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Original Research

Assessment of cerebrovascular complications during pregnancy

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ABSTRACT:

Background: Pregnancy increases the risk of focal ischemic cerebrovascular events. The risk of stroke and cerebrovascular complications are increased in pregnancy and puerperium compared to the non-pregnant women. The present study was conducted to assess cerebrovascular complications during pregnancy. **Materials & Methods:** 86 women with cerebrovascular complications during pregnancywere subjected to contrast and non-contrast-enhanced computed tomography and magnetic resonance imaging (MRI). Patients were classified into three stroke groups: ischaemic stroke (IS), intracerebral hemorrhage (ICH) and cerebral venous thrombosis (CVT). Parameters such as etiology, previous abortion, parity, Cesarean delivery etc. was recorded. **Results:** type of CVA was ischaemic stroke in 26, intracerebral hemorrhage in 18 and cerebral venous thrombosis in 42 cases. Primiparous were 30%,35% and 40%, multiparous were 65%, 67% and 70%, previous abortion seen in 32%, 30% and 17%, cesarean delivery in 38%, 22% and 16%, puerperal infection in 12%, 8% and 13%, anemiain 22%, 31% and 60%, pre-eclampsia in 10%, 24% and 9%, eclampsia in 24%, 30% and 2%, previous TIA in 5%, 1% and 1%, chronic hypertension in 1%, 5% and 2% and cigarette smoking in 12%, 6% and 8% in IS, ICH and CVT respectively. Etiology was pre-eclampsia/eclampsia in 35, vascular malformation in 20, chronic hypertension in 24 and metastatic choriocarcinomain 7 cases. **Conclusion:** Pre-eclampsia/eclampsia was the most common factorassociated with ICH and IS.

Key words: Cerebrovascular accident, eclampsia, Primiparous

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INTRODUCTION

Pregnancy increases the risk of focal ischemic cerebrovascular events. The risk of stroke and cerebrovascular complications are increased in pregnancy and puerperium compared to the non-pregnant women.[1] 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.[2]

When the possible causes for ischemic cerebrovascular events in pregnancy are being considered, thevarious pathophysiologic mechanisms can be categorized as follows according to which part of the vascular system is most prominently involved:[3,4] (1) cardiac disease; (2) cervical arterial disease; (3) cranial arterial disease; (4) intracranial venous occlusions; (5) hematologic disorders; (6) other uncommon disorders.The risk of stroke and cerebral venous thrombosis (CVT) has been reported between 3.8 and 29.1 per 100 000 deliveries in population-based studies made in the USA.[5] The causes and mechanisms of stroke reported during pregnancy and the 6 weeks following delivery are variable and have been widely analyzed.[6]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.[7]The present study was conducted to assess cerebrovascular complications during pregnancy.

MATERIALS & METHODS

The present study comprised of 86women with cerebrovascular complications during pregnancy. The consent was obtained from all enrolled patients.

Data such as name, ageetc. was recorded. All were subjected to contrast and non-contrast-enhanced computed tomography and magnetic resonance imaging (MRI).Based on clinical manifestations and neuro-imaging studies, patients were classified into three stroke groups: ischaemic stroke (IS), intracerebral hemorrhage (ICH) and cerebral venous thrombosis (CVT). Parameters such as etiology, previous abortion, parity, Cesarean delivery 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	26	0.05
intracerebral hemorrhage	18	
cerebral venous thrombosis	42	

Table I, graph I shows thattype of CVA was ischaemic stroke in 26, intracerebral hemorrhage in 18 and cerebral venous thrombosis in 42 cases. The difference was significant (P< 0.05).

