Paternal Robertsonian translocation t(13q;14q) and maternal reciprocal translocation t(7p;13q) in a couple with repeated fetal loss

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SUMMARY Marriages involving partners both of whom have abnormal karyotypes are rare and are usually ascertained because of a history of infertility, repeated abortions, or the birth of a balanced translocation carrier or chromosomally abnormal offspring. Abnormalities which have been noted include sex chromosome aberrations in both parents or a sex chromosome abnormality in one parent and an autosomal abnormality in the other.^{1,2} Four papers have reported balanced reciprocal autosomal translocations in both parents,³⁻⁶ two couples representing a first cousin marriage.^{5,6} We present a case of a paternal 13;14 Robertsonian translocation and a maternal (7p;13q) reciprocal translocation in a couple with repeated fetal loss.

Case report

The husband and wife were both 25 years old and presented with a history of two spontaneous abortions at 13 and 10 weeks' gestation. The wife had difficulty in conceiving and was placed on Clomid approximately 14 days before conception during both pregnancies. The husband had decreased sperm production presumably secondary to a varicocele. No significant complications were noted before the time of miscarriage in either pregnancy. Both patients were in good health and there was no consanguinity. There was no history of drug or alcohol abuse or radiation or chemical exposure in either patient. Family history was positive for anencephaly in the wife's sister, one miscarriage in

the wife's mother, and two miscarriages in the husband's aunt.

CYTOGENETICS

Chromosome studies were obtained from short term phytohaemagglutinin stimulated lymphocytes. GTG banding performed on the husband's cells revealed the presence of a Robertsonian translocation involving a chromosome 13 and a 14. The karyotype was designated 45,XY,t(13q;14q) (fig 1). Cytogenetic studies performed on his mother revealed the presence of the same translocation. Other family members declined cytogenetic studies.

GTG banding studies performed on the wife's cells revealed the presence of a balanced reciprocal translocation 7;13. The karyotype was designated 46,XX,t(7;13)(p21;q22-00) (figs 2 and 3). Cytogene-

FIG 1 Partial karyotype of the husband showing Robertsonian translocation t(13q;14q).

FIG 2 Partial karyotype of the wife showing reciprocal translocation t(7;13)(p21;q22-00).

FIG 3 Diagrammatic illustration of the reciprocal translocation. Breakpoints are indicated by arrows.

tic studies on her parents were normal, indicating that the translocation was de novo in this patient.

The wife recently had an amniocentesis at 16 weeks' gestation in her third pregnancy. Cytogenetic studies performed on cultured amniotic fluid cells revealed the presence of a female karyotype with a balanced reciprocal translocation like that present in the mother: 46,XX,t(7;13)(p21;q22-00).

Discussion

Dq;Dq Robertsonian translocations occur in an estimated 7 in 10 000 live births; balanced reciprocal and insertional translocations occur in approximately 9 in 10 000 live births.⁷ Therefore, the probability that one parent had a Robertsonian translocation and the other parent a reciprocal translocation is less than 6.3×10^{-6} .

This case presented a complex counselling problem, since the reproductive fitness of one, much less two, translocation carrier parents remains uncertain. The reduced sperm count in the father could represent the subfertility which has been reported in male t(13q;14q) carriers,^{8,9} and not oligospermia secondary to the varicocele as initially thought.

The theoretical probability that this couple would have a cytogenetically normal or balanced translocation offspring is 4 in 48. Odds may be somewhat more favourable if natural selection of normal germ cells is a factor. Also, if one assumes that the t(13q;14q) in the male carrier does not, or only minimally, increase the risk for having a chromosomally unbalanced offspring and that it does not increase the risk of spontaneous abortion,¹⁰ the reproductive outcome in this couple would primarily be the consequence of the maternal translocation.

Aminocentesis for antenatal chromosome studies appears to offer the most viable option for these

parents and similar couples who want other pregnancies.

As emphasised by Seabright,¹¹ routine banding studies are simple and therefore mandatory in all types of cytogenetic studies. This would allow the identification of subtle chromosome rearrangements in parental translocations which can result in unbalanced or balanced fetal karyotypes.

Cytogenetic analysis of the aborted products or viable offspring of this couple and those of other patients with similar chromosomal anomalies may allow further definition of the reproductive fitness of these translocation carrier parents and, subsequently, more precise genetic counselling.

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