XY translocation in a male inherited from his mother

BACKGROUND

Xp:Yq translocations are rare chromosomal rearrangements. Their molecular characterization suggest the etiology due to an aberrant exchange between highly homologous sequences on Xp and Yq during male meiosis. The phenotype of male carriers varies according to the extension of Xp deletion. They present short stature, Léri Weill dyschondrosteosis, facial dysmorphism, ichthyosis, mental retardation and hypogonadotropic hypogonadism in combination with anoma when the deletion is large. Females carriers are usually normal and they are fertile.

CASE REPORT

- At 1.07 yrs: evaluated for bilateral cryptorchidism and microphallicus.
- Child of unrelated and healthy parents. H: 70.5cm -1.97 SDS. W: 8.680 Kg -1.34 SDS.
- HC: 44.6cm (Pc 50). Minor facial dysmorphism: bulbous tip nose, elongated philtrum, fish mouth, hiperdysplastic and normal set ears, short neck, widely-spaced nipples, partial ichthyosis and developmental delay.
- Right testis nonpalpable, left testis inguinal, penis 1.2 cm.
- At 12 yrs: hCG stimulation test produced no change in serum testosterone.
- At 14.6 yrs: GnRH stimulation test: FSH and LH were both <0.5 IU/L. (IFMA).
- Results of hCG and GnRH stimulation tests confirmed the diagnosis of hypogonadotropic hypogonadism.
- Treatment with testosterone enanthate developed secondary sexual characteristics.
- At 17.4 yrs: H: 160.5 cm SDS -1.66. W: 77 kg. Facial hair and Tanner V pubic hair.
- Sleep disorders. Mental retardation.

METHODS

Karyotyping, molecular analysis and fluorescence in situ hybridization studies, were carried out to refine the breakpoints of the underlying unbalanced sex chromosome rearrangement.

RESULTS

Cytogenetic analysis of the patient showed male karyotype with additional chromosomal material on the distal short arm of the X chromosome: 46,Y,add(X)(p22.3).
The maternal karyotype was 46,X,add(X)(p22.3).

MOTHER´S KARYOTYPE: 46,X,der(X)t(X;Y)(p22.3;q11.2): monosomy Xp22.3-Xpter and disomic Yqh (Yqh++)

PROBAND´S KARYOTYPE: 46,Y,der(X)t(X;Y)(p22.3;q11.2): nullisomic Xp22.3-Xpter and disomic Yqh (Yqh++)

DNA analysis for Y-chromosomal sequences

Partial C-banded karyotype and ideograms of the normal X chromosome and the der(X) chromosome. The Xp22.3 breakpoint on the der(X) and Yq11.2 are arrowed.

Replication studies were performed on cultured lymphocytes of the mother after bromodeoxyuridine (BrdU) incorporation (6-h) exposure. The der(X) chromosome was late replicating in all metaphases.

DISCUSSION

Males carrying an X-Y translocation are nullisomic for Xpter chromosomal sequences genetically active, and disomic for Yqh sequences genetically inactives.

The phenotype in females depends on the X-inactivation pattern.

CONCLUSION

- We suggest that the translocation X-Y arises from the maternal grand-father meiosis.
- We conclude that the clinical signs present in our patient are due to loss of distal contiguous Xp genes, located in Xp22.3.