Graph I Distribution of patients

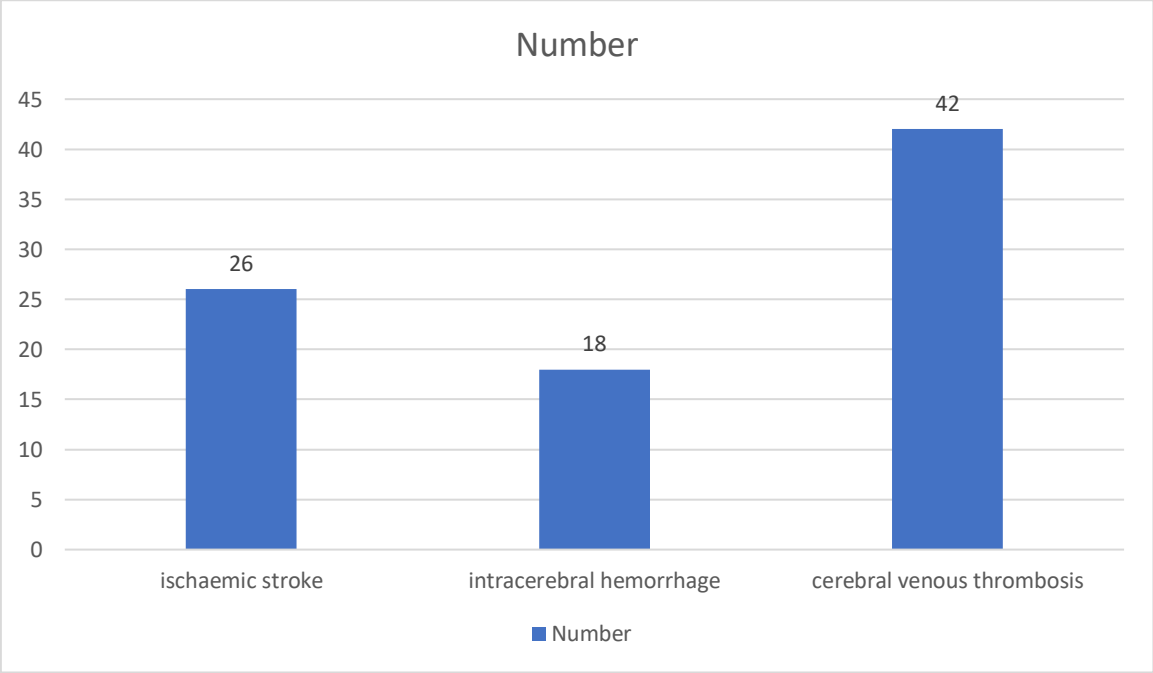

Table II Assessment of parameters

Parameters	IS	ICH	CVT	P value
Primiparous	30%	35%	40%	0.91
Multiparous	65%	67%	70%	0.82
Previous abortion	32%	30%	17%	0.05
Cesarean delivery	38%	22%	16%	0.12
Puerperal infection	12%	8%	13%	0.89
Anemia (Hb < 11 grm/dl)	22%	31%	60%	0.05
Pre-eclampsia	10%	24%	9%	0.92
Eclampsia	24%	30%	2%	0.05
Previous TIA	5%	1%	1%	0.03
Chronic hypertension	1%	5%	2%	0.02
Cigarette smoking	12%	6%	8%	0.04

Table II, graph I shows that primiparous were 30%, 35% and 40%, multiparous were 65%, 67% and 70%, previous abortion seen in 32%, 30% and 17%, cesarean delivery in 38%, 22% and 16%, puerperal infection in 12%, 8% and 13%, anemiain 22%, 31% and 60%, pre-eclampsia in 10%, 24% and 9%, eclampsia in 24%, 30% and 2%, previous TIA in 5%, 1% and 1%, chronic hypertension in 1%, 5% and 2% and cigarette smoking in 12%, 6% and 8% in IS, ICH and CVT respectively. The difference was significant (P< 0.05).

