Original Research Article

The role of corticosteroids in primary antiphospholipid antibody syndrome presenting as cerebral venous thrombosis in young females at peripartum

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Abstract

The clinical study of cerebral venous thrombosis in antiphospholipid antibody syndrome in young females at peripartum was done to study the incidence of antiphospholipid antibodies in highly susceptible population groups most commonly at peripartum women. The presence of these antibodies points towards increased susceptibility to thrombosis and ischemic stroke apart from other manifestations in peripartum period. The age group most affected was between 20-25 years. Most of them were primipara. Many of the patients underwent Cesarean section before the presentation with the specific neurological complaint. None of the patients gave positive history for use of oral contraceptive pills. This study showed a 69% incidence of antiphospholipid antibodies out of the total patients studied. It was also found that 66% of the APL positive patients had radiological evidence of cerebral venous thrombosis. To help clarify the significance of aCL in CVT, this study was systematically analyzed and the clinical, radiological, treatment, and outcome information of patients with CVT tested for aCL immunereactivity at our institution and the pertinent literature was systematically reviewed. It was also studied that the most of the patients improved with corticosteroids.

Key words

Corticosteroids, Antiphospholipid antibody syndrome (APS), Cerebral venous thrombosis (CVT), Peripartum.

Introduction

Antiphospholipid antibodies are predominantly acquired serum immunoglobulins with affinity for anionic and neutral phospholipid-containing moieties, such as cellular membranes of vascular endothelium. The two most extensively studied aPL are the aCL and the LA [1, 2]. In the past decade, the antiphospholipid syndrome (APS) has been described in which systemic and cerebral venous and arterial occlusions are seen at a relatively young age and with a relatively high risk of recurrent thrombo-occlusive events [3-6].

CVT is a rare disorder carrying a relatively high mortality (10% to 15%) [7, 8]. With the advent of MRI and MR angiography and digital subtraction angiography, the prevalence and natural history of CVT are being refined [9]. Risk factors for CVT include systemic non-infectious conditions such as pregnancy and puerperium, hyperviscosity syndromes, Behçet's disease, coagulopathies including activated protein C resistance and factor V Leiden mutation, and collagen vascular diseases.

The presence of aPL (aCL or LA) has been suggested as a risk factor for CVT, but the clinical, radiological, and outcome profiles have not been determined or systematically studied, mainly because of the scarcity of the reported cases. Whether the presence or absence of aPL in patients with CVT has clinical relevance remains unknown. Furthermore, the exact mechanism by which aPL promotes thrombosis and the therapy of choice also remain largely unknown.

Antiphospholipid syndrome (APS) causes significant difficulties in obstetrics and pregnancy, including maternal venous and arteraial thrombosis, fetal growth retardation, infertility, and Recurrent Miscarriage Syndrome (RMS) [10].

Cerebral sinus venous thrombosis

Thrombosis of the venous channels in the brain is an uncommon cause of cerebral infarction relative to arterial disease but is an important consideration because of its potential morbidity. Symptoms associated with the condition are related to the area of thrombosis. Cerebral infarction may occur with cortical vein or sagittal sinus thrombosis due to tissue congestion with obstruction. Lateral sinus thrombosis may be associated with headache and a pseudotumor cerebri like picture, Extension into the jugular bulb may cause jugular foramen syndrome; cranial nerve palsies may be seen in cavernous sinus thrombosis as a compressive phenomenon. No racial predilection has been observed. CVT is believed to be more common in women than men, in the age group of 20 to 35 years [11].

Clinical features

Clinical features are Headache, Nausea and vomiting, Pseudotumor cerebri, Seizures or Coma, and Focal neurological deficit. Mental status may be quite variable, with patients showing no changes in alertness, developing mild confusion, or progressing to coma. Cranial nerve findings may include papilledema, hemianopia, oculomotor and abducens palsies, facial weakness, and if the thrombosis extends to the jugular vein, the patient may develop involvement of cranial nerves IX, X, XI, and XII with jugular foramen syndrome.

Thrombosis of the superior sagittal sinus may present with unilateral paralysis that then extends to the other side secondary to extension of the clot into the cerebral veins. Because of the location, this may present as a unilateral lower extremity weakness or paraplegia. Cavernous sinus thrombosis with obstruction of the ophthalmic veins may be associated with proptosis and ipsilateral periorbital edema.

Causes

Infection, Trauma, Pregnancy and puerperium, Inflammatory bowel diseases, Hematological conditions like PNH, TTP, polycythemia, sickle cell anemia, Collagen vascular diseases, Nephrotic syndrome ,dehydration, cirrhosis liver and Hypercoagulable states like APLA syndrome, Protein C and protein S deficiency, AT III def, Factor V leiden mutation.

