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Computed Tomographic Evaluation of Cerebral Venous Thrombosis

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Abstract: ***Objective: To study the role of computed tomography in evaluation of cerebral venous sinus thrombosis. Materials and Method: This was a a prospective study of 30 patients irrespective of age group with clinical suspicion of cerebral venous thrombosis done in Dept of Radiodiagnosis, AVBRH, DMIMS(DU), Sawangi(meghe), Wardha. Result: Out of 30 patients diagnosed with CVT, 23(75%) patient were female and 7(25%) were male, transverse sinus involvement was seen in 18(60%)patients, sigmoid sinus in 6(20%), superior sagittal sinus in 4(13%), cortical veins in 2(7%) patients. Among risk factors most common was Pregnancy and puerperial period in 11(37%) patients followed by OC pill consumption present in 9(30%) patients. The main clinical presentation was thunderclap headache in 24(78%) , followed by seizure in 10(32%) patients. On CT scan imaging most common sign was cord sign in 10(33%) followed by delta sign in 9(30%) and Hemorrhagic infarcts in cortical white matter junction in 6(22%) patients. Conclusion: According to our study the highest prevalence was seen in younger age group with female preponderance. CT is the initial modality of choice, is found to be very helpful in diagnosing CVT, plays a crucial role in the patient care.***

Keywords: Cerebral Venous Thrombosis, CT Scan

1. Introduction

Cerebral venous thrombosis is relatively uncommon but serious neurological disorder which is potentially reversible with prompt diagnosis and appropriate medical care.[1] Because the possible causal factors and clinical manifestations of this disorder are many and varied, the disease may occur at any age, it often occurs in young people. Affects about 5per million and accounts for 0·5 % of all stroke with mortality rate of 8%.[2,3] Computed Tomographic imaging plays a primary and crucial role in the patient care.[4]

The clinical manifestations of CVT are often non-specific and are easily mistaken for those caused by other neurological disease processes. The clinical features includes thunderclap, headache, nausea, vomiting, seizures, tinnitus, papilledema, visual impairment, altered mental sensorium, focal neurological deficit, multiple cranial nerve palsy, diffuse encephalopathy and coma.[5]

MRI is more sensitive than CT in the setting of cerebral venous thrombosis, but CT is the initial modality due to its widespread availability, rapid image acquisition, no contraindication to pacemaker and ferromagnetic devices and increased imaging resolution.[6] The purpose of this study is to investigate radiological and clinical characteristics of cerebral venous thrombosis.

2. Materials and Methods

A Prospective Cross sectional observational study of 30 patients irrespective of age group was done in Dept of Radiodiagnosis, AVBRH, DMIMS(DU) sawangi(meghe), wardha. All the patients with clinical suspicion of CVT referred to our department were included in the study. Exclusion Criteria was Uncooperative patients in whom CT can not be performed. Consent was taken from the patients before the procedure.

Equipment

CT PHILIPS BRILLIANCE 16 slice. Patient was placed on gantry table in the supine position, Scans were taken parallel to the floor of the anterior fossa, the lowest section through the external auditory meatus continuing to the top of the head (orbito meatal line to high parietal region), With caudal angulation of gantry. Slice thickness of 5mm is used for scanning with further reconstruction of 3mm.

Ethical Approval

Ethical approval was taken from the ethical committee, DMIMS before commencing of the study.

3. Observations and Results

In present study all patients with clinically suspected CVT were included irrespective of age. Maximum belonged to age group 21-30years i.e. 9(30%) patients followed by 31-40years 7(23%). The youngest being 1 year old and oldest being 60 years old. Out of 30 cases of CVT, 7(23.34%) were males and 23(76.66%) were females with male to female ratio being 7:23 i.e. 1:3.

In our study out of 30 patients 11(36.66%) patients presented in pregnancy and puerperial period, 9(30%) had a history of OC pills consumption for long period, 4(13.33%) had a history of blood disorders,3(10%) had a history of steroid intake, 2(6.66%) had a history of dehydration and 1(3.33%) had a idiopathic history.

The main clinical presentation was thunderclap headache was present in 24(78%) patients followed by seizure in 10(32%) patients .Other clinical features found was focal neurological deficit 7(24%), altered sensorium 5(18%), blurring of vision 4(14%), fever 2(6%) and vomiting 8 (26%).Most of the symptoms were overlapping.

In our study,out of 30 patients 11(36.6%) patients had involvement of transverse sinus, 9(30%) had involvement of superior sagittal sinus, 2(6.66%) had involvement of cortical veins,4 (13.33%) had involvement of transverse sinus+ sigmoid sinus,4(13.33%) had involvement of superior sagittal sinus+ cortical veins.

