

Case Report

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Postnatal Edward's syndrome: Case report

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Abstract

Background: Edward's syndrome or trisomy 18 syndrome is due to meiotic nondisjunction with multisystemic involvement. It is characterized by craniofacial, skeletal, cardiovascular, central nervous system and genitourinary malformations. Developmental delay is common in all children. Most cases are diagnosed before birth based on the mother's age and the detection of ultrasound abnormalities in the second and third trimesters. A careful examination is therefore very important to confirm the diagnosis and to help identify unexpected abnormalities. There is very little data on Edward's syndrome. **Methods/Observation:** to describe the clinical and cytogenetic characteristics of a patient with Edwards syndrome, as well as the interest of genetic counseling and constitutional karyotype in the management of neonates with neonatal hypotrophy and/or smooth intra uterine growth retardation (IUGR). **Conclusion:** Health supervision should be diligent, especially in the first 12 months of life, and can require multiple pediatric and specialist evaluations.

Keywords: Trisomy 18 syndrome, Edwards syndrome, diagnosis, genetic disorders.

Introduction

The trisomy 18 syndrome, also known as Edwards syndrome, is the second most common autosomal trisomy syndrome after trisomy 21 (*A NEW TRISOMIC SYNDROME - The Lancet*, s. d.), due to the presence of an extra chromosome 18. The syndrome pattern comprises a recognizable pattern of major and minor anomalies, an increased risk of neonatal and infant mortality, a significant psychomotor and cognitive disability. The livebirth prevalence of trisomy 18 ranges from 1/3600 to 1/10,000 with the best overall estimate in liveborn as 1 in 6,000 (Rasmussen et al., 2003; Root & Carey, 1994). The presence of an extra chromosome 18, or less commonly a partial trisomy of the long arm of chromosome 18, on the standard R-banded karyotype confirms the clinical diagnosis. A small portion of patients have mosaicism of trisomy 18; they show an extremely variable phenotype. The aim of this paper is to describe the clinical and cytogenetic characteristics of a patient with Edwards syndrome, as well as the interest of genetic counseling and constitutional karyotype in the management of neonates with neonatal hypotrophy and/or smooth intra uterine growth retardation (IUGR).

Methods/ Observation:

A male child, born to a 46-year-old mother by normal vaginal delivery at 32 weeks of gestation, the last of a sibling group of 3, was referred to the medical genetics department of Ibn Rochd University hospital of Casablanca at the age of 1 month and 20 days. The child weighed 1.48 kg at birth and had multiple congenital anomalies. The abdominal ultra sound showed a right inguinal hernia and a right hydrocele with out any sign of testicular torsion. On clinical examination, he presented a delayed growth, specific craniofacial features, clenched fist with overriding fingers, small finger nails, underdeveloped thumbs, and short sternum. The conventional karyotype was performed and showed 47,XX,+18 in all analyzed metaphases (Figure 1).

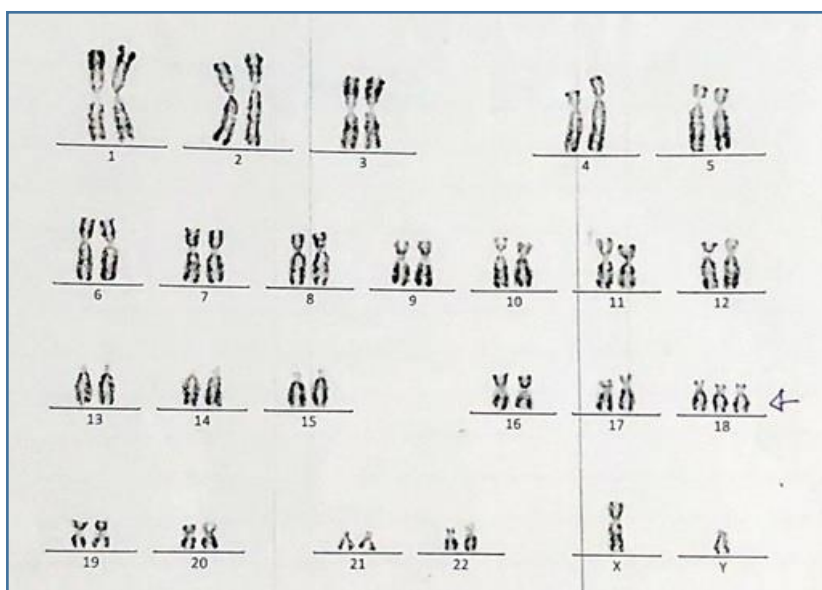


Figure 1: Chromosomal analysis of the patient showed 47 chromosomes with an extra chromosome 18 (arrow).