Laboratory Studies

- Clinical laboratory studies are useful for determining the possible causes of cerebral venous thrombosis (CVT). Diagnosis of the condition is made on the basis of clinical presentation and imaging studies.
- Complete Blood Picture (CBP) is performed to look for polycythemia as an etiologic factor.
- Antiphospholipid and anticardiolipin antibodies should be obtained to evaluate for antiphospholipid syndrome. Other tests that may indicate hypercoagulable states include protein S, protein C, antithrombin III, lupus anticoagulant, and Leiden factor V mutation. These evaluations should not be made while the patient is on anticoagulant therapy.
- Sickle cell preparation or hemoglobin electrophoresis should be obtained in individuals of African descent.
- Erythrocyte sedimentation rate and antinuclear antibody should be performed for screening of systemic lupus erythematosus, Wegener's granulomatosis, and temporal arteritis. If elevated, further evaluation including complement levels, anti-DNA antibodies, and neutrophil cytoplasmic antibodies (ANCA) could be considered.
- Urine protein should be checked and, if elevated, nephrotic syndrome considered.
- Liver function studies should be performed to rule out cirrhosis.

Imaging Studies

MRI

MRI shows the pattern of an infarct that does not follow the distribution of an expected arterial occlusion. It may show absence of flow void in the normal venous channels. MR Venography (MRV) is an excellent method of visualizing the dural venous sinuses and larger cerebral veins. Single-slice phase-contrast angiography (SSPCA) takes less than 30 seconds and provides rapid and reliable information. Many neurologists now consider it to be the procedure of choice in diagnosing cerebral venous thrombosis [12].

CT scan

CT scan is an important imaging technique, as it is often the first imaging study obtained. It may show evidence of infarction that does not correspond to an arterial distribution. However, in the absence of a hemorrhagic component, demonstration of the infarct may be delayed up to 48-72 hours. CT scan of the mastoids may be helpful in lateral sinus thrombosis. Empty delta sign (**Figure - 1, 2**) appears on contrast scans as enhancement of the collateral veins in the superior sagittal sinus (SSS) walls surrounding a non-enhanced thrombus in the sinus. However, the sign is frequently absent. The dense triangle sign formed by fresh coagulated blood in the SSS and the cord sign representing thrombosed cortical vein are extremely rare. CT Angiography (**Figure - 3**) has also been used to visualize the cerebral venous system. CT venography was superior to MR in identification of cerebral veins and dural sinuses. CT Venography was equivalent to MR in identification of dural sinus thrombosis and therefore is a viable alternative to MR Venography in the examination of patients with suspected dural sinus thrombosis.

Contrast studies

Carotid arteriography with delayed filming technique to visualize the venous system was the procedure of choice in the diagnosis of venous thrombosis prior to the advent of MRV. It is an invasive procedure and is therefore associated with a small risk. If MR studies are not diagnostic, conventional angiography should be

considered. Direct venography can be performed by passing a catheter from the jugular vein into the transverse sinus with injection outlining the venous sinuses.

Figure – 1: CT Brain showing the delta sign and the cord sign.

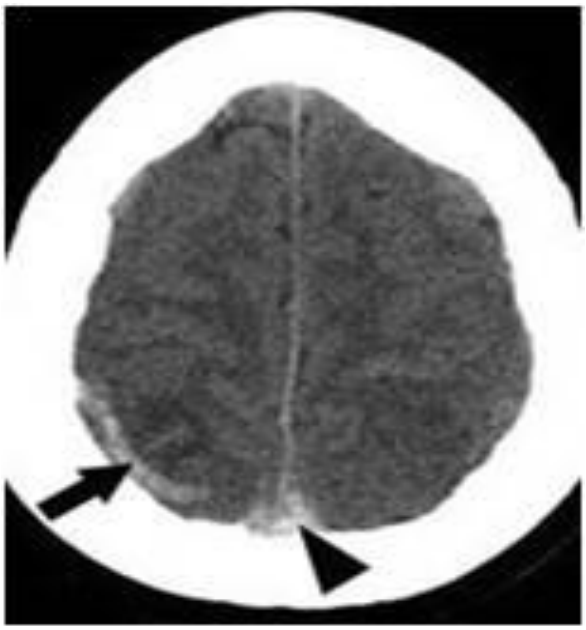
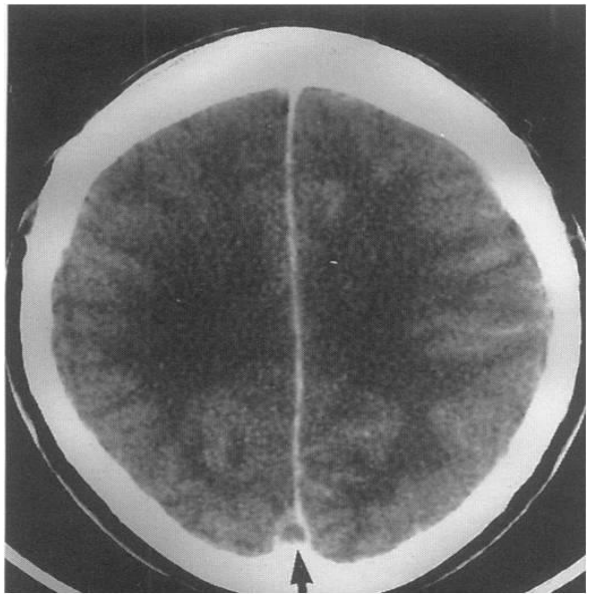


