

Intracranial hemorrhage from giant aneurysm in pregnancy: A rare association

Manasi Mehrotra, Anant Mehrotra¹, Anup Nair¹, Arun Srivastava¹, Rabi Narayan Sahu¹, Mandakini Pradhan, Raj Kumar¹

Departments of Maternal and Reproductive Health and ¹Neurosurgery, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, Uttar Pradesh, India

ABSTRACT

We report a case of giant aneurysm causing subarachnoid hemorrhage in a pregnant female. A 25-year-old female presented with sudden onset of severe headache and vomiting with altered sensorium and right hemiplegia. On investigation, she had a giant supraclinoid segment internal carotid artery (ICA) aneurysm. She was planned for digital subtraction angiography, but during the procedure she deteriorated neurologically and went into spontaneous labor. The baby was a male child with weight of 1.1 kg. She was taken up for surgery and aneurysm was clipped. We discuss the rare occurrence of intracranial hemorrhage in pregnancy due to a giant ICA aneurysm.

Key words: Giant aneurysm, pregnancy, subarachnoid hemorrhage

Introduction

Giant aneurysm is a rare lesion with overall incidence of 2-5% of all aneurysms. The incidence of giant aneurysm in pregnant case is unknown but appears to be exceedingly rare. We report a case of giant aneurysm presenting with subarachnoid hemorrhage in a pregnant lady and discuss the pathophysiology of the giant aneurysm in pregnancy.

Case Report

A 22-year-old, G2P0010 with 32 weeks pregnancy was admitted in neurosurgery intensive care unit (ICU) with complaints of sudden onset severe headache and recurrent episodes of vomiting for 1 day. Her pregnancy was supervised at a peripheral hospital and her blood pressure records were normal. At 22 weeks of gestation, she had one episode of generalized tonic clonic seizures, lasting for 2-3 minutes. She had no prior history of seizures. She was attended

at the peripheral hospital and started on antiepileptics but continued to have headache for which a computed tomography (CT) [Figure 1a] and magnetic resonance imaging [Figure 1b and c] were done at 20e and 28 weeks, respectively, which showed a left frontal hematoma with mass effect in form of effacement of ipsilateral ventricle with edema. She had one more episode of seizure 10 days before reaching neurosurgery department of our hospital. At the time of admission, she was conscious, obeying simple commands but was disoriented. Her pupils were bilaterally symmetrical and reacting to light. She had right hemiplegia. Her abdominal examination revealed a gravid uterus of 30 weeks size, relaxed with fetus, presenting as cephalic having regular fetal heart rate of 142 bpm. A CT angiography was done which demonstrated a left supraclinoid internal carotid artery (ICA) aneurysm. She was posted for digital subtraction angiography (DSA) (with precaution for fetal exposure of radiation). DSA showed a giant supraclinoidal ICA segment aneurysm [Figure 1d]. During the procedure, she had neurological deterioration and also developed per vaginal discharge. She went into spontaneous labor at 32 weeks and delivered a male child with birth weight of 1.1 kg. The baby was immediately

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Address for correspondence:

Dr. Mandakini Pradhan, Department of Maternal and Reproductive Health, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Raebareli Road, Lucknow - 226 014, Uttar Pradesh, India.
E-mail: mandakini_pradhan@rediffmail.com

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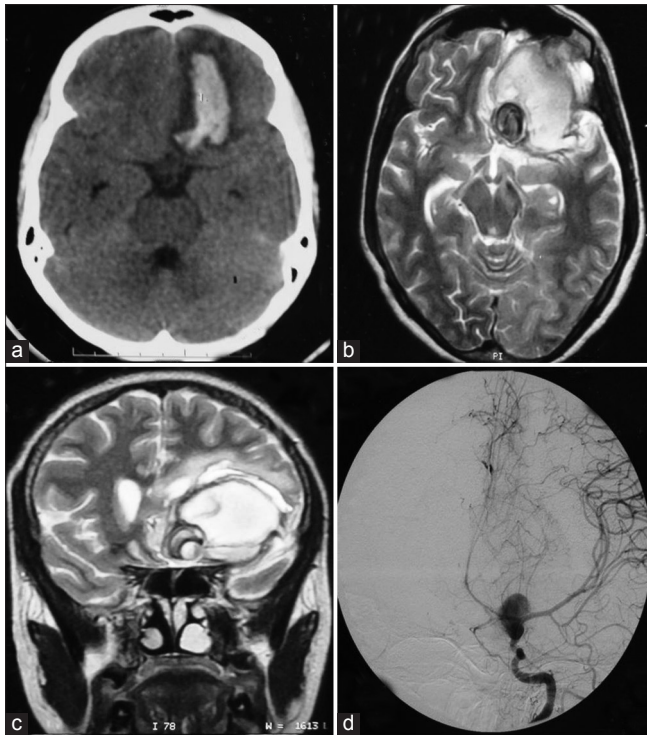


Figure 1: (a) CT showing left frontal hematoma; (b) and (c) Axial and coronal T2 MRI showing hematoma and suspected aneurysm; (d) DSA showing supraclinoid aneurysm

shifted to the neonatal ICU. In the immediate postpartum period, she developed hypotension and respiratory distress for which she required ventilator support. Repeat CT scan showed rebleed in anterior interhemispheric fissure. She was taken up for surgery after 12 hours postpartum and left pterional craniotomy was performed. Intraoperatively, the frontal lobe was tense and bulging and there was a clot in the frontal lobe. The clot was removed and the aneurysm was clipped successfully. Baby was under observation in neonatal ICU for 14 days and then discharged in satisfactory condition.

