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Klinefelter’s syndrome associated with a D/D translocation

Summary. A case of Klinefelter’s syndrome and a simultaneous familial D/D translocation is described. The clinical, endocrine, and psychiatric features were typical of those found in Klinefelter’s syndrome. Other family members showed no obvious abnormality despite presence of the D/D translocation.

Centric fusion translocation of the t(DqDq) is the most common chromosomal deviation with a general prevalence of about 1 per 1000 live births (Hamerton, 1971). It may be sporadic or familial (Cohen, 1971) and associated with other aneuploidies, infertility, and spontaneous abortions (Wilson, 1971). However, Hamerton found no increase in infertility or spontaneous abortions, which may indicate selection in certain series. The general prevalence of Klinefelter’s syndrome is about 1:500 live male births (Hamerton, 1971).

Although both of these aneuploidies alone occur not infrequently in the general population, their association has been only rarely reported (Lejeune et al, 1960; Tiepolo et al, 1967; Gilgenkrantz et al, 1970). This paper describes such a case of double aneuploidy: familial t(DqDq) translocation associated with Klinefelter’s syndrome.

Case report

S.K.H., a 62-year-old-white male was first seen in September 1973, for calcific tendinitis of the left shoulder. He had been hospitalized several times for various medical problems including diabetes mellitus, myocardial infarction, hypertension, repair of a hiatal hernia, appendectomy, haemorrhoidectomy, excision of an epidermoid cyst of the neck, and surgical repair of angular cheilosis.

He was the fourth of five sibs, all of whom are living and well, except for a sister who has Parkinson’s disease. The sibs were all married and have 29 children, two miscarriages and one early death. The mother was 31 years old when the propositus was born.

The propositus is of normal intelligence, and graduated from the Chicago Academy of Fine Arts, yet he worked for 29 years in a series of menial jobs. His puberty was normal except for very sparse facial hair and small testes. Libido was poor; stamina and strength were lacking. He married at age 32. He had a number of emotional problems including several depressions which required psychiatric attention.

Physical examination revealed a rather chubby white male of average intelligence and depressed demeanor (Fig. 1). He has increased peripelvic fat distribution and bilateral gynaecomastia. Facies appear hypogonadal with fine wrinkling, thin skin, and sparse beard. Scrotum and penis are normal but there is a female scutcheon and small firm testes (1.0 cm in long diameter). His colour vision is normal.

Radiology of the skull showed a normal sella turcica. Radioimmunoassay produced the following data: serum FSH of 73 IU/ml (normal 5–25) and a serum LH of 90 IU/ml (normal 6–30). Plasma cortisol and urinary corticoids and 17-ketosteroids were normal. The androsterone–aetiocholanolone ratio was 0.38, which is more characteristic of the female than the male proportion. Thyroid function tests were all normal, as was the antibody test to thyroglobulin. Barr bodies were present in 12% of the buccal mucosal cells. The patient was not able to produce a semen specimen for examination. In view of the patient’s psychiatric status, we decided not to perform a testicular biopsy.

Chromosome studies

Chromosome studies were carried out on peripheral lymphocytes by a modification of the technique of Moorhead et al (1960). Since both parents were dead and three sibs unavailable, we examined only the patient and one sister. The karyotype of the patient (Fig. 2) was 46,XXY, t(DqDq) in 87% of the cells; that of the sister, 45,XX,t(DqDq).

To characterize the D/D translocation more closely, we performed differential Giemsa staining (Seabright, 1971) on the chromosomes of the

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patient and his sister. This revealed a 13/14 Robertsonian translocation. Since the same translocation was found in two members of the same family, it indicates the familial type.

**Discussion**

Cases of t(DqDq) translocations are fairly numerous, but their association with Klinefelter's syndrome appears to be quite rare.

