Revista Colombiana de Anestesiología
Colombian Journal of Anesthesiology
www.revcolanest.com.co

Case report

Glioblastoma multiforme and pregnancy: case report☆

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ARTICLE INFO

Article history:
Received 28 March 2012
Accepted 25 April 2012

Keywords:
Pregnancy
Glioblastoma
Craniotomy
Anesthesia
Fetal monitoring

ABSTRACT

This is a case report of a 27-year-old female patient, G2P1, diagnosed at 20 weeks of gestation with a left frontal supratentorial tumor of a glioblastoma multiforme type, which manifested in the form of ictal absence. The patient was taken to surgery on week 28 and underwent a craniotomy under general anesthesia and fetal monitoring, with a successful outcome for both the mother and the fetus. We consider it important to report this case given this rare association.

Glioblastoma multiforme y embarazo: reporte de caso

Palabras clave:
Embarazo
Glioblastoma
Craneotomía
Anestesia
Monitoreo fetal

RESUMEN

Reportamos el caso de una paciente de 27 años de edad, G2P1, a quien se le diagnostica en la semana 20 de gestación un tumor supratentorial frontal izquierdo tipo glioblastoma multiforme, el cual se manifestó con una crisis de ausencia. La conducta tomada fue quirúrgica y la paciente fue sometida en la semana 28 a craneotomía bajo anestesia general, con monitoreo fetal, con resultados exitosos para la madre y el feto. Dado lo infrecuente de esta asociación, creemos importante su reporte.

☆ Please cite this article as: Trujillo MC, et al. Glioblastoma multiforme y embarazo: reporte de caso. Rev Colomb Anestesiol. 2012; 40:235–9.

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2256-2087/$ – see front matter

Introduction

The association between high-grade astrocytoma and pregnancy is very rare and, in most cases, it has an adverse outcome for the mother and the fetus. It was first described by Rand and Andler in 1950, in a report of three cases with fatal outcome. In 1959, Barnes and Abbott published a series of 170 cases over a ten-year period. At that time, medical treatment was based on a routine that included hypothermia, hypotension and neurosurgery.[1–3]

Glioblastoma multiforme is a highly malignant infiltrating tumor that usually grows to a significant size before giving rise to clinical symptoms. It may extend to the meningeal surface or up to the ventricular wall.[1,2] The malignant cells carried by the CSF may create distal foci in the spinal nerve roots or produce widespread meningeal gliomatosis. Extra-cranial metastases are very rare and usually affect the bones and lymph nodes after the craniotomy.[4,5] It accounts for 10–15% of all brain tumors, and 55% of gliomas, 90% of adult brain gliomas.

The prevalence of this type of tumor during pregnancy is very low, hence the absence of tests to establish the relationship between tumor growth and pregnancy, unlike what has been reported with meningioma and malignant glial cell tumors.[4–10] Because of this low prevalence, reports in the world literature are scarce and there are none in our country. For this reason, we decided to highlight and publish this case, given the challenge of providing anesthesia to a patient with increased intracranial pressure (ICP) and with the need to maintain adequate uterine and placental perfusion while avoiding further increases in ICP.

Clinical case

Twenty-seven year-old patient with no prior history of disease, G2P1, who was seen at 20 weeks of gestation because of a clinical picture of absence-type seizure, but not other associated symptoms. The magnetic resonance imaging (MRI) scan requested by the clinical neurologist revealed the presence of an intra-axial, left frontal expansive lesion 3 cm × 4 cm × 4.2 cm in size and hypointense appearance in T1, showing a slightly irregular wall with thickening toward the superior, anterior and lateral aspects, and which appeared hyperintense in T2 (Fig. 1). Because of the gestational age and the MRI findings, the case was discussed in a medical committee involving neurosurgery and perinatology, and it was decided to start therapy with dexamethasone to control cerebral edema and allow time for greater fetal development under surveillance by the neurosurgeon.

