44, X, der(15; 22)(q10;q10), a unusual karyotype. A case report

44, X, der(15; 22)(q10;q10), un cariotipo anormal. Un informe de caso

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Abstract

Routine karyotyping of an eleven-year-old female being investigated for proportional short stature revealed a 44, X, der(15; 22)(q10;q10) karyotype. This is the first case report of a patient with monosomy X and an aparently balanced 15:22 translocation.

Key words: Abnormal D 15 Chromosome; Abnormal G 22 Chromosome; Chromosomal Translocation; Monosomy; Robertsonian Tanslocation; Turner syndrome.

Resumen

El cariotipo de rutina de un individuo del sexo femenino de once años de edad, que estaba siendo estudiado por una baja talla proporcionada, reveló el siguiente resultado: 44, X, der(15; 22)(q10;q10). En este trabajo se reporta el hallazgo cromosómico en el que se combina una monosomía del X y una translocación 15:22 aparentemente balanceada.

Palabras clave: Cromosoma 15 anormal, cromosoma 22 anormal, translocación cromosómica, traslocación robertsoniana, Síndrome Turner.

Introduction

Monosomy X is one of a few viable forms of human aneuploidy. It is estimated that of 100 monosomy X conceptuses, only one will be live born, the rest are lost to early first trimester miscarriage or stillbirth. The prevalence in the live birth cohort is 1/2500 females.[1]

Robertsonian translocations, on the other hand, represent the most frequent chromosomal aberration in humans. Apart from rare examples of uniparental disomy (UPD) there is usually no phenotype associated with balanced structural defects.

Here we present a case carrying a Robertsonian translocation together with a monosomy of the X chromosome, giving rise to a unique karyotype with minimal clinical features.

Case report

The patient, an eleven year old female was born to a 27 year old P_0G_1 mother and her 29 year old father. There was no history of consanguinity and the family history was negative.

The baby was born at term after an uneventful pregnancy. Mild lymphedema of the hands and feet were noted shortly after delivery and a clinical diagnosis of Turner Syndrome was suspected, however a karyotyping was not performed.

Subsequently the proband was refered to our centre because of proportional short stature. At a chronological age of 11 years 2 months the physical examination revealed a heigth of 115 centimetres, weight of 30 kilograms and a head circumference of 52 centimetres. In addition there were signs of a low hair line,

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broad neck, high palate, broad thorax, wide spaced nipples, hyperconvex nails with shortening of the 4th and 5th metacarpals, and numerous nevis located mainly at the thorax and the back. External genitalia were normal.

Laboratory investigations showed a normal fasting blood glucose level, as well as creatinine and liver enzymes. In the endocrinological examination, thyroid function and levels of thyroxine (T4) and TSH were found to be normal.

An echocardiography was normal.

The ultrasonographic examination showed normal kidneys and renal collecting system. The uterus and gonads appereance was also normal.

