Multiple Cerebral Abnormalities at Third-trimester Ultrasound Scan in an Uncomplicated Pregnancy

Fabiana Castro*, Ana Portela Carvalho, Juliana Rocha, Carla Marinho, Graça Rodrigues
Department of Obstetrics and Gynaecology, Centro Hospitalar do Tâmega e Sousa, Porto, Portugal

Section 2 – Answer

Case description

A 31-year-old pregnant woman, multigravida (G3P2), was referred to our outpatient department at 30 weeks of gestation for abnormal growth pattern at the mid-trimester ultrasound scan (3 centile) performed at 20 weeks and 5 days of gestation despite normal morphology of the fetus for this stage.

Previous pregnancies were uneventful. Early antenatal care was managed at primary care. Routine first-trimester scan and combined screening demonstrated a reduced risk for aneuploidies. Serologic screening for HIV, hepatitis B, and syphilis was negative, and she lacked immunity for the Rubella virus and Toxoplasmosis.

At 31 weeks and 5 days, an ultrasound at our department revealed ventriculomegaly affecting the 3rd, 4th, and lateral ventricles [Figure 1] with hyperechogenic ventricular walls [Figure 2]. At the posterior fossa, a hyperechogenic cerebellum with an apparent loss of substance was observed [Figure 3]. A review of the remaining fetal anatomy also evidenced the presence of Grade 2 echogenic bowel [Figure 4]. The fetus had a standard amniotic fluid index and estimated fetal weight was 1672 g, corresponding to the 24th centile. The placenta was posterior, with no relation with internal cervical *os* and normal in appearance. Fetal Doppler and biophysical profile were normal.

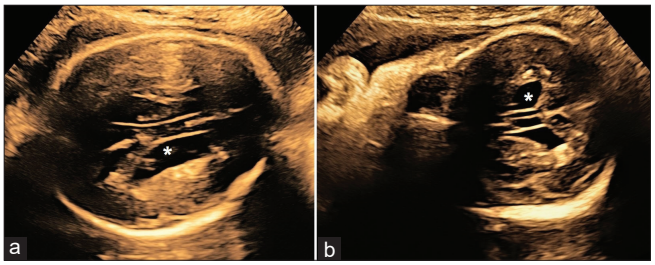

Figure 1: Third and lateral ventricles dilation (* symbol) of fetal brain in axial (a) and cororal (b) planes (31w5d)

At this visit, multiple diagnostic approaches were considered with the patient, and amniocentesis was offered. Karyotype, array comparative genomic hybridization, and infectious screening were carried out in the amniotic fluid as was TORCH (Toxoplasmosis, Other [syphilis, varicella-zoster, parvovirus B19], Rubella, Cytomegalovirus [CMV], and Herpes infections) seroconversion investigated in maternal serum.

For a further characterization of the ultrasound findings, magnetic resonance imaging (MRI) of the fetal brain was suggested. MRI was performed at 32 weeks and 5 days and demonstrated ventriculomegaly without subjective signs of hydrocephaly. Multiple periventricular calcified foci, bilateral temporal cysts, and extensive polymicrogyria were identified in cerebral hemispheres, and a cerebellar vermis hypoplasia was revealed [Figure 5].

At 33 weeks and 1 day of gestation, maternal viral serology results disclosed a positive CMV immunoglobulin G (IgG) and negative IgM. Amniocentesis revealed a normal karyotype and fetal microarray, but CMV DNA was detected by real-time polymerase chain reaction in amniotic fluid.