The course of the disease was torpid, with the patient presenting persistent headaches but no additional symptoms of intracranial hypertension (ICH). A new MRI was performed on week 28 of pregnancy, and it was found that the lesion had grown (a size of 4.8 cm × 5.5 cm × 5 cm), creating moderate compression on the adjacent structures, in particular the lateral wall of the ventricle, with slight deviation of the midline to the right. It was the opinion of the radiologist and the neurosurgeon that it could be a tumor of glial origin of the pilocytic astrocytoma type, which required prompt surgical management given its growth and the symptoms produced. In agreement with the perinatologist, it was decided to perform the surgery at 30 weeks of gestation, in order to ensure better viability conditions for the fetus.[11]

On pre-anesthetic assessment, the patient was found to be oriented in the three planes and hemodynamically stable, with no motor or sensory deficit, and with the convulsive syndrome under clinical control. The only positive finding was a pregnant uterus of 26 cm in height with a fetal heart frequency of 135 beats per minute, and active movement. Laboratory results were as follows: fasting blood sugar, 73 mg/dl, and postprandial blood sugar with a load of 50 g of glucose, 64 mg/dl. CBC: leukocytes, 8470/mm^3; neutrophils, 58.1%; lymphocytes, 20.3%; platelets, 217,000/mm^3; hemoglobin, 13.1 g/dl; hematocrit, 39.6%. Urinalysis was within normal range and serology (VDRL) was non-reactive. The patient was cleared by anesthesia for tumor resection through a frontal craniotomy in supine position, under general anesthesia.

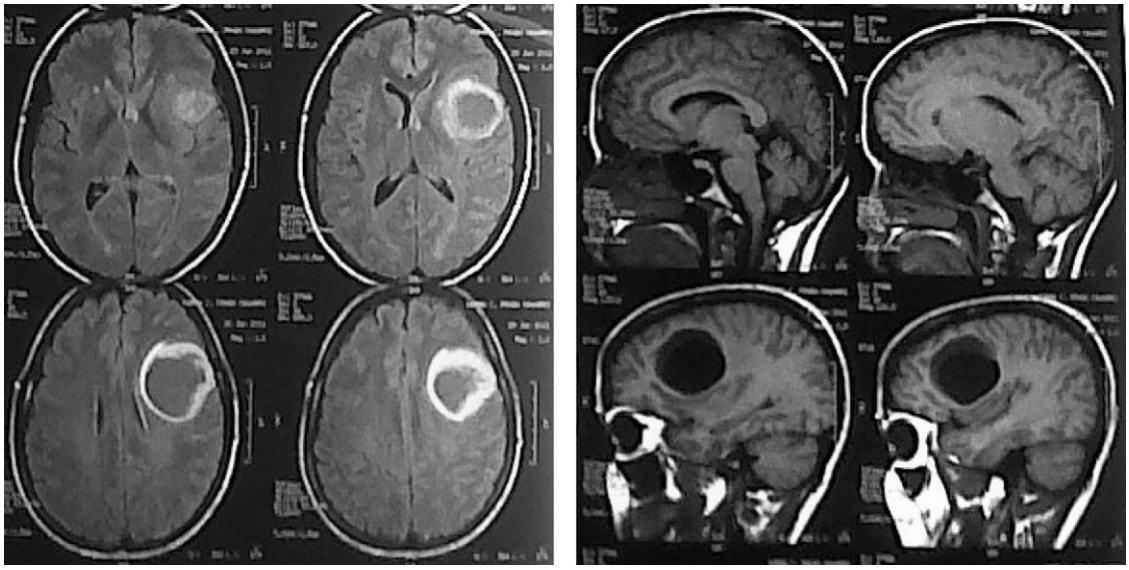

Fig. 1 – Brain MRI showing expansive lesion.

