

Placental abruption in a patient with Moyamoya Disease: A case report

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Background

Moyamoya disease (MMD), meaning a ‘puff of smoke’ in Japanese, is a progressive, non-inflammatory cerebrovascular disease involving steno-occlusion of the terminal portion of the internal carotid arteries (ICA)¹. These occlusive changes result in the radiographically distinct formation of a fine vascular network of perforators at the base of the brain, see Figure 1. The aetiology of MMD is unknown, it has a female predominance, at a ratio of 1.8:1, and increased incidence in Japan and East Asian populations¹. Pregnancy is thought to increase the risk of ischaemic and/or haemorrhagic stroke in women with MMD, yet there is limited evidence on extra-cranial pathology associated with MMD and in particular obstetric complications such as placental abruption.

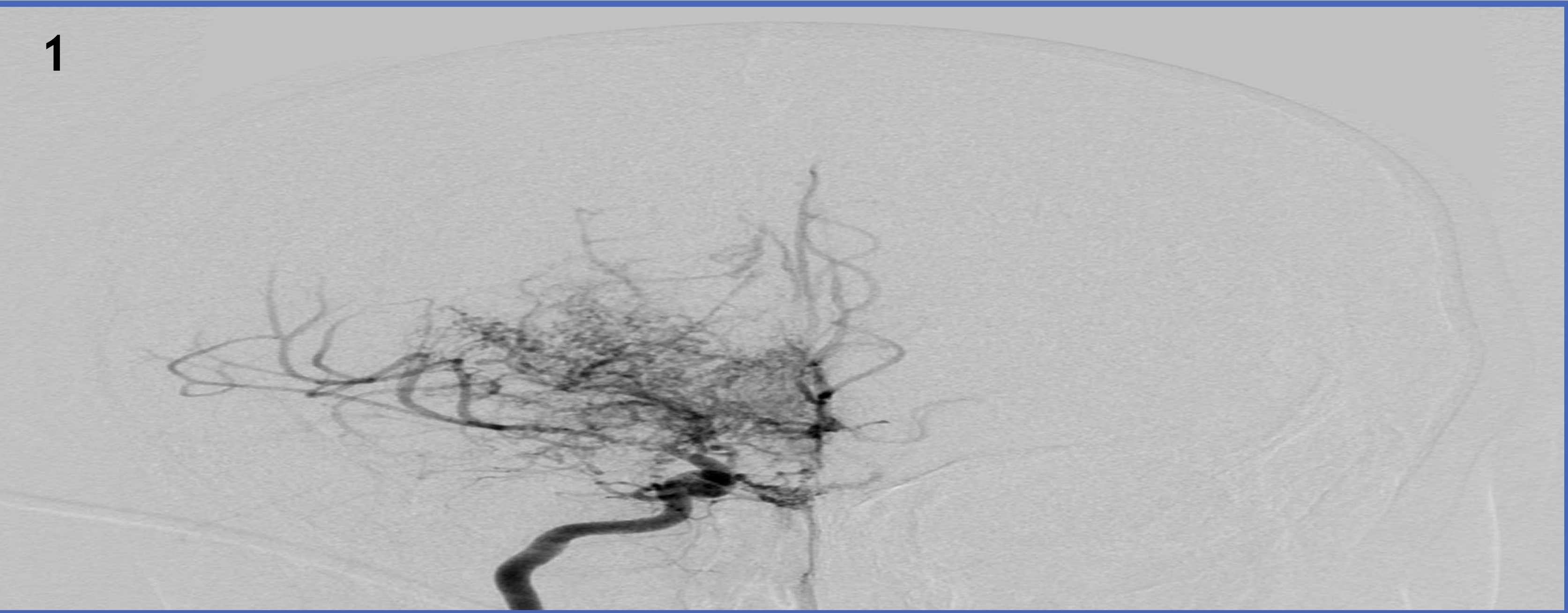


Figure 1: The hazy appearance of the hypertrophied collaterals on cerebral angiography resembles a ‘puff of smoke’².

