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Case Report / Olgu Sunumu

A Rare Case of In Vitro Fertilization: Patau Syndrome Associated with Bilateral Anophthalmia

Nadir Bir İn Vitro Fertilizasyon Olgusu: Bilateral Anoftalminin Eşlik Ettiği Patau Sendromu

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ABSTRACT

Background: Although the practice of preimplantation genetic diagnosis has seen major advances in both obstetrical and reproductive sciences in recent years, the methods used still have technical limitations that include the possibility of a false result.
Method: A case of neonate born from twin pregnancy, which is a product of in vitro fertilization, was reviewed.
Result: The one of twin babies was diagnosed with Patau syndrome and bilateral anophthalmia, while the other was normal.
Conclusion: Because of high risk of aneuploid embryos in women undergoing in vitro fertilization, genetic counselling must be provided to ensure that couples fully understand the risk of early pregnancy loss and having an affected child.

Keywords: Preimplantation genetic diagnosis, aneuploidy, Patau syndrome, anophthalmia

ÖZET

Giriş: Son yıllarda transfer öncesi genetik tanı pratiği, obstetrik ve üreme alanlarında büyük gelişmelere tanıklık etse de kullanılan yöntemlerin, yanlış negatif sonuç ihtimalini de içeren teknik kısıtlılıkları hala mevcuttur.
Yöntem: Tüp bebek uygulaması sonucu gerçekleşen ikiz gebelikten doğma bir yenidoğan olgusu gözden geçirildi.
Bulgu: İkiz bebeklerden biri Patau sendromu ve bilateral anoftalmi tanısı alırken, diğeri normaldi.
Sonuç: Tüp bebek uygulamasına girecek kadınlarda yüksek anöploidili embriyo riski olduğundan, çiftlere erken gebelik kaybı ve hasta çocuk sahibi olma riskini tam anlamıyla anlayacak şekilde genetik danışmanlık sağlanmalıdır.

Anahtar kelimeler: Transfer öncesi genetik tanı, anöploidi, Patau sendromu, anoftalmi

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INTRODUCTION

In recent years in vitro fertilization (IVF) has become common practice in Turkey. Preimplantation genetic diagnosis (PGD) is accepted as an important method for the identification chromosomal abnormalities and genes, which might be responsible for genetic defects in embryos that are created through IVF before pregnancy.[1] Although not applicable to all cases of IVF, the list of conditions and indications for PGD testing is continuing to extend enormously with newly established genetic analysis techniques.[1] We present here a case of neonate with Patau syndrome and anophthalmia, who was born from twin pregnancy after IVF. We intend to emphasize the importance of parental counselling for PGD, because one of the parents had an increased genetic risk.

CASE

The 25-year-old mother had her first IVF. Indication for IVF in this case was male infertility (azoospermia). There was no consanguinity between the parents and no family history reported. PGD was not conducted, due to the first IVF pregnancy attempt. Antenatal sonographic examinations at 16 weeks of gestation revealed anophthalmia, ventricular septal defect and growth retardation. The male patients was delivered after a caesarean section as a twin at 32 week of gestation. The patient had low APGAR (4/7) scores and required intubation at delivery room. His male twin had a birth weight of 1700 g and no anomalies. On physical examination weight was 1310 g (3-10th centile), length was 39 cm (3-10th centile), and head circumference was 27 cm (3rd centile). There were anophthalmia bilaterally, low-set ears, abnormal auricles, broad nasal root, camptodactyly, cardiac murmur, cryptorchidism and rocker bottom feet (Figure 1A). The laboratory studies were normal, except moderate thrombocytopenia. On chest X-ray, slightly widened mediastinum, decreased pulmonary vascular markings and slender ribs were detected. Abdominal ultrasound was normal with testes seen in the inguinal canal. Echocardiography revealed tetralogy of Fallot with pulmonary atresia and patent ductus arteriosus. The computed tomographic imaging showed minimal disorganized residual tissues in orbits with anophthalmos and slightly enlarged lateral ventricles (Figure 1B). Karyotype analysis was consistent with 47, XY+13.

