between the structural abnormality of the X chromosome and the physical findings in this case. Although the banding studies indicated a rearrangement of chromosome material, no visible deletion could be detected. The 'critical region' hypothesis of Sarto *et al*⁵ proposed that breaks from Xq21 to Xq25 result in gonadal dysgenesis. However, Summitt *et al*⁶ extended this region proximally to include Xq13 and the upper breakpoint in our patient is at band Xq13.1. Since the patient was prepubescent and surgery was imminent, a complete endocrine evaluation was declined by the family. It will be important to follow her progress over the next few years, and if puberty does not ensue, efforts will be made to obtain the endocrine studies. Should she achieve spontaneous sexual maturation and menarche, we could not predict with certainty the phenotype of any offspring, but it would seem reasonable to assume that fertility might be reduced. Unequal crossovers within the loop of the inverted chromosome could result in unstable derivative chromosomes. In addition, liveborn children with multiple anomalies due to rearrangements of duplication or deletion might result, for which antenatal diagnosis could be performed.

The authors gratefully acknowledge the expert technical assistance of Susan Ross, Teresa Stalcup, and Alice Wooldridge in the preparation of the cultures and karyotypes.

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Correspondence and requests for reprints to Ms H M Herr, Department of Genetics, Alfred I duPont Institute of the Nemours Foundation, PO Box 269, Wilmington, Delaware 19899, USA.

Monosomy 13q32.3→qter: report of two cases

H RIVERA, S A GONZÁLEZ-FLORES, F RIVAS, J SÁNCHEZ-CORONA, M MOLLER, AND J M CANTÚ

División de Genética, Subjefatura de Investigación Científica, Unidad de Investigación Biomédica, Centro Médico de Occidente, Instituto Mexicano del Seguro Social, Guadalajara, Jalisco, Mexico.

SUMMARY Two unrelated patients with monosomy 13q32.3→qter are reported. Comparison with six similar cases previously published indicates that the craniofacial dysmorphism of the 13qter monosomy syndrome is related to band 13q34, the thumb hypoplasia to band 13q32, and an apparently different phenotype to band 13q33. Coagulation deficiency appears to be non-specific in monosomy 13qter.

The purpose of this report is to describe two cases of monosomy 13q32.3→qter and to review the karyotype-phenotype correlation.

Case reports

CASE 1

The proband, a girl, was the product of the 12th pregnancy and normal delivery. She suffered from mild hypoxia during the neonatal period. Developmental milestones were delayed and at 5 months of age she was unable to control her head or to sit unsupported. At this age, physical examination (fig 1) revealed multiple abnormalities (table), including low set posterior hairline, large ears with overdeveloped lobules and prominent antitragus, inverted left nipple, slender fingers, sacral dimple, muscular hypotonia, and weak cry. No cardiac murmur was audible. A CT scan disclosed enlarged ventricles and basal cisternae. A skeletal x-ray showed abnormal ossification of the T3 vertebral

TABLE Clinical and cytogenetic features in 13q32→qter monosomy (based on published texts and photographs).

	Allerdice <i>et al</i> ¹		Turleau <i>et al</i> ²		Emanuel <i>et al</i> ³		Telfer <i>et al</i> ⁴		Pfeiffer <i>et al</i> ⁵		Present report	
	(Case 1)								Case MS		Case FP*	
Extent of deletion	Terminal 1/5th?		q33→qter		q33		q32→qter		q34?		q32.3→qter	
Father's karyotype	Normal		Normal		Normal		Normal		Normal		Normal	
Mother's karyotype	Normal		Normal		ins(7;13)		Normal		?		?	
Paternal/maternal age	42/27		24/22		27/26		35/31		24/22		37/35	
Age/sex	18 mth/M		14 mth/M		32 mth/F		8 y/F		13 y/M		5 mth/F	
Birth weight (g)	2300		2600		3520		2940		2680		2050	
Growth retardation	+		+		+		+		+		+	
Psychomotor retardation	+		+		+		+		+		+	
Microbrachycephaly	+		+		+		+		+		+	
Facial asymmetry	+		+		+		+		+		+	
Greek profile	+		+		+		+		+		+	
Nasal bridge	Broad		Normal		Normal		Broad		High		High	
Hypertelorism	+		+		+		+		+		+	
Mongoloid palpebral fissures	+		+		+		+		+		+	
Palpebral ptosis	+		+		+		+		+		+	
Chubby cheeks	+		+		+		+		+		+	
Protruding upper incisors	+		+		+		+		+		+	
Large, abnormal ears	+		+		+		+		+		+	
Thumbs: right	Absent		Normal		Normal		Hypoplastic		Normal		Slender	
Thumbs: left	Distal phalanx absent		Normal		Normal		Hypoplastic		Normal		Slender	
Brain abnormalities							+		+		+	
Congenital heart defect	+		+		+		+		+		+	
Scoliosis/hemivertebra	+		+		+		+		+		+	
Genital malformation	+		+		+		+		+		+	

*First reported by Gigenkrantz *et al*.⁶

FIG 1 Left, case 1. Right, case 2.

body and mildly delayed bone age. The mother had had five other children who died early in infancy, including a small for dates girl with anal atresia who resembled the proband, three spontaneous miscarriages, and three normal sons.

