



A CLINICAL STUDY OF CEREBRAL VENOUS THROMBOSIS.

General Medicine

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ABSTRACT

BACKGROUND: CVT is an uncommon form of stroke, usually affecting young population. Clinical features of CVT are diverse, and high degree of clinical suspect is mandatory to diagnose. The objectives of the study were to analyse commonest clinical modes of presentation, possible etiologies, to evaluate clinical outcome. **MATERIAL & METHODS:** This study was prospective, clinical study was conducted on 40 patients, the period August 2018 to August 2019 in Emergency room, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh. All patients included in study were subjected to neuroimaging techniques like Computed tomography (CT), magnetic resonance imaging (MRI) along with magnetic resonance venography (MRV) according to guidelines and standard protocol. **RESULTS:** Majority of the patients involved in the study were in the age group of 21-40 years. Male: female ratio was 1.5: 1. Headache was the most common presenting symptom seen (87.5%) cases, convulsions (80%) patients. Altered sensorium was observed in (65%), focal deficits (55%). On MRI scan, superior sagittal sinus thrombosis was observed in (62.5%). **CONCLUSIONS:** The clinical symptoms of CVT are not specific, as a result of chances of misdiagnosis tends to be more. CT scan and MRI along with MRV can improve the precision of CVT diagnosis.

KEYWORDS

CVT (Cerebral Venous Thrombosis) MRV (Magnetic Resonance Venography)

INTRODUCTION:

- Cerebral venous thrombosis is one of the important causes of stroke in young and in postpartum states.
- Cerebral Venous Sinus Thrombosis (CVT) has been recognized since the early part of the nineteenth century but still remains a diagnostic and therapeutic challenge for the clinician, given the varying and often misleading clinical presentation of this condition.
- It forms a distinct subgroup of cerebrovascular disease and is one of the commonest causes of stroke in India.
- Although it may present with a variety of signs and symptoms, headache is the most frequent and often the earliest manifestation.
- The diagnosis of cerebral venous sinus thrombosis requires high index of suspicion. CT brain may show direct or indirect signs of cerebral venous thrombosis.
- It may be normal in 10% of patients. In such cases advanced neurological diagnostic like Magnetic Resonance Imaging with venography is necessary to confirm cerebral venous thrombosis, but it is not always readily available in many hospitals
- The objective of the study was to evaluate sample of cerebral venous thrombosis patients, their clinical presentations and relevant investigations.

Pathogenesis of cerebral venous thrombosis:

Various theories have been advocated for the pathogenesis of the cerebral venous thrombosis. The main factors incriminated are:

1. Infective theory
2. Embolism
3. Local endothelial damage
4. Hypercoagulability

1. Infective theory:

The septic thrombosis is one where a purulent infection occurs with attendant thrombophlebitis. The classic examples of such a condition are cavernous sinus thrombosis following facial infection and lateral sinus thrombosis following otitis media.

2. Martin-Batson Theory of Embolic Thrombosis:

In understanding the pathogenesis of puerperal venous thrombosis, the studies of Batson (1940) and extension of the results of that study by Martin (1941) are milestones. Batson (1940) in experimental work on monkey and human cadavers showed that pelvic veins anastomose with cerebral plexus of veins, positive proof of functional conduit in

live patients has not been shown. Based on these data Martin (1941) argued that under circumstances of increased intra-abdominal pressure, the thrombi from parturient mother could pass into intracranial sinuses via the vertebral plexus. Once the thrombus reaches the sagittal sinus, where blood flow is slow, it acts as a nidus for further thrombosis.

This theory fails to explain

- (i) The basic mechanism of puerperal thrombosis.
- (ii) The fact that SSS is most frequently involved, although vertebral plexus of veins communicate with the occipital and petrosal sinuses and not SSS.
- (iii) Delayed onset of symptoms.

3. Kendall's Theory of Local Damage:

Kendall (1948) put forward his hypothesis of local damage to the sinus endothelium. He suggested that damage to endothelial lining occurs during periods of breath holding and straining, which may occur during the second stage of labour.

4. Stasis:

Bailey (1971) noted that in many pathologically proven SSS thrombosis, the thrombus was oldest in the middle fifth of the sinus and in some cases only the central portion was involved suggesting involvement of certain local factors. In this region the superior cerebral veins enter the sinus in a direction opposite to the direction of blood flow in the sinus. Also there is sudden widening of the sinus at this point and may contribute to the localisation.

5. Theory of Hypercoagulability:

During pregnancy normally the hemostatic balance changes in the direction of hypercoagulability, thus decreasing bleeding complications in connection with delivery. The most important initial factor for acute hemostasis at delivery is, however, uterine muscle contractions, which interrupt blood flow.

Increased endogenous thrombin generation, acquired protein C resistance, slightly decreased activated partial thromboplastin time (APTT) and increased prothrombin complex level (PT) measured as INR of less than 0.9, activation of platelets, release of beta-thromboglobulin and platelet factor 4 and increased thrombomodulin levels have been reported in normal pregnancy.

Most blood coagulation factors and fibrinogen increase during pregnancy. Factor XI is the only blood coagulation factor that decreases during pregnancy. Fibrinolytic capacity is diminished during pregnancy, mainly because of markedly increased levels of plasminogen activator inhibitor 1 (PAI-1) from endothelial cells and plasminogen activator inhibitor-2 (PAI-2) from the placenta.

The total hemostatic balance has been studied by analysis of prothrombin fragment 1 and 2, thrombin-antithrombin complex, fibrinopeptide A, soluble fibrin, D-dimer and plasmin-antiplasmin complex. There is activation of blood coagulation and a simultaneous increase in fibrinolysis without signs of organ dysfunction during normal pregnancy.

