Interstitial deletion in the long arms of chromosome 1: 
46,XY,del(1)(pter→q22::q25→qter)

SUMMARY A child was brought to us with multiple anomalies. On examination we found an interstitial deletion in the long arms of chromosome 1. We studied genetic and chromosome markers, comparing our clinical and cytogenetic findings with other reported cases of chromosome 1 interstitial deletion.

Few cases of chromosome 1 interstitial deletion, with banding, have been published. As far as we know, only four clinical descriptions of patients with this type of deletion have been reported: Turleau et al. 1 46,XX,del(1)(q24q32); Koivisto et al. 2 46,XY,del(1)(q25q32); Garver et al. 3 in two sibs with del(1)(q25q32); and Schwanitz et al. 4 46,XY,del(1)(q22q25) associated with a pericentric inversion (1)(q25p13). All these cases had similar congenital malformations.

Case report

The proband was born on 3.1.77 to non-consanguineous parents. Family history was unremarkable.

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The father was 25 and the mother 21. During pregnancy the mother, who worked with solvents, suffered from vulvovaginitis and metrorrhagia in the first three months and developed oedema which was treated with diuretics. Pregnancy was at term and delivery normal.

At birth the child weighed 1720 g (<3rd centile), was 40 cm tall (<3rd centile), and had a head circumference of 29.5 cm (<3rd centile). When we saw him 11 months later he weighed 4050 g (<3rd centile), was 54 cm tall (<3rd centile), and had a head circumference of 32.5 cm (<10th centile). Physical examination revealed microbrachycephaly with closed fontanelles and fused sutures, frontal bossing, sparse eyebrows, bilateral exophthalmus, epicanthus and hypertelorism, low set ears which were slightly pointed and without lobules, bilateral cleft lip, and cleft palate (fig 1). Other abnormal features included a slightly keel-shaped thorax, bilateral inguinal hernia, hips with bilateral coxa vara, bilateral cryptorchidism with hypoplastic scrotum, short broad hands and feet, clinodactyly of the 5th finger of both hands, and a transverse palmar crease in the right hand. X-ray examination showed the bone age to be retarded and he had only 11 pairs of ribs. Neurological examination was abnormal for his size, although not for his age. The ponderalstural curve rose slowly throughout this period. The VDRL, toxoplasmosis, cytomegalovirus, rubella, CSF, blood and urine tests were all normal.

CHROMOSOME STUDIES

Chromosome analysis was carried out on peripheral blood lymphocytes by G banding, Q banding, and C banding. The karyotype showed an interstitial deletion in the long arms of chromosome 1, because of loss of material between the q22q25 bands: 46,XY,del(1)(pter→q22::q25→qter) (figs 2 3).

The parents’ karyotypes were normal. In an attempt to discover the source of the deleted chromosome we studied the C banding pattern of...
the parents and proband without reaching any conclusion.

**GENE MARKER STUDIES (MRC 4103)**

The results of blood groups and enzyme and plasma protein markers are given in the table.

Assays of red cell UGPP at pH 7.8 using the method given by Bergmeyer showed that the patient and his parents had similar levels of this enzyme. UGPP \(_1\) is known to lie in the region 1q21→1q23. \(^9\) However, lack of control samples from children of the same age makes us reluctant to assert that UGPP \(_1\) is not in the deleted region 1q22→1q25. A further reason for caution is that the UGPP \(_2\) locus assigned to chromosome 2 by Shows et al. \(^1\) might contribute to the UGPP activity.

The proband is heterozygous for the markers MNSs, Jk, and Gc, which have not been firmly assigned to an autosome, and for the markers PGM\(_1\) and Fy, which are known to be on chromosome 1. These five markers can be excluded from the deleted region 1q22→1q25. The proband has also inherited Do\(^a\) from his father and Km\(^1\) from his mother, but because C banding was not informative we cannot say which of these two markers can also be excluded.

The Duffy blood group (Fy) is known to lie on chromosome 1q distal to 1q3 and has been lost in deletions from 1q25→1q32. Our patient's deletion would exclude Fy from the region 1q22→1q25 so that Fy probably lies proximal to our breakpoint in 1q22 or in 1q21 if the published family data are also considered. \(^1\)

**Discussion**

There are two known cases, one published, \(^4\) the other a personal communication (G S Sekhon, 1978), of interstitial deletions in chromosome 1 involving the same zone. The first case is a del(1)(q22q25) associated with an inv(1)(q25p13) in a 3-year-old mentally retarded child with delayed growth,

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**TABLE**  **Study of the family's genetic markers**

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hypotonia, micrognathia, abnormal ears, high arched palate, hypoplastic fingers, bilateral inguinal hernia, cryptorchidism, and pes valgus. The other case is a del(1)(q21 or q22q25) in a 16-month-old boy with microcephaly, frontal bossing, epicanthal folds, microphthalmia, abnormal ears, high arched palate, bifid uvula, micrognathia, small middle phalanges of the 5th fingers, clinodactyly, umbilical hernia, left cryptorchidism, small penis and scrotum, hypotonia, and delayed bone age.

Some of these clinical anomalies, delayed growth, malformed ears, micrognathia, abdominal hernias, hypotonia, and cryptorchidism, were also present in our case. These are all anomalies common to many non-specific chromosomopathies and some of them are to be found accompanying interstitial deletions in other zones of the long arms of chromosome 1. Further reports will be required to establish a characteristic clinical spectrum.

Our results suggest that the Fy locus might lie...
proximal to our breakpoint in 1q22 or in 1q21. Our UGPP assay results might suggest that UGPP, lies in the same region but this should be interpreted with caution.

Acknowledgements are due to Dr Maluenda of the Pediatric Service of the C E Ramón y Cajal, to Dr G de la Fuente of the Universidad Autónoma of Madrid, to Miss Jean Noades for blood group determinations, and to members of the MRC Blood Group Unit and MRC Human Biochemical Genetics Unit, University College London.

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References

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Interstitial deletion of the long arm of chromosome 5 in a deformed boy: 46,XY,del(5)(q13q15)

SUMMARY A boy with mental retardation and physical abnormalities had an interstitial deletion of one chromosome 5: 46,XY,del(5)(q13q15).

Deletion of the short arm of chromosome 5 is a well known syndrome. Interstitial deletions, however, are uncommon. We had the opportunity to study a patient with an interstitial deletion of the long arm of a chromosome 5.

Case report

The proband was born after a normal pregnancy. A caesarean section was performed for fetal distress. He was the second child of the family. The parents, 21 and 25 years old, were in good health and had normal intelligence. A sister was born prematurely 2 years previously and died at 6 days of age. She had no malformations. The family history was otherwise unremarkable and there had been no abortions. Birthweight was 2500 g, length 45 cm, and head circumference 34·5 cm. The Apgar score was 9.

On physical examination the following abnormalities were present (fig 1): a small and narrow forehead, a small, broad, upturned nose, a flat nasal bridge, hypertelorism, upward curving eyelashes, a large prominent metopic suture, a triangular shaped mouth, a large philtrum with a deep groove, retromicrognathia, large ears, short neck, short upper limbs, syndactyly of the big toe and the 3rd and 4th toes, and clinodactyly of the 5th finger. A cardiac murmur was also heard. The rest of the physical examination was normal.

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FIG 1 The patient with del(5)(q13q15).