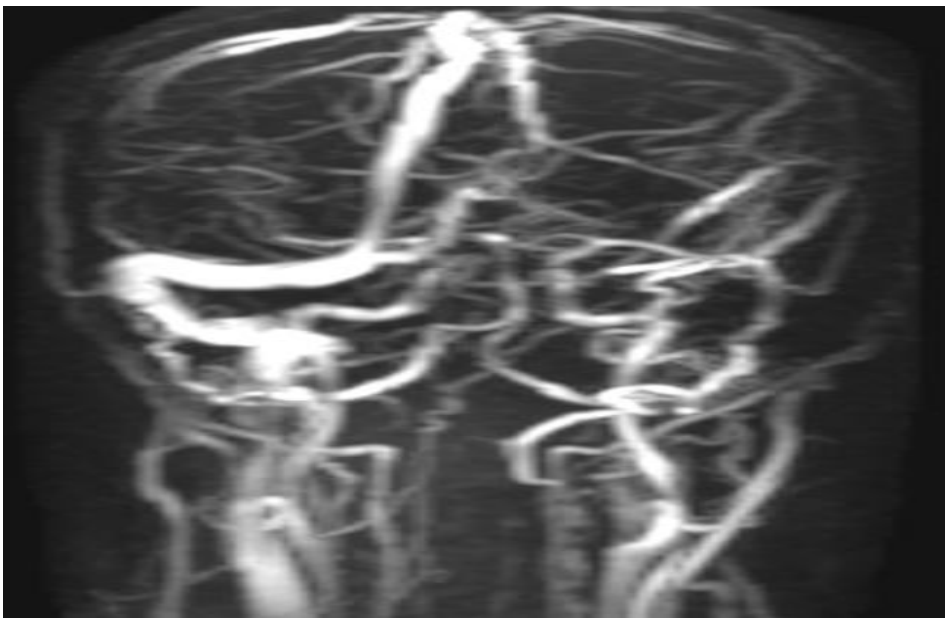
In my study of cerebral venous thrombosis it can be concluded that MRI in conjunction with MRV has the highest accuracy for diagnosis of CVT . Most common presenting symptom was headache, seizures, vomiting were the most common associated MRI findings.

SWI useful during the acute phase of CVT. Venous hypertension can be detected at an early stage in CVT showing venous congestion.

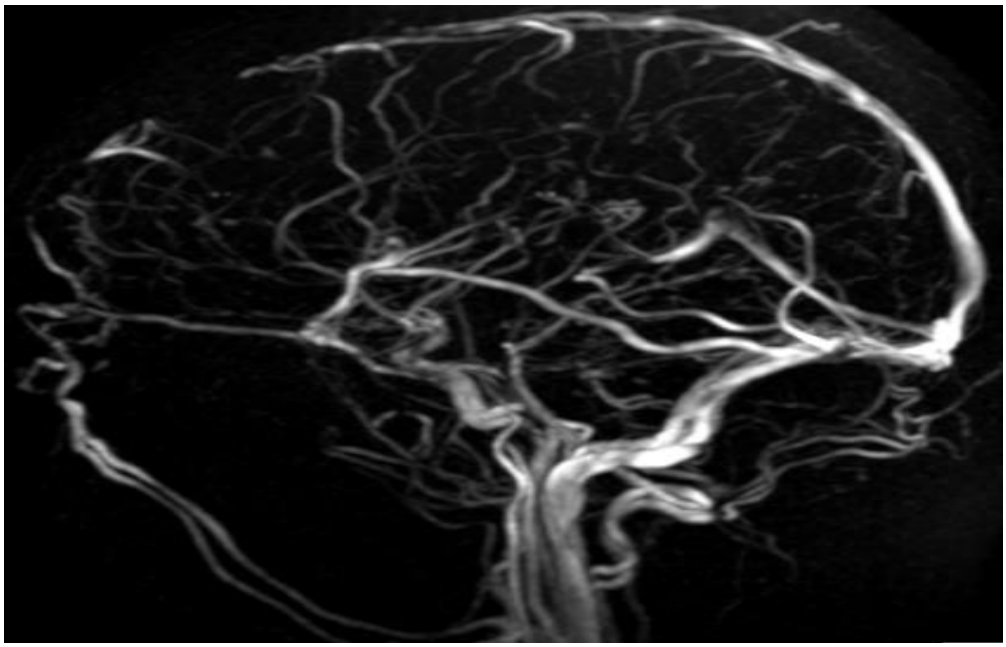
MRV has the highest sensitivity in diagnosing Cerebral venous thrombosis..



