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CAS CLINIQUE/CASE REPORT

CEREBRAL ANEURISMAL RUPTURE WITH SUBARACHNOID HEMORRHAGE DURING PREGNANCY: A CASE REPORT

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Atallah D, Mansour F, Samaha E, El Kassis N, Nassif J. Cerebral aneurismal rupture with subarachnoid hemorrhage during pregnancy : a case report. J Med Liban 2015 ; 63 (4) : 228-231.

ABSTRACT • Background : Intracranial hemorrhage due to arteriovenous malformation or intracranial aneurysm is a rare but severe complication of pregnancy with maternal and fetal mortality of 20% and 33% respectively. Whether to deliver the patient first, or to treat the aneurysm first is still controversial, but an emergency cesarean section followed by aneurismal treatment appears to be a widely accepted strategy in pregnant women with cerebral aneurysmal complications. **Case :** A 38-year-old patient, G3P2A0, presented at 36 gestational weeks with a diffuse bilateral subarachnoid hemorrhage with fourth ventricle bleeding and hydrocephalus. She had a cerebral aneurysm of the left posterior communicating artery on arteriography. A cesarean section was performed on the first day of admission, and an external ventricular derivation with clipping of the aneurysm on the left posterior communicating artery were done immediately after the cesarean section. Mother and newborn were discharged from hospital in a good health status except Broca's aphasia in the mother. **Conclusion :** In the absence of categorical recommendations, we stress the role of combined care by both neurosurgeons and obstetricians, on a case to case basis according to gestational age, mother neurological status and experience of caregivers.

Keywords : cerebral aneurysm, pregnancy, subarachnoid hemorrhage

Atallah D, Mansour F, Samaha E, El Kassis N, Nassif J. Rupture d'anévrisme cérébral avec hémorragie méningée pendant la grossesse : étude d'un cas. J Med Liban 2015 ; 63 (4) : 228-231.

RÉSUMÉ • Mise au point : L'hémorragie intracrânienne due à une malformation artério-veineuse ou à un anévrisme intracrânien est une complication rare et grave de la grossesse. Les mortalités maternelle et fœtale sont de l'ordre de 20% et 33% respectivement. Accoucher la patiente en premier lieu ou bien traiter l'anévrisme est un sujet de débat. Pourtant, une césarienne d'urgence suivie d'un traitement d'anévrisme semble être une stratégie conventionnelle pour les femmes enceintes présentant des complications d'anévrisme cérébral. **Étude de cas :** Une femme, G3P2A0, âgée de 38 ans, se présente à 36 semaines d'aménorrhée à notre service avec une hémorragie sous-arachnoïdienne bilatérale accompagnée de saignement au niveau du quatrième ventricule et d'hydrocéphalie. Elle avait un anévrisme cérébral de l'artère communicante postérieure gauche sur l'artériographie. Une césarienne a été réalisée le premier jour de son admission. Ceci a été immédiatement suivi par une dérivation ventriculaire externe avec clippage de l'anévrisme au niveau de l'artère communicante postérieure gauche. La mère et son nouveau-né sont sortis de l'hôpital en bon état de santé, sauf pour l'aphasie de Broca chez la mère. **Conclusion** : En l'absence de recommandations, nous insistons sur le rôle des soins combinés des neurochirurgiens et obstétriciens, au cas par cas, en fonction de l'âge gestationnel, l'état neurologique de la mère et de l'expérience des professionnels de santé.

INTRODUCTION

Intracranial hemorrhage due to arteriovenous malformation or intracranial aneurysms is a rare but severe complication of pregnancy with maternal and fetal mortality of 20% and 33% respectively [1]. Cerebral aneurysms have a variable clinical presentation during pregnancy [2]. Unruptured ones can be asymptomatic or present as hyperemesis gravidarium [3-4]. Whereas rupture can cause headaches, consciousness alterations and sometimes the difference between eclampsia and cerebral hemorrhage due to aneurismal rupture can prove to be difficult [5-7]. Aneurismal subarachnoid hemorrhage (SAH) during pregnancy occurs more often in primiparae and in the third trimester of pregnancy [6,8-10]. The confirmation of the diagnosis is made by computed tomography (CT) or lumbar puncture and cerebral angiography. Aneurismal management should be performed in an emergency but fetal prognosis should be considered. A review of the literature yielded on Pubmed displayed three case reports [11-13] or series of fifteen cases or less [1,5,8,14-16]. Whether to deliver the patient first, or treat the aneurysm first, is still controversial, but an emergency cesarean section followed by aneurismal treatment appears to be a widely accepted strategy in pregnant women with cerebral aneurysmal complications [5,8,16].

