Infantile Osteopetrosis in a Kazakh Boy

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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 anaemia 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 anaemia 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 echocardiography 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

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**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].

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References

“Humanity also needs dreamers, for whom the disinterested development of an enterprise is so captivating that it becomes impossible for them to devote their care to their own material profit. Without doubt, these dreamers do not deserve wealth, because they do not desire it. Even so, a well-organized society should assure to such workers the efficient means of accomplishing their task, in a life freed from material care and freely consecrated to research”

Marie Curie (1867-1934), Polish-born French physicist and chemist who conducted pioneering research on radioactivity. She was the first woman to win a Nobel Prize, the first person and only woman to win twice, the only person to win a Nobel Prize in two different sciences, and was part of the Curie family legacy of five Nobel Prizes. She was also the first woman to become a professor at the University of Paris, and in 1995 became the first woman to be entombed on her own merits in the Panthéon in Paris.