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Two cases with different deletions of the long arm of chromosome 7

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SUMMARY Two mentally and physically retarded girls, one with an interstitial deletion 7(pter→q21::q32→qter), and the other with an interstitial deletion 7(pter→q11::q22→qter), are described. Their clinical features are compared with those of 11 earlier reported cases with a deletion 7q. The Hageman factor, the locus of which is assigned to the distal part of 7q, was in both cases within normal limits. The data available do not justify the delineation of a specific clinical syndrome.

Deletions of a part of the long arm of chromosome 7 have been reported by De Grouchy *et al.* (1968), Shokeir *et al.* (1973), De Grouchy and Turleau (1974), Ayraud *et al.* (1976), Higginson *et al.* (1976), Harris *et al.* (1977), Kousseff *et al.* (1977), Valentine and Sergovich (1977), and Biederman and Bowen (1978). In the cases of Shokeir *et al.* (1973), De Grouchy and Turleau (1974), Harris *et al.* (1977), and Kousseff *et al.* (1977), the terminal part (q32→qter) was missing; the case of Valentine and Sergovich (1977) was cytogenetically characterised by an interstitial deletion 7q11→q22. Ayraud *et al.* (1976) described a case with probable loss of segment 7q2. Biederman and Bowen (1978) showed a patient with a deletion of the long arm of chromosome 7, which is most likely an interstitial deletion.

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We report two girls with multiple congenital malformations as a result of interstitial deletion of the long arm of chromosome 7.

Case reports

CASE 1 (FIG. 1A)

This case was the third daughter of a gravida 3, para 3 woman, and was born on 21.2.72 in the vertex position. Pregnancy was marked by minimal weight gain and minimal fetal movement. The delivery was normal at term. Birthweight was 1500 g (<3rd centile), length 43·5 cm (<3rd centile), and head circumference 33 cm (<3rd centile). No other physical abnormalities were seen at that time. Because of an underdeveloped sucking reflex, feeding difficulties arose soon after birth. The initial

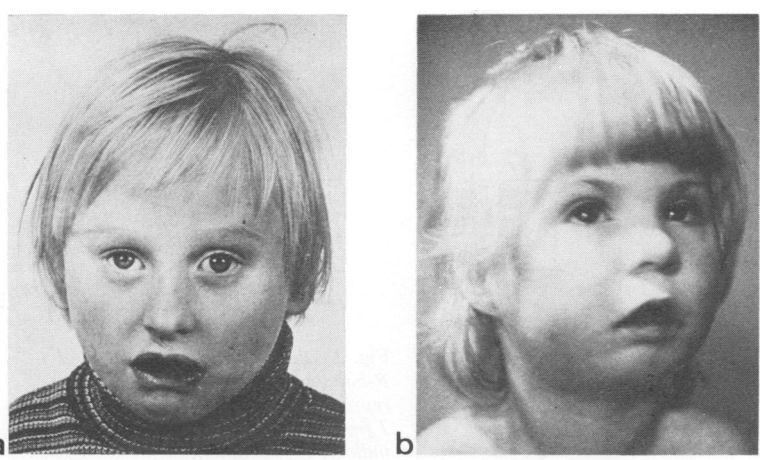

Fig. 1 (*a*) *Case 1 at age 6;* (*b*) *case 2 at age 4.*

failure to thrive improved after spoon-feeding was introduced. Infancy and early childhood were complicated by recurrent respiratory and urinary tract infections. Clinical examination at the age of 6 showed a girl, small for her age, height 103·5 cm (<3rd centile), relatively obese, weight 16 kg (3rd centile), with a head circumference of 49 cm (25th centile). The patient had brachycephaly, frontal bossing, sunken eyes, short philtrum, large mouth, large ears with prominent antihelices, widely spaced nipples, diastasis recti, a sacral dimple, and strongly curved large toenails. Neurological examination showed distinct hypotonia combined with hypertonia of the lower limbs. Electroencephalogram showed a diffuse abnormal pattern. There was severe psychomotor retardation, and the patient could not speak. Bone age was 5 years, 8 months. Routine laboratory investigations showed values within normal limits. Dermatoglyphic analysis showed bilateral simian creases, distally displaced axial triradii, and hypothenar patterns.

