Discordance for Ellis-van Creveld syndrome in twins

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ABSTRACT

Ellis-van Creveld (EVC) syndrome or chondroectodermal dysplasia is a rare autosomal recessive disorder characterised by a variable spectrum of clinical findings. Classical EVC syndrome comprises a tetrad of clinical manifestations of chondrodystrophy, polydactyly, ectodermal dysplasia, and cardiac defects. It is extremely rare for EVC syndrome to occur in one of a pair of newborn twins. Review of the existing literature revealed that only one such case has been reported so far.

Keywords: chondrodystrophy, chondroectodermal dysplasia, Ellis-van Creveld syndrome, twins

Singapore Med J 2008; 49(12): e369-e371

INTRODUCTION

Ellis-van Creveld (EVC) syndrome or chondroectodermal dysplasia is a rare autosomal recessive disorder which was initially described in 1940 by Richard Ellis and Simon van Creveld.[1] Subsequently, there was a review of 38 patients by Ellis and Andrew in 1962.[2] Although the tetrad constitutes the classical syndrome description of chondrodystrophy, polydactyly, ectodermal dysplasia and cardiac defects, a variable spectrum of clinical manifestations is frequently present.[3] Other organs of endodermal origin are sometimes affected in EVC syndrome. Pulmonary, renal, hepatic, pancreatic, and central nervous system abnormalities have been reported previously but constitute some of the rarer syndrome associations.[4-6]

CASE REPORT

A 24-year-old primapara underwent lower segment caesarean section for twin pregnancy with foetal distress. The first born was a completely normal female baby weighing 1,900 g delivered at a gestational age of 36 weeks. The second twin was a male baby weighing 2,450 g and had dysmorphic features. Apgar score was 5 and 7 at one and five minutes, respectively. This newborn was severely asphyxiated at the time of birth. There was no history of consanguinity in the parents.

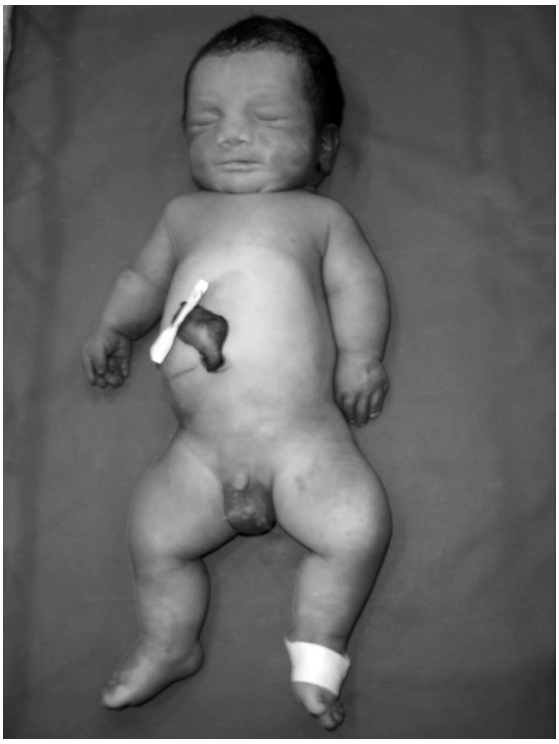

Fig. 1 Photograph shows short-limbed dwarfism with predominantly distal shortening, characteristic of the Ellis-van Creveld syndrome.

Physical examination of the second twin revealed a 36-week-old infant weighing 2,450 g, measuring 47 cm in length, and having a head circumference of 33 cm. The physical findings included short-limb dwarfism (the ratio of upper segment to lower segment was 2.1:1). The shortness of the limbs were chiefly in the distal parts (the forearms and legs) (Fig. 1). Also present were bilateral postaxial polydactyly and hypoplastic spoon-shaped nails. His facial and dental anomalies included multiple frenula with gum abnormalities and natal lower tooth. There was gross hypotonia noted on neurological examination. Cardiovascular examination revealed a soft grade 2/6 soft, systolic murmur. The infant was severely depressed with occasional gasping respirations.