We report here the case of a female patient with ruptured cerebral aneurysm at 36 weeks of gestation which presented to our department.

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CASE PRESENTATION

We report a case of a patient, 38 years old, G3P2A0 (two normal deliveries), pregnant at 36 gestational weeks without any pregnancy complication. She has no significant medical or surgical histories.

She presented with acute onset headache and vomiting. An alteration of her consciousness developed few hours later (Glascow score = 8). She was intubated and sedated. Her laboratory tests showed hematocrit of 34.0%, hemoglobin 11.2 g/dL, serum sodium level of 141.0 mmol/L, potassium 3.5 mmol/L and a blood type of A+. A cerebral CT-scan showed a diffuse bilateral SAH with fourth ventricle bleeding and hydrocephalus. An arteriography, with protection of the abdomen, showed a cerebral aneurysm of the left posterior communicating artery with arteriographic signs of hydrocephalus (Figure 1).

A cesarean section was performed on the first day of admission (clear amniotic fluid), and an external ventricular derivation with clipping of the aneurysm on the left posterior communicating artery were done immediately after the cesarean section.

The male newborn had an Apgar score of 2 over 10 at one minute of life. He was intubated and transferred to the neonatalogy department for neonatal respiratory distress. He weighed 2475 g, had a cranial perimeter of 34 cm and 48 cm of length. He was treated with antibiotics (cefotaxime and ampicilline) for ten days. A chest X-ray showed a bilateral bronchogram. He was extubated on the third day of life. Thereafter, a chest X-ray was done on the ninth day of life showing a superior left lobe atelectasia. As a result, the neonate left the department on the twelfth day of life in very good health status.

When it comes to the mother, she was extubated the next day of the interventions with normal neurologic status except for a Broca's aphasia which ameliorated during her hospital stay. On the fourth postoperative day, a cerebral CT-scan showed a shrinking of 30% of the ventricles' size with regression of the SAH. Also was noted a left fronto-parietal hygroma measuring 5 mm. The external ventricular derivation was ablated. This CT-scanning was repeated on the fourteenth postoperative day with a complete regression of the SAH. A majoration of 50% of the hygroma's size was noted without mass effect on the median line. A hypodense left fronto-parietal lesion with disappearing of the interface between the white and gray matter was also noted, suggesting ischemia. Normal ventricular size was found. Then a transcranial Doppler was done showing a severe vasospasm. Prior to her discharge, the patient had a cerebral magnetic resonance imaging (MRI) showing a recent left superficial sylvian ischemia with a little chronic subdural hematoma in the left fronto-temporo-parietal region. The ventricles were slightly enlarged.

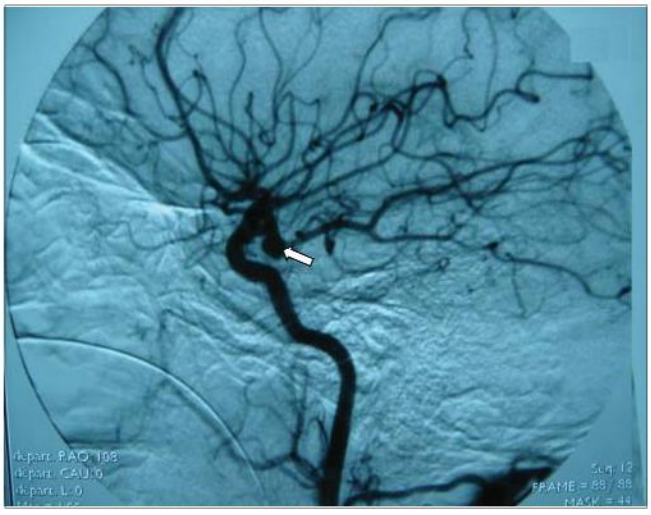

Figure 1. Arteriography showing cerebral aneurysm of the left posterior communicating artery.

DISCUSSION

Since the first case published by Feldman *et al*. in 1955 [17], the treatment of cerebral aneurysms in pregnancy is still debated. This problem is critical because over 50% of ruptured arterial aneurysms in women under the age of 40 are pregnancy-related [18].

