

# Partial trisomy 18 in a family with a translocation (18;21)(q21;q22)

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**SUMMARY** A family is described in which 2 sibs had similar congenital abnormalities. Chromosome investigation of the mother and another child disclosed they were carriers of a translocation  $t(18;21)(q21;q22)$ . The karyotype of one of the abnormal infants was determined and was found to be consistent with partial trisomy 18, 46,XY,-21,+der(21),t(18;21)(18pter → 18q21::21q22 → 21qter)mat

In 1962, Brodie and Dallaire described a male infant with the clinical features of Edwards's syndrome who was found to have partial trisomy for chromosome 18 caused by an unbalanced translocation of the long arms of 18 to a D group chromosome. Subsequently cases of partial trisomy E involving translocation of 18q material to autosomes of other groups have been reported, including cases involving translocation of the long arms of 18 to chromosome 21 (Cohen *et al.*, 1972; Dziekanowska *et al.*, 1976; Neu *et al.*, 1976). We present a further example of 18q/21 translocation in a family where two members carried the translocation in its balanced form and the index case had congenital abnormalities consistent with Edwards's syndrome. The family pedigree is shown in Fig. 1.

### Case reports

#### III. 4

The propositus was born in 1974 after a normal pregnancy to an unrelated 32-year-old mother and 27-year-old father. Delivery was normal, birthweight 2570 g, and gestational period 41½ weeks. At birth he was cyanosed and apnoeic. On the fifth day a grade IV pansystolic murmur was heard and the infant developed signs of heart failure which responded to digoxin. Cardiac catheterisation performed at the age of 2 months identified a ventricular septal defect but this did not require surgical intervention. Widely spaced nipples, a prominent praecordium and Harrison's sulcus were also noted. At age 3 months an inguinal hernia was observed on the right side and the

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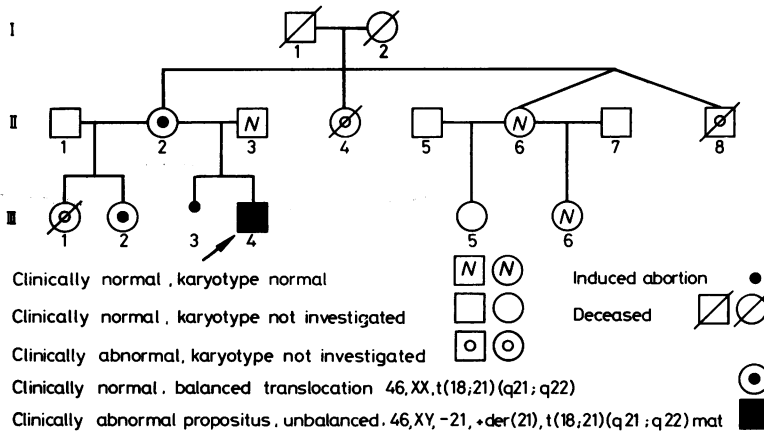


Fig. 1 Pedigree of family.

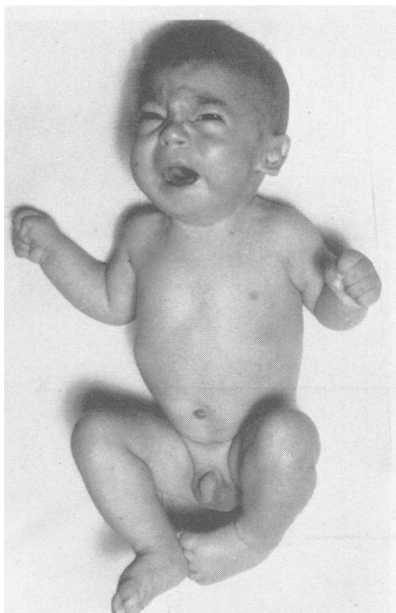


Fig. 2 *Propositus* age 5 months.

right testis was not palpable in the scrotum. The hernia was surgically repaired and a right orchiopexy performed. His facial appearance was abnormal, with micrognathia, narrow palatal arch, long upper lip, low set rotated ears, and ingrowing eye-lashes (Fig. 2). During the first 18 months of life the child had frequent attacks of upper respiratory tract infection accompanied by febrile convulsions. At his present age of 3 years 3 months his physical condition is generally good, though he is below but parallel to the 3rd centile for height and weight. He walks safely but has very poor powers of communication, with a vocabulary of only 5 words.