These changes increase as pregnancy progresses. Fibrinolysis improves and increases fast following childbirth and expulsion of the placenta, resulting in increased D-dimer levels. These changes are self limiting at normal delivery.

The hemostatic changes normalize after delivery within 4 to 6 weeks. Platelet count and free protein 5, however can be abnormal for a longer period.

AIM OF THE STUDY:

- I. To analyse the commonest clinical modes of presentation
- II. To analyse the topography of involved venous sinuses in MRV.
- III. To evaluate clinical outcome

MATERIALS AND METHODS:

All patients included in study were subjected to neuroimaging techniques. This study was prospective, clinical study was conducted on 40 patients, the period August 2018 to August 2019 in Emergency room, Alluri Sitarama Raju Academy of Medical Sciences, Eluru, Andhra Pradesh. Computed tomography (CT), magnetic resonance imaging (MRI) along with magnetic resonance venography (MRV) are done according to guidelines and standard protocol.

INCLUSION CRITERIA:

Patient presenting with history of cerebral vein thrombosis and confirmed by CT imaging (direct and indirect signs)

A) DIRECT SIGNS:

Hyperdense sinus on plain CT
Cord sign on plain CT
Empty delta sign on contrast enhanced CT
Dense triangle sign on plain CT

B) INDIRECT SIGNS:

Cerebral edema
Cerebral infarction not confining to arterial territory
Small ventricles
Bilateral involvement
Gyral enhancement
Tentorial enhancement

EXCLUSION CRITERIA:

CT scan inconclusive of CVT
Hypertensive haemorrhage
Arterial stroke
Metabolic encephalopathies
Space occupying lesions

INVESTIGATIONS:

Peripheral smear
RBS
Urea and creatinine
ECG
Chest x ray
CSF analysis
CT scan
Wherever possible MRV, ANA, APLA, ANTITHROMBIN III, Protein S, Protein C

RESULTS:

SYMPTOMS

Most common symptom seen is headache.
35 cases had headache (87.5%)
27 cases had convulsions (67.5%)

22 cases had altered sensorium (55%)

21 cases had focal deficits (52.5%)

Few cases had fever (32.5%)

NEUROLOGICAL SIGNS:

17 cases presented with hemiplegia (42.5%)

7 cases presented with dysphasia (17.5%)

15 cases presented with signs of papilledema (37.5%)

AGE INCIDENCE:

9 cases are seen in age group 15-20 years

28 cases are seen in age group 21-40 years

Only 3 cases are seen in age group >40 years

TOTAL NO OF CASES:

Out of 40 cases 24 (65%) are males, 16 (35%) are females.

CAUSES:

Cause	No Of Cases	Percentage
ALCOHOL	17	45
HYPERHOMOCYSTEINEMIA	4	10
POLYCYTHEMIA	2	5
PROTEIN S DEFICIENCY	2	5
PUERPERIUM & PREGNANCY	14	35
H/O OCP	1	2.5
APLA	1	2.5

MODE OF ONSET:

MODE OF ONSET	NO OF CASES	PERCENTAGE
ACUTE	11	27.5
SUBACUTE	27	70
CHRONIC	1	2.5

INVOLVEMENT OF SINUSES:

SINUS INVOLVED	NO OF CASES	PERCENTAGE
SUPERIOR SAGITAL SINUS	25	62.5
TRANSVERSE SINUS	14	35
SIGMOID SINUS	1	2.5
STRAIGHT SINUS	0	0
INTERNAL CEREBRAL VEIN	0	0

DISCUSSION:

Previous studies from India have shown CSVT to be highly prevalent and generally associated with postpartum state.

Most of these studies were done before the widespread use of modern neuroimaging and had limitations of having small numbers and incomplete investigations.

The largest international multicentric trial of CSVT in 2004 included very few patients from Asia and Africa.

With the greater availability of MRI, CSVT is being increasingly diagnosed in both genders and at an early stage in India.

Many new risk factors are being identified due to more complete workup. Due to the large sample size, uniform risk factor workup, and regular follow-up, the observations from the present study are most up-to-date and valid. In the present study, CSVT was found more frequently in men.

Previous studies found 60-79% of CSVT patients to be women and reported it as the commonest cause of stroke in young women in India.

The main reason for this was believed to be high prevalence of postpartum hypercoagulable state, precipitated by dehydration and consumption of high fat food in the developing countries during peripartum period.

The high frequency of CSVT in men in this study is probably due to rising consumption of alcohol by men, improvement in obstetric care, and higher level of clinical suspicion and detection of CSVT at an early stage.

CONCLUSION:

- This study emphasizes that cerebral venous thrombosis is an important cause of stroke especially in the peripartum settings and

stroke in young.

- The clinical symptoms of CVT are not specific, as a result of chances of misdiagnosis tends to be more.
- CT scan and MRI along with MRV can improve the precision of CVT diagnosis.
- Management with intravenous heparin followed by oral anticoagulants is appropriate and the prognosis is generally favourable

SUMMARY

1. The mean age of presentation in the present study is 24 years. Majority were in the age group 21-40 years of age
2. Mode of presentation was mostly subacute.
3. Puerperium was the most common risk factor associated with CVT. Majority of Puerperal CVT occurred during 1st 10 days after delivery.
4. ALCOHOL was the most common cause in males.
5. Headache was the most common presenting symptom seen (87.5%) cases. convulsions (80%) patients. Altered sensorium was observed in (65%), focal deficits (55%).
6. Most common CT finding was cerebral oedema.
7. Empty delta sign was noted in 42.5% cases
8. Radiologically most common sinus involved is superior sagittal sinus followed by transverse sinus.

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