CASE 2 (FIG. 1B)

This case was the daughter of a gravida 1, para 1 woman, born on 9.5.74. The mother was 28 years old and the father 30. The pregnancy was uneventful and ended at term in a normal delivery. Birthweight was 2160 g (<3rd centile), length 45 cm (3rd centile). At birth only a cleft palate was noticed. After surgical closure of the palatal defect at the age of 1, feeding difficulties in infancy persisted. Initial growth retardation improved after surgical correction of a diaphragmatic hernia when the patient was 2 years, 9 months old. There was no history of respiratory or urinary tract infections. Clinical examination at the age of 4 showed a mentally and physically retarded girl, height 89 cm (<3rd centile), weight 9·8 kg (<3rd centile for length), and head circumference 44·5 cm (<3rd centile). She had brachycephaly, prominent forehead with low frontal hairline, thick eyebrows (especially on the medial side), slight epicanthus, strabismus convergens, broad nose bridge, small (non-bulbous) nose,

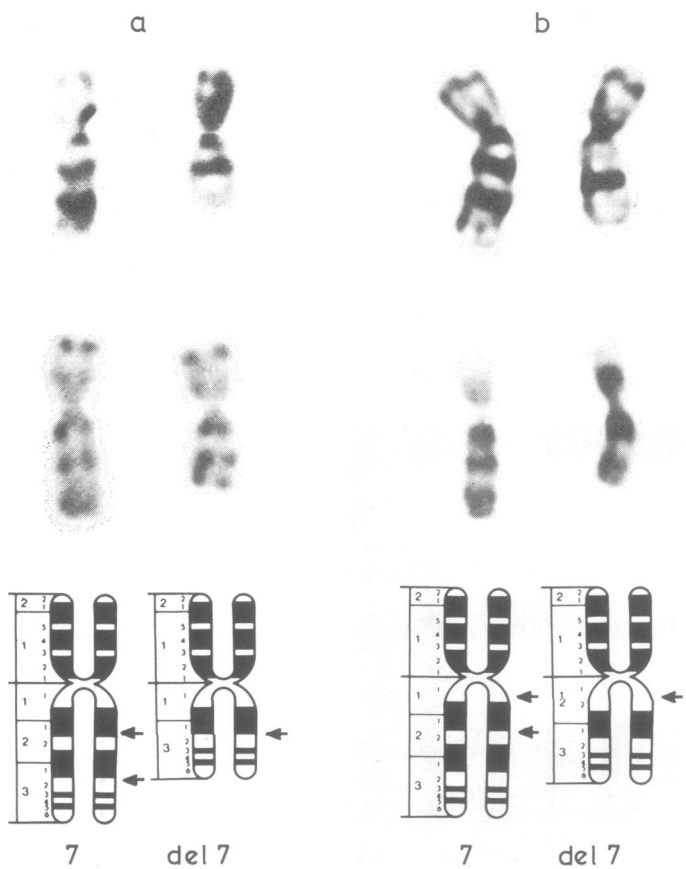

Fig. 2 *Partial karyotypes (G- and R-banding pattern) and schematic representation of the deleted chromosome 7 from (a) case 1 and (b) case 2 (arrows indicate breakpoints).*

Table 1 *Summary of gene marker studies of cases 1 and 2*

	Hageman n=80-200%	*AcP*	*ADA*	*AK*	*GPT*	*6PGD*	*PGM-1*	*Dia B*	*Es-D*	*GLO-1*	*SOD-A*	*Tf*	*C3*	*Pi*	*Hp*	*Gc*	*P.CHOL. E_2*
Case 1 $A_1\beta$ MNS− P_1+ (Lu(a−) ccdee K− Fy(a−) JK(a+b−)	210	A	1	1	2-1	A	1	1	2	2		C	S	M	2-1	2-1	C5−
Father $A_1\beta$ MMS− P_1+ Lu(a−) ccdee K− Fy(a−) JK(a+b−)	198	BA	1	1	2	A	1	1	2-1	2-1		C	S	M	2-1	2-1	C5−
Mother Oαβ MNS− P_1+ Lu(a−) CcDee K− Fy(a−) JK(a+b+)	215	A	1	1	2-1	A	2-1	1	2-1	2		C	S	M	2-1	2-2	C5−
Case 2 Oαβ MMS+ P_1+ Lu(a−) CCDee K− Fy(a−) JK(a−b+)	142	A	1	2-1	2-1	A	1	1	1	2-1	1	C	S	M	2-1	2-1	C5−
Father Oαβ MNS+ P_1+ Lu(a−) CCDee K− Fy(a−) JK(a+b+)	125	BA	1	1	1	A	2-1	1	1	1	1	C	S	M	1-1	2-2	C5−
Mother Oαβ MMS+ P_1+ Lu(a−) CCDee K− Fy(a−) JK(a−b+)	95	BA	1	2-1	2	A	1	1	1	2-1	1	C	S	M	2-2	1-1	C5−