Given the presence of numerous cerebral abnormalities, the poor perinatal prognosis was explained, including the possibility of long-term neurological impairment. The option for pregnancy termination was discussed and required by the couple. Feticide took place at 35 weeks and 1 day followed

Address for correspondence: Dr. Fabiana Castro, Department of Obstetrics and Gynaecology, Centro Hospitalar do Tâmega e Sousa, Avenida do Hospital Padre Américo, No. 210, 4564-007, Penafiel, Porto, Portugal.
E-mail: fabianacastro. 93@gmail.com

Received: 27-03-2021 **Revised:** 05-05-2021 **Accepted:** 20-05-2021 **Available Online:** 24-07-2021

Access this article online

Quick Response Code:

Website: www.jmuonline.org

DOI: 10.4103/JMU.JMU_63_21

How to cite this article: Castro F, Carvalho AP, Rocha J, Marinho C, Rodrigues G. Multiple cerebral abnormalities at third-trimester ultrasound scan in an uncomplicated pregnancy. J Med Ultrasound 2023;31:69-71.

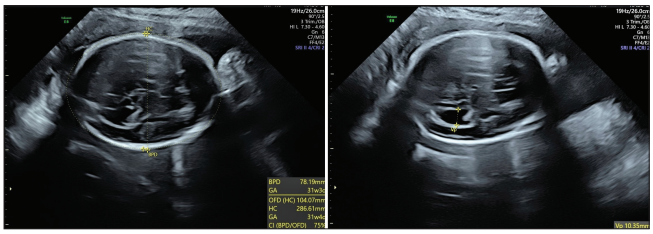

Figure 2: Axial plane of fetal brain. Lateral ventricles measuring 10.35 mm showing ventriculomegaly with hyperechogenic ventricular walls at 31w5d scan

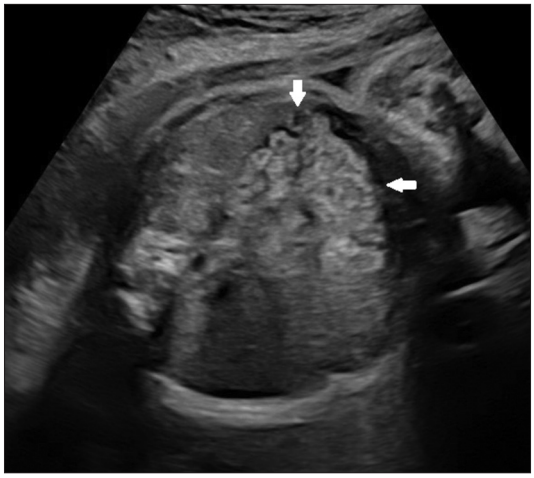

Figure 4: Grade 2 echogenic bowel (white arrow) noted at 31w5d scan

by induction of labor with dinoprostone. The patient had an uncomplicated vaginal delivery.

Interpretation

CMV is the most common congenital infection, affecting 0.5%–2% of all live births and the main nongenetic cause of congenital sensorineural hearing loss and neurological damage.[1,2]

This article presents the case of a fetus with various cerebral abnormalities in the 3rd-trimester ultrasound typical of a congenital CMV infection such as ventriculomegaly, cerebral cysts, polymicrogyria, hypoplastic cerebellar vermis, and the extracerebral finding of an echogenic bowel. On the other hand, mid-trimester scan did not reveal any morphological abnormality despite a small biometry, a very unspecific clue. This case highlights the fact that ultrasound abnormalities can only appear later in pregnancy.

Cerebral abnormalities are among the most important prognostic factors of neonatal outcome. Congenital CMV infection can cause developmental delay, cognitive impairment, cerebral palsy, epilepsy, impaired vision function, and autism spectrum disorder, which occur primarily in patients with symptomatic congenital CMV.[1] In this case, the extensive cerebral abnormalities helped us to inform and counsel the patient about the poor prognosis of this pregnancy. MRI may be used to further describe cerebral findings and to detect other anomalies.[2]

