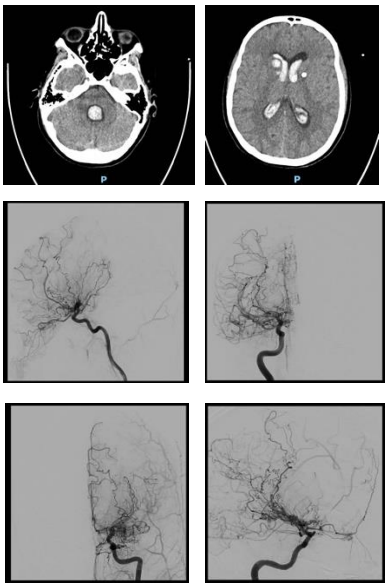
Good fetal and maternal outcomes after subarachnoid hemorrhage in newly diagnosed Moyamoya disease: the importance of a multidisciplinary team approach

Anna Digiovanni[1,2], Maria Elena Nives[2], Daniela Monaco[2], Alessia Memmo[3], Antonella Frattari[4], Caterina Di Carmine[2], Vincenzo Di Egidio[5], Vezzaro Roberto[6], Donato Carlo Zotta[7], Antonio Lanterna[8], Maria Vittoria De Angelis[2]

1. *Department of Neuroscience, Imaging, and Clinical Sciences, "G. D'Annunzio" University of Chieti-Pescara, Chieti, Italy.*
2. *Department of Emergency Neurology and Stroke Unit, "Santo Spirito" Hospital, Pescara, Italy*
3. *Department of Obstetrics and Gynecology, Spirito Santo Hospital of Pescara, Pescara, Italy*
4. *Unit of Intensive Care, Pescara General Hospital, Pescara, Italy.*
5. *Radiology Unit, Spirito Santo Hospital of Pescara, Pescara, Italy*
6. *Radiology Unit, Renzetti Hospital, Lanciano, Italy*
7. *Neurosurgical Unit, Ospedale Spirito Santo, Chieti-Pescara, Italy*
8. *Department of Neurosurgery, Ospedale Papa Giovanni XXIII, Bergamo, Italy*

Moyamoya is a rare cerebrovascular disorder characterized by progressive narrowing of subarachnoid arteries, leading to the formation of compensatory small vessels that appear as a "puff of smoke" on angiography. It can result in both ischemic and hemorrhagic events. The impact of pregnancy on the risk of cerebrovascular events in Moyamoya remains uncertain, but such events during pregnancy pose significant maternal and fetal risks. Prompt multidisciplinary intervention is essential for optimal management.



We describe the case of a 26-year-old pregnant woman (G1P0) with a history of recurrent headaches. Her first-trimester screening was low-risk. At 20 weeks' gestation, she presented with acute severe headache, nausea, and vomiting, followed by rapid deterioration in consciousness. Brain CT revealed subarachnoid hemorrhage with massive intraventricular and intraparenchymal bleeding in the right basal ganglia. She underwent urgent neurosurgical intervention with ventricular shunt placement and was admitted to the ICU with continuous intracranial pressure monitoring. Fetal well-being assessments remained reassuring. A second-trimester ultrasound confirmed normal fetal growth and low risk of preterm delivery or hypertensive disorders.

To exclude cerebral aneurysm, a multidisciplinary team—neurologist, neurosurgeon, anesthesiologist, interventional radiologist, and obstetrician— agreed to performed angiography, which demonstrated a Moyamoya vascular pattern. After gradual sedation reduction, the patient achieved full neurological recovery. Follow-up imaging showed resolution of the hemorrhage. Fifteen days later, she was discharged from the ICU to the Stroke Unit in good neurological condition and without respiratory support. She regained independence in daily activities and was discharged home at 23+6 weeks' gestation, with a normal pregnancy and no therapy except for a recommendation to consider brain bypass surgery postpartum.

Weekly neurological and obstetrical evaluations followed. The patient remained asymptomatic with normal fetal growth. Delivery planning involved a multidisciplinary team discussing the maternal–fetal risk–benefit ratio. Given the Moyamoya diagnosis and the need to delay revascularization until postpartum, a cesarean section at 34 weeks with corticosteroid prophylaxis was planned, under general anesthesia and with no complications. Postpartum recovery was uneventful. Six months after delivery, she underwent brain bypass surgery, remaining asymptomatic at 2-year follow-up.

The neonate, delivered at 34 weeks, had an APGAR score of 6 at 1 minute and 8 at 5 minutes, required minimal respiratory support, and displayed normal neuromotor development at 2 years.

This case underscores the importance of a coordinated multidisciplinary team to ensure prompt diagnosis, safe delivery, and favorable maternal and fetal outcomes in Moyamoya disease during pregnancy.