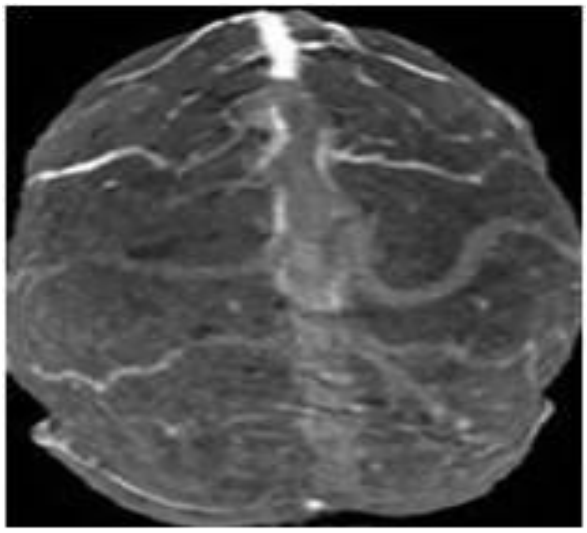
Figure – 2: CT Brain showing the empty delta sign.



Medical Care

Medical management of the patient with cerebral venous thrombosis (CVT) is similar to that of patients with arterial stroke as far as stabilizing the patient is concerned. Patients with altered mental status or hemiplegia should be given nothing by mouth to prevent aspiration. Intravenous fluids should not be hypotonic solutions. Normal saline is recommended at a rate of approximately 1000 mL in 24 hours. Seizures should be treated with appropriate anticonvulsants.

Figure – 3: Digital subtraction imaging showing the thrombosis of superior sagittal sinus.



Use of anticoagulation in CVT has been a subject of some debate among neurologists. The question of effectiveness of anticoagulation is not clear, but most articles tend to point toward improved outcome with utilization of anticoagulation. In this study corticosteroids are used as this disease is related to forme frustes of SLE. Medication [1, 13] used in other studies include, Anticoagulants like Heparin, Warfarin (Coumadin), Thrombolytics, Alteplase (Activase)

Antiphospholipid antibody syndrome

The cardinal features of the antiphospholipid syndrome (APS), first described in 1983 by Dr. Graham Hughes and his team at the Hammersmith Hospital, included recurrent arterial and venous thromboses, fetal losses, and thrombocytopenia. APS is now recognized as a common disorder and its importance lies in the fact that once diagnosed, this a treatable condition

Clinical criteria

Vascular thrombosis: One or more clinical episodes of arterial, venous, or small vessel thrombosis, in any tissue or organ. Thrombosis must be confirmed by imaging or Doppler studies or histopathology, with the exception of superficial venous thrombosis. For histopathologic confirmation, thrombosis should be present without significant evidence of inflammation in the vessel wall.

Pregnancy morbidity

- One or more unexplained deaths of a morphologically normal fetus at or beyond the 10^{th} weeks of gestation, with normal fetal morphology documented by ultrasound or by direct examination of the fetus, or
- One or more premature births of a morphologically normal neonate at or before the 34th week of gestation because of severe pre-eclampsia or eclampsia, or severe placental insufficiency or
- Three more unexplained consecutive spontaneous abortions before the 10th week of gestation, with maternal anatomic, or hormonal abnormalities and paternal and maternal chromosomal causes excluded.

Laboratory criteria

Anticardiolipin antibody of IgG and/ or IgM isotype in blood, present in medium or high titre, on two or more occasions, at least 6 weeks apart, measured by a standard enzyme linked immunosorbent assay for 2-glycoprotein 1-dependent anticardiolipin antibodies.

Lupus anticoagulant present in plasma on two or more occasions at least 6 weeks apart, detected according to the guidelines of the International Society on Thrombosis and Hemostasis.