On CT scan imaging most common sign was cord sign in 10(33%) patients followed by delta sign in 9 (30%) patients. Other parenchymal changes includes Haemorrhagic infarcts in cortical white matter junction in 6(22%) patients, Dense cortical vein in 2(6%), cerebral edema, intense tentorial enhancement and focal cortical ischemia .

4. Discussion

Cerebral venous thrombosis is relatively rare and distinct cerebrovascular disorder that, unlike arterial stroke. It affects both sexes, although it is more common among women of childbearing age .[7] Risk factors includes pregnancy, postpartum period, oral hormonal contraceptives, hormone replacement therapy, dehydration, trauma, blood dyscrasias and neoplasms as well as systemic and local inflammatory states.[7,8] Despite having identified over 100 possible factors that might predispose to CVT, etiology remains unknown in about 20–25% of cases.[9] During the past decade, increased awareness of the diagnosis, improved neuroimaging techniques and more effective treatment have improved the prognosis. More than 80 percent of all patients now have a good neurologic outcome.[10]

In our study out of 30 patients most of the cases of CVT belonged to the young age group, maximum being in the age group of 21-30years (30%) followed by 31-40years (23%). With female preponderance having female to male ratio of 3:1. These findings are almost similar with the study done by Gustavo S et al.[10] in his study he reported that CVT is an uncommon form of stroke, usually affecting young adults with female predominance and maximum belonging to reproductive age group. Another study done by Jerzy Walecki et al[8] shows female preponderance in CVT with 65% female patients. Also study done by Pratibha Issar et al[11] And S F T M de Bruijn et al[5] shows prevalence of CVT more common in younger age group with female preponderance.

Pregnancy and puerperal period and long term use of OC pills are the most common causes of CVT among females. In our study out of 23 female patients, 48% patients were in pregnancy and puerperal period and 40% were OC pill users. This is accordance with the study done by Shah-Naz Hayat Khan et al[12] and Masahiro Uemura et al[13]. In their study they concluded that in CVT there is female preponderance with history of oral contraceptive use and during pregnancy and puerperium.

Thunderclap headache is the most common presentation in 24(78 %) patients followed by seizures in 10(32%), vomiting in 8(26%) and focal neurological deficit in7(24%) patients. Which is in accordance with the study done by Mohapatra S et al[14] in their study they reported that headache is the most common symptom present in more than 80% cases, seizures 35-40% cases, focal neurological signs 30-35% cases and vomiting 30% cases. Another study done by Pratibha Issar et al[12] reported the same findings.

In our study most commonly involved sinus was transverse sinus (36.6%) followed by superior sagittal sinus(30%). This is in accordance with the study done by Jerzy Walecki et al[8] in his study maximum patients presented with the involvement of transverse sinus followed by superior sagittal and sigmoid sinus.

Regarding brain parenchymal abnormality, most common sign was cord sign 10(33%) patients seen in transverse sinus thrombosis followed by delta sign 9 (30%) patients seen in superior sagittal sinus thrombosis. Other parenchymal findings includes Hemorrhagic infarcts in cortical white matter junction, Dense cortical vein, cerebral edema, intense tentorial enhancement and focal cortical ischemia Which is in accordance with the study done by Gustavo S et al[10] reported in their study that approximately one third of the patients had shown direct signs of hyperdense dural sinus. Leach J et al[1] reported that focal brain parenchymal abnormalities are visualized in 57% of cases . Our findings are also similar with the study done by Kathikeyan et al[6] in their article focused on the spectrum of CT findings in patients with CVT.

5. Conclusion

CVT presents with variable clinical presentation in all the age groups and both sexes, though more common in young female patients. CT is the initial modality of choice, is found to be very helpful in diagnosing CVT, plays a crucial role in the patient care due to its widespread availability, rapid image acquisition, no contraindication to pacemaker and ferromagnetic devices, increased imaging resolution, and fewer equivocal imaging findings. No flow related artifacts have been reported with use of a contrast material bolus and acquisition in the venous phase and is cost effective.

