

Trisomy 22 mosaicism

SUMMARY A child with many symptoms of trisomy 22 syndrome is described. The child showed a 46,XY/47,XY,+22 chromosome constitution. This is the first reported case of a trisomy 22 phenotype with such a mosaic karyotype.

The availability of new techniques of chromosome identification and the increasing number of case reports have led to the delineation of trisomy 22 syndrome as a distinct nosological entity with a characteristic phenotype (Penchaszadeh and Coco, 1975). We report here a patient who showed many symptoms of this syndrome. It is the first example of trisomy 22 phenotype with a 46/47,+22 complement.

Case report

The proband was the sixth child of a 44-year-old father and of a 33-year-old mother. No congenital abnormalities had been reported among relatives. The mother had been submitted to appendicectomy during the first month of gestation. The boy was born 15 days after term, with a birthweight of 3800 g. At the age of 3 months he suffered from bronchopneumonia. During the first year of life his somatic development was extremely delayed. At 13 months he was admitted to the Paediatric Clinic of the Uni-

versity of Catania for evaluation of his retarded growth and of multiple defects present from birth.

At admission he weighed 7680 g and his length was 69 cm; head circumference was 48.5 cm. Several malformations were noted on physical examination (Fig. 1): cranial asymmetry with prominence of the right parietal area and flattening of the opposite region and of the occiput; right frontal bossing; markedly depressed superciliary regions due to hypoplasia of the underlying bone; large and low-set ears; mild micrognathia. The nose was long and beaked; the palate was normal. There was prominence of the sternum and of the costal margins (Fig. 2); the nipples were widely spaced. A loud pansystolic murmur was heard over the praecordium. Bilateral partial syndactyly of the fourth and fifth fingers and toes was present with right simian line; the thumbs were long and finger-like. A voluminous bilateral inguinal hernia was present. The muscles were hypotrophic and very hypotonic; the tendon reflexes were normal.

Routine laboratory findings, including RBC, WBC, blood glucose, fetal Hb, were all within the normal limits. A chest x-ray film showed cardiac enlargement caused by prominence of the first and third arches of the left profile. Intravenous pyelography was normal. Electrocardiogram was within normal limits. The electroencephalogram disclosed non-specific abnormalities. Ophthalmological examination was normal. Dermatoglyphic study of

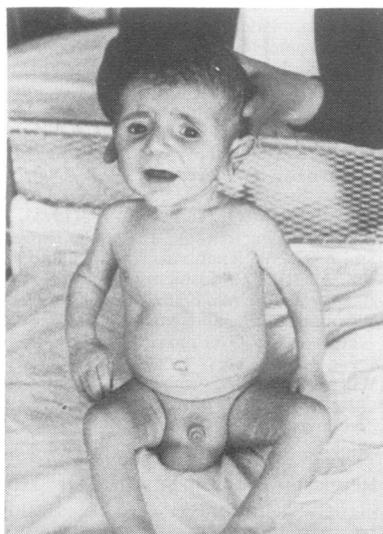


Fig. 1 The patient.



Fig. 2 Prominence of the sternum and of the costal margins. Voluminous bilateral inguinal hernia.

hands showed 8 ulnar loops, 1 radial loop (left second finger), and a whorl (fourth right finger).

Chromosome study of 57 blood leucocytes showed 18 cells of normal male karyotype and 39 cells trisomic for a group G chromosome; the extra chromosome was identified as a no. 22 chromosome by trypsin-Giemsa banding and by quinacrine fluorescence (Fig. 3a and b). The parents had a normal karyotype. A month later a second chromosome analysis of the proband was performed, which confirmed the mosaicism (15 normal and 29 trisomic cells).

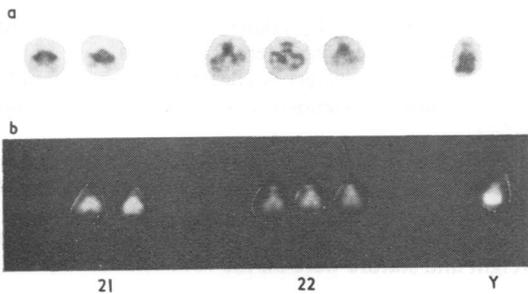


Fig. 3 Partial karyotype showing G-group and Y chromosomes identified by Giemsa-trypsin (a) and by quinacrine fluorescence (b).