Definite APS is considered to be present if at least one of the clinical and one of the laboratory criteria are met.

Primary antiphospholipid antibody syndrome

Primary APS-Hughes syndrome is an immune-mediated coagulopathy associated with cerebral ischemia in young adults, the etiology of which remains unknown. Secondary APS can occur within the context of several diseases, mainly autoimmune or rheumatologic disorders, infections, malignancy, and drugs. Although only ischemic stroke is accepted neurological diagnostic criterion for the syndrome, other neurological conditions have been associated with aPLs, most commonly multiple sclerosis, migraine, psychiatric diseases, and various movement disorders.

Pathophysiology

The IgG isotypes of aCL and LA are the mostly associated aPLs with risk for first ischemic stroke. The real underlying mechanism of thrombosis remains unclear. Several mechanisms have been postulated, including multi-factorial interactions with phospholipids in endothelial cells and platelet membranes, multi-factorial interactions with coagulation factors, direct abrogation of endothelial cell prostacyclin production, and down-regulation of interleukins in vascular beds [15-17].

Clinical presentations

In addition to cerebral infarctions, arterial or VTEs may involve any tissue or organ in patients who have APS. Coronary artery events are common, accounting for 25% of arterial thrombosis, second only to cerebral infarctions. Retinal thrombosis, adrenal gland infarction or hemorrhage, peripheral venous thrombosis, pulmonary embolism and pulmonary hypertension, myocardial infarction, and skin infarction mainly in patients receiving warfarin therapy, may occur. Other features include recurrent miscarriage, thrombocytopenia, livedo reticularis, renal and celiac artery stenosis, ischemic bone fractures, and avascular necrosis of bone.

The most common cerebral ischemia associated with aPLs is arterial infarction, with small vessels and the middle cerebral arteries being the

most involved in the arterial circulation. Multiple recurrent cerebral infarctions may occur. Cerebral vein or dural sinus thrombosis are not uncommon. A wide spectrum of neurological disorders, including seizures, psychiatric diseases, dementia, transverse myelitis, optic neuropathy and multiple sclerosis-like disorders, migraine, Guillain-Barre syndrome, sensory-neural hearing loss, and atypical movement disorders, most commonly chorea, hemidystonia, parkinsonism, and hemiballismus, also has been associated with positive aPLs or APS.

Diagnostic tools

There are three aPL tests of clinical usefulness of determining the likelihood of thrombosis and assisting in the decision for treatment: LA, aCLs, and anti- b2GP1antibodies. Work-up should include a complete blood count, a Coomb test, and serologic tests such as antinuclear antibody (ANA) and ESR. The aPL tests should be repeated on two occasions at least 12 weeks apart, as variability of the results may alter the course of treatment. Neuroimaging studies with MRI of brain may show subcortical white matter changes, cerebral infarctions, or sinovenous occlusive disease. Patients who have suspected VTE should undergo a Doppler sonography of the lower extremities, and when there is clinical suspicion; CT of the chest should be obtained to rule out pulmonary embolism. Echocardiogram should be performed in all patients who have APS presenting with strokes looking for cardiac thrombi or Libman Sacks endocarditis.

Management of primary antiphospholipid antibody syndrome

Primary prevention: It is key in individuals who have persistently elevated aPL levels. Young women should avoid oral contraceptive use. Behavior risk factors modifications including smoking cessation and enhancing physical activity should be encouraged. Other modifiable vascular risk factors such as arterial hypertension, diabetes mellitus, and hyperlipidemia, should be controlled [18-20].

Secondary prevention: Although anticoagulants often are indicated in patients who have recurrent VTEs, the optimal duration and intensity of anticoagulation are disputable. The best therapeutic strategy for preventing stroke in patients who have APS remains unclear. In patients who have stroke and APS, aspirin is as effective as moderate-intensity warfarin for preventing recurrent cerebral events. Other antiplatelet agents shown to be beneficial in preventing atherosclerotic ischemic stroke, such as extended release dipyridamole in association with aspirin, or clopidogrel, may be used, but their efficacy in patients who have APS and ischemic stroke is not proven.

Antimalarial drugs such as chloroquine and hydroxychloroquine are disease modifying agents useful in for preventing postoperative thrombosis and managing SLE and APS with or without SLE.

In patients who have recurrent miscarriage associated with APS, treatment with heparin and low-dose aspirin may improve fetal survival as compared with aspirin alone. Intravenous immune globulin therapy may reduce obstetric complications. Because of its teratogenicity, warfarin should be avoided during pregnancy in APS and should be replaced by low molecular weight heparin (LMWH) or unfractionated heparin (UFH).