Graph I Assessment of parameters

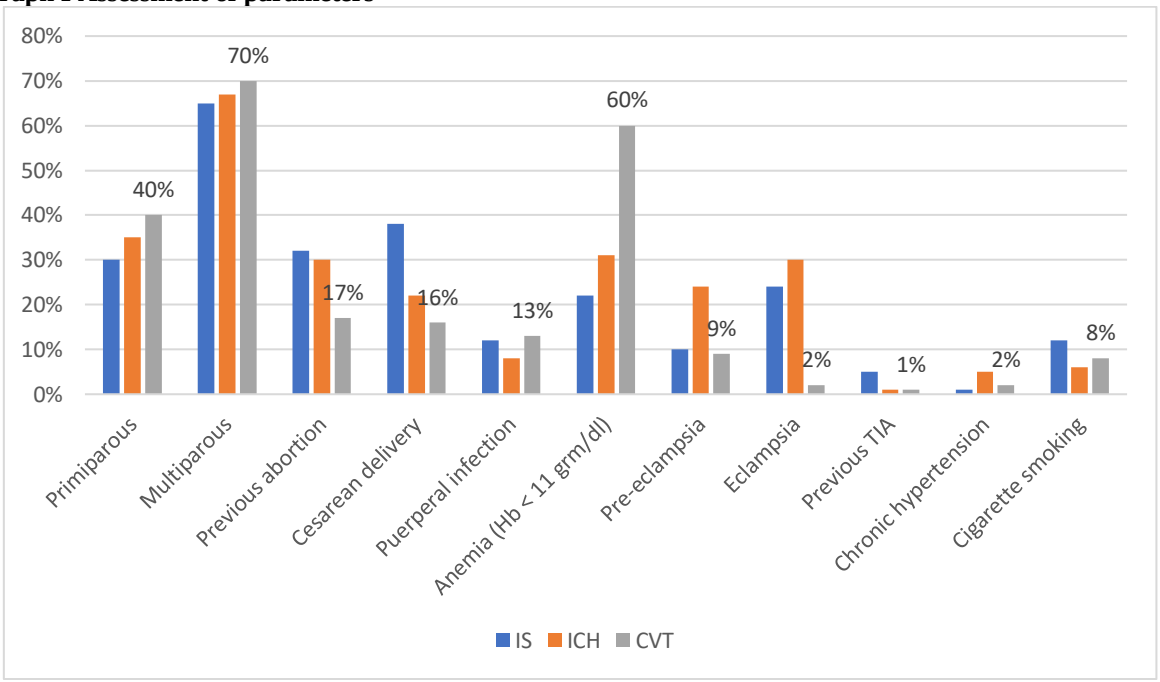

Table III Assessment of etiology

Etiology	Number	P value
Pre-eclampsia/eclampsia	35	0.05
Vascular malformation	20	
Chronic hypertension	24	
Metastatic choriocarcinoma	7	

Table III shows that etiology was pre-eclampsia/eclampsia in 35, vascular malformation in 20, chronic hypertension in 24 and metastatic choriocarcinoma in 7 cases. The difference was significant (P< 0.05).

DISCUSSION

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.[8] 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).[9]In Glasgow, Scotland,' 35% of 65 female subjects aged 15 to 45 years with ischemic stroke were pregnant or puerperal at the time of stroke, which is three to four times the prevalence of pregnancy in that age group. The overall incidence of ischemic stroke for women of childbearing age (15 to 49 years) was 6.2 cases per 100,000 population per year, but the rate doubled with each advance of age from 15 through 29 years, to 30 through 39 years, to 40 2 through 49 years.[10]The present study was conducted to assess cerebrovascular complications during pregnancy.

We found that type of CVA was ischaemic stroke in 26, intracerebral hemorrhage in 18 and cerebral venous thrombosisin 42 cases. Prabhu T et al[11]analyzed 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. In these patients, the clinical data, risk factors, neurological features, investigations, results, and neuro imaging reports were analyzed. The incidence of cerebrovascular complications in this study was 66 per 100,000 deliveries. None had prior history of diabetes, hypertension, renal disease, or seizure disorder. 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.

We found that primiparous were 30%,35% and 40%, multiparous were 65%, 67% and 70%, previous abortion seen in 32%, 30% and 17%, cesarean delivery in 38%, 22% and 16%, puerperal infectionin 12%, 8% and 13%, anemiain 22%, 31% and 60%, pre-eclampsia in 10%, 24% and 9%, eclampsia in

24%, 30% and 2%, previous TIA in 5%, 1% and 1%, chronic hypertension in 1%, 5%and 2% and cigarette smoking in 12%, 6% and 8% in IS, ICH and CVT respectively.Cantu-Brito et al[12]described the cerebrovascular complications occurring during pregnancy/postpartum and compared the characteristics amongst stroke types. They studied 240 women with cerebrovascular complications during pregnancy and the first 5 weeks postpartum, from our stroke registry. Patients were classified into three groups: cerebral venous thrombosis (CVT), ischaemic stroke (IS), and intracerebral hemorrhage (ICH). For each group, clinical data, timing of the event, and outcome were analyzed.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 weeksfollowing 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 (modified Rankin Scale: 0-1) was observed amongst women with CVT (64%) and IS (50%) compared to ICH (32%).

We observed that etiology was pre-eclampsia/eclampsia in 35, vascular malformation in 20, chronic hypertension in 24 and metastatic choriocarcinoma in 7 cases. Kittner et al[13]reported that for either type of stroke, cerebral infarction and intracerebral hemorrhage, the relative risk during pregnancy and puerperium was 2.4. The reported incidence of pregnancy-related cerebrovascular complications varies in different parts of the world.

CONCLUSION

Authors found that pre-eclampsia/eclampsia was the most common factorassociated with ICH and IS.

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