Microcephaly, microphthalmos, and retinal folds: report of a family

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SUMMARY A retarded boy with microcephaly, microphthalmos, and retinal folds is described. His mother and sister showed microphthalmos and the sister was also microcephalic. Another family showing similar findings has been described, indicating that this combination of abnormalities constitutes a discrete entity showing single gene inheritance.

In 1981, Jarmas et al1 described two brothers each of whom had severe microcephaly, microphthalmos, falciform retinal folds, and visual deficit. Their mother was also microcephalic and showed mild mental retardation. We now describe a third patient with similar findings. His mother and sister showed milder manifestations of the same disorder.

Case report

The proband weighed 2.5 kg when born at 34 weeks after an uneventful, drug free pregnancy. Bilateral pedal oedema was present at birth and disappeared by the age of three months. The neonatal period was otherwise uncomplicated and no additional oxygen was given at any time.

At six months he presented with impaired central vision and was noted to have a divergent squint and to be microcephalic (OFC = 36.5 cm), with a closed anterior fontanelle. Examination under general anaesthesia revealed bilaterally reduced horizontal corneal diameters (10.0 mm right and left, normal = 11.64±0.49 mm [±2SD]). Both lenses were clear.

The right fundus contained a falciform vitreoretinal fold, into which all the retinal vessels were drawn, extending from the optic disc (fig 1). As the fold approached the temporal periphery, vitreous bands branched and were inserted circumferentially an-

FIG 1 The proband's right fundus at six months of age.
months, when he was again noted to have impaired central vision but good peripheral fields. Mild cognitive delay was apparent with a mental age of 19 months on the Bayley mental scales. On examination his head circumference was 42.5 cm (4 cm below the 3rd centile) with height and weight falling on the 10th centile. He had a narrow, sloping forehead (fig 3) and bilateral fifth finger clinodactyly, with no other dysmorphic features. Apart from the ocular findings, neurological examination was normal. Investigations giving normal results included congenital infection screen, banded karyotype, blood and urine amino acids, and audiology. There was no evidence of craniostenosis on skull X ray.

**Family history**

The proband was the second child of unrelated parents. At the age of six years his older sister was noted to have bilateral microphthalmia (corneal diameters 9.5 and 10.0 mm) with normal fundi, strabismus, and microcephaly (OFC = 46.7 cm). Her cognitive abilities were below average but she was able to attend normal school. His younger brother was examined and found to be entirely normal.

The father and paternal grandmother were of normal intelligence with normal eyes and head size, as was the maternal grandmother. The proband’s mother was of normal intelligence with a head circumference of 55.0 cm. Her fundi were normal but both eyes were small with corneal diameters of 10.5 mm. Her Guthrie test and urinary amino acid screen were normal. All fundal examinations were performed after pupil dilatation.

**Discussion**

Retinal folds have recently been the subject of a comprehensive review. Aetiology they may result from either a malformation, often in association with strands of primary vitreous as in the boy
now described, or from insult occurring after organogenesis, such as infection or retinopathy of prematurity (ROP). Although born prematurely, our patient had no neonatal problems and he did not require oxygen therapy. ROP has been reported in similar circumstances but the ocular signs are different. The boy we describe is hypermetropic whereas in cicatricial ROP, myopia is the rule and extensive vitreous bands are not seen.

From the genetic viewpoint retinal folds are found in several entities. In isolation they may show autosomal dominant, autosomal recessive, or sex linked recessive inheritance. In this latter form minor ocular abnormalities may be detected in carrier females. They may also be a manifestation of autosomal dominant familial exudative vitreoretinopathy but insert equatorially in this condition, whereas in the present case the vitreous strands extend further forwards to the ora serrata. Furthermore, no retinal changes have been detected in other family members.

Pleiotropic autosomal recessive syndromes which may feature retinal folds include the Seckel-like syndrome described by Bixler and Antley and the combination of hydrocephalus with microphthalmos documented by Warburg. Retinal folds have also been observed in one of four patients who had a sex linked recessive disorder characterised by microphthalmos, corneal clouding, cataracts, microcephaly, hypospadias, and cryptorchidism, and in a blind retarded boy who was found to have an interstitial deletion of the long arm of chromosome 13.

The combination of microcephaly, microphthalmos, and retinal folds has been described in a male offspring of first cousin parents, to a variable degree in four persons from two sibships in a large inbred family, and in the aforementioned brothers reported by Jarmas et al. One of these brothers also had pedal oedema and both showed mildly anteverted nares, these features also being present in our own patient, in whom the pedal oedema resolved slowly over the first three months of life. In the family of Jarmas et al the boys' mother showed microcephaly and microphthalmos. Taken in conjunction with the findings in our patient's mother and sister, this would suggest that there is an inherited form of microcephaly, microphthalmos, and retinal folds in which males show the full stigmata with females being more mildly affected. Inheritance could be sex linked dominant or sex influenced autosomal dominant.

References

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A de novo 3p;8p unbalanced translocation resulting in partial dup(3p) and partial del(8p)
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SUMMARY We present the first case of a de novo translocation resulting in dup(3p). Giesma banding studies tentatively identified the
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