

# Infantile Osteopetrosis in a Kazakh Boy

Francesca Cainelli MD<sup>1</sup>, Venera Tastanbekova MD<sup>3</sup>, Dair Nurgaliev MD PhD<sup>3</sup>, Natalya Lim MD<sup>1</sup> and Sandro Vento MD<sup>1,2</sup>

<sup>1</sup>Department of Medicine, School of Medicine, Nazarbayev University, Astana, Kazakhstan

<sup>2</sup>Nazarbayev University Medical Center, Asana, Kazakhstan

<sup>3</sup>Department of Oncology 1, National Research Center for Maternal and Child Health, Astana, Kazakhstan

**KEY WORDS:** osteopetrosis, bone marrow, thrombocytopenia, rare diseases, Kazakhstan

IMAJ 2017; 19: 65–66

**A** 20 month old boy was referred to the National Research Center for Maternal and Child Health in Astana, Kazakhstan in March 2012 because of anemia and thrombocytopenia since the age of 2 months, and hepatosplenomegaly. His family history was remarkable for autoimmune diseases as the patient’s elder sister died of systemic lupus erythematosus at the age of 16 years and his grandmother had rheumatoid arthritis.

A diagnosis of myelodysplastic syndrome and aplastic anemia had been made 8 months previously and he had been treated with pulsed corticosteroids and blood and platelets transfusions. A bone marrow aspiration demonstrated moderate cellularity with 1.6% blasts and no megakaryocytes, while the trephine

biopsy revealed pronounced bone density and showed proliferation of reticular cells with areas of fibrosis. HLA haplotype was A\*01,02, B\*08,15, DRB1\*03,11, DR\*3. An X-ray of the hip joints and of the skull revealed increased medullary bone density and sclerosis, and a provisional diagnosis of autosomal recessive osteopetrosis was made. The child was referred back to a regional hospital for supportive treatment.

The patient, now almost 6 years old, has been referred again to the National Research Center for Maternal and Child Health because of anaemia (Hb 10.2 g/L), thrombocytopenia (46,000/μl), and easy skin bruising. Physical examination now revealed stunted growth, macrocephaly, frontal bossing, large fontanelle, mild exophthalmos, delayed tooth eruption, narrow chest, varus deformity of the lower limbs and significant hepatosplenomegaly [Figure 1].

A brain magnetic resonance imaging (MRI) demonstrated Arnold Chiari I malformation, moderate asymmetric hydrocephalus, increased bone density and thickness of the skull [Figure 2]. An echo-

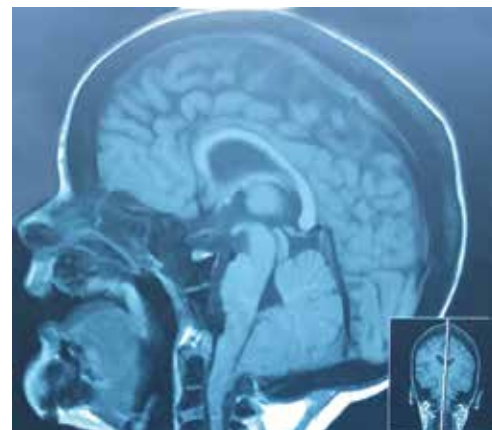
cardiography showed pulmonary artery systolic pressure of 29 mmHg.

Osteopetrosis is a very rare congenital disorder caused by defective osteoclast function leading to impaired bone resorption with abnormal bone cavity formation and bone marrow failure. The autosomal recessive form is thought to have an incidence of 1:250,000 births [1], which is higher in certain areas of the world (Costa Rica, Middle East, Chuvash Republic of Russia, and Västerbotten Province in northern Sweden), possibly due to consanguinity [2,3].

Infantile-onset osteopetrosis has symptoms associated with bone marrow failure and extramedullary hematopoiesis, neurological deficits (failure to achieve normal vision, hydrocephalus) caused by the encroachment of cranial nerve foramina or premature closure of calvarian sutures, fractures, failure to thrive, recurrent infections, and excessive bruising. Death generally occurs within the first decade of life.

Due to the rarity of the disease and unspecific symptoms, a correct clinical diagnosis is often missed initially and made

**Figure 1.** Size of patient’s hepatosplenomegaly



**Figure 2.** Sagittal T1-weighted MR image shows thickening of the calvaria and facial bones, hypointensity of skull and cervical vertebra, and cerebellar tonsillar ectopia

only because of the sclerotic bony changes seen on an occasionally performed X-ray. Bone marrow transplantation, which our patient is expected to receive soon, is the only possible cure and results in long-term survival, even though the rates of graft failure and hepatic and pulmonary toxicity are fairly high [4].

---

### Correspondence

**Dr. S. Vento**

Dept. of Medicine, School of Medicine, Nazarbayev University, Astana 010000, Kazakhstan

**email:** sandro.vento@nu.edu.kz

### References

1. Stark Z, Savarirayan R. Osteopetrosis. *Orphanet J Rare Dis* 2009; 4: 5.
2. Loría-Cortés R, Quesada-Calvo E, Cordero-Chaverri

C. Osteopetrosis in children: a report of 26 cases. *J Pediatr* 1977; 91: 43-7.

3. Bliznetz EA, Tverskaya SM, Zinchenko RA, et al. Genetic analysis of autosomal recessive osteopetrosis in Chuvashiya: the unique splice site mutation in TCIRG1 gene spread by the founder effect. *Eur J Hum Genet* 2009; 17: 664-72.
4. Orchard PJ, Fasth AL, Le Rademacher J, et al. Hematopoietic stem cell transplantation for infantile osteopetrosis. *Blood* 2015; 126: 270-6.