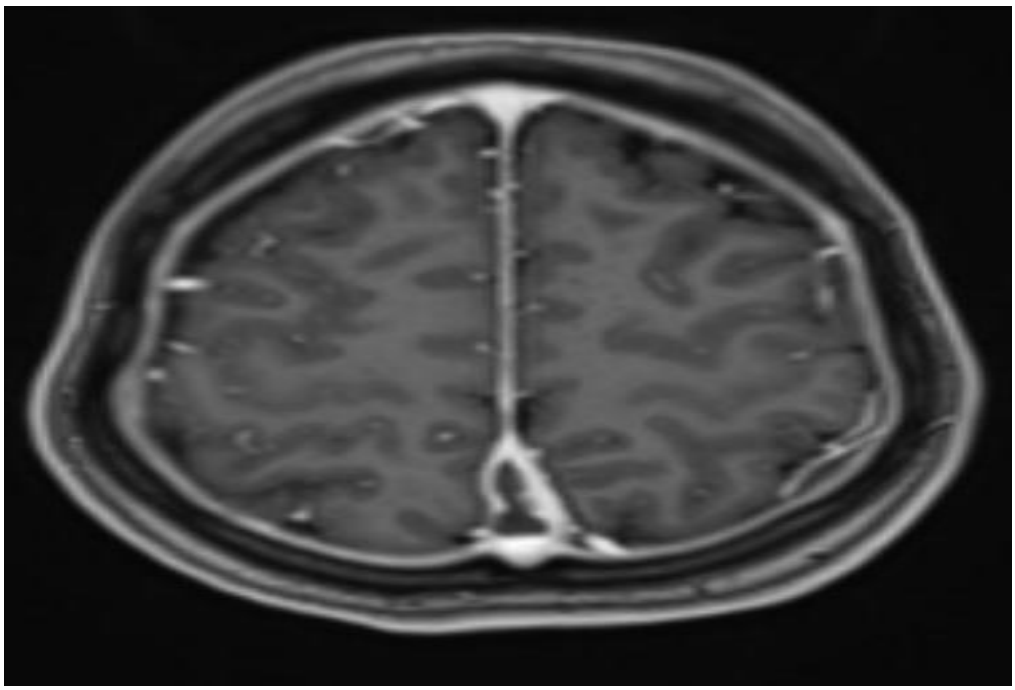
MRV IMAGE SHOWS NON VISHUALISATION OF RIGHT TRANSVERSE SINUS - RIGHT TRANSVERSE SINUS THROMBOSIS



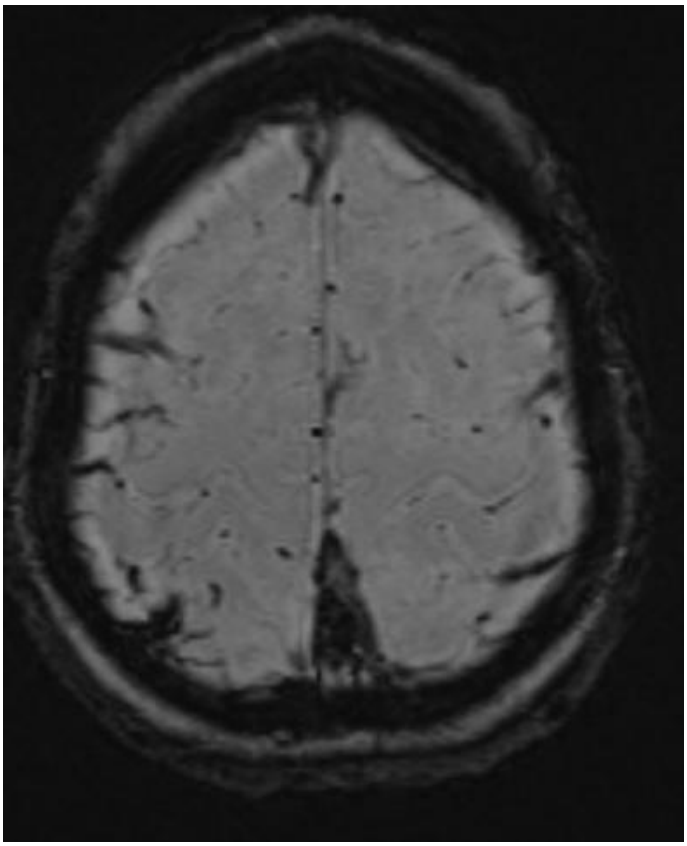
MRV IMAGE SHOWS NON VISHUALISATION OF LEFT TRANSVERSE SINUS , LEFT SIGMOID SINUS - DURAL VENOUS THROMBOSIS