Surgery for cardiac anomaly was refused by parents due to poor prognosis. Oxygen saturation was around 80% during the process of intensive care and the patients could not tolerate extubation, and remained on mechanical ventilator until his dead at five months of life.

DISCUSSION

This is a noteworthy aneuploid case of IVF pregnancy. This case report shortly discusses the chromosomal disorder with anomaly and the implementation of PGD in IVF. In our country context, parents are more concerned with the anatomical integrity, then neuromotor ability, and lastly viability of their child. In this case, the eye abnormality was an important appearance of the pathology.

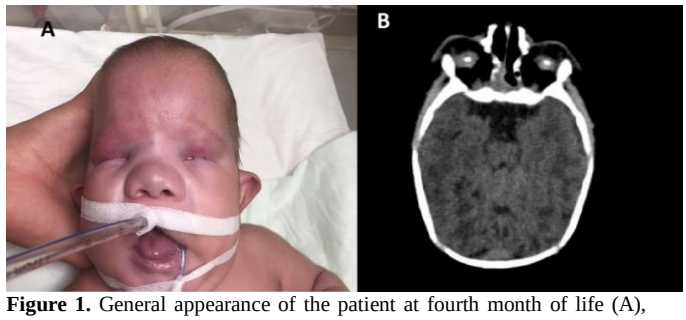

Figure 1. General appearance of the patient at fourth month of life (A), and axial cranial tomography scan (B), which show calcified and disorganized residual tissues in orbits with anophthalmos.

The combined birth prevalence of anophthalmia and microphthalmia has been reported up to 30 per 100,000 population. Although the precise pathogenesis of anophthalmia and microphthalmia remains unknown, it is suggested that anophthalmia may develop as a result of failure of development of the anterior neural tube (secondary anophthalmia) or optic pit(s) to enlarge and form optic vesicle(s) (primary anophthalmia) or degeneration of optic vesicles subsequent to formation (degenerative anophthalmia). Anophthalmia/microphthalmia has a complex aetiology with chromosomal, monogenic and environmental causes identified.[2] Infants with anophthalmia and microphthalmia, have to 90 % associated malformations.[3] Anophthalmia has been reported in about 10% of cases with Patau syndrome, which is a chromosomal disorder characterized by a well known presentation of multiple congenital anomalies.[4] The main findings of Patau syndrome consist of congenital heart defects (from 56% to 100%), central nervous system anomalies (from 16% to 100%), finger abnormalities (from 52% to100%), eye abnormalities (from 42% to 84%), cleft lip/palate (from 33% to 68%), aplasia cutis/scalp defects (from 25% to 47%) and anogenital abnormalities which is more common among males than females (from 10% to 100%).[4] The majority of patients affected die within the first year.[4]

IVF carries a high risk of aneuploidy. The majority of miscarriages in the first trimester should be considered as a result of aneuploidies (ranging from 50% to 80%)[5]. The rate of aneuploid oocytes increases with advancing age and it is often increased in males with oligoasthenoteratozoospermia.[6] PGD testing is indicated in couples with recurrent miscarriages, couples with repeated IVF failures, severe male infertility, and mothers with increased age.[6] High costs make these tests optional (to select a single euploid embryo for transfer, or to decrease the transmission of genetic disorders to the offspring, or for sex selection).[6] The timing and technique used for biopsy, the amplification techniques, the genetic diagnosis techniques, and appropriate genetic counseling play important roles in establishing a successful PGD.[1] The

choice of technique depends mostly on the indication (whether the purpose is either mutation testing or chromosomal analysis) and on the cost, the availability, and the applicability of the technique.[1] Although it varies depending on the technique used, the rate of misdiagnosis is between 3-10%.[6] In conclusion, couples should be informed in detail, that after the PGD test risks concerning discontinuation of pregnancy and subsequent affection of offspring still exists.

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