CASE REPORT

A rare case of trisomy 13 mosaicism with only findings on first-trimester ultrasound single umbilical artery and increased nuchal translucency

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Abstract
Background: Trisomy 13 is a chromosomal defect with high prenatal and postnatal mortality that may reach 87 % during the first year of life. More than 90 % of cases of fetuses with trisomy 13 may be detected by first-trimester ultrasound based on severe fetal structural malformations together with increased nuchal translucency thickness.
Case description: We report a case of a fetus with trisomy 13 mosaicism with only anomalous findings on prenatal ultrasound of a single umbilical artery and increased nuchal translucency in the absence of major structural abnormalities.
Conclusion: This case highlights the importance of performing first-trimester fetal ultrasound by specialists in Fetal Medicine to avoid misdiagnosis. Trisomy 13 should be included in the differential diagnosis and prenatal counseling in cases with a single umbilical artery and increased fetal nuchal translucency, even in the absence of major anatomic anomalies. HIPPOKRATIA 2024, 28 (1):38-40.

Keywords: Trisomy 13, nuchal translucency, single umbilical artery, ultrasonography, early prenatal diagnosis

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Introduction

Trisomy 13 is the third most common chromosomal defect following trisomy 21 and trisomy 18[1]. It occurs in 1.68 per 10,000 newborns; prevalence and outcomes vary by country and termination policies[1]. The syndrome was first described as a distinct entity by Patau et al in 1960, and early studies showed that females are more commonly affected than males[2]. In 80 % of cases, there are three copies of chromosome 13; in 15 %, there is an extra portion of chromosome 13 in all cell lines, leading to the partial phenotypic expression of the syndrome; and in 5%, there is mosaicism, whereby a variable portion of cell lines are euploid. Prenatal diagnosis of trisomy 13 is clinically relevant, since mortality may reach 87 % during the first year of life[1]. The most frequent fetal findings on first-trimester ultrasonography are prominent, including nuchal edema, holoprosencephaly, cyclopia, proboscis, congenital heart defects, exomphalos, megacystis, and polydactyly[3]. Herein, we report a rare case of trisomy 13 mosaicism, with a single umbilical artery and increased nuchal translucency as the only abnormal findings on first-trimester ultrasound, in the absence of major structural abnormalities. This case highlights the importance of performing first-trimester fetal ultrasounds by specialists in Fetal Medicine to avoid misdiagnosis and provide appropriate prenatal counseling.

Description of Case

A 31-year-old primigravida at 13w+1d gestation attended the antenatal care center for routine first-trimester ultrasonography. The conception was spontaneous. A singleton fetus with regular heart activity (163 bpm) was detected. The crown-rump length was 70 mm, consistent with gestational age, and the nasal bone was present. Pulsed Doppler ultrasonography of the tricuspid valve was normal, and the ductus venosus pulsatility index was 1.23. The placental position was posterior and high, and the amount of the amniotic fluid was normal. No fetal structural abnormalities were detected. However, the fetal nuchal translucency was increased (4.45 mm) (Figure 1), and a single umbilical artery was suspected (Figure 2) with the umbilical cord tightly wrapped around the fetal neck. Regarding maternal serum biochemistry, the free human chorionic gonadotropin concentration was normal [21.2 IU/l - 0.641 multiple of the median (MoM)], whereas the pregnancy-associated plasma protein A concentra-

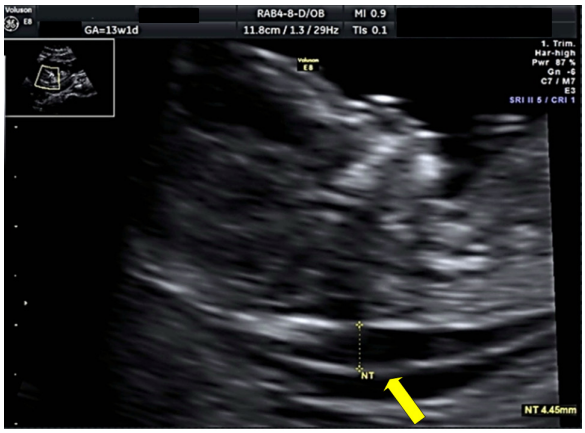

Figure 1: Fetal sonographic 2D-imaging demonstrating increased nuchal translucency, 4.45 mm (yellow arrow) at 13w+1d gestation.

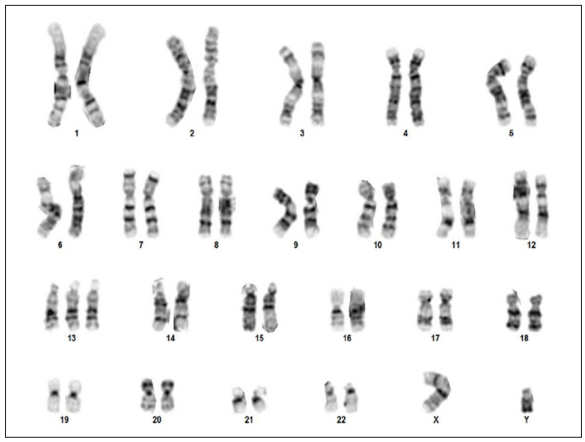

Figure 3: Cell line with a 47,XY+13 karyotype; in the present case, 85 % of cell lines had a 47,XY+13 karyotype, while 15 % had a normal 46, XY karyotype.

tion was low (1.992 IU/l - 0.392 MoM). Based on these findings, the adjusted risk for trisomy 13, 18, and 21 was 1:49, 1:47, and 1:30, respectively.