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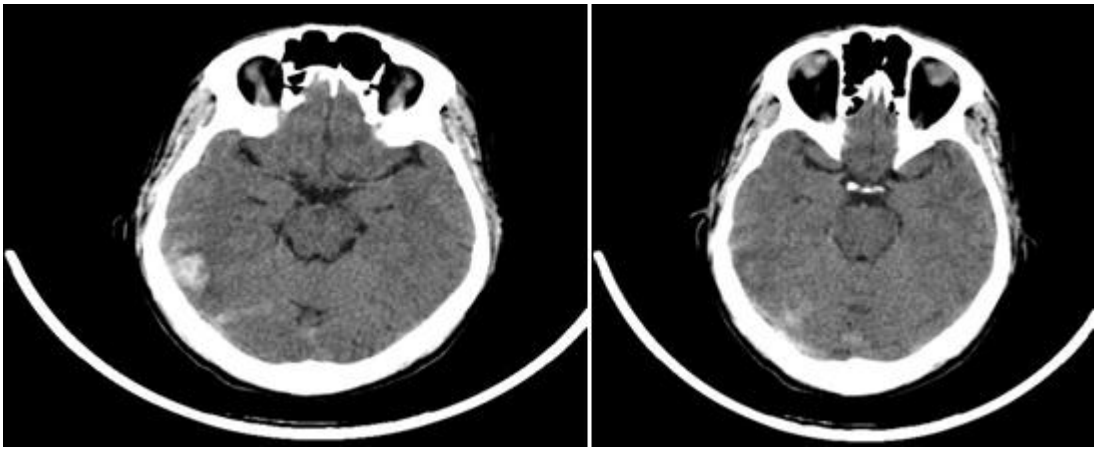

Image 1: Axial non-contrast CT scan showing venous infarct : a. ill defined hyperdense collection in right temporo-occipital region b. hyperdense right transverse sinus

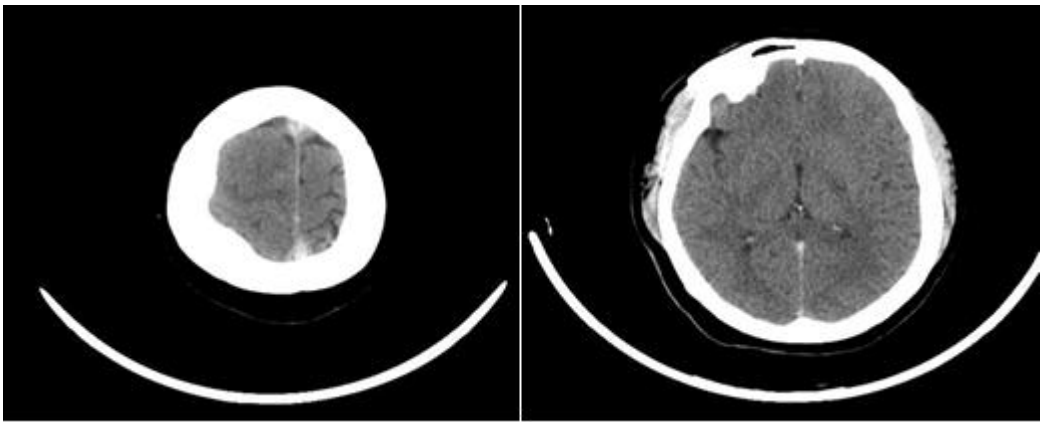

Image 2: Axial non-contrast CT scan showing cerebral venous sinus thrombosis : a. hyperdense superior sagittal sinus b. hyperdense straight sinus

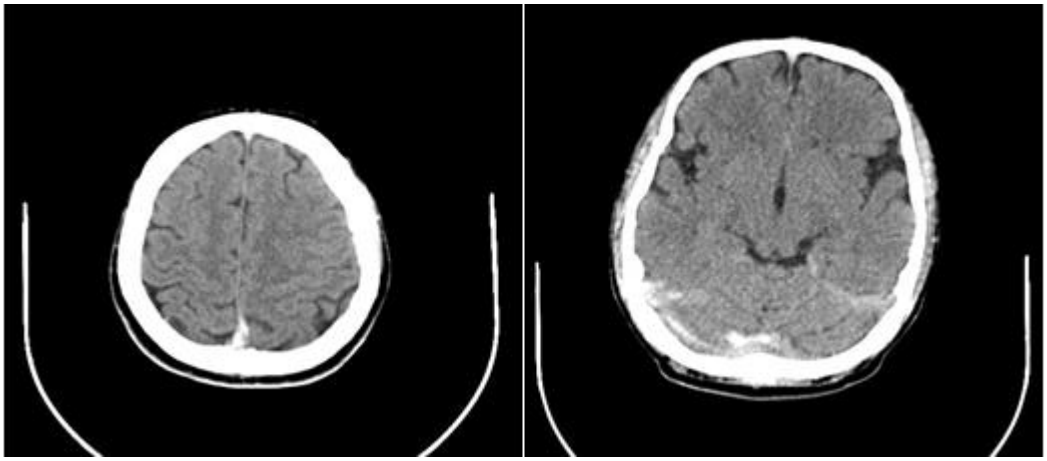

Image 3: Axial non-contrast CT scan showing cerebral venous sinus thrombosis: a. hyperdense superior sagittal sinus b. hyperdense right transverse sinus, sigmoid sinus and torcular herophili.