Haematological investigations were positive for the

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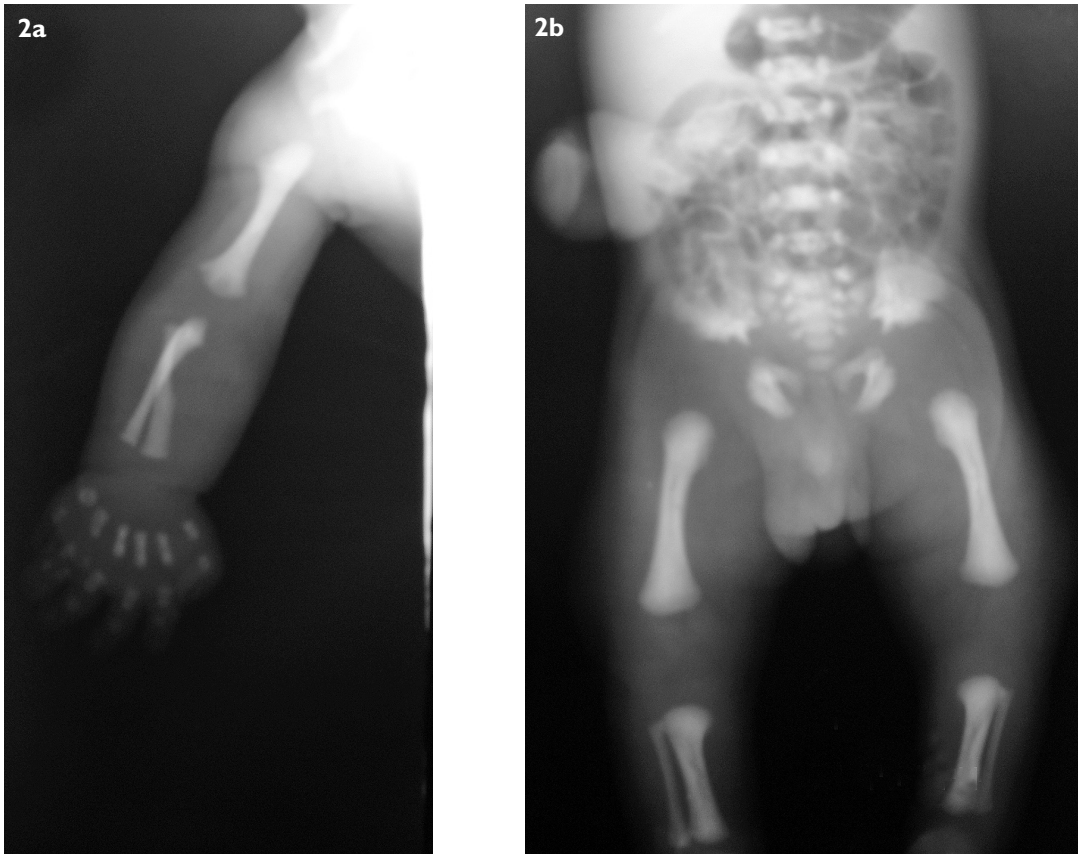

Fig. 2 Radiographs show shortening of the distal limb segments. Note the hook-like projection of the ilium in the region of the triradiate cartilage and postaxial polydactyly of the hand.

sepsis screen. Echocardiography revealed the presence of a 12-mm perimembranous ventricular septal defect. Skeletal survey revealed limb bones with predominantly distal shortening. "Hook-like" projections in the region of the triradiate cartilage of both iliac bones were noted (Fig. 2). A clinical diagnosis of EVC syndrome was made, based on the physical findings strongly characteristic of chondroectodermal dysplasia (short-limb dwarfism, dysplastic nails, dental anomalies, abnormal frenula and polydactyly) coupled with the radiological evidence. Despite our best efforts, he expired the following morning due to respiratory failure.

DISCUSSION

The incidence of EVC syndrome is 1:244,000 of the total population. It is higher in closed ethnic communities (an incidence of 2:1,000 in the Amish population of Pennsylvania). This condition is usually detected at birth. Important findings in the head include a "pseudo-cleft lip", absent upper gingivolabial sulcus and hypertrophic gingival frenum. Chondrodystrophy, the most consistent clinical feature, is due to a defect in ossification that results in short stature and limb shortening, which is more striking in the distal rather than proximal extremities.[1] The trunk is however normal in length with a relatively narrow thorax. Polydactyly, which is always present, is typically seen as postaxial hexadactyly of the hands, or in a few cases, the feet (about 20% of cases).[7] Ectodermal defects frequently manifest as nail hypoplasia, malformed teeth, and thin scanty hair.[8] The dentition is usually precocious but delayed eruption may also occur. Abnormal tooth shape (conical teeth), size (macro/microdontia), structure (enamel hypoplasia, caries and early tooth loss), number (absent lateral incisors and fused teeth) or site of implantation (disorderly arrangement and irregular spacing) may be seen. Abnormal pubic and axillary hair with hypotrichosis of the eyebrows may be occasionally observed.[9] Cardiac defects are present in 50%–60% of patients. A common atrium and persistent atrioventricular canal are the most common cardiac defects.[1,4] Additional endocardial cushion defects have also been described, including patent ductus arteriosus, ventricular septal defects, and atrial septal defects.[1,4] Intelligence in most patients is normal, but short stature is seen uniformly in adult patients (average height of 135 cm, with wide variations).

Radiological features comprise a narrow thoracic cage with short ribs and wide, spade-like anterior ends. The pelvis has square iliac ala and "trident acetabulum". Limbs have shortened long bones, especially in the

middle and distal segments, with wide diaphyses and metaphyses and occasional marginal spurs. Fibular shortening is more marked than in the tibia. Tubular bones of the hand are shortened with bifid or fused supernumerary metacarpals. Proximal and middle phalanges are short with cone-shaped epiphyses.[9]

EVC syndrome is an autosomal recessive disorder that has recently been mapped to human chromosome 4p16.[10] The differential diagnosis of EVC syndrome in the neonatal period includes thoracic dysplasia of Jeune and other forms of lethal short-limbed dwarfism. The chief guide is the severe hypoplasia of the nails and the short, fused upper lip, which are present only in EVC syndrome. In childhood, the short distal limb segments, the deformity of the upper tibia and the fused capitate and hamate bones differentiate EVC syndrome from other short-limbed dwarfs. There is a high mortality rate in the first six months of life secondary to heart disease and respiratory failure. Survival is excellent in the absence of congenital heart disease. Review of the existing literature has shown that to date, there is a single published case of occurrence EVC syndrome in twins.[3]

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