Campomelic dysplasia in a twin pregnancy. A case report

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Introduction

Campomelic dysplasia is a rare skeletal dysplasia originally reported by Maroteaux *et al.* [1]. It is characterized by bowed lower extremities in association with other specific skeletal, cartilaginous and extraskeletal anomalies. The features of this entity have been described in the literature [2]. We present for the first time a case report of campomelic dysplasia in one fetus of a twin pregnancy and we review the clinical, sonographic, radiologic and pathologic findings.

Case report

A 31-year-old woman (gravida 4, abortions 3) was admitted to our hospital in the 22nd week of pregnancy because of vaginal bleeding which had been present from the beginning of the pregnancy. This was her fifth gestation. Real-time imaging of the uterus demonstrated two active fetuses. The first one (A) was normal during all sonographic examinations. The second one (B) had short and bowed femora and bowed tibiae and fibulae. In the 26th week oligohydramnios was observed. The femoral length and the biparietal diameter (BPD) of fetus B are listed in Table 1.

During the 29th week of pregnancy abortion occurred. Fetus "A" was a male, 31 cm long and 800 gr in weight, who died 20 min after the delivery because of pulmonary hemorrhage, aspiration and intracranial hemorrhage. Fetus "B" was stillborn. He was a male, 28 cm long and 800 gr in weight. He had a flat nasal bridge, small mouth, cleft palate and micrognathia. The thorax was bell-shaped. There was bowing of the femora, anterior bowing of the tibiae with cutaneous dimples and bilateral varus deformity of the feet (Fig. 1). The pathologic investigation revealed pulmonary aspiration, atelectasis, hydrocephalus and intracranial hemorrhage. A chromosome analysis was not carried out.

The roentgenographic manifestations were the following (Fig. 2). The femora were sharply bowed anterolaterally near the junction of their proximal and middle thirds. The tibiae were similarly bowed near the junction of their middle and distal thirds. Along the concave aspects of their curvatures the bones were extremely dense. The fibulae were bowed too. The tali and calcanei were unossified. There was facial hypoplasia and micrognathia. The scapulae were hypoplastic. The cervical vertebrae were abnormal (hypoplastic). There was failure of mineralization of the pedicles of the thoracic vertebrae. There were 11 pairs of ribs. The iliac wings were narrow and oriented in an excessively vertical direction. The acetabular angles were increased and there was disclocation of the hips.

Table 1. — *Femoral length and biparietal diameter (BPD) of fetus "B" at sequential sonographic examinations (normal measurements in brackets).*

Gestational age (weeks)	22+5	24	27+4
Femoral length	39 (41)	40 (44)	47 (52)
B.P.D.	53 (56)	59.4 (60)	63 (69)

Discussion

Campomelic dysplasia is a very rare form of congenital short-limbed dwarfism. Its incidence has been reported as 0.05-0.09 per 10,000 live births [3]. There is a sporadic autosomal dominant mode of inheritence and a sex-reversal phenomenon: male 46XY karyotype with female phenotype. These patients have female external genitalia, vagina, uterus and fallopian tubes. Pathologic studies revealed poorly-differentiated ovarian tissue or gonadal tissue with an embryonal testicular pattern. It has recently been recognized that camponelic dysplasia and autosomal XY sex reversal are caused by mutations in the SRY-related gene SOX9 on 17q [4]. The clinical picture of this entity includes a low or normal birth weight, term newborn with macrocephaly, disproportionately short trunk and lower extremities and extreme hypotonia. The face and the nasal bridge are flat. The palpebral fissures are narrow giving the appearance of hypetelorism. The mouth is small. Micrognathia, retrognathia, a cleft of the soft palate and low-set ears are other features. The chest is small and bell-shaped. There is mild scoliosis. The hands may show brachydactyly and clinodactyly. The lower limbs are anteriorly bowed with pretibial skin dimples. Dislocation of the hips, talipes equinovarus and halux deviation may also be present.

Roentgenographic findings are described in table 2. Bowed femora and tibia, hypoplastic scapula, nonmine-

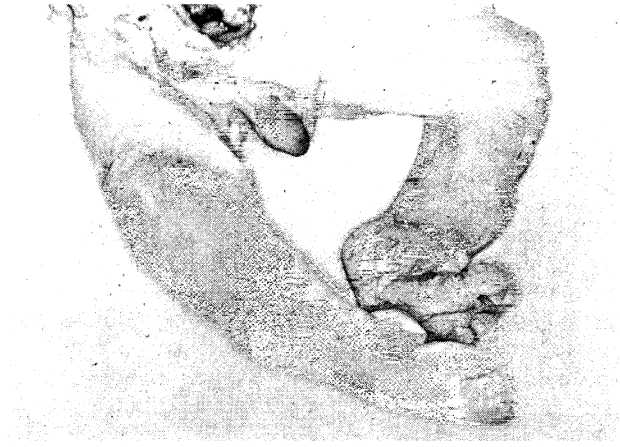

Figure 1. — Gross morphology of the lower extremities showing prominent bowing of the tibiae.

