

Case Report

A Rare Case of Late First Sonographic Appearance of Fetal Ventriculomegaly in The 3rd Trimester

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Abstract

We present a rare case of fetal ventriculomegaly initially diagnosed at 37 weeks of gestation in an otherwise uncomplicated pregnancy of a 30-years-old primigravida. During a growth scan arranged at 37 weeks of gestation in order to determine the placental position and fetal lie, both lateral brain ventricles were found to be severely dilated, approximately 16 mm. No other markers of chromosomal abnormalities or major structural defects were identified on the scan. Our case highlights the importance of a more detailed brain assessment in case that 3rd trimester sonographic evaluations are undertaken. In the literature, no case of fetal ventriculomegaly diagnosed via ultrasound later than 36 weeks has been documented. Fetal brain is probably the only fetal structure that continues to develop significantly throughout late gestation and sonographers and clinicians should take advantage of these fetal imaging advances in all pregnancy trimesters for parental reassurance and optimal fetal development.

Keywords: Intracranial Hemorrhage; Third Trimester; Ventriculomegaly

Case Report

A 30-years-old primigravida underwent a scheduled growth scan at 37 weeks of gestation to determine placental position and fetal lie. Another scan 2 weeks ago for educational purposes indicated no signs of impaired growth, posterior low placenta and fetal breech presentation (Figure 1). During the 37 weeks' scan, bilateral severe ventriculomegaly (16mm) was noticed (Figure 2). There were also signs suggesting intraventricular hemorrhage (bright echogenic lining of the ventricular walls and intraventricular hyperechogenic foci indicating blood clots) (Figure 3) [3, 4]. Next day the pregnant woman was admitted to the University Hospital of Ioannina and the subsequent day, at 37 weeks + 2 days of gestation, she underwent a caesarean section after maternal request. Unfortunately, the newborn was admitted to the ICU with signs of intracranial hemorrhage. Postnatal sonographic assessment confirmed the diagnosis (Figure 4). The newborn was transferred for care to a specialized center. After neurosurgical evaluation conservative management with close monitoring was decided. Eventually, the hematoma resolved spontaneously within 3 months, with no obvious residual neurological defects. A year

Introduction

Nowadays, sonographic antenatal assessment has become part of the routine obstetric care, in almost all countries. Usually, an early pregnancy scan sets the diagnosis of a viable pregnancy at about 6 to 8 weeks of gestation. Later on, all ongoing pregnancies are offered the combined first trimester prenatal screening, which includes the Nuchal Translucency measurement and maternal biochemistry, performed between 11 and 14 weeks. The combined test evaluates the risk of major chromosomal abnormalities, as well as, certain fetal cardiac defects [1]. The second trimester anatomy scan is performed between 18 and 23 weeks of gestation and in uncomplicated pregnancies, usually being the last sonographic assessment [2]. Subsequent scans are performed late in pregnancy in cases of several maternal or fetal indications, specifying fetal growth and arterial Doppler's, amniotic fluid volume, fetal lie and placenta grading and position being the factors that need to be assessed.

has passed and the child shows no sign of developmental nor behavioral derangements.

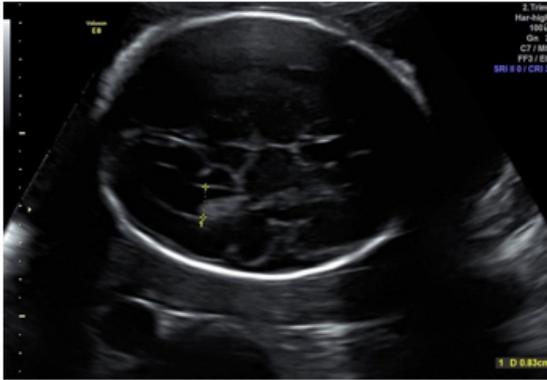


Figure 1: Ultrasound at 35 weeks of gestation demonstrating no signs of ventriculomegaly.



Figure 2: Sonographic finding of ventriculomegaly with late onset (37 weeks of gestation).



Figure 3: Sonographic signs of intracranial haemorrhage (distended ventricular walls (16mm) (yellow dashed line) and intraventricular hyperechogenic foci.



Figure 4: Postnatal sonographic confirmation of ventriculomegaly (Day 1 postpartum).