A t(DqDq) translocation is in fact one of the most common chromosomal abnormalities in man. It occurs in approximately 1:1000 live births. Autoradiography (Cohen, 1971), or Giemsa banding, techniques permit exact identification of chromosomes. In our case, Giemsa banding showed that the chromosomes involved were Nos. 13 and 14 (Fig. 3). A recent study of 64 t(DqDq) translocations (Cohen, 1971) also demonstrated the highest frequency (77%) for these two chromosomes.

**Fig. 1.** The patient showing gynaecomastia and testicular atrophy.

**Fig. 2.** 46,XXY,t(DqDq) of the patient (peripheral blood culture).

**Fig. 3.** Chromosomes of the D group following differential Giemsa staining. A 13/14 Robertsonian translocation is present.

The coincidence of chromosomal non-disjunction and centric fusion of the (13/14) type, as in the present case, raises the possibility of a common cause for the two aberrations. Klinefelter's syndrome occurs in about 1:500 live male births and cases of t(DqDq) in about 1:1000 live births or 1:2000 male births. Hence the expected likelihood of both abnormalities occurring in the same male should be about 1:1 000 000 live births from chance alone.

We could find only three reported cases of Klinefelter's syndrome occurring in a t(DqDq) heterozygote. This figure is too small to permit any firm conclusions, but it suggests that there is no relationship between the two chromosomal aberrations.
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REFERENCES

Partial 9 trisomy by 3 : 1 segregation of balanced maternal translocation (7q+; 9q−)*

Summary. A male infant is presented with an extra derivative chromosome No. 9 resulting from a 3:1 meiotic segregation of a maternal balanced translocation involving the long arms of chromosomes No. 7 and 9. The patient is trisomic for the short arm and secondary constriction of the long arm of No. 9 and for the telomeric end of the long arm of No. 7. In addition to the features of the 9p trisomy syndrome he presents marked congenital myopia and extreme hypoplasia of the penis.

Trisomy for the short arm of chromosome No. 9 was first described by Rethoré et al (1970) and there are at present at least 11 reported cases in the literature (see review by Rethoré et al, 1973). Most cases were derived from parental balanced translocations and were trisomic for small segments of different other chromosomes in addition to No. 9. The phenotypic spectrum of this syndrome includes microbrachicephaly, oblique antimongoloid palpebral fissures, ocular hypertelorism, malformed ears, phalangeal hypoplasia, dermatoglyphic anomalies, and variable degrees of mental retardation.

In this report we present a male infant with trisomy for the short arm and secondary constriction region of the long arm of chromosome No. 9 and for the telomeric end of the long arm of chromosome No. 7 who, in addition to the phenotype of the 9p trisomy syndrome, has congenital myopia and genit al hypoplasia.

Case report

The propositus is the first live born child of healthy and non-consanguineous parents. The mother was 25 years old and the father 26 years old at his birth. Three previous pregnancies ended in spontaneous abortions in the first trimester. Vaginal bleeding occurred during the second month of the propositus' gestation. He was born at term, weight 3850 g, and required stimulation to initiate breathing; unilateral pnuemothorax developed subsequently, but this resolved spontaneously. Early psychomotor development was delayed, while physical growth rate was normal. At 2 months of age weight was 6000 g, length 57 cm, and head circumference 40.5 cm. At 8 months of age weight was 10 100 g, length 71.9 cm, and head circumference 46 cm. At this time physical examination showed multiple anomalies (Figs. 1 and 2); acrocephaly, large anterior fontanelle, ocular hypertelorism, antimongoloid slant of the eyes, large low set ears with otherwise normal conformation, broad and bulbous nose, high arched palate, micrognathia, short and broad neck. Hands and fingers were short and broad, with bilateral clinodactyly of fifth fingers and hypoplastic nails. Cutaneous dimples were present in the external sides of both knees. The phallicus was extremely small and the scrotum hypoplastic; testes were descended and small. Ocular examination revealed a severe myopia of 16°. Cardiovascular evaluation was normal. He had dysphonic voice and the psychomotor development was mildly retarded.

Radiology showed retarded bone age and hypoplastic

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