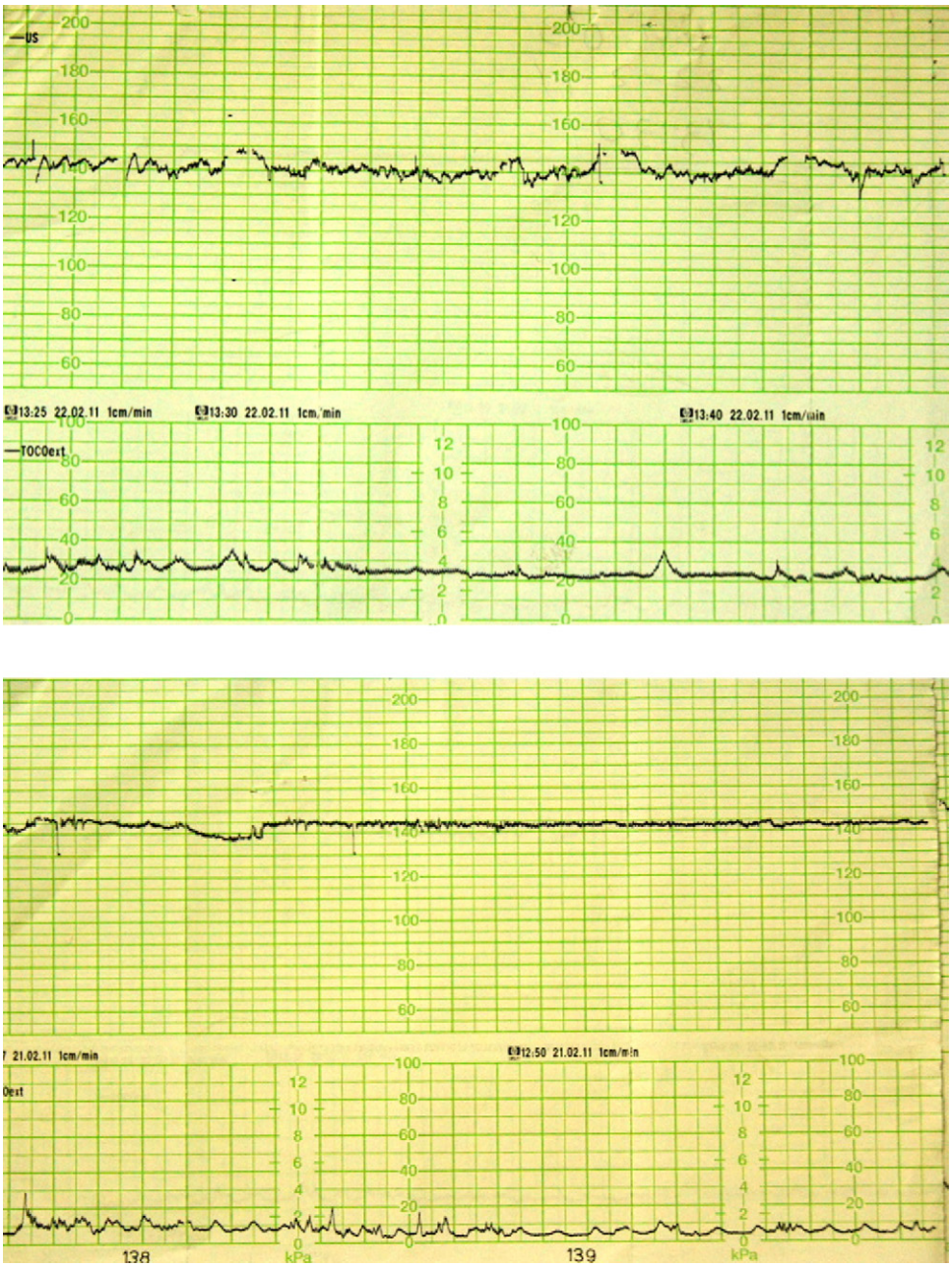

Fig. 2 – Pre- and post-operative fetal monitoring.

Anesthetic management and surgical procedure

Monitoring: Oximetry, Capnography, VSC DII, central temperature, right subclavian central venous catheter, left radial arterial line, Foley catheter, thermal blanket, anti-posterior positioning, anti-embolic measures using gradual compression stockings and intermittent pneumatic compression of the lower limbs. Fetal monitoring was maintained before and after surgery (Fig. 2).

Anesthesia induction: facial mask pre-oxygenation with 100% oxygen for 5 min, midazolam 2 mg, fentanyl 150 mcg, propofol 80 mg, cisatracurium 8 mg, followed by orotracheal intubation with a No. 7.0 ringed tube using the CLARUS VIDEO SYSTEM, and trying to avoid the sympathetic response during intubation. Maintenance was achieved with 100% oxygen, sevoflurane at a sub-MAC dose of 1%, Remifentanil 0.1 mcg/k/minute, and propofol 2 mg/k/h. Intra-operatively, before opening the dura mater, 20% mannitol was given at 0.25 g/k, followed by 7.5% hypertonic saline solution at 3 ml/kg, with continuation of the anti-convulsant and steroid. Surgery lasted 4 h with minimum bleeding and no need for intropic or vasopressor support; acid–base status was normal, with a pH 7.37; PCO_2, 35 mmHg; PO_2, 261.5; HCO_3, 20.6; BE, −4.6; SaO_2, 99%. Prophylactic granisetron 3 mg was given for nausea and vomiting, and dipirone 2.5 mg and meperidine 50 mg i.v. were given for analgesia. Extubation was achieved with the patient