Antiphospholipid syndrome in pregnancy

CVT in special populations (Pregnancy)

Incidence estimates for CVT during pregnancy and the puerperium range from 1 in 2500 deliveries to 1 in 10,000 deliveries in Western countries, and odds ratios range from 1.3 to 13. The greatest risk periods for CVT include the third trimester and the first 4 post-partum weeks. Up to 73% of CVT in women occurs during the puerperium. Caesarian delivery appears to be associated with a higher risk of CVT.

Antiphospholipid syndrome (APLS) causes significant difficulties in obstetrics and pregnancy, including maternal thrombosis, fetal growth retardation, infertility, and recurrent miscarriage syndrome (RMS). The most

common of these, by far, is RMS. APLS has long been recognized as a cause of miscarriage and infertility; it also has long been recognized that treatment is often successful. Many clinicians consider APLS to be the most common prothrombotic disorder among both hereditary and acquired defects and the most common thrombotic disorder causing recurrent miscarriage. When assessing causes of infertility alone, APLS is thought to account for about 30% of infertility. Although most cases of APLS are clearly acquired, familial APLS associated with RMS has been reported [21-27].

Future Pregnancies and Recurrence

Patients with previous VTE are at increased risk of further venous thrombotic events when compared to healthy individuals. Based on the available evidence, CVT is not a contraindication for future pregnancies. Considering the additional risk that pregnancy adds to women with previous history of CVT, prophylaxis with LMWH during future pregnancies and the postpartum period can be beneficial [28-31].

Proposed mechanisms of thrombosis of antiphospholipid antibodies

- Interference with endothelial phospholipids and thus prostacyclin release
- Inhibition of prekallikrein and thus inhibition of fibrinolysis
- Inhibition of thrombomodulin and thus protein C/S activity
- Acquired protein C resistance (nonmolecular)
- Interaction with platelet membrane phospholipids
- Inhibition of endothelial tPA release
- Direct inhibition of protein S
- Inhibition of annexin-V, a cell surface protein that inhibits tissue factor
- Induction of the release of monocyte tissue factor.

Role of steroids

A number of observational studies, both prospective and retrospective, are available, primarily from single centers. In a retrospective study of 102 patients with CVT, 43 had an ICH. Among 27 (63%) who were treated with dose-adjusted, intravenous heparin after the ICH, 4 died (15%), and 14 (52%) patients completely recovered. Mortality was higher (69%) with lower improvement in functional outcomes (3 patients completely recovered). The largest study by far was the ISCVT, which included 624 patients at 89 centers in 21 countries. Nearly all patients were treated with anticoagulation initially and mortality was 8.3% over 16 months. 79% had complete recovery (modified Rankin scale (mRS) 0-1), 10.4% had mild to moderate disability (mRS 2-3) and 2.2% remained severely disabled (mRS 4-5)

Although patients with CVT may recover with anticoagulation therapy, 9-13% have poor outcomes despite anticoagulation. Anticoagulation alone may not dissolve a large and extensive thrombus and the clinical condition may worsen even during heparin treatment. Incomplete recanalization or persistent thrombosis may explain this phenomenon [32-36].

Vitamin K antagonists, including warfarin, are associated with fetal embryopathy and bleeding in fetus and neonate and thus are generally contraindicated in pregnancy. Anticoagulation for CVT during pregnancy and early in the puerperium consists of LMWH in the majority of women. As in non-pregnant women, fibrinolytic therapy is reserved for patients with deterioration despite systemic anticoagulation and has been reported during pregnancy [37, 38].

Only a few drugs are approved by the FDA for treatment of lupus. These include hydroxychloroquine (Plaquenil®), aspirin, glucocorticoids, and, since March 2011, belimumab (Benlysta®). Other drugs used for lupus, such as methotrexate, mycophenolate, and cyclophosphamide, have not been approved for lupus because their therapeutic value has not been proven in clinical trials. However, these medications are considered effective by

rheumatologists and are frequently used to treat the disease. As indicated above, these medications may have significant adverse effects, because they work by lowering the immune system. Therefore, we still need new medications that will be effective for the disease but less toxic [39].

Corticosteroids are very effective in the treatment of APS. Of note, a very important reason why one uses immunosuppressive medications in lupus is the fact, that glucocorticoids, although very effective, have many adverse effects that are directly associated with the dosage level used. In other words, the higher the dose of glucocorticoids and the longer they are used, the more likely and more severe their adverse effects will be. Using immunosuppressive medications allows the physician to minimize the use and adverse effects of Glucocorticoids [39].