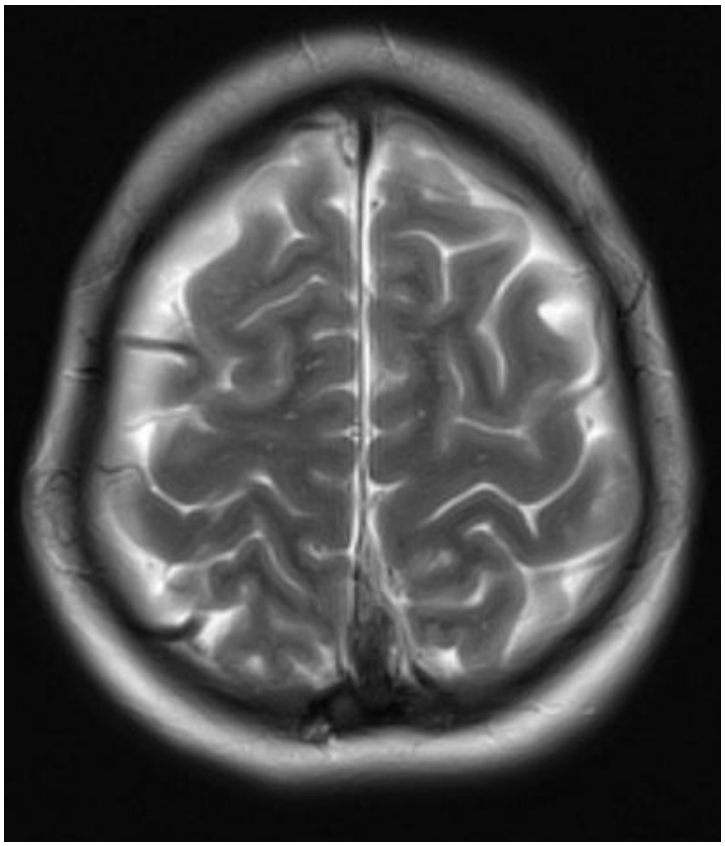
MRV IMAGE SHOWS NON VISHUALISATION OF ANTERIOR PORTION OF THE SUPERIOR SAGITTAL SINUS - SUPERIOR SAGITTAL SINUS THROMBOSIS



CONTRAST ENHANCED T1W SEQUENCE SHOWING LARGE THROMBI IN THE POSTERIOR PART OF THE SUPERIOR SAGITTAL SINUS (SSS)



SWI SHOWS SUPERIOR SAGITTAL SINUS THROMBOSIS



T2W SHOW THROMBUS IN SSS AND SWELLING OF THE CORTICAL VEINS.

References

[1]. Bousser MG. Cerebral venous thrombosis: nothing, heparin orlocal thrombolysis? Stroke 1999;30:481–3.
[2]. Lanska DJ, Kryscio RJ. Risk factors for peripartum andpostpartum stroke and intracranial venous thrombosis. Stroke2000;31:1274–82.
[3]. Ferro JM, Lopes MG, Rosas MJ, et al. Long-term prognosis ofcerebral vein and dural sinus thrombosis. Results of the venoport study. Cerebrovasc Dis 2002;13:272–8.
[4]. Ferro JM, Canhao P, Stam J, Bousser MG, Barinagarrementeria F. Prognosis of cerebral vein and dural sinus thrombosis: results ofthe International Study on Cerebral Vein and Dural SinusThrombosis (ISCVT). Stroke 2004;35:664–70.
[5]. DeVeber G, Andrew M. Cerebral sino-venous thrombosis inchildren. N Engl J Med 2001;345:417–23.
[6]. Ennaifer R, Moussa A, Mouelhi L, et al. Cerebral venous sinusthrombosis as presenting feature of ulcerative colitis. Acta Gastroenterol Belg 2009;72:350–3.
[7]. Schievink WI, Maya MM. Cerebral venous thrombosis in spontaneousintracranial hypotension. Headache 2008;48:1511–9.
[8]. Bousser MG, Ferro JM. Cerebral venous thrombosis: an update.Lancet Neurol 2007;6:162–70.
[9]. Van Buchem MA, Liauw L, Split A, et al. MR angiography of theintracranial venous system. Radiology 2000;214:678–82.
[10]. Khealani BA, Wasay M, Saadah M, et al. Cerebral venousthrombosis: a descriptive multicenter study of patients in Pakistanand Middle East. Stroke 2008;39:2707–11.
[11]. Bousser MG. Cerebral venous thrombosis: diagnosis and management.Eur J Neurol 2000;247:252–8.
[12]. Duddalwar VA. Multislice CT angiography: a practical guide toCT angiography in vascular imaging and intervention
[13]. Einha¨ upl K, Bousser MG, de Bruijn SF, et al. EFNS guideline on the treatment of cerebral venous and sinus thrombosis. Eur J Neurol 2006;6:553–9.
[14]. Ameri A, Bousser MG. Cerebral venous thrombosis. Neurol Clin 1992;10:87–111.
[15]. Nagaraj D, Haridas T, Taly AB, Veerendrakumar M, Subbukrishna DK. Puerperal cerebral venous thrombosis: therapeutic benefit of low dose heparin. Neurol India 1999;47:43–6.
[16]. Bousser MG, Barnett HJM. Cerebral venous thrombosis. In: Barnett HJM, Mohr JP, Stein BM, Yatsu FM, editors. Stroke pathophysiology diagnosis and management. 2nd ed. New York, NY: Churchill Livingstone Inc.; 1992.
[17]. Jeffryey J, Lisa M, Raiseer DM, et al. Cerebral sinus thrombosis diagnosed by MRI and MRV venography in cancer patients
[18]. Simonds GR, Truwit CL. Anatomy of the cerebral vasculature. Neuroimaging Clin N Am 1994;4:691–706.
[19]. Hinman JM, Provenzale JM. Hypointense thrombus on T2-weighted MR imaging: a potential pitfall in the diagnosis of dural sinus thrombosis. Eur J Radiol 2002;41:147–52.

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