

## Stroke in Early Postpartum Period in a Young Woman: A Case Study

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### Abstract

This is a case of 35-years-old woman who presented with visual disturbances, gait disturbances and headache ten days postpartum. Imaging studies identified an acute infarction in the right parietal region. This case report discusses her presentation, investigations and management and the Etiology of stroke in pregnancy and the post-partum period.

**Keywords:** Woman; Postpartum; Infarction; Stroke; Pregnancy

### Introduction

Stroke is the fourth main cause of women's death and accounts for one eighth of all pregnancy associated deaths [1]. Pregnancy associated stroke occurs antepartum, intrapartum and up to 6 weeks postpartum and causes brain tissue damage. In pregnancy, both physiological changes and pre-existing cardiovascular disease or risk factors increase the risk of stroke [2]. Incidence of pregnancy associated stroke ranges from 3.8 to 34.2 per 100,000 births [3]. Risk for stroke in pregnancy and in the postpartum period varies according to the stage of pregnancy. According to a study that involved 2850 pregnancy related stroke patients, 11% cases presented antepartum, 41% presented intrapartum and 48% presented postpartum [3]. It is the first week post-partum in which the risk for stroke is maximum [4]. Mortality and morbidity associated with pregnancy related stroke is significant with 15% of affected women die and most survivors suffer from long term weakness and cognitive dysfunction [5]. We are presenting a rare case of stroke in early post-partum period. This case report discusses her presentation, investigations and management and the Etiology of stroke in pregnancy and the postpartum period.

### Case Report

A 35-years-old woman was seen in emergency department with complaints of left-sided weakness, headache, blurred vision, up rolling of eyes, slurring of speech, focal sensory losses and gait disturbances. She was 10<sup>th</sup> day post-partum after delivering a normal baby via vertex delivery at 38 weeks. The placenta was removed properly within 20 minutes of delivery by senior midwife. On first post-partum day there was 500 ml bleed and blood pressure were normal and on second post-partum day there was 300 ml bleed with normal vitals. Subsequently she was discharged. She was not on any medications. She had moderate gestational hypertension without proteinuria in second trimester. Her BP was well-controlled in 2<sup>nd</sup> and 3<sup>rd</sup> trimester with Labetalol and methyldopa. She was living with her husband and had 5 children two sons and three daughters with ages 10, 7, 5, 4 and 3 years respectively. She was not a smoker and had a BMI of 20 Kg/m<sup>2</sup>.

From emergency department, the patient was shifted to ICU. She was seen by on call medical registrar and consultation from obstetrician and neurologist was arranged. She was found to have sinus tachycardia, failure of upward gaze, inter-nuclear ophthalmoplegia, blurred vision, mild left hemiparesis and loss of touch, pain, temperature and vibration sensations on the left side of face, arm and lower shin. There was also mild incoherence of speech and ataxia. Her BP was 140/90 mmHg. Power was 4/5 in left upper limb and 3/5 in left lower limb and on right side it was normal. Maximum National Institutes of Health Stroke Scale (NIHSS) score was 15. A differential diagnosis of cerebral infarction, venous thrombosis, Brain tumour, seizures, cavernous sinus thrombosis, and multiple sclerosis was made and investigated.

|                  |                           |
|------------------|---------------------------|
| Hb               | 8.8 g/dl                  |
| WBC              | 9.8 x 10 <sup>3</sup> /uL |
| Platelets        | 306 x 10 <sup>3</sup> /uL |
| ESR              | 42 mm/hr                  |
| ALT              | 36 umol/L                 |
| Serum creatinine | 64 mmol/L                 |
| Serum Sodium     | 142 mmol/L                |
| Serum potassium  | 4.6 mmol/L                |

**Table 1:** A differential diagnosis of cerebral infarction, venous thrombosis, Brain tumor, seizures, cavernous sinus thrombosis, and multiple sclerosis.

Lab results were as under; haemoglobin 8.8 g/dl, WBC 9.8 x 10<sup>3</sup>/uL, Platelets 306 x 10<sup>3</sup>/uL, ESR 42 mm/hr with normal liver and renal function tests. Electrolytes and Clotting profile were normal. CT scan of the brain revealed infarction in the right parietal region, representing an acute infarct (Table 1).

After taking informed consent from her husband, IV-rtPA was administered with a standard protocol (9 mg/kg over 60 min as a 10% bolus and 90% infusion). Anticoagulant therapy was subsequently started. She was placed on enoxaparin 80 mg subcutaneously twice daily (Supplementary Figures). During her stay in hospital further investigations were carried out Trans-thoracic echocardiography was done.

