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Case Report

3C syndrome: third occurrence of cranio-cerebello-cardiac dysplasia (Ritscher-Schinzel syndrome)

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We report a child with an unusual pattern of malformations: severe delay in bone maturation, wide fontanelles and facial dysmorphism (evoking cleidocranial dysplasia), relative macroencephaly with cerebellar vermis hypoplasia; hypertelorism, skeletal abnormalities (1st ribs aplasia, multifocal sternal ossification centers, thin bones), septal defect, muscular waste, hypotonia and developmental delay. Most of these features have been reported previously by Ritscher, Schinzel et al. in two sibs, who suffered more severe cerebellar malformations (Dandy-Walker cyst or vermis aplasia). We propose 3C syndrome as an easy acronym for this Cranio-Cerebello-Cardiac dysplasia.

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Key words: bone maturation delay; congenital heart defect; delayed closure of fontanelles; MCA/MR syndrome; rib anomalies.

Very recently, Ritscher, Schinzel et al. (1987) reviewing Dandy-Walker malformation, described two sibs with a "private" MCA/MR syndrome consisting of cerebellar defect associated with several other malformations. We report here a third unrelated child for which a diagnosis of "Ritscher-Schinzel syndrome" may be proposed.

Report of Patient

Our proposita is the second girl of non-consanguineous, normally developed parents. The father was 27 years old, and the mother 23 years old at the birth. The elder sister of the proposita was in good health. The family history was not remarkable. The uneventful pregnancy ended, at the 39th week, with the delivery of a girl weighing 3250 g, 49 cm long, with an occipitofrontal diameter of 35 cm.

Several dysmorphic features were recorded soon after birth: large bulging forehead with the anterior edge of the anterior fontanelle reaching the supraorbital line, very large (4 cm) longitudinal suture, flat face, hypertelorism with downslanted palpebral fissures, and receding chin (Fig. 1 and 2).

Cardiac investigations disclosed a large subaortic and sub-tricuspid interventricular septal defect, interauricular septal defect, and decreased left ventricular performances. Congestive heart failure soon required digitalization, and pulmonic artery banding was performed at age 4 months.

At this time, she weighed 4300 g (<3rd centile), her length was 59 cm (25th centile) and she had an OFC of 41.6 cm (75th centile). The inner intercanthal distance 32 mm (>97th centile), and the outer intercanthal

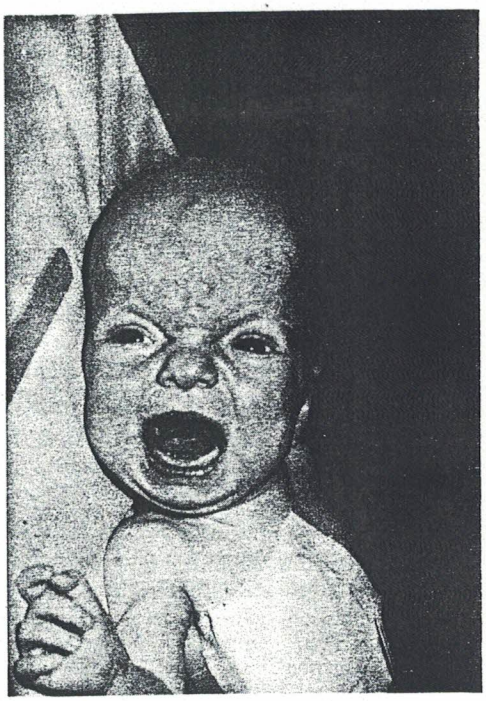

Fig. 1. The proposita aged 3 months. Note hypertelorism and depressed nasal bridge.

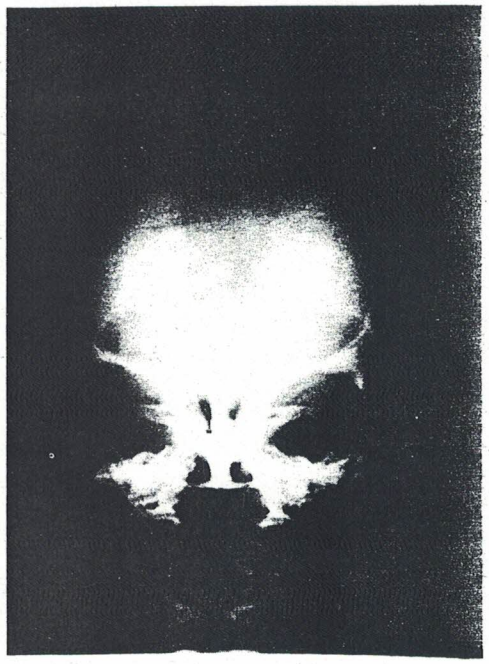

Fig. 3. Skull. Front view. Very wide sutures and orbital hypertelorism.

distance 79 mm (>97th centile). She was very hypotonic, with an underdeveloped muscular system. Psychomotor development was rated at 1 month. Renal ultrasonography was normal. Fundoscopy was normal.

Bone survey at birth revealed a striking undermineralisation of the calvarium, huge fontanelles with ragged bone edges (Fig. 3), normal spine, narrow pelvis, and normal clavicles. The ribs were very thin; the first

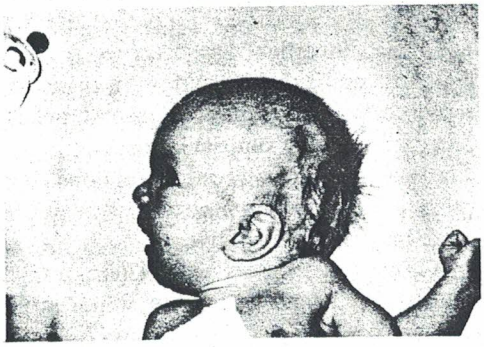

Fig. 2. Note flat profile and sloping chin.

