Table Cases of familial translocations with aneuploidy not involving translocated chromosomes

	No of reported cases	Expected frequency
Down's syndrome	10 cases	1/ 350 000
Klinefelter's syndrome	6 cases	1/ 500 000
18 trisomy syndrome	1 case	1/2 500 000
Turner's syndrome	1 case	1/3 400 000

relationship between the two chromosomal aberrations.

To our knowledge, the present case is the first report of Turner's syndrome with a familial balanced translocation not involving the X chromosome. Turner's syndrome occurs in about 1 in 6800 live births. Cases with balanced translocations occur in about 1 in 500 live births and most cases originate from familial translocation carriers (Bochkov *et al.*, 1974; Hamerton *et al.*, 1975; Nielsen and Sillesen, 1975). Hence, the expected likelihood of both abnormalities occurring in the same female should be about 1 in 3 400 000 live births through chance alone. From a similar calculation the expected occurrence of Down's syndrome, Klinefelter's syndrome, and 18 trisomy syndrome with a familial balanced translocation should be about 1 in 350 000, 1 in 500 000, and 1 in 2 500 000, respectively. When the number of reported cases of Down's syndrome with familial translocations are taken as a standard, the number of reported cases of Turner's syndrome and other aneuploidies with familial translocation in publications seem to match the expected frequency (Table). In addition, non-disjunction of the X chromosome in Turner's syndrome generally occurs in paternal gametogenesis (Sanger *et al.*, 1971). Though we could not determine the origin of the X chromosome, it is likely that in this case the non-disjunction also occurred in paternal gametogenesis. There seems to be no relationship between the two chromosomal abnormalities in the present case.

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De novo interstitial deletion del(1)(p21p32)

SUMMARY A girl aged 14 years 9 months, overweight, with severe psychomotor retardation, short stature, a sheep-like face, malformed ears, skeletal and dermatoglyphic abnormalities, and partial deletion of the short arm of chromosome 1 is presented. The karyotype was 46,XX,del(1)(qter→p22::p32→pter).

Structural anomalies of chromosome 1, compatible with the development to term of the fetus, occur quite rarely. Until now, 5 partial trisomies (Neu and Gardner, 1973; Van den Berghe *et al.*, 1973; Norwood and Hoehn, 1974; Garver *et al.*, 1976;

Palmer *et al.*, 1977) and 3 partial deletions (Turleau *et al.*, 1974; Koivisto *et al.*, 1976; Garver *et al.*, 1976) of the long arm of this major chromosome have been reported.

Our report presents for the first time the clinical syndrome caused by a structural anomaly on the short arm of chromosome 1, which occurred *de novo*.

Case report

The patient, a female, born in 1962, has been under medical care from the age of 9 months for severe psychomotor retardation. The parents were not consanguineous and, at birth, the father was 28 and the mother 25 years of age. The proband, their first child, was born at 7 months and 2 weeks' gestation after an uneventful pregnancy. At birth the baby was 48 cm long and weighed 2000 g.

At the time of the first medical examination, the child was 63 cm tall and weighed 9 kg. Striking peculiarities were noticed: the face was round with a prominent, bulbous nose, a large, half-open mouth, ridged tongue, microretrognathism, small, asymmetrically-inserted and malformed ears (smaller

auricles with rolled-over helix covering the anhelix, large lobulus), short neck, convex thorax, widely spaced nipples, long thin fingers, clinodactyly of the 5th finger and toe, enlargement of the first interdigital space of the foot, genu valgum, and open anterior fontanelles (2/2 cm). The child made only slow movements, and did not sit, play, or talk.

At the ages of 5, 9, and 14 years (in 1968, 1971, and 1977, respectively) the patient was re-examined. There was little growth in stature and she was overweight (Fig. 1). The last time the patient was seen, at the age of 14 years 9 months, she showed grotesque thickening of the features of the face (sheep-like), predominantly facial and truncal distribution of the adiposity, and mental retardation (IQ = 50). Signs of puberty present were pubic and axillary hair and 2nd degree Tanner breast development (Fig. 2, 3, 4).

