

CASE REPORT

Status epilepticus due to brain tumor during pregnancy

Michi Kasai¹, Shigeru Aoki¹, Natsuko Kobayashi¹, Fumiki Hirahara² & Tsuneo Takahashi¹

¹Perinatal Center for Maternity and Neonate, Yokohama City University Medical Center, Yokohama, Japan

²Department of Obstetrics and Gynecology, Yokohama City University Hospital, Yokohama, Japan

Correspondence

Michi Kasai, Perinatal Center for Maternity and Neonate, Yokohama City University Medical Center, 4-57 Urafunecho, Minami-ku, Yokohama City, Kanagawa 232-0024, Japan. Tel: +81 45 261 5656; Fax: +81 45 253 5784; E-mail: mkasai@yokohama-cu.ac.jp

Funding Information

No sources of funding were declared for this study.

Received: 9 August 2015; Revised: 14

December 2015; Accepted: 28 January 2016

Clinical Case Reports 2016; 4(4): 333–335

doi: 10.1002/ccr3.514

Introduction

Although the concurrence of brain tumors with pregnancy is rare, their comorbidity is frequently complicated by epileptic seizures, which sometimes develop into status epilepticus [1]. Status epilepticus is an uncommon complication of pregnancy, but when it does occur, it presents as high maternal and fetal mortality rate [2]. There is no consensus on the timing of delivery of an infant with nonreassuring fetal status (NRFS) that is associated with maternal status epilepticus.

We herein describe a case of status epilepticus due to brain tumor at 28 weeks of gestation. The fetus presented with NRFS spontaneously, we managed the pregnancy expectantly and a healthy infant without any neurological sequelae was delivered at full term.

Case Report

A 39-year-old primiparous woman presented with numbness of the upper and lower limbs. Computed tomography (CT) and magnetic resonance imaging (MRI) were performed and revealed a brain tumor. On MRI, the brain tumor, which was located in the left frontal lobe and which measured 64 × 45 mm, exhibited high

Key Clinical Message

There is no consensus on the timing of delivery of an infant with nonreassuring fetal status that is associated with maternal status epilepticus. We herein describe a case of status epilepticus due to brain tumor at 28 weeks of gestation.

Keywords

Antiepileptic drugs, brain tumor, nonreassuring fetal status, status epilepticus.

intensity on T2-weighted images, low intensity on T1-weighted images, and no enhancement after a gadolinium injection. An oligodendroglioma was suspected (Fig. 1). While treatment was being planned, the patient discovered that she was pregnant 1 month later. Because of her strong desire to continue the pregnancy and the high possibility of a benign brain tumor, a decision was made to treat the brain tumor after delivery. At 25 weeks of gestation, an MRI that was performed to reevaluate the brain tumor showed that it had grown to 72 × 53 mm (Fig. 2). However, because no symptoms were associated with the growth of the brain tumor, she was followed up without treatment. Her pregnancy course was uneventful except for a diagnosis of gestational diabetes. At 28 weeks and 4 days of gestation, she had generalized seizures and was rushed to our hospital.

She arrived 40 min later and had lost consciousness, and she still presented with a generalized tonic–clonic seizure (GTCS). Her level of consciousness was a Glasgow coma scale score of 6 (E1V1M4), and the seizure persisted. An arterial blood gas analysis showed a pH of 7.049 and a base deficit of 18.7 mmol/L. She was intubated and placed on respiratory support. Antiepileptic drugs (AEDs; 1500 mg of fosphenytoin and 20 mg of diazepam) were administered and propofol was continued

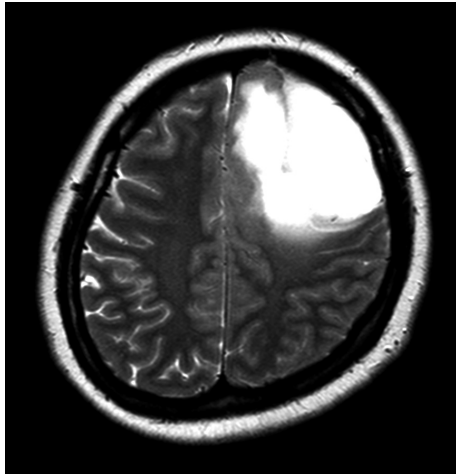


Figure 1. T2-weighted magnetic resonance imaging (MRI) obtained before pregnancy.

