3M dwarfism: a study of two further sibs

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SUMMARY Two sibs are reported with clinical and radiological features of the 3M syndrome. The differential diagnosis is discussed, particularly with regard to Russell-Silver syndrome.

In 1975, Miller *et al*¹ described a type of dwarfism, which they distinguished from other syndromes of primordial dwarfism by characteristic facial dysmorphism and the absence of microcephaly and mental retardation.¹ The term 3M dwarfism originates from the common initial of the first three authors of the first report. We had the opportunity of studying two sibs with severe dwarfism. They are the offspring of consanguineous, healthy parents of Tunisian origin who have had two more unaffected children. They could not specify accurately their degree of consanguinity. The father is 159 cm and the mother is 157 cm tall. The diagnosis was made after the birth of the youngest child, her dwarfism being similar to that of her nine year old brother.

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III.4 (fig 1) was born at term after an uncomplicated pregnancy and delivery. She weighed 2400 g, was 40 cm long, and had a head circumference of 33 cm (50th centile for her age, >90th centile for her size). Her sitting height was 27.5 cm giving a US/LS ratio of 2.20 (+2 SD). The nose was broad and fleshy

with anteverted nostrils. The lips were thick and the chin square; there was no abnormality of the philtrum. The eyebrows had a curvilinear shape without synophrys. Hair patterning was normal (fig 2). The thorax and neck were short, the abdomen was distended, and the liver was not enlarged but easily palpable. She had flat feet. There were no articular deformities or limitation of movement. Radiographs showed slender long bones and ribs which contrasted with the child's stocky appearance (fig 3). The growth curve in the first months showed an SD of -5. At the age of 10 months she was 59 cm tall; the radiographical appearance had changed, the bones no longer appearing as long and narrow. The acetabular roofs were horizontal. Alertness, activity, and psychomotor development were normal. There were no visual or auditory defects.

Her brother (III.3) (fig 4), born in Tunisia, had a length of 40 cm at birth (-5 SD) and weighed 2000 g. On arriving in France at eight years of age, his growth retardation was assessed. His height was 101 cm (-4.8 SD), weight was 17.5 kg (-2.5 SD for his age, +1 SD for his size), and head circumference was 55 cm (-2 SD for his age, 0 SD for his size). The US/LS ratio was 1.3. Bone age was equivalent to that of a seven year old boy. Radiological examination and static and dynamic hormonal examination

FIG 1 Family pedigree.

FIG 2 III.4 at two months of age showing characteristic facial dysmorphism, especially fleshy tip of nose, anteverted nostrils, and patulous lips.

FIG 3 X ray of III.4 at two months of age; note slender bones and no articular anomaly.

(a)

(b)

FIG 4 III.3 at eight years of age showing (a) triangular shaped face with square chin and anteverted nostrils, (b) severe dwarfism with proportionate limbs, frontal bossing, and short thorax.

did not show any abnormality. The karyotype was 46,XY. At the age of nine years, the child was 105 cm tall (-4.8 SD) and weighed 18 kg. His face was triangular with a small, square chin. The nose was short and the nostrils were anteverted. The mouth and philtrum appeared normal. The eyebrows were curvilinear. There were no articular deformities or limitation of movement. The feet appeared flat with prominent heels. The thorax was short and there was a distended abdomen. A balanic hypospadias was observed. The ribs were tubular and horizontal and the metacarpals had a tendency to taper (the length-width relationship of the second metacarpal (PNA) equalled 8 compared to a median of 6.7 for this size). The feet were flat and the calcanea were prominent. There did not seem to be any metaphyseal or joint abnormalities. The child was of average intelligence.

Discussion

3M dwarfism is a clinically recognisable entity and 16 cases have been published since the first description.¹⁻⁴ The disorder is not often recognised early; it was the birth of a second affected child which suggested the diagnosis in the first born child in four of the families described and in our family. The parents were related in four families and the inheritance pattern appears to be autosomal recessive.⁵

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TABLE Clinical features of 3M dwarfism and Russell-Silver syndrome.

	Russell-Silver syndrome	3M dwarfism
Intrauterine growth retardation	-3 to -4 SD, no catch up growth	-5 to -6 SD, no catch up growth
Final height	153 (M), 147 (F) cm ¹²	120 to 130 cm
Cranium	Pseudohydrocephalus	Dolichocephaly
Facial dysmorphism	Slight (Silver) Important (Russell)	Constant
Facies	Triangular	Triangular
Chin	Pointed and small	Square
Mouth	Downturned corners	Normal
Lips	Thin vermilion border	Thick
Nose	Small tip	Fleshy tip
Nares	Normal	Anteverted
Ears	Low set	Normal
Skeletal abnormalities	Asymmetry (Silver)	Tall vertebral bodies, prominent heels
Inheritance	Sporadic	Autosomal recessive

The size of these children at birth, between 40 and 42 cm, is clearly smaller than other types of non-lethal dwarfism. The head size is normal for gestational age, giving a disproportionate appearance. Conversely, the limbs and trunk are proportionately reduced. There is no catch up growth and the children continue to grow parallel to -5 SD below the mean for age. Although the characteristic triangular face only appears later, the dysmorphic features are typical enough to be recognised at birth. The most characteristic features at birth are the protruding, fleshy lipped mouth and the small, upturned, fleshy tipped nose.¹⁻⁶ All the children show great similarity despite their ethnic origins.

The most typical radiological feature is the slenderness of the long bones with thin diaphyses.² Other characteristics are less consistent and include foreshortened vertebral bodies in the lumbar region,^{6,7} reduction of pelvic size,² flat feet and prominent calcanea,² dystrophy of the elbow,² and moderately retarded bone maturation.⁶

3M dwarfism belongs to the group of intrauterine growth retardation-malformation syndromes. Having an older affected case in our family easily enabled us to eliminate types of dwarfism where mental retardation is a feature. Other types of intrauterine dwarfism were not considered because of the lack of associated features.

Differentiation from Russell-Silver syndrome is difficult because of the clinical heterogeneity of the syndrome.⁷⁻¹¹ Skeletal asymmetry is a variable feature in Russell-Silver syndrome; short stature of prenatal onset and small triangular facies are found in both syndromes. However, some features differentiate them (table), particularly the severely reduced growth potential in 3M dwarfism and the absence of familial cases in Russell-Silver syndrome. Tanner *et al*¹² studied the sibs of 39 cases and found that none of the 61 brothers and sisters was affected.

The recognition of 3M dwarfism allows a prediction of normal psychomotor development but also severe short stature of between 120 and 130 cm.¹⁻⁴ An early diagnosis is important for genetic counselling since, unlike the Russell-Silver syndrome, 3M syndrome has an autosomal recessive mode of inheritance. An ultrasonographic survey may detect the disorder but probably late during a pregnancy.

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