III. 1

A female born in 1959. The delivery was normal, period of gestation 36 weeks, and birthweight 2693 g. The infant progressed satisfactorily, but medical records commented on cold blue extremities and cyanosis after feeding. She was admitted to hospital at the age of 2 months because of cyanotic attacks and

difficulty in feeding. She died very shortly after admission. At necropsy a ventricular septal defect, short sternum, and hypoplastic mandible were noted.

III. 2

A female born in 1961. The pregnancy was uneventful, delivery normal, gestational period 41 weeks, and birthweight 3062 g. The child is phenotypically normal.

III. 3

Induced abortion carried out in 1971 on psychiatric grounds.

II. 2

Born in 1942, a physically fit female who was married twice and gave birth to two children (III.1 and III.4) with congenital anomalies.

II. 4 AND II. 8

According to (II.2) both died shortly after birth of congenital cardiac lesions.

**Dermatoglyphs**

The dermatoglyphs of the propositus differ from those observed in his mother, father, and half sister, and show features that are typical of E trisomy (Fig. 3).

The digital patterns show an excess of arches; there are 6 arches on the fingers and 9 arches on the toes. The total finger ridge count is 60 ridges which is low and well below the expected value of 169 ridges derived from the parents. On the hallucal area of the right sole there is an open field pattern.

**Cytogenetic investigations**

Chromosomal studies were performed on metaphases from lymphocytes of peripheral blood using a modification of the method of Moorhead *et al.* (1960). The G-banding technique of Seabright (1971) was also used for detailed analysis of the structural rearrangement of the chromosomes.

Study of the karyotype of (II.2) revealed that she was carrying a presumptive reciprocal balanced translocation 46,XX,t(18;21)(q21;q22). A break had

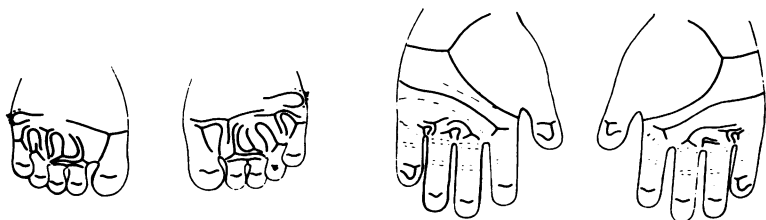


Fig. 3 *Dermatoglyphic pattern on hands and feet of propositus.*

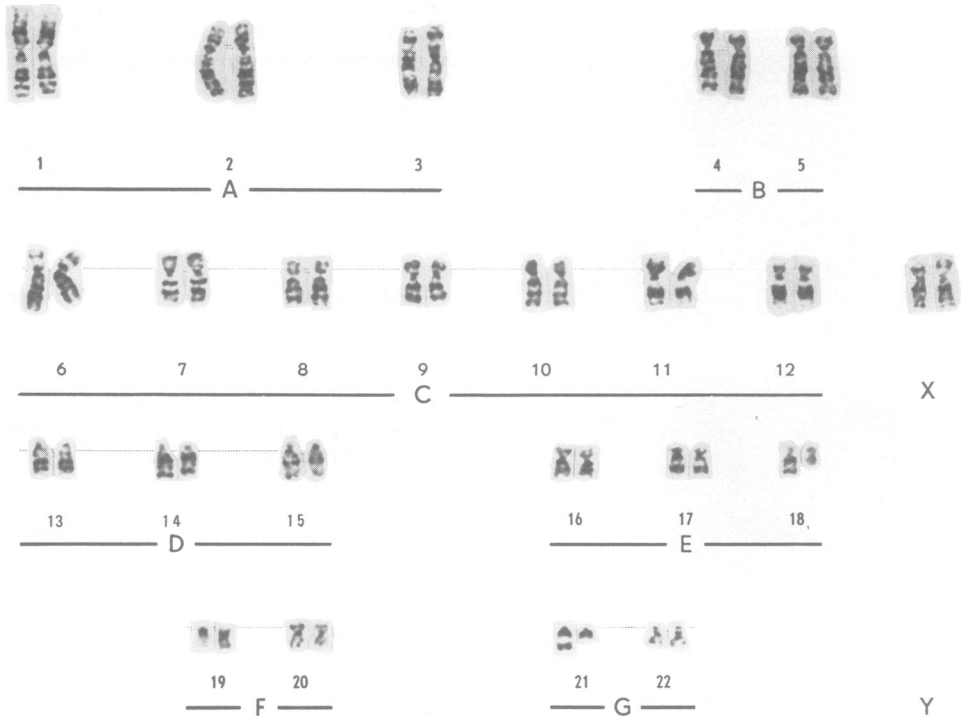


Fig. 4 Karyotype of (II.1) showing translocation  $t(18;21)(q21;q22)$ . G-banding.

