CONGENITAL OSTEOCHONDRODYSPLASIA
– A CASE REPORT

PRIKAZ BOLESNICE
S KONGENITALNOM OSTEOHONDRODISPLAZIJOM

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Abstract

Congenital osteochondrodysplasia is a rare inborn disorder of the development and growth of bone and cartilage. Its incidence in children is 2–3/10,000.

We present the case of a female patient, born in 1952 from an unplanned pregnancy as the fourth child in the family. At her birth the mother was 42 and the father 53 years old. At examination her body height was 152 cm and body weight 87 kg.

She was hospitalized at our clinic because of pain in the spinal and peripheral joints from which she had been suffering since young age. Her father and uncle had similar problems. On physical examination the patient was obese with a large scaphoid calvaria, a very high forehead, a nose with wide base, short trunk and extremities, especially the arms with semi-contractures of the elbow joints and fingers of equal length. There was a contracture of the right hip, the feet were in disproportion with the rest of the body, while Lasegue's test was positive on both sides at 30°. The patient's karyotype was 46 xx. Radiography of the hip joints showed varus deformations and pronounced sclerosis of the femoral head. The knee radiographs were characterized by congenital deformities, and there were clinical and radiographic signs of osteoarthritis. Radiographs of the lumbosacral spine and pelvis showed osteoporosis, hyperlordosis, and a compression fracture of the L5 vertebral body. Total T-score of the hip on DEXA scan was –3.7.

Based on data from the history, physical examination, as well as clinical and laboratory findings, we established the diagnosis of congenital osteochondrodysplasia, a condition which should be considered and diagnosed as soon as possible. Treatment of the disease is multidisciplinary and mainly symptomatic.

Keywords: Osteochondrodysplasia – diagnostic image, genetics; Bone diseases, developmental – diagnostic image, genetics; Radiography
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Case report

Introduction

Congenital osteochondrodysplasia is an inborn disorder of the development and growth of bone and cartilage. This disease is rare with an incidence in children of 2–3/10,000.

It occurs in two forms, lethal and non-lethal. Nowadays the disease can be diagnosed before birth by ultrasound or DNA analysis of fetal cells (1, 2).

The nonlethal form includes: 1) disorders of long bone and spinal cord growth, 2) increased anarchic fibrous tissue and bone cartilage, and c) decreased and increased bone density.

Non-lethal osteochondrodysplasia can be presented in three major forms: short extremities, short body and extremities, and curved bone pathology.

In the past there were several classifications of these disorders regarding their causes, etiology, and prognosis. One of the most commonly used classifications is the one based on genetic changes in the previously mentioned three clinical forms (Tables 1–3) (3).

In the case of achondrodysplasia, the genetic disorder involves a derangement of the gene composition of the 3rd fibroblast growth factor, while in the other forms mutations of the gene for collagen II and different mutations in the same gene occur, causing various defects and disorders of bone and cartilage. Inheritance runs through dominant and recessive pathways. The disorder starts in the embryonic stage and often has a lethal outcome before, during, or immediately after birth. At birth it can be observed that the head is increased by dysmorphism, showing the typical pronounced craniocephalic neurocranium with a high forehead, irregular root of the nose, and a relative progeria. Other prominent features of the disease are consequences of the growth disorder causing reduced growth of long bones and vertebrae. Most affected are the extremities, especially the femur and humerus, which lag in development, resulting in a disproportion

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Table 1 Osteochondrodysplasia with short limbs

<table>
<thead>
<tr>
<th>Type of osteochondrodysplasia</th>
<th>Mode of heredity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Achondrodysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>2. Diastrophic dysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>3. Chondrodysplasia with epiphysis</td>
<td>AR,XVD,XVR</td>
</tr>
<tr>
<td>4. Metatropic dysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>5. Omodysplasia</td>
<td>AD,AR</td>
</tr>
<tr>
<td>6. Mesomelic dysplasia</td>
<td>AD,AR</td>
</tr>
<tr>
<td>7. Acromesomelic dysplasia acromesomelica</td>
<td>AR</td>
</tr>
<tr>
<td>8. Grebe dysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>9. Other micromelic dysplasias</td>
<td>SP</td>
</tr>
</tbody>
</table>


Table 2 Osteochondrodysplasia with short body and extremities

<table>
<thead>
<tr>
<th>Type of osteochondrodysplasia</th>
<th>Mode of heredity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spondyloepiphyseal congenital dysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>2. Hypochondrogenesis</td>
<td>AD</td>
</tr>
<tr>
<td>3. Kniest dysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>4. Spondyloepiphyseal dysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>5. Pseudodiastropic dysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>6. Immunoosseous dysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>7. Opsismodysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>8. Spondyloepiphyseal dysplasia with laxity</td>
<td>AR</td>
</tr>
<tr>
<td>9. Spondyloepiphyseal dysplasia with abnormal calcification</td>
<td>AR</td>
</tr>
</tbody>
</table>

Table 3 Osteochondrodysplasia with curved bones

<table>
<thead>
<tr>
<th>Type of osteochondrodysplasia</th>
<th>Mode of heredity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Campomelic dysplasia</td>
<td>AD</td>
</tr>
<tr>
<td>2. Kyphomelic dysplasia</td>
<td>AR</td>
</tr>
<tr>
<td>3. Stuve-Wiedemann dysplasia</td>
<td>AR</td>
</tr>
</tbody>
</table>
between the extremities and the trunk. Thus the domi-
nant clinical presentation is rhizomelic dwarfism. Of-
ten there is a decreased range of motion, with restrict-
ed extension and pronation in the elbows.