Discussion

As can be seen in the Table, the case reported here shows many symptoms of the trisomy 22 phenotype as delineated by previous clinical and cytogenetic

Table Comparison between symptoms of known cases of trisomy 22 syndrome and those of present case

Clinical features of trisomy 22 syndrome*	Present case
Constant	
Mental retardation	+
Growth retardation	+
Microcephaly	-
Cryptorchidism (males)	-
Very frequent (> 80%)	
Muscle underdevelopment and/or hypotonia	+
Cleft palate	-
Micrognathia	+
Large low-set malformed ears	+
Preauricular tags and/or sinuses	-
Long slender fingers and/or finger-like thumbs	+
Congenital heart disease	+
Congenital hip dislocation	-
Frequent (≥ 60%)	
Craniofacial asymmetry	+
Long and beaked nose	+
Long philtrum	+
Strabismus	-

*Data from Penchaszadeh and Coco (1975).

studies (Hsu *et al.*, 1971; Zellweger *et al.*, 1975). Moreover he is astonishingly similar in facial appearance to the 22-trisomic girl reported by Penchaszadeh and Coco (1975). These authors collected from the published reports, including their own, 17 cases showing remarkable correspondence in phenotype and which they consider as examples of trisomy 22 syndrome. Among these there are 3 pairs of sibs. This high recurrence rate may be the result of anomalies, such as mosaicism (Uchida *et al.*, 1968) or deletion (Zackai *et al.*, 1973) of a parental no. 22 chromosome. In our patient, both parents had normal karyotypes, and no congenital abnormalities were reported among the 5 sibs or other relatives: the mosaicism of this patient, therefore, probably results from nondisjunction in a postzygotic mitosis. This is, to our knowledge, the first report of a trisomy 22 syndrome with a 46/47, +22 karyotype. The proband of Bühler *et al.* (1972) had a 46,Gq-/47,+Gq- complement, and the parental 46/47 +G karyotypes observed by Uchida *et al.* (1968) and by Hsu *et al.* (1971) were accompanied by normal phenotypes.

The mosaicism of our patient may be responsible for the lack of some important symptoms of the trisomy 22 syndrome (see Table). In this respect our patient may be considered to be an example of an 'abortive case' of trisomy 22 syndrome, as indicated by Zellweger *et al.* (1975).

F. MOLLIKA, G. SORGE, and L. PAVONE

Clinica Pediatrica Università Catania,
Catania, Italy

References

- Bühler, E. M., Méhes, K., Müller, H., and Stalder, G. R. (1972). Cat-eye syndrome, a partial trisomy 22. *Human-genetik*, **15**, 150-162.
- Hsu, L. Y. F., Shapiro, L. R., Gertner, M., Lieber, E., and Hirschhorn, K. (1971). Trisomy 22: a clinical entity. *Journal of Pediatrics*, **79**, 12-19.
- Penchaszadeh, V. B., and Coco, R. (1975). Trisomy 22. Two new cases and delineation of the phenotype. *Journal of Medical Genetics*, **12**, 193-199.
- Uchida, I. A., Ray, M., McRae, K. N., and Besant, D. F. (1968). Familial occurrence of trisomy 22. *American Journal of Human Genetics*, **20**, 107-118.
- Zackai, E., Aronson, M., Kohn, G., Moorhead, P., and Mellman, W. (1973). Familial trisomy 22 (abstract). *American Journal of Human Genetics*, **25**, 89A.
- Zellweger, H., Jonasescu, V., and Simpson, J. (1975). Trisomy 22. *Journal de Génétique Humaine*, **23**, 65-75.

Requests for reprints to Professor F. Mollica, Clinica Pediatrica Università, Viale A. Doria, 95125 Catania, Italy.