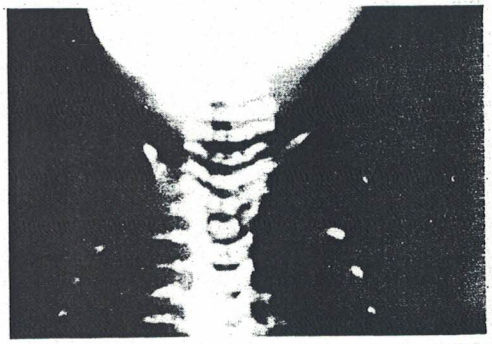

Fig. 4. First ribs. Lack of the first pair, shortened 2nd and 3rd pairs, normal clavicles.

pair was lacking, and the second and third pairs were unusually short (Fig. 4). The sternum contained 7 ossification centers (Fig. 5). Bone maturation age, following Sénécal's method (1977), was estimated at 28 weeks of gestation at birth and reached 1 month following Elgenmark when she was 4 months old. CT-scan performed at 2 months showed an enlarged fourth ventricle and a very large cisterna magna, both signs suggestive of vermis hypoplasia (Fig. 6).

Several metabolic investigations gave non-relevant results. The GHG-banded karyotype was not remarkable.

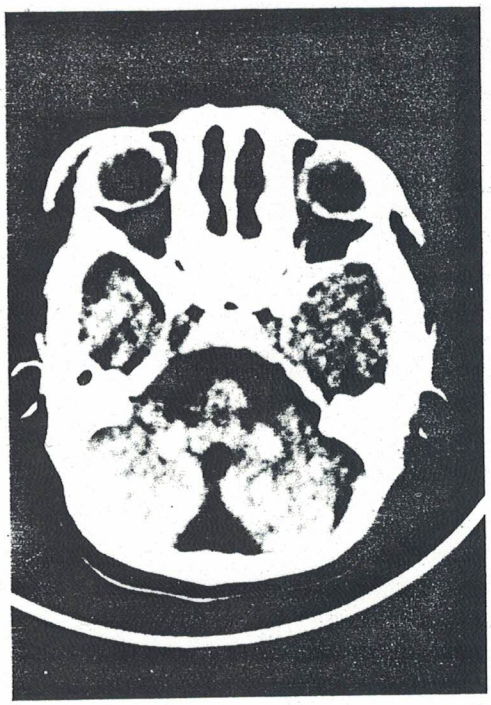

Fig. 6. CT-scan. Large 4th ventricle and cisterna magna.

Discussion

Our patient shares many features with the two sibs previously reported as "Dandy-Walker (like) malformation, atrio-ventricular septal defect and (...) minor anomalies" by Ritscher and co-workers (1987). Table 1 summarizes the clinical features of the three patients. Our proposita probably represents the third occurrence of this syndrome, validates it as a true "public" MCA/MR syndrome, but does not bring new information about its mode of inheritance (presumed to be autosomal recessive).

Intra-uterine bone maturation delay without I.U.G.R. and cranial vault hypomineralisation with very large metopic suture, and depressed nasal bridge are seen in cleidocranial dysostosis (CCD), but neither heart and cerebellar defects nor mental retardation occur in that dysplasia. Multiple sternal ossification centers are not reported in CCD, and we could not find any other syndrome for which this anomaly is a feature. That anomaly was not present, or was overlooked, in Ritscher's cases. Cerebellar involvement is less severe in our proposita than in the previous report. We may forecast that it could be virtually normal in some children.

We propose the name 3C dysplasia as an easy acronym for this "new" Cranio-Cerebello-Cardiac dysplasia.

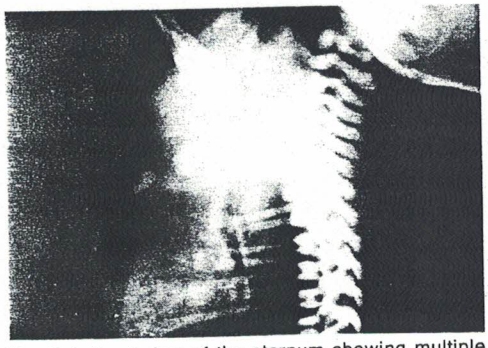

Fig. 5. Lateral view of the sternum showing multiple ossification centers.

Table 1

Clinical features in 3C syndrome

	Ritscher's cases Pt 1	Ritscher's cases Pt 2	Our case
Skull			
Macrocephaly	+ +	+	+
Hydrocephaly	+	−	−
Skull undermineralisation	+	+	+
Bulging forehead	+	+	+
Prominent occiput	+	+	+
Foramina parietalia	+	+	−
Face			
Ocular hypertelorism	+	+	+
Downslanting palpebral slit	+	+	+
Depressed nasal bridge	+	+	+
Anteverted nostrils	?	+	+
Apparent low-set ear	+	+	+
Narrow palate	+	+	+
Receding chin	?	+	+
Flat face	?	+	+
Body			
I.U.G.R.	−	−	−
Post-natal growth retardation	+	+	+
Hypoplastic nipple	−	+	−
Gaping vulva	+	+	+
Absent ribs	+ (12th)	−	+ (1st)
Aberrant sternal ossification	?	?	+
Delayed bone maturation	?	?	+
Kyphoscoliosis	−	+	?
Heart			
Atrioventricular valvular defect	+	+	−
Interventricular septal defect	+	−	+
Interauricular septal defect	+	+	+
CNS			
Large brain	+	+	+
Dandy-Walker cyst	+	−	−
Vermis aplasia	+	+	+ − (partial)
Developmental delay	+	+	+
Hypotonia	+	+	+
Muscular underdevelopment	+	+	+

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