Discussion

In post-natal, the diagnosis of Edwards syndrome is clinically established based on the presence of prenatal growth delay, specific craniofacial features, distinctive hand posture (overriding fingers) nail hypoplasia, short hallux, short sternum, major malformations notably in the cardiac, pulmonary, renal and digestive systems, with omphalocele and diaphragmatic hernias [5]. The main causes of death are cardiomyopathy, heart failure and respiratory failure (Cereda& Carey, 2012). Thus, survival rate is 42% in the first week, 29% in the first month, 12% at 3 months and 8% at 6 months (*A NEW TRISOMIC SYNDROME - The Lancet*, s. d.). Most studies have suggested that the extra chromosome is present because of non-disjunction during meiosis or post zygotic mitosis which is most often of maternal origin (Bugge et al., 1998; Kupke& Müller, 1989). About 50% of the non-dysfunctional errors in oogenesis occur in meiosis II, unlike other human trisomy where the mal segregation is more frequent in meiosis I (Kupke & Müller, 1989). In a minority of cases in which the extra chromosome has a paternal origin, the abnormality's the result of a post zygotic error. The cause of non-disjunction is unknown. However, Hassold et al. have reported a high prevalence of methylene tetra hydro folate reductase gene (*MTHFR*) polymorphisms in mothers of trisomy 18 fetuses compared with controls (50% versus 39.3%), but this result has not been confirmed (Hassold et al., 2001) . The region of long arm of chromosome 18 extending from q11.2 has been proposed as the critical region for trisomy 18 phenotype, however some controversial data have been reported (Wilson, 1993). Boghosian-Sell et al. hypothesized the presence of two critical regions along the long arm of chromosome 18: one proximal region lying between 18q12.1-18q21.2 and another distal region lying between 18q22.33-18qter (Boghosian-Sell et al., 1994). The same authors reported the case of two patients with trisomy of 18q11.2 to terminus who do not show the complete pattern of trisomy 18. The patients had better survival and growth. Therefore, the genes present in the short arm or the 18q11.1 region could play a role in the expression of the complete phenotype.

- *Antenatal diagnosis*

Currently in North America and Europe most cases of trisomy 18 are prenatally diagnosed, based on maternal age, maternal serum marker screening, or detection of sonographic abnormalities during the second and third trimester. The prenatal diagnosis of trisomy 18 leads to the decision of pregnancy termination in 86% of cases. First trimester noninvasive screening demonstrated high sensitivity for diagnosis of trisomy 18, and it is now being applied routinely. The levels of human chorionic gonadotropin, unconjugated estriol, and alpha-fetoprotein are significantly lower ($< 0,5$ MoM) in pregnancies with trisomy 18 compared to normal pregnancy. The most common soft sonographic markers detected in the late first/early second trimester are the increased nuchal translucency thickness and the absence or hypoplasia of the nasal bone; the screening by assessment of nuchal fold and nasal bone identifies 66.7% of cases with trisomy 18. By including the evaluation of reversed flow in the ductus venosus and the tricuspid valve regurgitation, the detection rate increases to 83.3%. Furthermore, the frequency of miscarriage or still birth is higher for males compared to females (Yamanaka et al., 2006).

- *Genetic counseling*

Genetic counselling must be performed for couples with a child having a free and homogeneous trisomy 18, the probability of recurrence in the next pregnancy is 1%. In the cases of partial trisomy 18, it is necessary to perform a karyotype of the parents in order to eliminate carriers with a balanced translocation, including the trisomy segment, because in these cases, the probability of recurrence is greater. Furthermore, the incidence of trisomy 18 increases with advanced maternal age. Eighty percent of cases of trisomy 18 are the result of maternal meiotic non-disjunction, and 5% of the cases are due to paternal meiotic non-disjunction. Exceptionally, the trisomy 18 is secondary to a chromosomal translocation (Carey, 1992).

Conclusion

The complexity and the severity of the disease at birth and the high neonatal and infant mortality make the perinatal and neonatal management of babies with trisomy 18 particularly challenging, controversial, and unique. Health supervision should be diligent, especially in the first 12 months of life, and can require multiple pediatric and specialist evaluations.

- **Ethics statement:** Informed consent was obtained from parents.
- **Conflict of interest:** The authors declare that they have no competing interests.

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