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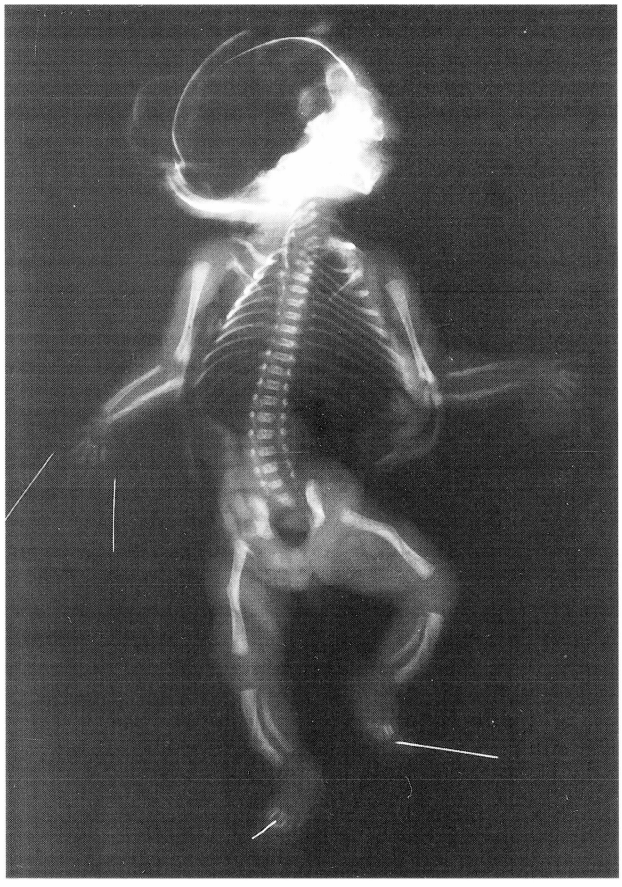

Figure 2. — X-ray of fetus "B" the skull, chest and abdomen were opened and the viscera were removed. There is bowing of femora, tibiae and fibulae, unossified tali and calcanei, facial hypoplasia, micrognathia, hypoplastic scapulae and cervical vertebrae, 11 pairs of ribs and narrow iliac wings with an excessively vertical direction.

ralized thoracic pedicles, narrow iliac bones, widely-spaced ischial bones are found in almost all cases. The next most frequent features are unossified proximal tibial epiphyses (97%), absent mineralization of sternum (93%) and abnormal cervical vertebrae (97%). Recently, cases of campomelic dysplasia without overt campomelia have been reported [5].

Today prenatal diagnosis is possible after the 18th week of gestation with the use of high-resolution sonography. Measurement of fetal femur length with real-time scanners allows the accurate detection of this dysplasia. In addition to limb-shortening, cleft palate, absent scapula, hypertelorism, macrocephaly, hydronephrosis and hydrocephalus may be detected during sonographic examination [6].

We must differentiate campomelic dysplasia from other bone dysplasias with congenital bowing and early death. Some difficulties may arise with diastrophic dwarfism, Larsen syndrome, osteogenesis imperfecta and hypophosphatasia. Hypoplastic scapula, abnormal thoracic vertabrae and vertical iliac bones are features found only in campomelic dysplasia.

The affected infants are stillborn or die within minutes of birth or the first month of life due to respiratory distress. Rarely does a child survive longer and the oldest has been a 17-year-old boy.

In our case one fetus of a twin pregnancy had campomelic dysplasia. To our knowledge this has not been described previously. The role of the radiologist is to detect and evaluate any abnormality of the femur on sonographic control during the pregnancy. He can also recognize the skeletal abnormalities in a stillborn infant. In this way he helps the management of the gestation. After that genetic counseling must be offered to the parents and subsequent pregnancies must be carefully planned and monitored.

Table 2. — *Radiographic findings in campomelic dysplasia*

Skull
enlargement of skull
facial hypoplasia
micrognathia
Thorax
Slender ribs
11 pairs of ribs
Absent mineralization of sternum
hypoplastic scapulae
small bell-shaped thorax
Spine
kyphoscoliosis
poor or absent mineralization of lower cervical spine
flattened vertebral bodies
Pelvis
narrow vertical ilial bones
poor development of ischiopubic rami
increased acetabular angles
dislocation of hips
Upper limb
bowed humeri and radii
dislocation of elbow
brachydactyly / clinodactyly
widened tips to distal phalanges
luxation of proximal joint of the thumb
Lower limb
bowed femora and tibia
hypoplastic fibula
unossified distal femoral/proximal tibial epiphysis
unossified talus and/or calcaneus

References

[1] Maroteaux P., Spranger J., Opitz J. M. *et al.*: "Le syndrome campomelique". *Presse Med.*, 1971, *79*, 1157.
[2] Hall B. D., Spranger J. W.: "Campomelic dysplasia: further elucidation of a distinct entity". *Am. J. Dis. Child.*, 1980, *134*, 285.
[3] Stoll C., Dott B., Roth M. P., Alembik Y.: "Birth prevalence rates of skeletal dysplasias". *Clin. Genet.*, 1989, *35*, 88.
[4] Mansour S., Hall C. M., Pembrey M. E., Young I. D.: "A clinical and genetic study of campomelic dysplasia". *J. Med. Genet.*, 1995, *32 (6)*, 415.
[5] Friedrich U., Schaefer E., Meinecke P.: "Campomelic dysplasia without overt campomelia". *Clin. Dysmorphol.*, 1992, *1 (3)*, 172.
[6] Balcar I., Bieber F. R.: "Sonographic and radiologic findings in campomelic dysplasia". *A. J. R.*, 1983, *141*, 481.

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