Thoracolumbar kyphosis is another sign in these pa-
tients. There is muscle hypotonia and arcual kyphosis,
and when the child begins to walk there are also hyper-
lordosis, disc herniation, and other changes consistent
with osteoarthritis, which may result in spinal cord
compression. Another feature of the disease is an early
appearance of various deformities of the extremeties,
and osteoarthritis of the peripheral joints, mainly hips
and knees, are found at an early age. Obesity and osteo-
porosis with high levels of blood lipids and sugar are
also seen early in life (4). Cardiovascular involvement
is one of the extraskeletal manifestations of osteochondro-
dysplasias, manifested as valvular insufficiency, fo-
ramen ovale, patent ductus arteriosus, and other asso-
ciated congenital heart malformations.

**Case presentation**

The female patient that we are presenting here was
admitted to our Rheumatology Clinic for the first time
because of spinal and joint pain. She had been feeling
pain from a very young age. She was occasionally treat-
ed on an outpatient basis. For over 10 years she could
not walk without the aid of another person, and re-
cently she could not stand on her own.

The patient was born from an unplanned pregnancy,
the fourth child in the family. At the time of her birth
the mother was 42 and the father 53 years old. Her
height was 152 cm and body weight 87 kg. The father
and uncle also had “rheumatic and bone problems” in
their young age. On physical examination the patient
was conscious, oriented to time, space, and people,
subfebrile, eupneic, anicteric, acyanotic, obese, with
visible skin and mucosa of normal appearance. She
took a passive position in bed. Regarding the appear-
ance of the head and neck, the following features were
observed (Figure 1): reduced pilosity (for her age),
high forehead, scaphoid form of the skull, and signs of
average progenia. The neck was characterized by lim-
ited movement (lateral flexions and both rotations).
During the examination there was pain and sensitivity
to palpation at all vertebral spinous process levels, with
a positive “ring sign” at the L4 l and L5 levels. Pain sen-
sitivity on palpation of all long bones was also ex-
pressed. Short arms with semi-contractures of both
elbows and the fingers of the hand were present, too.
There was a flexion contracture of the right hip joint
and pain during motion of both knee joints, with aches,
movement restriction, and Baker’s cysts in the right
knee. The feet were large (European size 44) and in dis-
proportion with the rest of the body. There was a posi-
tive bilateral straight leg test (Lasegue’s test) at 30°. De-
creased superficial touch sensation was found from the
knees below.

Laboratory findings were as follows: ESR 25/1h, al-
kaline phosphatase 170 UI/L, Ca 5.3, PCR- 12.9 mg/L,
uric acid 353.1 μmol/L. Urine culture 3 times was neg-
ative.

Brucella agglutination test, AST-O, and Wraight’s
test were also negative. The patient’s karyotype was
46 xx.

Chest radiography showed an increased shadow of
the aortic knob, increased transparency in both pul-
monary areas, an elevated diaphragm (due to obesity),
and changes consistent with osteoporosis and right
scoliosis of the thoracic spine (Figure 2). Radiographs
of the lumbosacral region in two standard projections
and the pelvic region including the hips showed re-
duced mineralization, a compressive fracture of the L5
vertebral body, hyperlordosis, congenital malforma-
tion of the hips in the form of coxa vara, with deforma-
tions and pronounced sclerosis of the femoral head
(Figures 3 and 4). Radiographs of the knee joints were
characterized by congenital deformations and osteoar-
thritic changes as well (Figure 5). A total hip DEXA
scan showed a T-score of –3.7.

As it is known that osteochondrodysplasia is associ-
ated with aortic valve insufficiency, standard 2-dimen-
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Case report

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Various diagnostic echocardiography, M-mode, color Doppler, and pulsed Doppler echocardiography were done. Impairment of the diastolic function was found, with reduced E wave velocity, E/A ratio, and isovolumetric relaxation time (IVRT), while the E wave deceleration time was increased. Based on measurements of the aortic annulus, sinotubular junction, ascending aorta, descending aorta, and correcting for body surface area (BSA), mild aortic valve insufficiency was established.

In spite of the discovery of this rare disease, doctors’ lack of experience with it, as well as the lack of specialized teams for diagnosis and treatment, the genetic damage that causes this disease is transmitted from generation to generation (5). This was the case with our patient as well. The disease itself does not affect the intellectual aspect and the patient’s ability to experience life like everyone else. This should be taken in consideration, too.

If the disease is suspected at birth, follow-up during the growth period is essential, especially taking into consideration the longitudinal body measures and anthropometric measurements (height, weight, limb size, distance between fingertips at arms apart, length and width of the head). The measures should be compared to the growth age and sex percentile (6). Since collagen is one of the main structural components of the connective tissues, this disease can have various extraskeletal clinical manifestations. Collagen disorders in osteochondrodysplasia patients affecting the connective tissue of the heart are responsible for valvular heart diseases and aortic disorders (7–9).

Patients with this disease require specialized and trained teams (involving pediatricians, orthopedic surgeons, genetics specialists, psychiatrists, endocrinologists, psychologists, rheumatologists, cardiologists, and rehabilitation medicine specialists) to reduce the...
consequences of the disease as much as possible. This kind of care was not available for our patient during her years of growth; she had to cope with just counseling about how to make her life as easy as possible in the circumstances.

Diagnosis of patients with congenital osteochondrodysplasia is challenging because the disease starts during the fetal period. Skeletal changes are early findings and their prevention is of the greatest importance for the prognosis and quality of life of these patients. Treatment of these patients is multidisciplinary and lifelong. At the first presentation of suspicious individuals with short limbs and body it is essential to exclude or confirm the diagnosis of congenital osteochondrodysplasia.

**Declaration on conflict of interest:** The authors declare no conflict of interest.

**Izjava o sukobu interesa:** Autori izjavljaju da nisu u sukobu interesa.

**LITERATURE**


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