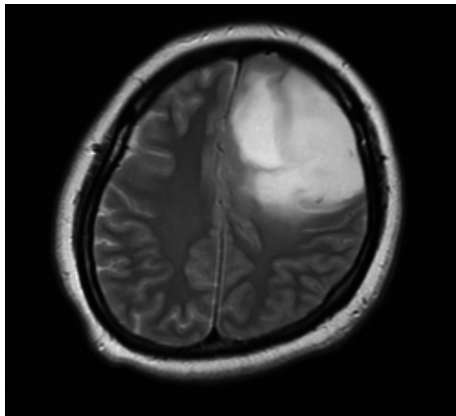


Figure 2. T2-weighted magnetic resonance imaging (MRI) obtained at 25 weeks gestation. The size of the tumor appears increased.

after intubation. A CT scan of the head did not show intracranial hemorrhage, and she was diagnosed with status epilepticus. Meanwhile, we checked fetal heart rate using Doppler ultrasonography; it was 80 beat per minute (bpm) at admission, which indicated bradycardia and led to a diagnosis of NRFS. When the status epilepticus was resolved by maternal treatment, the fetal heart rate returned to normocardia of 130 bpm in approximately 10 min. Subsequently, a reassuring fetal heart rate pattern was maintained. GTCS was frequently observed immediately after the start of AED treatment. When the dose of carbamazepine was increased to 600 mg/day, the blood concentration reached optimal levels of 5.6–7.0 $\mu\text{g/mL}$. While she continued to be hospitalized and managed afterward, she remained seizure free. At 39 weeks and 2 days of gestation, simple partial seizures occurred.

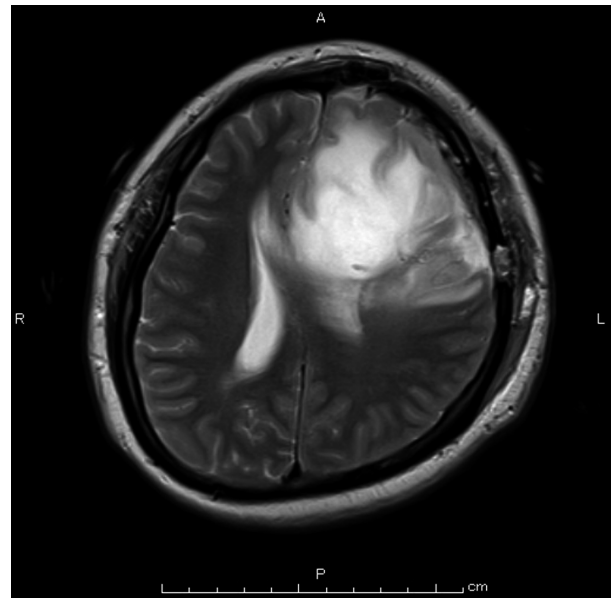


Figure 3. T2-weighted magnetic resonance imaging (MRI) image obtained 7 days after the operation.

Because epileptic seizures repeatedly occurred despite the administration of diazepam and fosphenytoin, a cesarean section was planned to deliver the infant, although fetal heart rate pattern remained reassuring. An emergency cesarean section was performed under general anesthesia, and the postoperative course was uneventful and seizure free. An appropriate-for-date male infant weighing 2584 g was delivered with Apgar scores of 7 and 10 at 1 and 5 min, respectively, an umbilical arterial pH of 7.290, and a base deficit of 3.2 mmol/L.

The general condition of the infant has been favorable, and no neurological abnormality has been observed. He is living at home. As for the mother, an MRI examination performed 10 weeks after delivery showed continued tumor growth, and she underwent a craniotomy for tumor resection 17 weeks after delivery. Because the tumor was located in the dominant hemisphere and was diagnosed as a low-grade glioma by intraoperative rapid diagnosis, the surgical procedure was limited to partial tumor resection (Fig. 3). The final diagnosis was a World Health Organization-grade II oligoastrocytoma. Chemoradiotherapy was started 6 weeks after the craniotomy for the tumor resection, and the tumor has not progressed after treatment.

Discussion

This case demonstrated the following two points. First, when a pregnant woman develops status epilepticus during preterm gestation and has a fetus with NRFS,

expectant management can be applied if the fetal heart rate is normalized by maternal treatment. Second, the control of convulsive seizures is important in pregnant women with brain tumors.

