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Case report

Anaesthetic management for craniotomy in a pregnant patient with rupture of a cerebral arterio-venous malformation: Case report☆

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ABSTRACT

Intracranial haemorrhage (ICH) is the third leading non-obstetric indirect cause of maternal death. We describe the anaesthetic management of a 32-year-old woman at 22 weeks gestation with intracranial haemorrhage due to a ruptured arteriovenous malformation (AVM). Managing these patients requires a complex approach with a highly individualised plan involving neurosurgeons, neuroradiologists, anaesthetists, obstetricians and neonatologists to assess the risk and benefit of all the different therapeutic alternatives. Given the high risk of further bleeding during pregnancy and the location of the AVM, the best therapeutic option in this case was considered to be a craniotomy and complete removal of the lesion.

Manejo anestésico para craneotomía en paciente gestante con ruptura de malformación arteriovenosa cerebral: reporte de caso

Palabras clave:
Hemorragia cerebral
Embarazo

RESUMEN

La hemorragia intracraneana (HIC) es la tercera causa indirecta no obstétrica de muerte materna. Describimos el manejo anestésico de una mujer de 32 años con 22 semanas de gestación, quien presentó hemorragia intracraneana debida a la ruptura de una malformación arteriovenosa (MAV). Para el manejo de esta clase de pacientes se requiere un enfoque

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complejo con un plan altamente individualizado en el que participen neurocirujanos, neurorradiólogos, anestesiólogos, obstetras y neonatólogos a fin de evaluar los riesgos y los beneficios de las diferentes alternativas terapéuticas. Considerando el riesgo elevado de sangrado ulterior durante el embarazo y la localización de la MAV, se consideró que la mejor alternativa terapéutica en este caso era la craneotomía para extirpar por completo la lesión.

Introduction

We report the anaesthetic management of a 32-year-old woman at 22 weeks gestation with intracranial haemorrhage (ICH) due to a ruptured arteriovenous malformation (AVM) (Fig. 1). A multidisciplinary medical team decided to perform a craniotomy for surgical resection of the AVM under general anaesthesia.

Case report

A 32-year-old woman with a body weight of 54 kg, P1D0, at 22 weeks gestation with no past medical history was admitted to hospital with severe headache associated with nausea and vomiting.

Physical examination revealed a Glasgow Coma Score (GCS) of 14, motor aphasia, disorientation and a sudden right hemianopia. Abdominal ultrasound showed a single live foetus.

Computerised tomography scan of the brain showed an acute haematoma of 37 mm × 27 mm × 45 mm (volume of 22 mL) in the left temporo-occipital region, with surrounding oedema and 4 mm midline shift.

Cerebral angiography showed a left AVM with feeding vessels from the left middle cerebral and posterior cerebral arteries and venous drainage via the superior transverse sinus (Fig. 1).

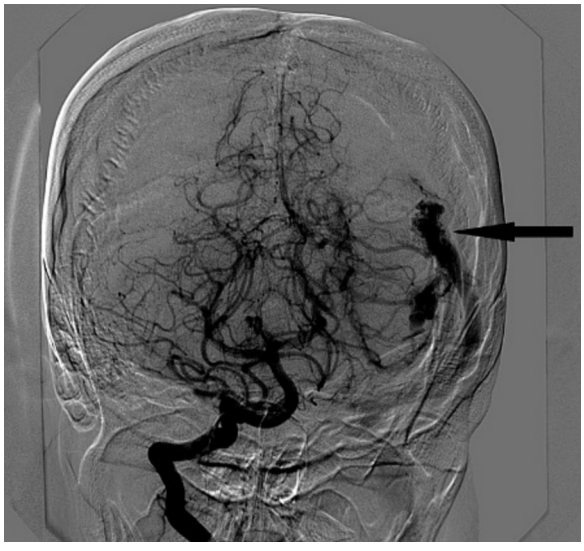

Fig. 1 – Cerebral angiogram via right internal carotid artery showing a left arterio-venous malformation (arrow).
***Source*: authors.**

This AVM was small and assessed as being easily accessible for surgical resection. A multidisciplinary medical team decided to perform a craniotomy for surgical resection of the AVM under general anaesthesia.

A regimen of corticoids was begun 5 days prior to surgery, with the main objective of reducing the cerebral oedema. In the operating room, monitoring included electrocardiography, non-invasive blood pressure monitoring, pulse oximetry, capnography and hourly urinary output monitoring. Intra-arterial blood pressure monitoring was established prior to induction of anaesthesia. The obstetrics team decided against foetal heart rate monitoring.

A rapid-sequence induction of anaesthesia with cricoid pressure was performed with fentanyl 150 μg, propofol 160 mg and rocuronium 60 mg (1 mg kg^{-1}) to facilitate tracheal intubation and positive pressure ventilation. After induction of anaesthesia, a central venous line was placed in the right internal jugular vein. Anaesthesia was maintained with 60% oxygen, sevoflurane 1–1.5% and remifentanil continuous infusion. Neuromuscular blockade was maintained with rocuronium.

During surgery, the patient remained stable from a haemodynamic and respiratory perspective. The systolic blood pressure was maintained between 110 and 120 mmHg, heart rate of 85 beats/min, peripheral oxygen saturation (Spo2) of 99%, PACO2 in the range of 30–35 mmHg.

The neurosurgical team reported adequate brain relaxation conditions and no extra measures were required to prevent cerebral oedema. The AVM was successfully removed.

Estimated blood loss was 600 mL and 3 L of Ringer's solution were infused.[1] Surgery took 4 h. At the end of the procedure ondansetron 4 mg was administered to reduce the risk of postoperative nausea and vomiting and the neuromuscular blockade was reversed with neostigmine 2 mg and atropine 0.8 mg.

The patient awoke from general anaesthesia without neurologic deficit and was extubated in the operating room. Postoperative FHR monitoring and ultrasonography were normal. She was discharged from the critical care unit on day 2 and went home on day 10.

Discussion

The incidence of ICH during pregnancy is approximately 1 per 10,000.[2] This condition is associated with a mortality rate of 40%.[3] One of the potential causes of ICH in pregnancy are AVMs. Most authors recommend conservative management of unruptured AVMs in pregnant women.[4] However, an AVM is generally only diagnosed during pregnancy in the case of