

ORIGINAL ARTICLE**Evaluation of cerebrovascular complications during pregnancy**

Sofia Haroon

Assistant Professor, Department of Obstetrics and Gynaecology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

ABSTRACT:

Background: A pregnancy-related stroke usually refers to a stroke occurring during pregnancy and up to 6 weeks postpartum, although some thrombotic events may extend to 12 weeks postpartum. The present study was conducted to evaluate cerebrovascular complications during pregnancy. **Materials & Methods:** 90 females with cerebrovascular complications during pregnancy were subjected to radiographical examination such as computed tomography (CT scan) and magnetic resonance imaging (MRI) were performed. Patients were divided into 3 stroke groups: ischaemic stroke (IS), intracerebral hemorrhage (ICH) and cerebral venous thrombosis (CVT) based on clinical manifestations and neuro-imaging. Parameters such as etiology, caesarean delivery, previous abortion, parity etc. was recorded. **Results:** Type of CVA was ischaemic stroke in 32, intracerebral hemorrhage in 14 and cerebral venous thrombosis in 44 patients. The difference was significant ($P < 0.05$). Etiology was pre-eclampsia/eclampsia in 34, metastatic choriocarcinoma in 8, vascular malformation in 20, chronic hypertension in 28 cases. The difference was significant ($P < 0.05$). **Conclusion:** Common type of CVA was cerebral venous thrombosis, ischaemic stroke and intracerebral hemorrhage.

Key words: Cerebrovascular accident, Pregnancy, postpartum hemorrhage

Corresponding Author: Sofia Haroon, Assistant Professor, Department of Obstetrics and Gynaecology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India

This article may be cited as: Haroon S, Evaluation of cerebrovascular complications during pregnancy. J Adv Med Dent Scie Res 2016;4(6):422-424.

INTRODUCTION

A pregnancy-related stroke usually refers to a stroke occurring during pregnancy and up to 6 weeks postpartum, although some thrombotic events may extend to 12 weeks postpartum. Pregnancy increases the risk of focal ischemic cerebrovascular events.^{1,2} The risk of stroke and cerebrovascular complications are increased in pregnancy and puerperium compared to the non-pregnant women.³ The hypercoagulable state of pregnancy and puerperium is an important factor contributing to the risk of cerebral infarcts and several risk factors have been implicated, which can predispose a pregnant woman to cerebrovascular complications.⁴

The causes and mechanisms of stroke reported during pregnancy and the 6 weeks following delivery are variable and have been widely analyzed.⁵ A direct comparison amongst the timing of onset, causes, obstetric, and maternal outcome in patients with CVT, ischaemic stroke (IS), and intracerebral hemorrhage (ICH) during pregnancy and the first 5 weeks following delivery has rarely been reported.⁶

During pregnancy, cardiac disease may produce symptoms of focal cerebral ischemia through various mechanisms, including valve-related embolization, mural thrombus formation with subsequent

embolization, and systemic venous thromboembolism through a cardiac defect.⁷ Pregnancy may aggravate pre-existing maternal heart disease (for example, rheumatic fever and subacute bacterial endocarditis) or may cause maternal heart disease (for example, peripartum cardiomyopathy).⁸ The present study was conducted to evaluate cerebrovascular complications during pregnancy.

MATERIALS & METHODS

The present study consisted of 90 females with cerebrovascular complications during pregnancy. All enrolled patients gave their written consent.

Data such as name, age etc. was recorded. Radiographical examination such as computed tomography (CT scan) and magnetic resonance imaging (MRI) were performed. Patients were divided into 3 stroke groups: ischaemic stroke (IS), intracerebral hemorrhage (ICH) and cerebral venous thrombosis (CVT) based on clinical manifestations and neuro-imaging. Parameters such as etiology, caesarean delivery, previous abortion, parity etc. was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Type of CVA	Number	P value
Ischaemic stroke	32	0.05
Intracerebral hemorrhage	14	
Cerebral venous thrombosis	44	

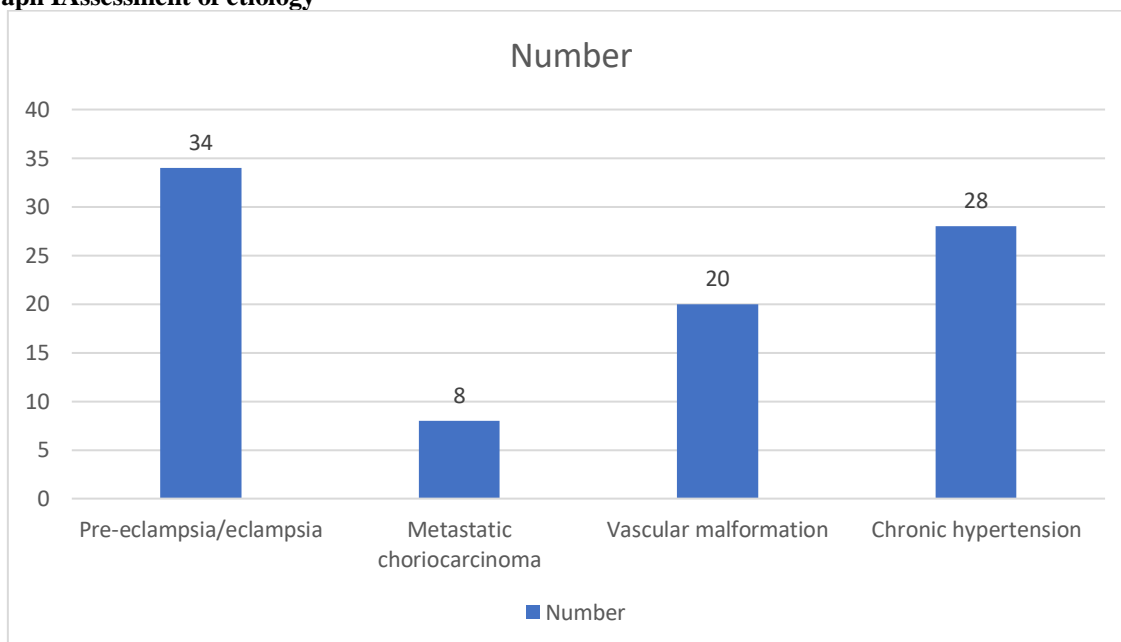
Table I shows that type of CVA was ischaemic stroke in 32, intracerebral hemorrhage in 14 and cerebral venous thrombosis in 44 patients. The difference was significant ($P < 0.05$).

