CASE REPORT

Cytogenetic Studies in Males with Hypogonadism and Gynecomastia

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Abstract

Two male patients in the age group of 11-12 years having hypogonadism and gynecomastia have been found to be mosaic for sex-chromosomes (45, X/46, XY). In both the cases, two cell lines (45, X/46 XY) are present in the ratio of 1:1. Phenotypic anomalies such as hypogonadism and gynecomastia have been attributed to sex-chromosome mosaicism.

Key Words

Gynecomastia, Hypogonadism, XY mosaicism

Introduction

Hypogonadism and gynecomastia are the clinical manifestations of Klinefelter syndrome and its variants (1-3) and of males having mosaicism of the sex-chromosomes (4-8). Both these phenotypic anomalies are because of the sex-chromosome abnormalities and males with these abnormalities are always infertile. While hypogonadism is characterized by extremely small and non-functional testes, in gynecomastia there is abnormal enlargement of breast. Males with gynecomastia have greater body mass than other boys of similar age. Besides chromosomes, numerous pathogenic mechanisms have been involved in gynecomastia (9-11) but hypogonadism is either due to endocrinological problems (12,13) or chromosomal abnormalities (2).

In the present study, 2 males in almost similar age group and with same phenotypic anomalies have been subjected to chromosome study.

Clinical History

An 11 year and six months old boy (Case 1) 2nd in birth order born to non-consanguinous, healthy couple was clinically found to have gynecomastia and hypogonadism and normal I.Q. All brothers and sisters of the proband were normal.

A 12 year old boy (Case 2) born to young healthy, non-consanguinous couple was clinically found to have gynecomastia and hypogonadism. IQ was normal. There was no family history of any congenital anomaly.

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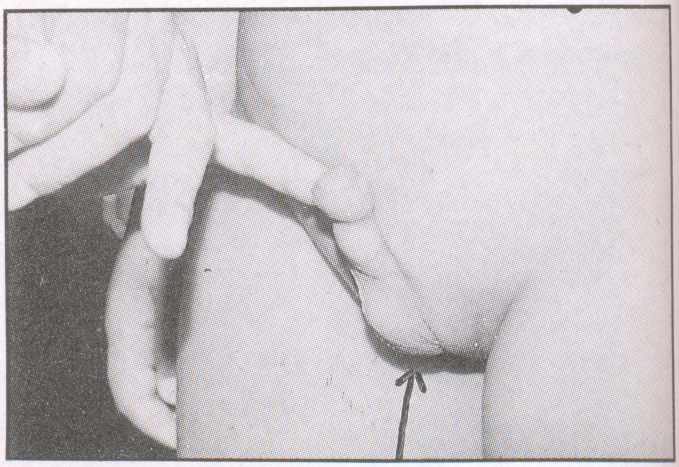
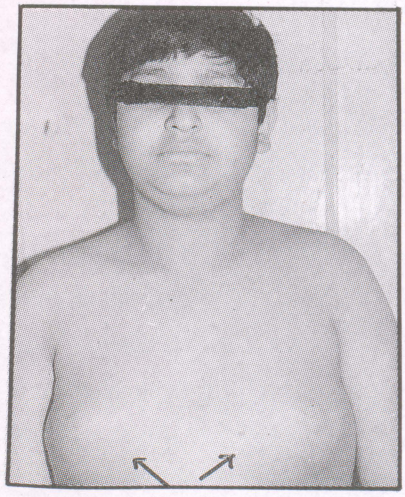
Short term lymphocyte culture were setup in both the cases. Harvesting was done after 48 hours and slides were prepared without banding and also with banding techniques (14) with slight modifications. Seven days old slides were treated with 0.025% trypsin for 30 seconds. After rinsing the slides with distilled water, they were treated with 90% alcohol and finally stained for 5 minutes in 5% Giemsa stain.

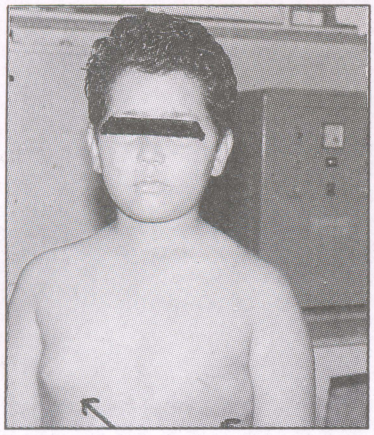
In both the cases, some of the well spread metaphase plates were selected for the study of the exact chromosome number and for the preparation of the karyotypes. Some of the G-banded cells possessed 46 chromosomes (Fig. 1) while others contained 45 chromosomes (Fig. 3). Karyotype prepared from the cell having 46 chromosomes contained XY as the sex chromosomes (Fig. 2). Whereas the karyotype prepared from the cell possessing 45 chromosones contained single X chromosome (Fig. 4), thus representing X0 sex chromosome constitution. In both the karyotypes no structural abnormality of any kind has been observed. Both cell lines (45,X/46,XY) have been found in the ratio of 1:1.