While the obstetrical management of women known to have a cerebral vascular malformation is controversial [14], cerebral aneurysms are treated whether they rupture or not. The risk of bleeding from cerebral arteriovenous malformations is not significantly increased during pregnancy. However, the risk of hemorrhage is slightly increased at the end of pregnancy, but unchanged during labor and delivery, in women with arterial aneurysms [14]. This difference can be due to the hemodynamic and endocrine changes in the growth and rupture of aneurysms [6,19]. In fact, on one hand, cardiac output increases by 60% at the end of the second trimester as blood volume and blood pressure reached their maximum values at term [20]. On the other hand, pregnancy hormones (estrogen, progesterone and human chorionic gonadotropin) predispose to intracranial aneurysms formation, enlargement and rupture [21].

Lynch JC *et al*. report that surgical management of the aneurysms is associated with lower maternal and fetal mortality than the conservative endovascular treatment; they treated some aneurysms before delivery [1].

According to Mosiewicz *et al*., ruptured intracranial aneurysms should be treated similarly in pregnant and non-pregnant patients [6-7,19]. When the aneurysm is successfully clipped, the pregnancy can be allowed to progress to term. In these cases, vaginal delivery is preferred by most clinicians. Moreover, unruptured aneurysms should be treated if they are symptomatic or enlarging. Other aneurysms should be treated on an individual basis [19]. Cesarean section would be indicated in several circumstances: 1) when the clinical state of the mother is severe (coma, brain stem damage); 2) if the aneurysm is diagnosed during labor, or 3) if the period between the neurosurgical treatment of aneurysm and

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labor is less than eight days [6]. In all other cases, a vaginal delivery is preferable under epidural anesthetic which should be given if medical induction is carried out, and where instrumental delivery is being carried out systematically, unless radical treatment is being performed. Our patient was admitted unconscious in our department, which justifies the C-section followed by the clipping of the aneurysm.

Recent trends are the endovascular treatment with successful maternal and fetal outcome [11-12,14]. Shahabi *et al*. performed this treatment after emergency cesarean delivery in a patient at 38 weeks of pregnancy [12]. It should also be noted that recurrence of an aneurysm following coiling can occur in 25% to 30% of cases with an average time of 12 months [22]. Moreover, surgical clipping was shown to be superior to endovascular coiling in terms of total occlusion rate, in an international subarachnoid aneurysm trial [23-24].

Neurosurgical considerations generally take precedence over obstetric ones to avoid the two great risks that follow, namely recurrence of hemorrhage and ischemia.

Van Buul BJ *et al*. reported the effect of general anesthesia in surgical repair for intracranial aneurysm in pregnancy on fetal heart rate (FHR). There was a complete disappearance of FHR variability without decelerations or bradycardia. At 41-gestational week, a healthy girl of 4015 g was born [13].

Subarachnoid hemorrhage in pregnancy can be easily missed due to the rarity of the condition and similarity of symptoms with eclampsia. In fact, the most common differential diagnoses of intracranial hemorrhage during pregnancy include aneurysm, arteriovenous malformation and preeclampsia [25].

First, patients with aneurysmal subarachnoid hemorrhage present with a sudden onset of severe headache, with or without alteration of consciousness, and meningeal irritation. Nausea and vomiting are more frequent after the rupture. Hematoma or vasospasm are also responsible for focal neurologic deficits [25]. As for preeclamptic patients, they present with diastolic hypertension, proteinuria, pathological edema and accelerated weight gain [25]. Preeclampsia becomes eclampsia when a grand mal seizure occurs with or without thrombocytopenia, signs of hemolysis or disseminated intravascular coagulation. Seizure may be followed by a temporary coma. The latter can be prolonged in presence of important cerebral edema or intracranial hemorrhage [25]. As such, a high index of suspicion of subarachnoid hemorrhage is important for early diagnosis and prevention of morbidity and mortality.

Lastly, in the absence of categorical recommendations, we stress the role of combined care by neurosurgeons, obstetricians, anesthesiologists and interventional radiologists, on a case to case basis according to the gestational age, the mother's neurological status and the experience of caregivers.

The authors indicate that written informed consent was obtained from the patient for publication of her case report and the accompanying figure. This paper has not been presented in a national medical society and no financial support was attributed to its writing.

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