If a pregnant woman develops status epilepticus during preterm gestation and responds to treatment, expectant management can be applied. In our case, when the mother developed status epilepticus, the fetus presented with bradycardia. As the status epilepticus was resolved in the mother, the NRFS was resolved in the fetus. The fetus then remained in a reassuring fetal status until delivery, and a live infant was delivered without any complications that were associated with premature delivery. There is no consensus on the timing of delivery of an infant with NRFS that is associated with maternal status epilepticus. The traditional obstetric teaching is that, when managing a seizure in a pregnant patient, every attempt should be made to stabilize the mother and resuscitate the fetus in utero before making a decision about delivery [3]. It was confirmed that, if the fetal heart rate is normalized by maternal treatment, expectant management until full term may be an option to prevent the complications that are associated with premature delivery in infants.

For pregnant women with brain tumors, seizure control is important. It is thought that 27–41% of pregnant women with brain tumors develop seizures during pregnancy [1, 3]. Zwinkels et al. [4] report that three of 103 women who were diagnosed with gliomas before or after becoming pregnant developed status epilepticus during pregnancy. In our case, status epilepticus recurred after the introduction of carbamazepine.

While there is no clear guideline on the dosage of carbamazepine during pregnancy [5, 6], Battino et al. [7] report that an increase in dose and/or the addition of another AED between the first and the third trimesters occurred in 16.7% of pregnancies exposed initially to carbamazepine monotherapy. Moreover, in our case, the incidence of convulsive seizures might have been affected by changes in the brain tumor during pregnancy as well as changes in the pharmacokinetics of AEDs in association with pregnancy. Yust-Kats et al. [8] reported that, in contrast to grade I gliomas, the tumor biology of grade II and -III gliomas may be altered during pregnancy, thus resulting in an increased risk of tumor progression that is associated with a higher frequency of seizures. It is necessary to measure the blood concentrations of AEDs at appropriate times during pregnancy and adjust the doses of AEDs in consideration of an increased frequency of convulsive seizures that is associated with tumor growth.

Conclusion

Status epilepticus is a serious condition that adversely affects the prognoses of mothers and infants. However, if the fetal heart rate is normalized by maternal treatment, expectant management can be one treatment option. In pregnant women with brain tumors, a convulsive seizure is a frequent complication. It is necessary to control the convulsive seizures while considering changes that are associated with the pharmacokinetics and growth of brain tumors during the pregnancy.

Conflict of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content of the paper.

References

1. Verheecke, M., M. J. Halaska, C. A. Lok, P. B. Ottenvanger, R. Fruscio, K. Dahl-Steffensen et al. 2014. Primary brain tumours, meningiomas and brain metastases in pregnancy: report on 27 cases and review of literature. *Eur. J. Cancer* 50:1462–1471.
2. Pennell, P. B. 2002. Pregnancy in the woman with epilepsy: maternal and fetal outcomes. *Semin. Neurol.* 22:299–308.
3. Kaplan, P. W., E. R. Norwitz, E. Ben-Menachem, P. B. Pennell, M. Druzin, J. N. Robinson, et al. 2007. Obstetric risks for women with epilepsy during pregnancy. *Epilepsy Behav.* 11:283–291.
4. Zwinkels, H., J. Dorr, F. Kloet, M. J. Taphoom, and C. J. Vecht. 2013. Pregnancy in women with gliomas: a case-series and review of the literature. *J. Neurooncol.* 115:293–301.
5. Tomson, T., U. Lindbom, B. Ekqvist, and A. Sundqvist. 1994. Disposition of carbamazepine and phenytoin in pregnancy. *Epilepsia* 35:131–135.
6. Taylor, W. J., and M. H. Diers Caviness. 1985. *A Textbook for the Clinical Application of Therapeutic Drug Monitoring.* pp. 210–224. Abbott Diagnostic Division, Irving.
7. Battino, D., T. Tomson, E. Bonizzoni, J. Craig, D. Lindhout, A. Sabers, et al. 2013. Seizure control and treatment changes in pregnancy: observations from the EURAP epilepsy pregnancy registry. *Epilepsia* 54:1621–1627.
8. Yust-Kats, S., J. F. de Groot, D. Liu, J. Wu, Y. Yuan, MD. Anderson, et al. 2014. Pregnancy and glial brain tumors. *Neuro. Oncol.* 16:1289–1294.