Discussion

Normal measurements of fetal brain ventricles are considered to be a significant marker of normal fetal CNS development [5]. Ventriculomegaly is defined as mild (10-12mm), moderate (12-15mm) and severe (>15mm) [6, 7]. Ventriculomegaly is the most frequent sonographic pathology that is detected during antenatal ultrasounds and its importance is based on the adverse outcomes on the fetus development [8]. Fetal ventricular system allows for the assessment of CNS development and its sonographic visualization is also suggested in the third trimester [9]. According to published data ventriculomegaly has a 74% mortality rate and 84% of these cases are associated with additional abnormalities [10]. Isolated ventriculomegaly has a lower mortality rate of 11% compared to 56% of non-isolated cases [11]. Fetuses with apparently isolated unilateral ventriculomegaly have good prognosis since the rate of chromosomal abnormality is almost zero, of congenital infection is 8% and only 5% of them will eventually develop ventriculomegaly during the course of pregnancy. Fetal MRI can facilitate the diagnosis of additional brain abnormalities in 5% of cases. The prevalence of neurodevelopmental delay is estimated to be quite low (6%) [12].

In case of severe bilateral ventriculomegaly 805 of fetuses survive and, of these, just over 40% show normal neurodevelopment, while the overall survivors without disability account for more than 30% of the total [13]. Given that many cases undergo termination of pregnancy mortality and prevalence of developmental delay may be even higher [13]. The surprising issue of our case is the time of appearance and diagnosis of ventriculomegaly (37 weeks). To our knowledge, there is no study in the literature on late onset fetal severe ventriculomegaly after 35 weeks of gestation and fetal outcome [14]. Fetal intracranial hemorrhage, as a likely cause of fetal ventriculomegaly, may

be accurately identified and classified by antenatal sonography [15]. The incidence of fetal intracranial hemorrhage is estimated approximately 40% of all premature neonates (<32 weeks) but remains unknown in the general population and is usually linked with a number of risk factors - all absent in this case report- such as, maternal trauma, often also uteroplacental or other fetal injuries, a variety of maternal pathologies, such as pancreatitis, cholecystectomy, seizures and CMV infection and has also been associated with amniocentesis [16, 17].

Antenatal ultrasound findings have a good correlation with the postnatal diagnosis [17]. The outcome is usually poor, especially for those fetuses affected by higher-grade intraventricular hemorrhages and approximately 40% of fetuses die either in utero or within the first month after birth. Among the survivors, less than 50% appear neuro-developmentally normal at short-term follow up [16]. The preferable mode of delivery of a fetus with sonographic evidence of intracranial hemorrhage is yet to be confirmed. Although usually considered optimal mode, there are no data to indicate that c-section may favor a better outcome for those neonates [18]. According to the existing evidence, late in pregnancy sonographic assessments are used electively in cases indicated for maternal and fetal reasons. They correspond better in high risk pregnancies with precedent ultrasound abnormal findings [12]. Some fetal structural abnormalities manifest late in pregnancy, such as brain abnormalities, microcephaly, hydrocephaly, intestinal obstruction/atresia, urinary tract abnormalities and skeletal dysplasia's. Nevertheless, the identification of these anomalies is still ambiguous, since there is no evidence that fetal short-term or long-term outcome is improved.

The cause is often difficult to determine and advanced knowledge and experience on the subject is essential to deal with these cases [13]. Sonographers and Fetal Medicine experts tend to expedite their antenatal sonographic assessments. This tendency results in neglecting and underestimating the value of ultrasound in the 3rd trimester. Even more, there is no evidence that fetal ultrasound in the second trimester improves fetal outcome [14]. Our case underlines the importance of late antenatal sonographic investigations. In ambiguous cases fetal MRI could potentially reveal more information and improve fetal outcome [18]. It is important to visualize the fetal brain ventricular system in the 3rd trimester since it is considered to be the optimal window to assess the fetal CNS development. Sonographers should be aware that ventriculomegaly may occur later than usual during pregnancy. In ambiguous cases fetal MRI could potentially reveal more information.

Ethical Approval

All authors declare no conflict of interest nor funding of any kind. Informed consent was obtained from all individual participants included in this case report.

Disclosure

All authors declare no conflict of interest nor funding of any kind.

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