CLINICAL INVESTIGATIONS

X-ray examination showed thickened cranial bones, especially in the vertex area; sella turcica with moderate hypertrophy of the posterior lamella; dextroconvex dorsal scoliosis; distortions in the distal half of the metacarpals and phalanges, clinodactyly of the 5th finger and toe, and decalcification of the leg bones.

DERMATOGLYPHS

Digital dermatoglyphs

The digital dermatoglyphs are shown in the Table. Decadactyl formula, Al L8 W1; TRC 74.

Palmar dermatoglyphs

Right hand: formula a1, b8, cx, d11 t(11); $ab=48$, $bc=7$, $cd=30$; patterns Hy=Lu, Th=Ar, Ito, IIto, IVto; palmar sulcus type II, $atd=73^\circ$. Left hand: formula a1, b6, c(o), dlo, t'(11), $ab=28$; patterns Hy=M, Th=Ar, Ito, IIto, IVto, normal flexion lines, $atd=53^\circ$.

The total number of digital crests was at the lower limit of the normal control mean ($-1SD$). The triradius palmar line (A) opened at the root of the thumb and the axial triradius line (T) opened in the 2nd interdigital spaces of both hands. Ulnar loops on the right hand in the hypothenar area, associated with an increased atd angle, and a transitional form of palmar sulcus were present.

Fig. 1 Graphic representation of height and weight development.

Table Digital dermatoglyphs

	I	II	III	IV	V	Formula
Right hand	W	Lu	Ar	Lu	Lu	pattern L3 Al
	13	3	0	13	14	ridges 43
Left hand	Lu	Lu	Lu	Lu	Lu	pattern L5
	4	6	6	7	8	ridges 31

Fig. 2 *The patient at the age of 9 years 3 months (left) and 14 years 9 months (right).*

Fig. 3 *Facies of patient.*

Fig. 4 Feet of patient. Enlargement of the 1st interdigital space and bilateral clinodactyly of the 5th toe can be seen.

CYTOGENETIC FINDINGS

An X chromatin study showed 18% positive cells. There was an interstitial deletion of the short arm of an A1 chromosome. The chromosomal formula established with the help of GTG bands was 46, XX, del(1)(p22p32) or, in more detail, 46, XX, del(1)(qter→p22::p32→pter) (Fig. 5, 6). Cytogenetic findings in the younger sister and the parents of the patient were normal.

Fig. 6 Pair of chromosome 1 and diagrammatic representation of chromosomal bands.

Discussion

Partial monosomies and trisomies, through the gene imbalance that they induce, are the most frequent causes of spontaneous abortion and interruption of pregnancy. According to Boué (1977) only 6-7% of products of conception with structural abnormal-

Fig. 5 Karyotype of patient (G bands).

malities of the chromosomes survive the period of embryonal development. Most of them are eliminated before the mother is aware that she is pregnant and few embryos are brought to term. Yet, there is enough evidence to suggest that a fetus may survive even when over 5% of the haploid genome is triplicated, whereas small autosomal deficiencies are not compatible with complete embryonal development. Norwood and Hoehn (1974), in describing a trisomy for a segment of the long arm of an A1 chromosome (2 to 4 bands or 3·2% of the haploid genome), studied pregnancies in bearers of balanced translocations involving this arm. They found an increased incidence of spontaneous abortions (7/34) and fetuses born dead (2/34).

In our case, the deletion of an area representing approximately 0·98% of the haploid genome allowed the pregnancy to progress to 7 1/2 months, and the birth and survival for as long as 14 years 9 months of a child with several abnormalities. Most of these abnormalities (severe mental retardation, small stature, facial dysmorphism, and anomalies of the auricles and extremities) are often encountered in chromosomal disorders. Their association may be characteristic, but confirmation will be obtained only after further similar cases have been reported. The general aspect of the face, prominent bulbous nose, large mouth, retrognathism, clinodactyly of the 5th finger and toe, misshapen, low set ears, and dextroconvex scoliosis are similar to the 'sheep-like face' syndrome first described by Wiedemann and Tolksdorf (1973) in a 10-year-old girl and encountered again by Schöenberg and Habedank (1974) in 3 other children with severe mental retardation. While in the first case, using traditional staining methods, a chromosomal anomaly was detected (karyotype 46,XX,2q+), the latter 3 cases failed to show cytogenetic anomalies though banding methods were used.

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