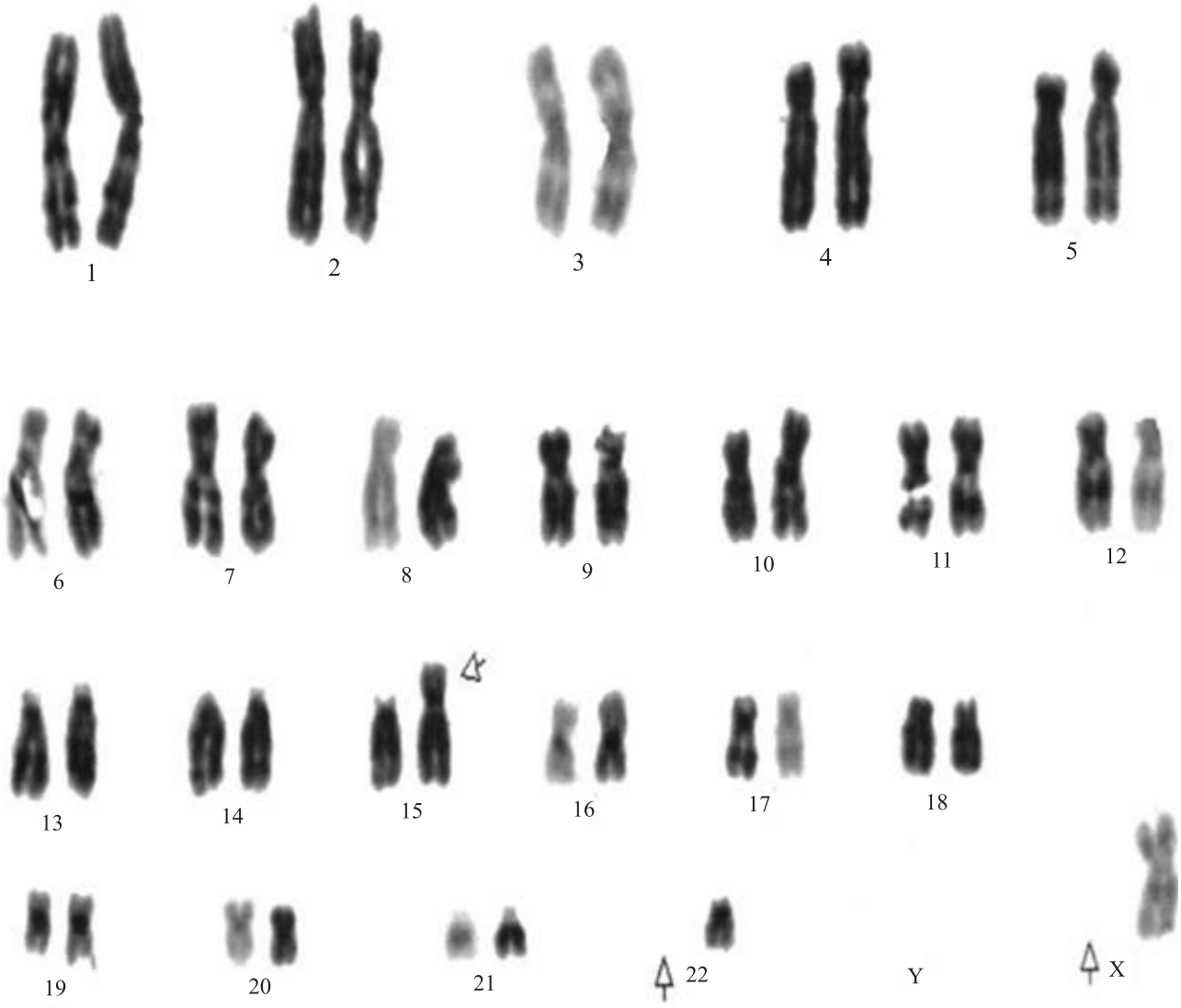
Materials and Methods

After informed consent from the parents was obtained peripheral blood karyotyping with Giemsa banding was performed according to standard procedures, and 10 metaphases from different culture flasks were examined at the Provincial Center of Medical Genetics in Holguin, Cuba.

Results

Chromosome analysis showed 44 chromosomes including an X monosomy together with a Robertsonian translocation between chromosomes 15 and 22: 44, X, der(15; 22)(q10;q10) (Figure 1).

Figure 1. Karyogram showing 44 chromosomes, including a 15-22 Robertsonian translocation and an X monosomy.



This couple considered their family complete and the mother had a tubal ligation after the birth of a second apparently unaffected child, that was why they did not agree to parental karyotyping.

Discussion

Four previous cases have been reported of patients having both a monosomy of the X chromosome and a 13:14 Robertsonian translocation.[2-5] The present case is the first report of an X monosomy together with an apparently balanced Robertsonian translocation involucrying chromosomes 15 and 22.

In 1985 Salamanca[2] described the first case with Turner Syndrome and a 13q14q translocation, he did not investigate the origin of the paternal nondisjunction of X chromosome. The second report was made by Laszlo[3] refering to a case of 44,X streak gonad syndrome who´s mother carried a familial 13-14 Robersonian translocation. There was no convincing evidence of an interchromosomal effect in this case. Krajinovic[4] presented a similar case identifying the paternal origin of both the X chromosome and the 13-14 translocation, concluding that translocation did not exert an interchromosomal effect on the nondisjunction of X chromosome. The fourth case described by Lourenço da Silva,[5] of a five-year-old female having an X monosomy and a 13-14 translocation, both inherited from the mother, thus ruling out an interchromosomal effect in meiotic nondisjunction.

With some exceptions patients with a Robertsonian translocation karyotype do not exhibit clinical manifestations. We did not find any previous report of a 15-22 Robertsonian translocation combined with an X monosomy in our review of the literature. However, this balanced karyotype has been reported combined with a Philadelphia (Ph) Chromosome-Positive Chronic Myelocytic Leukemia (CML)[6] in a phenotypically normal 40-year-old man. The possibility that carriers of Robertsonian translocations have an increased risk to develop Ph-positive CML was mentioned. A case of Cardio-Facio-Cutaneous (CFC) Syndrome and an apparently balanced 15:22 karyotype was reported by Fryns.[7]

A possible relationship between translocations and nondisjunction of chromosomes unrelated to the translocation has been extensively reviewed.[8-10]

In the present case due to the lack of parental DNA sample it was not possible to determine the paternal origin of the X, nor the translocated chromosomes.

Taking into account all five cases reported (2,3,4,5 and this case) the question of a possible interchromosomal effect can not be settled, because data on parental origin was missing in three of five cases reported.

None of previous studies considered the possibility of an early postfertilization interchromosomal effect as the explanation for the loss of an X chromosome. Further studies are therefore necessary to test this hypothesis.

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