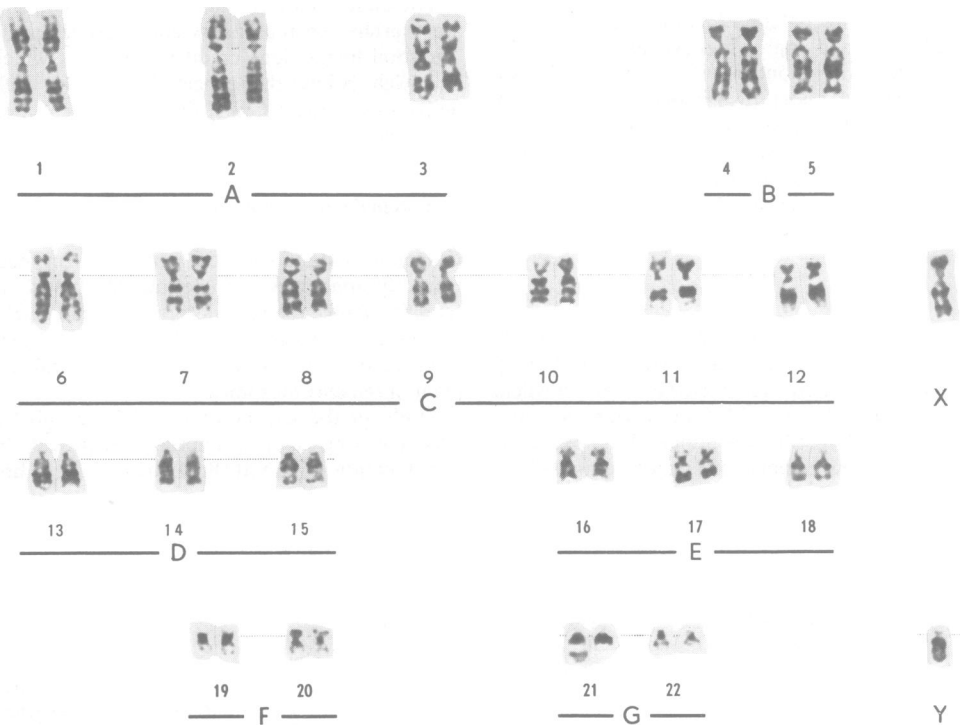


Fig. 5 Karyotype of propositus 46,XY,-21,+der(21), $t(18;21)(18\text{pter} \rightarrow 18q21::21q22 \rightarrow 21q\text{ter})\text{mat}$ . G-banding.

occurred in or near the pale staining band q21 of chromosome 18, and the entire part distal to this break had become attached to the broken end of long arm of chromosome 21 (Fig. 4). The propositus inherited the translocation chromosome resulting in the partial trisomy 18, 46,XY,-21+der(21),t(18;21)(18pter → 18q21::21q22 → 21qter)mat (Fig. 5). Study of the karyotype of the half sib (III.2) of the propositus revealed that she was a carrier of the translocation identified in (II.2). The father (II.3), maternal aunt (II.6), and cousin (III.6) had normal karyotypes.

### Comment

The clinical findings in the propositus are consistent with those most commonly found in regular trisomy 18, namely developmental retardation, failure to thrive, micrognathia, low-set malformed ears, congenital cardiac disease, inguinal hernia, undescended testis, and an excess of arches on the digits (Taylor, 1968; Hamerton, 1971). However, other common features of Edwards's syndrome such as hypertonia, elongated skull, short sternum, ocular hypertelorism, flexion deformity of fingers, hypoplastic nails, limited hip abduction, prominent calcaneus, and short dorsiflexed hallus were not observed in the propositus. The half sib (III.1) was observed at necropsy to have some of the abnormalities present in the propositus, but at the time of her death Edwards's syndrome was not recognised as a separate entity and cytogenetic study was not performed.

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