Case Report

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Comparative Study of Fetal Behaviour in a Case of Monozygotic Twins, One Being Anencephalic

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Key Words

Fetal behavior
Anencephaly
Medulla oblongata

Abstract

Fetal behavior in monozygotic twins, one being anencephalic, was serially recorded from 20 to 35 weeks of gestation and analyzed. The commencement of breathing movement was concluded to reflect the development of the medulla oblongata of the fetus.

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Introduction

Recently, we reported the fetal behavior of an anencephalic fetus whose central nervous system above the medulla oblongata was absent [1], showing that the development of the central nervous system above the medulla oblongata plays an important role in the elimination of movements such as startle, jumping and writhing, and in the appearance of breathing movements. Now, we report comparative fetal behavior in a case of monozygotic twins, one of which was anencephalic.

Case Report

A nulliparous 32-year-old woman had become pregnant after artificial insemination with her husband's semen. At 16 weeks of gestation, she visited Nagoya University Hospital for follow-up of her pregnancy. Ultrasound examination showed a twin pregnancy and one of the twins to be anencephalic. The next week, she was admitted to the hospital for treatment of a threatened abortion and subsequent premature labor. Administration of the tocolytic agent, ritodrine, was started at week 24 and continued until week 36. The behavioral patterns of each fetus were recorded weekly on videotape as previously reported [1] and analyzed. Informed consent was obtained beforehand.

Fetal movements were defined as previously described [1]. Both general movements (flexion, stretch, rolling, startle, jumping, and writhing) and rest-activity cycles in the anencephalic fetus showed the same characteristics as previously reported [1]. Differences between the 2 cases were, however, observed in breathing and hiccup. In the previously reported anencephalic fetus, these movements were recognized occasionally at 28-30 weeks, but they were not detected at all during the recording period for the present case (fig. 1b, c). The fetal heart rate patterns of this case have been reported previously [2].

From 29 weeks of gestation, both fetuses developed polyhydramnios and several amniotomies were performed as considered appropriate. Two female fetuses were delivered by cesarean section at week 36 and the birth weights of the normal and anencephalic twins were 2,260 and 1,790 g, respectively. The anencephalic infant died soon after delivery. The mother and the normal infant were discharged on the 14th postpartum day.

Monozygosity was diagnosed by monochorionic placenta and concordance of HLA types (A, B, C, DR and DQ). Morphologically, only part of the spinal cord was present in the anencephalic twin. Moreover, the cord was aplastic in the cervical region and the lung was hypoplastic.

Histologically, the cervical spine showed an abnormal structure with a few neurons and cystic dilatation of the central canal-like structure. The thoracic and lumbar regions of the spine showed dorsal and ventral horns with an abnormal structure and an almost normal structure, respectively.

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Conclusions

9 10

Normal fetus Anencephalic fetus

n

25 30

Gestation,
Fig. 1. The
writhing, b
analyzing
We
twins

weeks

incidences of movements, a Startle, jumping and Hiccup, c Breathing. Frequencies were generated by videotapes.

previously reported the fetal behavior in dizygotic when one is anencephalic, and suggested that development of the central nervous system above the

medulla oblongata plays an important role in the elimination of movements such as startle, jumping and writhing, and in the appearance of breathing movements [1]. Since there are more differences in the movement pattern between dizygotic twins [3], the present case was considered more suitable for comparison purposes.

The present study confirmed the findings documented in our previous report. In the previous case, the medulla oblongata was present, although dysplastic and histologically not clear. In the present anencephalic fetus, the medulla oblongata was totally absent and breathing movements and hiccups were not recognized at all. This strongly indicates that the medulla oblongata is involved in the appearance of breathing movements, as we proposed previously. Thus, the present study provided further evidence that the commencement of breathing movements reflects the development of the medulla oblongata in the fetus.

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