At discharge, patient was conscious, following simple commands and was oriented to person though she had persistent right hemiplegia. At 3 months follow-up, she was oriented to place and person and was accepting orally. Follow-up angiography was not done due to financial constraints of the family.

Discussion

Intracranial hemorrhage (ICH) (subarachnoid and/or intraparenchymal) is a rare occurrence during pregnancy with incidence reported to be 0.01 to 0.05% of all pregnancies.^[1] Despite being such a rare occurrence, it accounts for 5-12% of maternal deaths during pregnancy.^[1-4] Cerebral aneurysm rupture is one of the several causes of ICH during pregnancy. Other causes of ICH during pregnancy are arteriovenous malformation and pregnancy-associated condition like

hypertension, eclampsia, metastatic choriocarcinoma, and disseminated intravascular coagulopathy (DIC).^[5]

The risk of ICH from cerebral aneurysm rupture varies with the stage of pregnancy and appears to be highest during the late third trimester, during delivery and in puerperium.^[6] Aneurysms during pregnancy are distributed similarly to those in general population, usually located at the major branch points of the circle of Willis.^[5,6] Subarachnoid hemorrhage (SAH) is the predominant mode of presentation of aneurysms in pregnant females.

Giant aneurysm (diameter more than 25 mm) accounts for 2-5% of all intracranial aneurysms.^[7] Giant aneurysms are found in all locations throughout the intracranial vascular tree with ICA being the most common site. In our case, the patient had a giant supraclinoid segment aneurysm which had ruptured. The exact incidence of giant aneurysm in pregnancy is not known as it a rare lesion even in nonpregnant cases. However, extrapolating the incidence of giant aneurysms in nonpregnant to pregnant cases would mean that its occurrence would be extremely rare in pregnant cases.

Pathological evaluation of giant aneurysms often demonstrates a lack of a muscular layer and degeneration of the elastic lamina layers.^[8] As most of the aneurysms are saccular and occur at arterial bifurcations, it is believed that hemodynamic factors must be involved in the formation of the cerebral aneurysms. Vessel weakness could be accelerated by flow-related phenomena or degenerative disease such as atherosclerosis. Hemodynamic and endocrine changes associated with pregnancy may predispose to aneurysm formation, enlargement, and rupture. The levels of several hormones, including estrogen, progesterone, human chorionic gonadotrophin, and relaxin, that affect the connective tissue and blood vessels increase during pregnancy. There are evidences that suggest that cerebral aneurysms may grow, in part, because of the increased laxity of vascular walls during pregnancy.^[5,9,10] As the aneurysm grows, wall tension must increase to maintain the vessel integrity. The hemodynamic forces that prompt an aneurysm to grow may be responsible for its ultimate rupture.

Although SAH might occur at any period of gestation, it is more likely to peak in the third trimester between 30 and 34 weeks of gestation, roughly paralleling the physiological 50% increase in blood volume.^[1,11-14] Changes in blood pressure and stroke volume may be more important than changes in blood volume in the pathophysiology of cerebral aneurysm rupture. During pregnancy, labor, and delivery, there are rapid and sometimes large fluctuations in blood pressure and intracranial pressure. These changes result in changes in aneurysm transmural pressure which may strain the aneurysmal wall and lead to its rupture. The classic notion that rupture of an arterial aneurysm

occurs more frequently during labor has not been confirmed. The mean time for aneurysm rupture was seventh month of gestation. In 2% of patients, the aneurysm ruptured during labor and in 13% during the postpartum period.^[15]

Pregnant patients with a ruptured aneurysm should be treated as nonpregnant patients and undergo treatment when in good clinical condition.^[10,16] Those with a ruptured aneurysm should have the aneurysm clipped/endovascularly treated as rapidly as possible.^[17-22] During such clipping, general hypotension should be avoided and reliance placed on temporary clips. Once the aneurysm is successfully clipped, the pregnancy can be allowed to progress to term and patient can be delivered vaginally if she is in good neurologic condition.^[5] In the review article, Dias and Sekhar and Stoodley *et al.*,^[1,5] could not confirm that cesarean section improved maternal or the fetal survival rate. Thus, the method of delivery should be based on an obstetric consideration.

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Conflicts of interest

There are no conflicts of interest.

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