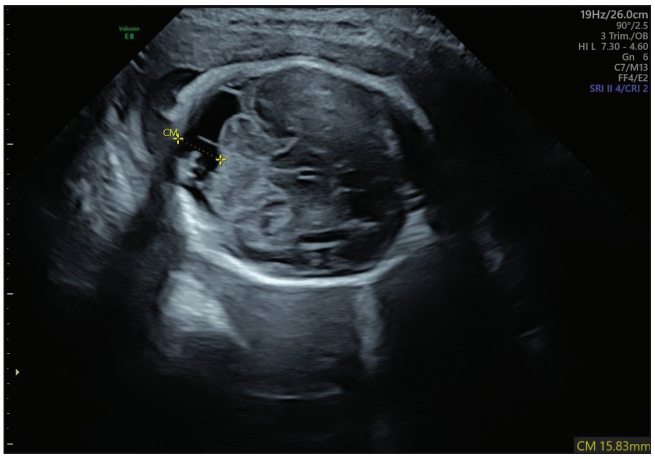

Figure 3: Axial plane of posterior fossa showing loss of cerebellar substance and an increased cisterna magna with 15 mm

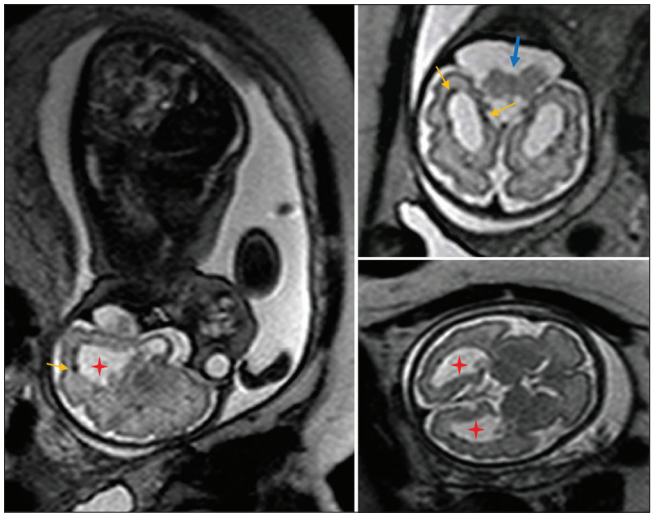

Figure 5: Fetal magnetic resonance imaging at 32w5d exhibiting hydrocephaly (red star), periventricular calcified foci (yellow arrow), and cerebellar vermis hypoplasia (blue arrow)

Despite being impossible to assure it retrospectively as there were no previous maternal CMV serologies, its detection of CMV DNA in amniotic fluid led us to the conclusion that this case resulted from an undiagnosed primary infection for CMV in the first half of pregnancy. Maternal serologies in the 3rd trimester showed immunity for CMV, with high IgG avidity. This leads to the conclusion that the infection occurred in this first trimester of the pregnancy or was a nonprimary infection. As described in the literature, only about 1%–2% of congenital infection result from nonprimary infection.[2] Besides, although transmission is higher when maternal infection occurs later in pregnancy, the severity of the disease is more significant in the first trimester. The gestational age at maternal infection is nowadays considered to be a main prognostic factor as long-term sequelae have shown to appear in 51%–57% of cases from 1st-trimester primary infection.[1] Finally, recent studies have been promising about the efficacy of valaciclovir treatment in women carrying a nonsevere

infected fetus, but further evidence from randomized studies is required.[3]

Discussion

This article focuses on the challenges related to the prenatal diagnosis of congenital CMV infection, as well as the difficulties in managing a late diagnosis with poor prognosis.

Unfortunately, severe congenital CMV infection remains a public health issue at the prenatal period as there is no efficient screening program or treatment for this disease during pregnancy.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Leruez-Ville M, Foulon I, Pass R, Ville Y. Cytomegalovirus infection during pregnancy: state of the science. Am J Obstet Gynecol 2020;223:330-49.
2. Mathias CR, Joung SJS. Diagnostic challenges in congenital cytomegalovirus infection in pregnancy: A case report. Case Rep Womens Health 2019;22:e00119.
3. Leruez-Ville M, Ville Y. Fetal cytomegalovirus infection. Best Pract Res Clin Obstet Gynaecol 2017;38:97-107.