A case of triploidy detected by crosstrimester test

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Summary

A 40-year-old woman presented in her second pregnancy, naturally conceived. Maternal serum screening and ultrasound examination raised concerns regarding aneuploidy. After genetic counselling an amniocentesis was performed, showing a 69,XXX karyotype.
Here we report a case of digynic triploidy, which resulted from fertilization of a diploid ovum by a single sperm.

Key words: maternal serum screening, triploidy, prenatal diagnosis, amniocentesis.

Introduction

Triplody is characterized by an extra haploid chromosome set (3n=69). Most of these conceptions result in spontaneous abortion in the first trimester of pregnancy. The origin of the additional chromosomal set could be maternal (digynic) or paternal (diandric).

Case report

A 40-year-old woman presented in her second pregnancy, naturally conceived. The obstetric history presented a spontaneous miscarriage at 22 weeks' gestational age due to uterine contractions. The fetus had an apparently normal phenotype. Cytogenetic analysis was not performed on tissues of the first miscarriage.
The patient was submitted to our Unit performing a crosstrimester test. The test combines the ultrasound and serologic risk assessments of first trimester test with the serologic risk estimates of the second trimester screen (1). The first trimester test was performed between 10 and 12 weeks of gestation using maternal age, free-beta-human chorionic gonadotropin (free-beta-hCG), pregnancy-associated plasma protein-A (PAPP-A) and fetal nuchal translucency (NT). The second trimester test was based on alpha-fetoprotein (AFP), total hCG and unconjugated estriol (uE3). The final risk assessment was based on both the first and second trimester tests considered together, with a non-disclosure of the first trimester risk. NT measurement was performed by a certified sonographer. Down syndrome risk was calculated using a dedicated software (Prisca Typolog, Germany). Trisomy 18 risk was computed according to Palomaki et al. (2).
Maternal free-beta-hCG level was 0.13 multiples of the median (MoM), PAPP-A was 0.12 MoM, AFP 0.6 MoM, total hCG 0.12 MoM and uE3 level was below 0.1 MoM. The NT value was 1.43 mm. The final risk was 1:154 for trisomy 21 and 1:5 for trisomy 18. After genetic counselling, an amniocentesis was performed, in order to exclude aneuploidies related to serum screening and fetal morphology. The fetus showed a 69,XXX karyotype (Fig. 1).
A subsequent scan at 16 weeks' gestation displayed a severe symmetric growth retardation, micrognathia, and neural tube defect (Fig. 2a,b).
The fetus presented intrauterine fetal demise diagnosed at 17 weeks' gestation. Chromosomal preparation obtained from fibroblasts confirmed the diagnosis. Both parents had normal chromosome complement.
Post-mortem examination findings revealed a fetus of 14 weeks' size confirming the severe intrauterine growth retardation, spina bifida, facial abnormalities including low-set

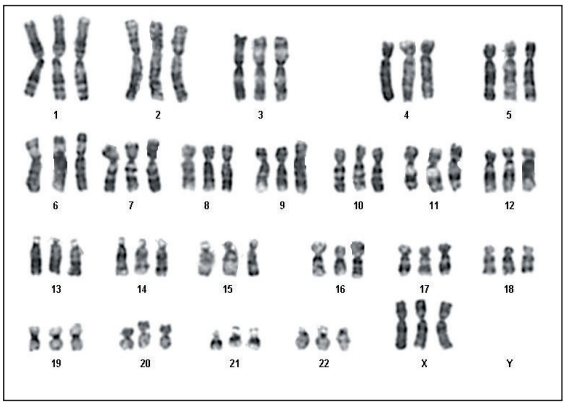

Figure 1. Fetal karyotype 69, XXX.

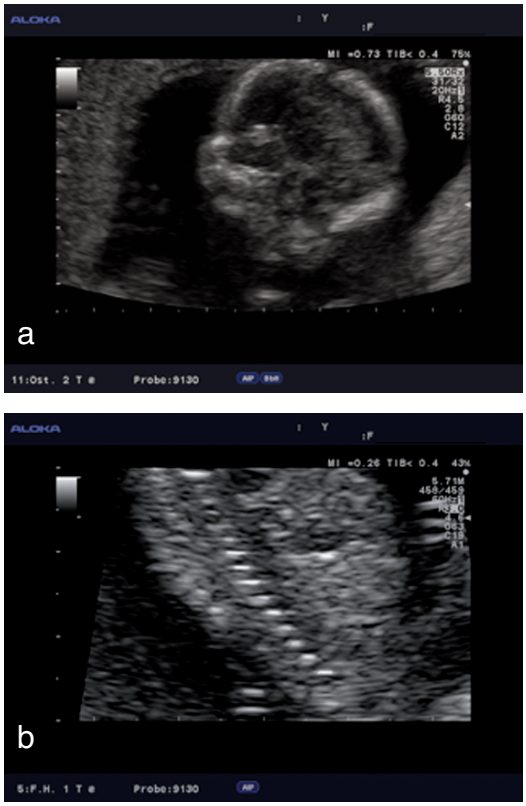

Figure 2. Ultrasound scan at 16 weeks' gestation demonstrating a) micrognathia and b) neural tube defect.

ears and micrognathia, and total syndactyly of third and fourth fingers. No further pathologic findings were revealed due to fetal maceration. Maternal source of triploidy was confirmed from ultrasound and post-mortem evaluation.

Discussion

Triploidy is estimated to occur in 1% of all conceptions (3). The major rate of fetuses were aborted during the first trimester and the prevalence of triploidy at 12 weeks' gestation is estimated to be 1/3500 compared with 1/30000 at 16 weeks (4). Increased maternal age is not a risk factor in triploidy and there is not an increased recurrence risk (5). There are two phenotypes of triploidy, depending on whether the origin of the extra haploid chromosome set is paternal (diandric) or maternal (digynic). In the diandric type the placenta is enlarged and partially multicystic (molar), whereas the fetus is relatively well-grown with either proportionate head size or slight microcephaly. During the screening test fetal NT is increased as well as maternal serum total hCG, free □-hCG and AFP with mildly decreased PAPP-A (6). The digynic type, which is the most common, is characterised by a small normal looking placenta and severe asymmetrical fetal growth restriction, with pronounced wasting of the body and sparing of the head. The fetal NT is normal, with markedly decreased maternal serum total hCG, free □-hCG and PAPP-A, with mildly decreased AFP. Previous published biochemical studies have confirmed such serologic picture in the two phenotypes of triploidy. UE3 levels was extremely low accordingly to previous data (7,8). The biochemical findings in our case are comparable with the results of previous reports of maternal origin (6,9,10). Fetal NT was not increased (1.43 mm) and there was a decrease in maternal serum free-□-hCG (0.13 MoM), PAPP-A (0.12 MoM), AFP (0.6 MoM), total hCG (0.12 MoM), uE3 level was below 0.1 MoM. The crosstrimester test showed an increased risk for both trisomy 21 and 18, leading to the identification of the triploid pregnancy, albeit further studies are mandatory.

Conclusion

Our findings emphasize the ability of maternal serum screening tests in detecting other chromosomal abnormalities in addition to Down syndrome.

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