Cytogenetic studies

The patient's karyotype, established on GTG banded metaphases from lymphocyte cultures, was 46,XX,13q-. The abnormal 13 resulted from a maternal (8;13)(q24·3;q32·3) translocation (fig 2a) through an adjacent 1 segregation, that is, she was monosomic for the segment 13q32·3→qter and, assuming a reciprocal exchange, also trisomic for the tip of 8q24 (fig 2b). Besides the mother, a brother was also a carrier while the father and the other sibs were normal. Other family members refused cytogenetic studies.

CASE 2

The 2 year 7 month old proband was the second child of unrelated parents, who had a normal boy and a first trimester spontaneous abortion. Pregnancy, labour, and delivery were normal. Developmental delay was noted shortly after birth and at present she does not talk or walk. The patient (fig 1), besides the features listed in the table, showed moderate body hypertrichosis, muscular hypotonia,

FIG 2 GTG banded chromosomes from (a) the mother of case 1 showing the balanced $t(8;13)(q24·3;q32·3)$, (b) case 1 with the unbalanced maternal translocation, and (c) chromosomes 13 from case 2.

narrow forehead, prominent metopic suture, synophrys, left exotropia, epicanthic folds, low set and widely spaced nipples, slender fingers with contractures, clinodactyly of the fifth fingers, and broad first toes. Radiographs of the skeleton showed neither hemivertebra nor dysplastic changes.

Coagulation studies (prothrombin time, partial thromboplastin time, and platelets) were normal.

Cytogenetic studies

The analysis of GTG banded chromosomes from the patient revealed a 46,XX,del(13)(q32·3) karyotype (fig 2c). The mother's karyotype was normal. The father and sib were unavailable for study.

Discussion

Cases of monosomy for the segment 13q32→qter or a part of it constitute a clinically and cytogenetically heterogeneous, though small, group (table). Nevertheless, the analysis of these observations indicates that monosomy 13q34 is responsible for the craniofacial dysmorphism classically described in the 13qter monosomy syndrome^{7,8} and mainly characterised by microbrachycephaly, 'Greek profile', hypertelorism, and protruding upper incisors. Thumb hypoplasia also seems to be related to

monosomy 13q32.⁵⁻⁸ Conversely, deficiency of band 13q33 appears to be associated with a different phenotype without the typical head profile and thumb anomalies.³ The association of coagulation defects with (probable) loss of 13q34 observed in two unrelated patients⁵ was not found in our case 2. Our findings, together with the absence of coagulation disorders in the majority of 13qter monosomy cases, do not support the proposed relationship between monosomy 13q34 and deficiency of factors VII and X.⁵ Such a defect may rather be an unspecific and inconstant finding in some chromosomal disorders as it has also been observed in three cases of trisomy 8.⁹

To conclude, the observations reported here contribute to the establishment of the phenotypic mapping of chromosome 13,^{7-8,10} which nevertheless remains incomplete.

The authors wish to thank A Alcaraz for the artwork.

Addendum

Recently, de Grouchy *et al* (*Hum Genet* 1984;66:230-3) have provided additional evidence for the assignment of the structural genes of clotting factors VII and X to 13q34. Whether the coagulation in our cases is indeed abnormal remains uncertain.

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Correspondence and requests for reprints to Dr H Rivera, División de Genética, Subjefatura de Investigación Científica, Unidad de Investigación Biomédica, Centro Médico de Occidente, Instituto Mexicano del Seguro Social, Apartado Postal 1-3838, Guadalajara, Jalisco, Mexico.

Congenital diaphragmatic hernia in half sibs

A H LIPSON AND G WILLIAMS

Birth Defects and Neonatal Units, Royal Alexandra Hospital for Children, Camperdown, NSW 2050, Australia.

SUMMARY Half brothers from the same mother had congenital left sided posterolateral diaphragmatic hernias repaired in the neonatal period. The inheritance of diaphragmatic hernia should probably be based on the multifactorial hypothesis.

There are two types of developmental defects of the diaphragm, posterolateral defects or Bochdalek hernia and retrosternal defects or Morgagni hernia. Other, more extensive, defects can involve most or

all of the hemidiaphragm. Eventration of the diaphragm and hiatus hernia will not be considered. The patient usually presents in the first hours or days of life with respiratory distress. The condition is amenable to surgical repair, the first successful cases having been treated in the 1940s. We wish to report left sided posterolateral diaphragmatic hernias in two half brothers from the same mother and review published reports concerning the familial incidence of diaphragmatic hernia.

Case report

The first child, a male, was born at term weighing