Objective

We aim to investigate the risks posed to obstetric patients with MMD and determine if placental abruption is a previously documented risk through a literature review.

Literature Review

It does not appear that there is a direct relation between MMD and placental abruption. A nationwide Korean study found no statistically significant difference between the rates of placental abruption in patients with MMD compared to patients without¹.

Case Report

A 28-year-old, para 2, White British woman with known MMD and Body Mass Index (BMI) 41, presented at 34+5 weeks pregnant with sudden onset abdominal pain and antepartum haemorrhage. Placental abruption with retro-placental clots and intrauterine fetal death were confirmed. The patient had a caesarean section under general anaesthesia complicated by major post-partum haemorrhage requiring post-operative High Dependency Unit admission.

The patient had a history of multiple cerebral insults, both haemorrhagic and ischaemic, previously requiring surgical revascularisation with direct Extracranial-Intracranial (EC-IC) bypass bilaterally. The patient smoked and was medicated during pregnancy with Aspirin, low dose Nifedipine (5mg) and prophylactic Low Molecular Weight Heparin. However, the patient discontinued Nifedipine a few weeks before presentation. Antenatally the fetus was Small for Gestational Age (SGA) with last ultrasound scan showing slowed growth between 3rd-10th centile. The patient presented on three occasions with vaginal bleeding in the second trimester and ultrasound confirmed a haematoma of 45x19x31mm at 23 weeks’ gestation. Placental histology did not identify any focal lesions.

Discussion

Pregnancy is thought to increase the risk of ischaemic and/or haemorrhagic cerebrovascular events in patients with MMD. Although a nationwide Korean study has found no statistically significant difference between the rates of placental abruption in patients with MMD compared to patients without¹, there is no UK population data of this kind.

Independent risk factors for placental abruption applicable in this case:

A) Hypertension



Patients with MMD have significantly higher rates of pregnancy-induced hypertension and require careful blood pressure monitoring to prevent intracranial complications, yet the optimum blood pressure is unknown¹. This patient was medicated with Nifedipine for its vasodilatory properties rather than as a direct antihypertensive, but did require a BP profile at 30 weeks’ gestation. There is little known of what the cumulative risk of MMD and hypertension has on the risk of placental abruption.

Discussion (continued)

B) Fetal Growth Restriction (FGR)



There is a cause-and-effect relationship between fetal growth restriction and placental abruption. This patient was undergoing serial growth scans from 28 weeks for a history of FGR.

C) Threatened Miscarriage



Threatened miscarriage increases the risk of placental abruption from 1% to 1.4%³. When an intrauterine haematoma is identified on ultrasound scan, as seen in this case at 23 weeks’ gestation, the risk of subsequent placental abruption is increased³.

D) Smoking



Smoking is an independent risk factor for placental abruption, however the pathophysiology explaining this association remains largely unknown. Smoking is also an independent risk factor for stroke and increased risk for re-bleeding in patients with MMD.

Cerebral ischaemia in patients with MMD occurs mainly after delivery, in comparison to cerebral haemorrhage which occurs mainly in the second trimester. Cerebral ischaemia is thought to be due to increased coagulability and decreased cerebral blood flow and therefore this may also manifest with extra-cranial pathology, as seen in our patient who developed bilateral pulmonary embolisms in the post-natal period.

Conclusions & Learning Points

Pregnancy increases the risk of cerebrovascular events in patients with MMD, but further research is required to determine other obstetric risk factors for patients with MMD.

MMD in pregnancy is high risk and requires multidisciplinary collaboration between obstetricians and neurosurgeons for optimal management. There is limited data in a UK population examining the risk of placental abruption in patients with MMD who smoke and there are associated difficulties determining correlation versus causation.

Further studies are needed to better characterize increased maternal risks for pregnant women with MMD and to subsequently develop preventive strategies.

Acknowledgements

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2. Radiopaedia (2022) Available at: <https://radiopaedia.org/articles/puff-of-smoke-sign> [Accessed: 25 April 2022].

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