Systolic function was good and heart valves were mobile and normal with no evidence of foramen oval or septal defect. Doppler ultrasound was negative for deep vein thrombosis. No visual field defects were detected on Goldman perimetry.

After 1-week patient was referred to stroke rehabilitation centre with advice to continue aspirin 300 mg once daily for 2 weeks and clopidogrel once daily thereafter. At the time of discharge neurological deficits were greatly improved and her NIHSS score was 6. She was advised not to breastfeed her child and not to use any estrogenic containing contraceptives by Gynaecologist.

### Discussion

This study concerns a rare case of early post-partum cerebral

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infarction involving the parietal lobe. The incidence of pregnancy related stroke varies, and it ranges from 3.8 to 34.2 per 100,000 maternities with the highest risk in the early post-partum period [3]. From 1994 to 2010, stroke rate in women with pregnancy associated disorders increased by 103% [6]. A case-oriented review by Angela et al. evaluated the presentation, timing, and management for women with haemorrhagic stroke, ischemic stroke and cerebral venous thrombosis in pregnancy and in post-partum period [7]. They analysed 9 cases, and all of these occurred in the third trimester and in the early postpartum period.

There are two main types of stroke, haemorrhagic and ischemic. It is the Ischemic stroke that accounts for most of the pregnancy associated strokes. The most common cause is thrombus. Permanent neuronal damage can be avoided by early lyses of the clot by medical intervention.

The pathophysiology of stroke in pregnancy and in post-partum period is related to changes in the circulatory dynamics in pregnancy and in post-partum period. Coagulation factors VII, X, XII, fibrinogen and plasminogen activator inhibitors 1 and 2 are increased. Along with this anticoagulant factor like protein c and anti-thrombin are decreased during the third trimester and in early post-partum period. These changes in pro-coagulant and anticoagulant factors make pregnancy a hyper-coagulable state. This hyper-coagulable state along-with venous stasis is likely responsible for high risk of thromboembolic complications in the 3<sup>rd</sup> trimester and the puerperium. Concentration of coagulation factors normalizes to that of non-pregnancy levels by 4 weeks post-partum till that stroke risk remains high [6].

Various studies found an association between hypertensive disorders of pregnancy and caesarean section and post-partum stroke [8]. Our patient had only gestational hypertension in the second trimester, but her blood pressure was well-controlled with Labetalol and methyl-dopa. Besides these, other known risk factors that are independently associated with post-partum stroke are diabetes, obesity, black race, smoking, haematological disorders, autoimmune disorders, heart disease, migraine with aura and older age [9]. All these risk factors were absent in our patient.

There are some conditions that are exclusively associated with pregnancy and these they can cause ischemic stroke [10]. These include preeclampsia, eclampsia, amniotic fluid embolism, post-partum cardiomyopathy, and post-partum cerebral angiopathy [10]. Preeclampsia is characterized by increased blood pressure, edema and proteinuria with symptoms of headache, visual abnormalities and right hypochondrium pain. In eclampsia, there is addition of seizures. Our patient had only hypertension without any other sign and symptom of pre-eclampsia. There were no signs of heart failure and on echo there was no clot, heart chambers were normal, so post-partum cardiomyopathy was ruled out. CT angiography was done to check for cerebral angiopathy and there was no abnormality of vessels. Our patient presented at 10th day post-partum with no hypotension and dyspnea, ruling out the possibility of Amniotic fluid embolism.

Up to 40 percent of ischemic strokes have no identifiable cause despite investigations and are regarded as cryptogenic [11]. The most common causes of cardiac-embolism include patent foramen ovale

(PFO), atrial-fibrillation and valvular heart-disease. Vascular disorders like fabry's disease may cause cryptogenic stroke [12].

A study conducted by Hovsepian et al. showed that many strokes after hospital discharge occurred in women who have given normal birth. Women during post-partum period remain at risk for stroke even if there were no complications during labour and after delivery [13].

## Conclusion

The patient was young, and no other risk factor was present except her recent pregnancy. This case report gives us an insight that clinicians should be wary of the fact that stroke is rare but not much rare and its risk is high [4] in the perinatal period. Early detection and intervention prevent long term morbidity and mortality. Fortunately, this patient's prognosis was excellent.

## Conflict of Interest

There was no conflict of interest among authors.

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