Up to 20% of women with Obstetric Antiphospholipid Syndrome (OAPS) do not receive the currently recommended therapeutic regimen. Unfortunately, well-designed studies regarding the usefulness of new drugs in refractory OAPS are scarce. Hydroxychloroquine and low-dose prednisolone appear to be useful when added to standard therapy. Current data do not support the use of intravenous immunoglobulins in this field. The role played by double anti-aggregant therapy, fondaparinux, vitamin D, pentoxifylline and TNF-targeted therapies should be tested in well-designed studies [40].

Aim

- To study the incidence of primary antiphospholipid antibody syndrome in cases of cerebral venous thrombosis in young females at peripartum and the role of steroids in its treatment.

Materials and methods

35 female patients in the peripartum period suspected clinically of having CSVT were subjected to detailed clinical examination and CT brain plain and contrast. The diagnosis was confirmed by MRI and MRV. Then the presence of Anti phospholipid anibodies was confirmed by ELISA for IgG, IgM, and IgA. Cases other than those of CVT were kept for comparison of the relative frequency of the same in patients at peripartum. All the cases were given steroids, 2 mg/kg body wt.

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Inclusion criteria

- All young females at peripartum presenting with various CNS manifestations
- Only females between 15 to 38 years are included.
- Only cases of primary antiphospholipid antibody syndrome were included.

Exclusion criteria

- Cases of secondary APLAS were excluded but studied for comparison e.g. SLE, Behcet's disease and other connective tissue dosorders.
- Cases of APLAS presenting with symptoms other than those of CSVT are excluded e.g. MI, DVT, Arterial thrombosis etc.

Results and Discussion

Total number of patients taken for the study was 35. The study included only young females at peripartum period. Among them the age group maximally affected was between 20-25 years, which constituted 48% (17) of the study group.

Age group 36-40 years constituted only 3% (1) of the study group (**Table - 1**).

Table – 1: Age distribution.

Age group (years)	No. of cases	%
15-20	04	11%
21-25	17	48%
26-30	10	29%
31-35	03	09%
36-40	01	03%

Seizures were the most common presenting symptom in the study group 57% (20) and 6 patients presented with both seizures and hemiparesis. Second most common presenting symptom was hemiparesis which constituted 20% (7). 9% (3) patients presented with headache (**Table - 2**). Among the 26 patients who presented with seizures 13 patients showed radiological evidence of CSVT., and 17 patients were positive for anti phospholipid antibodies.

Table – 2: Presentations.

Presentation	No. of cases	%
Seizures	20	57%
Hemiparesis	7	20%
Headache	3	9%
Headache and seizures	4	11%
Seizures and hemiparesis	1	3%

Verrot, et al. [41] studied 163 consecutive patients with epilepsy in order to determine the prevalence and the relationship between ANA and/or aCL with epilepsy. They found that aCL were present in 20% of the patients, independently of the type of epilepsy. This study suggested a relationship between epilepsy and aCL, speculating that these antibodies can play a role in pathophysiology of epilepsy.

Among the 35 patients studied 57% (20) patients had cerebral venous thrombosis (**Table - 3**), (**Figures – 4, 5, 6, 7, 8**). The most common sinus involved was shared equally by the superior sagittal sinus (27%) (**Figure - 6**) and transverse sinuses (27%) (**Figure - 4**) that was 6 patients each, while 2 patients (9%) showed involvement of both. Sigmoid sinus involvement was the second most common seen in 14% (3) of patients (**Table - 4**). In one study of cerebral venous thrombosis the superior sagittal sinus was the most common sinus involved followed by the transverse and straight sinuses.

Table – 3: Cerebral venous thrombosis.

Cerebral venous thrombosis	No. of cases	%
Present	20	57%
Absent	15	43%

Table – 4: Sinus involved.

Sinus involved	Cases	%
Superior sagittal	6	27%
Transverse	6	27%
Inferior sagittal	1	4%
Sigmoid	3	14%
Superior sagittal and transverse	2	9%
Transverse and sigmoid	1	5%
Sigmoid and inferior sagittal	1	5%
Only parenchymal infarcts	2	9%

Anticardiolipin antibodies were positive in 69% (24) of patients (**Table - 5**). The most common antibody subtype was IgM which was seen in 54% (13) of patients, second most common was IgG which was present in (2) 8% of patients. IgM + IgG was combinedly positive in (4) 17% of patients (**Table - 6**). And only two patients were positive for lupus anticoagulants. In a study of antiphospholipid antibodies by Cabral, et al. [42], it was found that 36% had isolated IgG; 17% had isolated IgM; 14% had isolated IgA; 33% had various admixtures.

Among the patients who had CSVT 46% (16) of them showed positivity for antiphospholipid antibodies (**Table - 7**). In our study there were 24 APL positive patients out of which 16 cases

showed radiological evidence of CSVT, constituting about 66%.