awake in the operating room. The post-operative neurological examination was normal. In the immediate post-operative period, the obstetrics service performed fetal monitoring, finding adequate heart rate and no evidence of uterine activity. The vaginal examination did not reveal cervical changes, and uterine inhibition was initiated prophylactically with nifedipine and magnesium sulfate. The patient was transferred to the ICU where she remained for 3 days and evolved satisfactorily with no obstetric complications and adequate fetal wellbeing. The patient was then transferred to the ward and discharged 2 days later.

The pathology laboratory reported an anaplastic glioblastoma multiforme that led to the decision of terminating pregnancy in order to initiate radiotherapy for the mother. After completing the fetal maturation protocol, at 32 weeks of gestation, the baby was delivered by C-section under balanced general anesthesia as a measure for neuroprotection. The same basic monitoring was used with no invasive monitoring, and rapid sequence anesthesia induction was achieved with fentanyl, propofol and esmeron. A female baby with an apgar score of 8/10 at 1 min and 10/10 at 5 min was delivered. Anesthesia was then continued with 100% oxygen, sevoflurane at a 1% sub-MAC dose, Remifentanil 0.1 mcg/k/min, and propofol 2 mg/k/h. The newborn was taken to the neonatal ICU for observation. The mother's operation proceeded without complications, she was extubated awake in the operating room, and was then transferred to the recovery room after a normal neurological examination. On follow-up after 11 months, the mother was found to have an adequate quality of life under treatment with chemotherapy, and the infant was found in good neurological and behavioral state of development.

Discussion

Pregnancy itself produces significant physiological alterations that make women more vulnerable to stress or insults, including increased intra-cerebral pressure due to the presence of a brain tumor. The coexistence of this lesion during gestation creates a dilemma and a great challenge for the multidisciplinary team that must manage these cases, considering the need for surgical treatment and radiotherapy for these tumors. The optimal timing for the termination of pregnancy is determined on the basis of fetal viability, patient prognosis, and the effects of anesthetic drugs on the fetus, the mother and the physiology of the brain.[12–18]

Consequently, decision-making when faced with this diagnosis depends on the multi-disciplinary team, which is required to act on priorities, one of them being that the life of the mother predominates over that of the fetus.[12] The indication for surgical removal of the tumor depends on the manifestations of ICH and the condition of the patient. If the diagnosis is made because of an incidental finding or because of other manifestations not directly related to ICH, the decision of surgical interruption might be deferred until the fetus comes to term, but without considering the possibility of normal delivery, given the increase in ICH produced by the mechanism of delivery.

In this case, the correct expectant behavior was adopted until week 28, when ICH and tumor growth mandated surgical resection, without the need to interrupt the pregnancy at that time. The pregnancy was interrupted once fetal maturation was confirmed, and based also on the histopathological diagnosis, which required additional radiotherapy for the management of the mother.

We did not find other similar reports in our country, but in Latin America there are cases described in Mexico and Venezuela with adverse results, sometimes for the mother and the fetus, but most of the time for the mother.[19]

If we agree that these cases must be done under general anesthesia, then the question is, which is the best for the mother and the fetus? The answer must be based on the following considerations: teratogenicity of the anesthetic drugs, prevention of fetal asphyxia, prevention of miscarriage and premature delivery, avoiding increased intra-cerebral pressure, classifying the case as a difficult airway with high risk of aspiration, and predictable clearance. The final decision must be individualized, there are no standardized treatment guidelines, and management must be multidisciplinary. In our case, we achieved a balance and management was based on consensus; teratogenicity was not a significant risk given gestational age, and we avoided drugs and maneuvers that could have increased ICP. Although the use of rapid sequence induction could be controversial, the matter has not been settled yet in pregnant women in their 30th week of gestation, although we did use vide-assisted access to the airway. Finally, pregnancy was continued until the time the neurosurgeon decided to initiate emergent chemo and radiotherapy. Considering the high probability of fetal viability, the patient was taken to C-section with a successful outcome for both the mother and the baby.

Funding

Authors' own resources.

Conflict of interests

None.

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