Table 2 *Clinical findings in 13 cases with deletion 7q*

	del(7)(q32→qter)								*del(7)(q21→q32)*			*del(7)(q11→q22)*	
	de Grouchy et al. (1968)	*Shokeir et al. (1973)*	*Harris et al. (1977) Case 1*	*Case 2*	*Case 3*	*Case 4*	*Kousseff et al. (1977)*	*Biederman and Bowen (1978)*	*Ayraud et al. (1976)*	*Higginson et al. (1976)*	*Our case 1*	*Valentine and Sergovich (1977)*	*Our case 2*
Sex	M	F	F	M	F	M	M	F	F	F	F	M	F
Birthweight (g)	1730		2900	2480	3000	1450	1680	3150	1740	2320	1500	2100	2160
Growth retardation	+	+	+	−	+	+		+		−	+		+
Mental retardation	+	+	+	+	+	+		+		+	+	+	+
Feeding difficulties	+		+	−	+					+	+		+
Recurrent infections									+	+	+		−
Microcephaly			+	+	+	+	+	+	+	+	+	+	+
Prominent forehead	+		+	+	−						+		+
Short and/or bulbous nose	+	−	+	+	+	−		+	+		+		−
Malformed ears	−		+	+	+	+			+	+	−		+
Low-set ears	+				+					+	−	+	−
Short philtrum									−	+	+	−	−
Long philtrum									+	−	−	+	+
Large mouth				+	+				+	+	+		−
Cleft lip and/or palate		−			+	+		−			−		+
Micro/retrognathia	+	−			+				+	+	−		+
Hypotonia					+	+				+	+	+	+
Hypertonia					+		+	+		+	+		+
Tapering fingers		+											+

marked micrognathia, thin upper lip, long philtrum, irregularly shaped teeth, small dysplastic ears with prominent antihelices, kyphoscoliosis, a sacral dimple, bilaterally tapering fingers (digits 2 and 5), and general hypotonia with hypertonia of the lower limbs. The patient could not speak and could neither stand nor walk without help. Her hearing was severely impaired. Routine laboratory investigations showed values within normal limits. Dermatoglyphic analysis showed no abnormalities, except for a pattern of abnormal creases overlying the smaller dermal ridges.

Chromosome studies

Using G-banding (Gallimore and Richardson, 1973) and R-banding (Sehested, 1974), an interstitial deletion of the long arm of a chromosome 7 was found in both cases. The karyotype of case 1 was interpreted as: 46,XX,del(7) (pter→q21::q32→qter), and that of case 2 as: 46,XX,del (7) (pter→q11::q22→qter) (Fig. 2a and b, respectively). The karyotypes of the parents of the two probands were normal.

Gene marker studies

The Hageman factor, the locus of which has been tentatively assigned to 7q35 (De Grouchy and Turleau, 1974), was within normal limits for both cases, 210% and 142% for case 1 and 2, respectively (normal range 80 to 220%). Serum and red cell markers obtained from the patients and their parents revealed no abnormalities. The results are presented in Table 1.

Discussion

The clinical features of the 13 cases, including our 2 cases, with a deletion 7q are summarised in Table 2. Since, in these cases at least, 3 different structural aberrations are involved, the patients have been grouped according to the type of the deletion present. The case of Biederman and Bowen (1978) has been grouped arbitrarily under 'terminal deletions', though in their case the Hageman factor was within normal limits. The discrepancy in the case of Biederman and Bowen could be explained by an interstitial deletion in 7q with preservation of the 7q35→qter region. In our cases, the Hageman factor was within normal limits, which confirms the findings of De Grouchy and Turleau (1974). Comparison of the clinical data shows no distinct phenotypical differences between the cases in the 3 subgroups. Signs occurring in at least 6 of the 13 patients are: pre- and postnatal growth retardation, mental retardation, feeding difficulties, microcephaly, short and/or bulbous nose, malformed ears, and general hypotonia (in 4 cases combined with hypertonia of the lower limbs). Less frequent signs are prominent forehead, large mouth, and micro/retrognathia. The above symptoms have been described in several (partial) trisomy and/or monosomy syndromes. In our opinion, the data presented here neither justify the delineation of a specific 7q— deletion syndrome, nor give evidence for the existence of a pathognomonic sign for such a deletion.

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