Table – 5: Anticardiolipin antibodies.

Anticardiolipin antibodies	No. of cases	%
Present	24	69%
Absent	11	31%

Table – 6: Distribution of anticardiolipin antibodies.

Type of antibody	No. of cases	%
Only IgM	13	54%
Only IgG	2	8%
Only IgA	1	4%
IgM + IgG	4	17%
IgG + IgA	1	4%
IgA + IgM	3	13%

Table – 7: Distribution of CSVT and APL antibodies

CSVT	APL antibodies	No. of cases	%
Present	**Positive**	16	46%
Present	**Absent**	4	11%
Absent	**Present**	8	23%
Absent	**Absent**	7	20%

In this study many of the patients i.e. 24 cases were primi para, rest of them were multipara i.e. 11cases. 15 cases presented after an abortion or IUD, out of which 11cases showed positivity for antiphospholipid antibodies. Other findings in the study were that 30 patients showed elevated ESR levels indicating an autoimmune state, total WBC count was raised in 12 patients.

20 cases presented after a normal delivery. Presentation of CSVT was seen more commonly after undergoing lower segment Cesarean section, which was seen in 12 cases. Most common indication for LSCS was PIH. Out of the 12 cases which underwent LSCS, 7 cases were positive for CSVT (**Table - 8**).

Table – 8: APS – Primipara patients' characteristics.

Characteristics	No. of patients
Primi para	24
Abortion/ IUD	15
LSCS	11
PIH	07
Apl positive	11
CSVT	07

Among 35 patients 2 died. 6 of the patients had repeated attacks of seizures, needed Antiepileptics. 2 patients complained of chronic headache. Those with hemiparesis (7 patients), showed improvement to a major extent, rest of them improved completely, with steroid therapy alone (**Table - 9**).

Table – 9: The role of steroids.

Outcome	No. of patients
Patients studied	35
Steroids given	35
Deaths	02
Repeated seizures	06
Chronic headache	07
Complete improvement	20

Figure – 4: Thrombosis of the left transverse sinus.

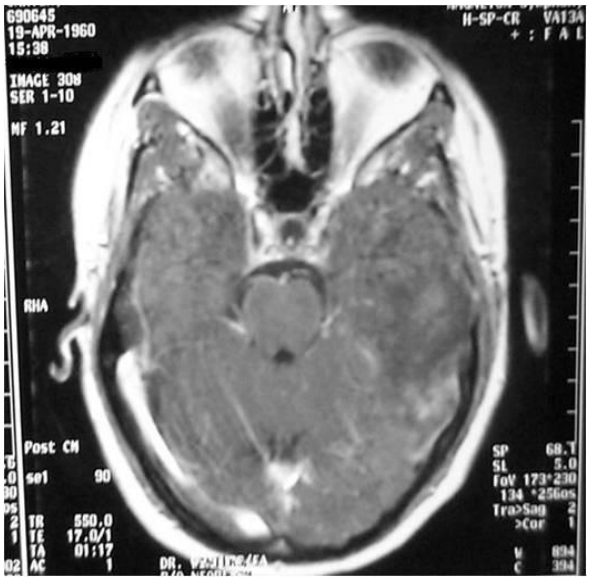


Figure – 5: Infarct –right frontoparietal area.

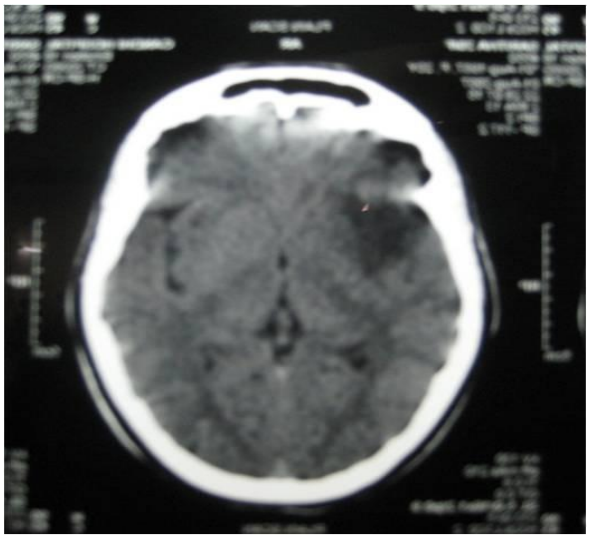


Figure – 6: Superior sagittal sinus thrombosis.