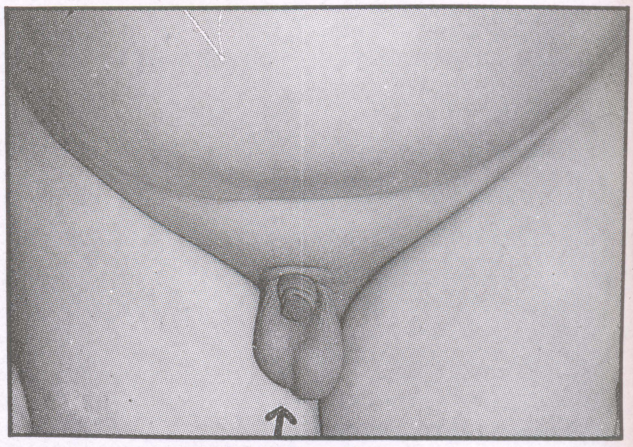
Case-I



Case-II



Case-I



Case-II

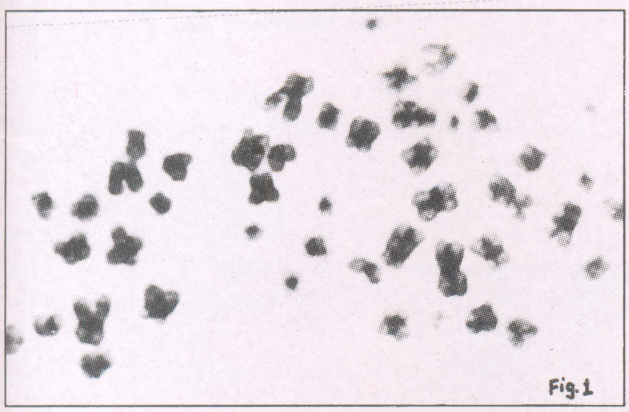


Fig 1. G-baned metaphase plate possessing 46 chromosomes

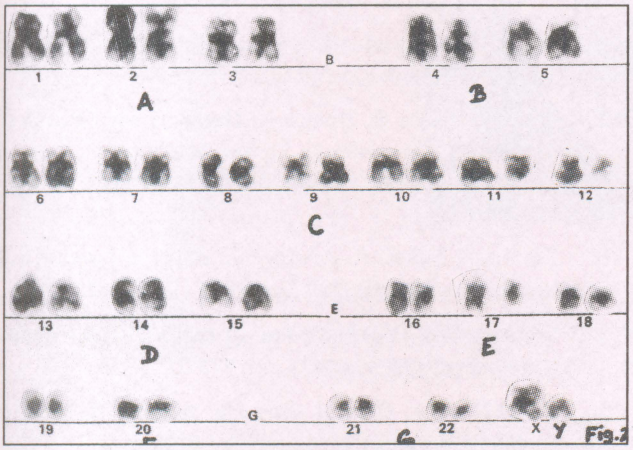


Fig. 2 : Karyotype showing 46, XY.

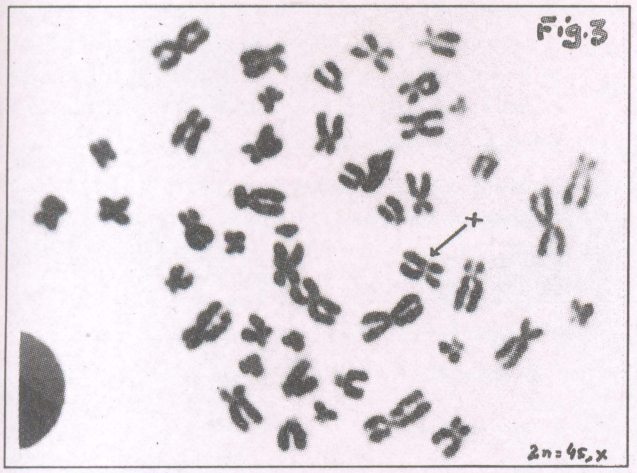


Fig. 3 : A metaphase plate without G-banding pessessing 45 chromosomes

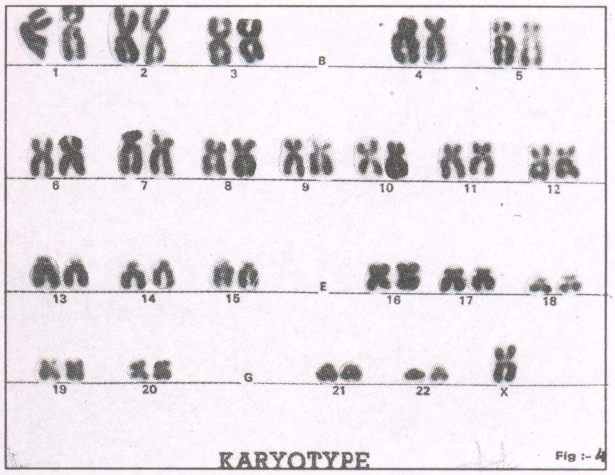


Fig. 4 : Karyotype showing 45,X.

Discussion

Chromosome study in the males with hypogonadism and gynecomastia becomes essential from the clinical point of view. These children have varied phenotype. They have either mixed gonadal dysgenesis (9,15,16) or ambiguous genitalia (10,16) or are true hermaphrodites (17). In all these cases, abnormalities of genitalia have been attributed to sex chromosome mosaicism (X/XY). 45,X/46,XY mosaicism has also been reported in phenotypically female patients (5) which have some features of Turner syndrome.

The present cases are phenotypically males with no ambiguity of external genitalia or hermaphroditism. They are of normal height, but gynecomastia and hypogonadism are the main clinical manifestations. Gynecomastia is either seen in males who are Klinefelter or have hormonal disturbances. It has not been reported in males with X0/XY sex chromosomes mosaicism. Both the present cases, in addition to other phenotypic anomalies, have hypogonadism. Clinical conditions like hypogonadism interfere with normal reproductive life, whereas, gynecomastia may or may not do so. If gynecomastia is due to an abnormality of the sex chromosome (XXY), the male called Klinefelter syndrome is infertile, however, if it is only due to

hormonal disturbances, it is curable and there is no effect on the reproductive life of the patient. In the present cases, gynecomastia is neither because of an extra X chromosome nor due to harmonal disturbances, it is because of 45, X/46, XY condition and both the the cases have hypogonadism too. Whether these cases lead a normal reproductive life or not is something to be found out.

Acknowledgement

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