Table II Assessment of etiology

Etiology	Number	P value
Pre-eclampsia/eclampsia	34	0.02
Metastatic choriocarcinoma	8	
Vascular malformation	20	
Chronic hypertension	28	

Table II, graph I shows that etiology was pre-eclampsia/eclampsia in 34, metastatic choriocarcinoma in 8, vascular malformation in 20, chronic hypertension in 28 cases. The difference was significant ($P < 0.05$).

Graph I Assessment of etiology



DISCUSSION

When the possible causes for ischemic cerebrovascular events in pregnancy are being considered, the various pathophysiologic mechanisms can be categorized as follows according to which part of the vascular system is most prominently involved such as cardiac disease, cervical arterial disease, cranial arterial disease, intracranial venous occlusions, hematologic disorders, other uncommon disorders.^{9,10,11} The present study was conducted to evaluate cerebrovascular complications during pregnancy.

We found that type of CVA was ischaemic stroke in 32, intracerebral hemorrhage in 14 and cerebral venous thrombosis in 44 patients. Cantu-Brito et al¹² studied 240 women with cerebrovascular complications during pregnancy and the first 5 weeks postpartum. Patients were classified into three groups: cerebral venous thrombosis (CVT), ischaemic stroke

(IS), and intracerebral hemorrhage (ICH). Of the 240 women, 136 had CVT (56.7%), 64 IS (26.7%), and 40 ICH (16.6%). In 72 women (30%), the event occurred during pregnancy, in 153 (64%) during postpartum, and in 15 (6%) closely related to labor. CVT was more common in the first trimester of pregnancy and in the second and third weeks following delivery; whilst IS and ICH were seen mainly during pregnancy and the first 2 weeks following delivery. Pre-eclampsia/eclampsia was more common in patients with ICH (57.5%) and IS (36%) than in those with CVT (9.6%) ($P < 0.001$). An excellent recovery was observed amongst women with CVT (64%) and IS (50%) compared to ICH (32%).

We observed that etiology was pre-eclampsia/eclampsia in 34, metastatic choriocarcinoma in 8, vascular malformation in 20, chronic hypertension in 28 cases. Prabhu T et al¹³ assessed the incidence, possible etiological factors,

pathology, clinical manifestations, brain CT scan features, treatment, and prognosis of cerebrovascular complications occurring in pregnancy and puerperium. 26 women were diagnosed with various cerebrovascular complications. Two women were suffering from cardiac disease. PET and eclampsia were seen in 19/26 (73%) cases. Seven women were suffering from anemia and one with severe sepsis. The neurological complications manifested predominantly in the postpartum period. Cases presented with hemiplegia/ facial palsy and aphasia. CT scan imaging showed intracerebral hemorrhage in four cases, cerebral infarcts in five cases, and cortical vein thrombosis in 16 cases. There were five maternal deaths.

Skilton et al¹⁴ found that pregnancy can reduce high-density lipoprotein and apolipoproteins A and B, causing atherosclerosis and increasing the risk of stroke. Pregnant women should be alert to cerebrovascular risks when they have difficulty breathing, sudden severe headaches, and sudden changes in nervous system symptoms (including changes in consciousness, speech, muscle strength, vision, balance, or sensation on one side of the body). MRI may show cerebral parenchymal lesions caused by RCVS, such as watershed cerebral infarction, cerebral hemorrhage, subarachnoid hemorrhage, and PRES lesions.¹⁵ Patients with RCVS may have hyperintense vessels within sulci on T2-FLAIR images, representing the slowing of blood flow in the cortical and pial vessels. This finding suggests severe cerebral vasoconstriction, and the risk of cerebral infarction and PRES is greatly increased.¹⁶ DSA examination is the gold standard for diagnosing RCVS. Typical vascular changes are characterized by moderate vascular segmental and multifocal stenosis (string of beads) in the anterior and posterior cerebral circulation, usually returning to normal 4 to 12 weeks after onset.¹⁷

CONCLUSION

Authors found that common type of CVA was cerebral venous thrombosis, ischaemic stroke and intracerebral hemorrhage.

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