After detailed counseling, the woman agreed to undergo an invasive prenatal diagnosis due to the increased risk of fetal chromosomal abnormality. Chorionic villous sampling was performed at 13w+6d gestation. DNA isolated from this sample was analyzed with quantitative fluorescence-polymerase chain reaction (QF-PCR), which showed two copies of chromosomes 18 and 21 and abnormal proportions in genetic markers of chromosome 13. Due to the possibility of placental mosaicism, amniocentesis was advised and performed at 17w + 1d after written informed consent and the previous result was confirmed by QF-PCR analysis of amniotic fluid. Furthermore, two independent cell cultures were established by the amniocentesis sample. Using the G-banding method, with a resolution of 550 bands, the chromosomes of 100 metaphases (50 from each cell culture) were studied, revealing a karyotype of mos 47, XY,+13[85]/46, XY [15] (Figure 3). A single umbilical artery was confirmed as

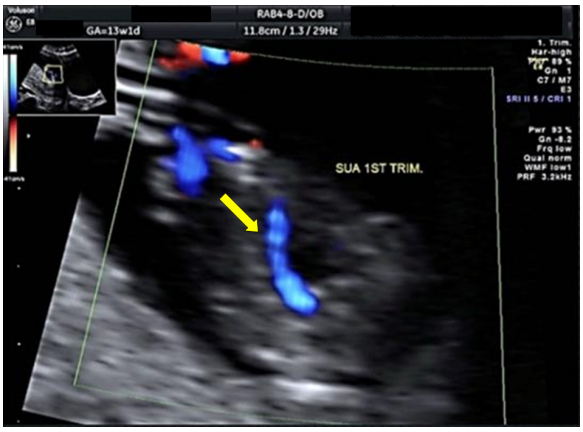

Figure 2: Fetal sonographic 2D-imaging with color Doppler showing a single umbilical artery (yellow arrow) at 13w+1d gestation.

the only pathological finding in second-trimester fetal ultrasound at 18w+6d. An umbilical cord wrapped around the fetal neck and right shoulder was demonstrated. Following genetic counseling, the parents decided to terminate the pregnancy, and induced abortion took place at 19w+1d. The post-abortion findings were an intact amniotic sac, a double nuchal cord, and low-set ears. A formal post-abortion autopsy and histologic examination were not deemed necessary, since diagnosis was already established by prenatal ultrasound and karyotype findings.

Discussion

Trisomy 13 mosaicism may occur with minimal or without any accompanying anatomical defects[4]. First-trimester ultrasonography allows systematic examination of fetal anatomy[5] and more than 90 % of fetuses with trisomy 13 may be detected as early as the first trimester. Holoprosencephaly, face anomalies, major cardiac malformations, exomphalos, megacystis, and polydactyly are the most frequently detected structural abnormalities at the early pregnancy stage[6]. Increased nuchal translucency thickness may predict trisomy 13[7]; in one study, 77.9 % of 189 fetuses had a nuchal translucency thickness above the 95th percentile[6]. Ki et al reported a case of trisomy 13 with increased nuchal translucency as the only finding during the first trimester ultrasonography[8].

Fetal hydrops, abnormalities of the central nervous, cardiovascular and urogenital system, face and abdominal wall anomalies, and skeletal dysplasias are frequent findings on second-trimester ultrasound[3]. The presence of a single umbilical artery has also been associated with trisomy 13[3]. In 1991, Dicke et al reported ultrasonographic abnormalities in five out of seven fetuses with trisomy 13[9]. In 1995, Lehman et al reported that no structural defects were detected by ultrasonography in three out of 33 affected fetuses[10]. However, back then, echocardiography was not an established prenatal diagnostic tool. Later on, Papp et al. reported three undetected cases of trisomy 13[11], and Watson et al reported no second-trimester sonographic findings in five out of 54 fetuses with trisomy 13.

However, in three of these five cases, ultrasound visualization conditions were poor[12]. More recently, Moczulska et al reported two cases of prenatal diagnosis of trisomy 13 mosaicism, one with normal examination at 18 weeks and one with multiple structural defects at 20 weeks[4].

We report herein a case of a fetus with trisomy 13 mosaicism, with increased nuchal translucency and single umbilical artery, as the only findings during the first-trimester sonographic examination. Single umbilical artery was confirmed in the second-trimester scan, while no additional structural abnormalities were detected. Specialists in Fetal Medicine performed ultrasonography.

In conclusion, trisomy 13 is associated with severe, incompatible with-life fetal structural abnormalities, which may be detected by ultrasound during the first and second trimesters. Nevertheless, in rare cases, fetuses with trisomy 13 may appear with minimal signs in prenatal sonographic screening. Hence, it is of paramount importance that specialists in Fetal Medicine should perform appropriate first-trimester sonographic screening of pregnant women to avoid misdiagnosis and unacceptable delay in the management of such cases. Trisomy 13 should be included in the differential diagnosis and prenatal counseling in cases with increased fetal nuchal translucency and single umbilical artery, even in the absence of major anatomic anomalies.

Conflict of interest

Authors declare no conflicts of interest.

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