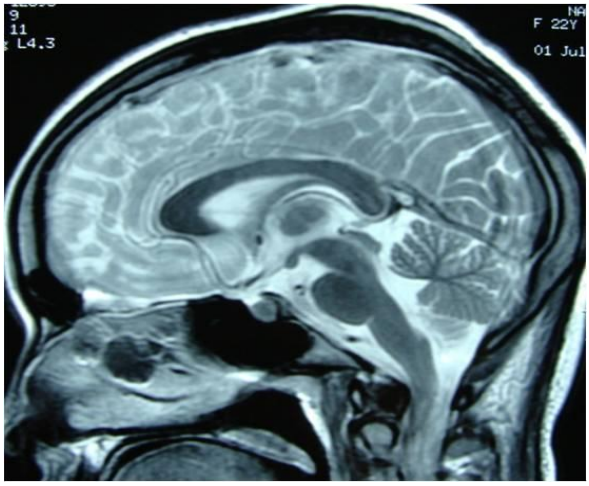


Figure – 7: Hemorrhagic infarct in the left parietal area.

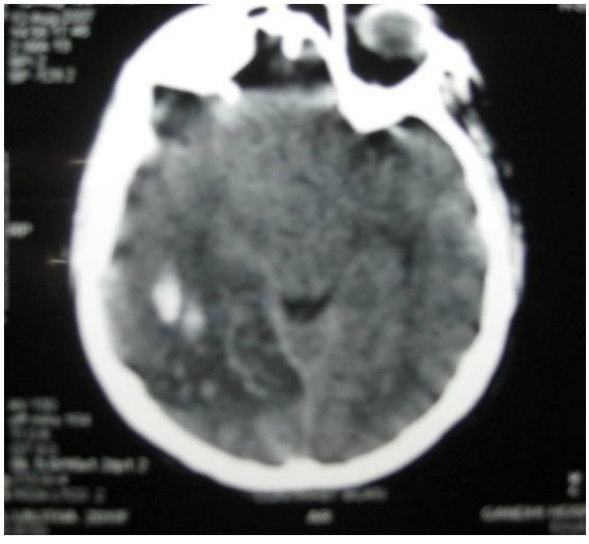
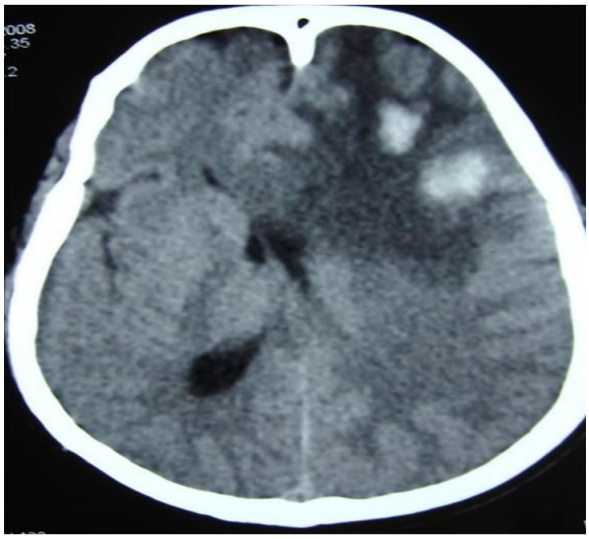


Figure – 8: Hemorrhagic infarct – left frontoparietal area.



All the patients were treated with steroids 2mg/kg body wt, along with antiepileptics where indicated. No treatment related complications occurred even in those with hemorrhagic infarction supporting the previous studies of treatment benefit.

International preliminary catastrophic antiphospholipid syndrome (CAPS) classification criteria and treatment guidelines were proposed in 2002 [43]. It recommended combination therapy with steroids, plasmapharesis, immunosuppressive drugs like cyclophosphamide along with anti coagulants. The current rationale for the recommended therapy of combined anticoagulation, steroids, and plasmapheresis or intravenous gammaglobulins is derived from the reported survival rate of 70% in patients so treated. Based on this, the study group received treatment with steroids alone with consequent improvement.

Conclusion

The primary antiphospholipid antibody syndrome must be considered as an important differential diagnosis in cases of cerebral venous thrombosis in young females in the peripartum period .The anti phospholipid antibodies were found in majority of the patients with cerebral sinus venous thrombosis. The prevalence of anti cardiolipin antibodies is very common in these

patient groups even in those who are asymptomatic. Since the occurrence of antiphospholipid antibodies is common in normal people also, the importance of these antibodies needs to be established in these population groups. The syndrome is more commonly manifested in primis. Many of the patients improved completely on treatment with steroids. In a country like India where majority of people are poor, they can't afford costly drugs, and most of the drugs for APS are questionable, may not be available. Hence, the steroids in therapeutic doses, which have good results, are recommended [39, 40].

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