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OSTEOGENESIS IMPERFECT: A CASE REPORT

Laura Afonso Alvarenga Borges
Pediatric resident doctor at Santa Casa de Misericórdia de Franca, Franca-sp
Researcher - Responsible for research

Lays Cristina Oliveira Campos
Pediatric resident doctor at Santa Casa de Misericórdia de Franca, Franca-sp
Researcher

Sade Germano de Antonio e Silva
Student of the Medicine course at `` Centro Universitário Municipal de Franca`` - UNIFACEF, Franca-SP
Researcher

Marcelo Pinho Bittar
Intensive care physician and pediatric endocrinologist at Santa Casa de Misericórdia de Franca, Franca-SP
Advisor

Abstract: Osteogenesis imperfecta (OI), or brittle bone disease, is a rare skeletal dysplasia characterized by bone fragility, which results in multiple fractures, bone deformity and short stature. OI is a heterogeneous genetic disease, caused by mutations in genes involved in the production of an extra-cellular structural protein, related to collagen 1, which is the most important matrix of our bone framework. There are 4 types of the disease, among these, there is the severe form that is lethal in the perinatal period, while mild OI sometimes cannot be recognized until adulthood. Severe or lethal OI can usually be diagnosed through prenatal ultrasound and confirmed by imaging tests, such as CT scans, X-rays, among others, and genetic tests. The treatments currently available for the disease are only palliative, that is, they are not curative and individuals affected with severe OI can suffer multiple fractures and bone deformities throughout their lives. There are studies being carried out that perhaps, in the future, it may be possible to perform stem cell transplantation in utero, which could be a new therapeutic option for severe OI. The objective of this study was to describe a case of Osteogenesis imperfecta, not diagnosed in the prenatal period, in a city in the interior of the state of São Paulo.
Keywords: Keywords: Osteogenesis imperfecta, Glass bones, skeletal dysplasia

INTRODUCTION

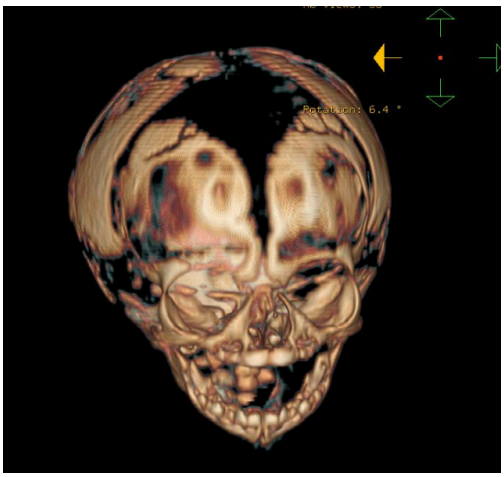
Osteogenesis imperfecta (OI), or brittle bone disease, is a rare skeletal dysplasia characterized by bone fragility, which results in multiple fractures, bone deformity and short stature (Andersen PE,1989). OI is a heterogeneous genetic disease, caused by mutations in genes involved in the production of an extra-cellular structural protein, related to collagen 1 (Chu, 1983), which is the most important matrix of our bone framework (Silece DO, 1979). There are 4 types of the disease, among these, there is the severe form that is lethal in the perinatal period, while mild OI sometimes cannot be recognized until adulthood (Forlino A, 2016). Severe or lethal OI can usually be diagnosed using prenatal ultrasound and confirmed by various imaging modalities and genetic testing (Stoll C, 1989). Furthermore, genetic testing, whether non-invasive or invasive, can further confirm the prenatal diagnosis. Early and accurate diagnoses give parents more time to decide on reproductive options (Marini JC, 2017). The treatments currently available for the disease are only palliative, that is, they are not curative and individuals suffering from severe OI may suffer multiple fractures and bone deformities throughout their lives (Trejo, 2016). Studies are being carried out to evaluate the possibility of stem cell transplantation in utero, which could be a new therapeutic option for severe OI (Mortier, 2019).

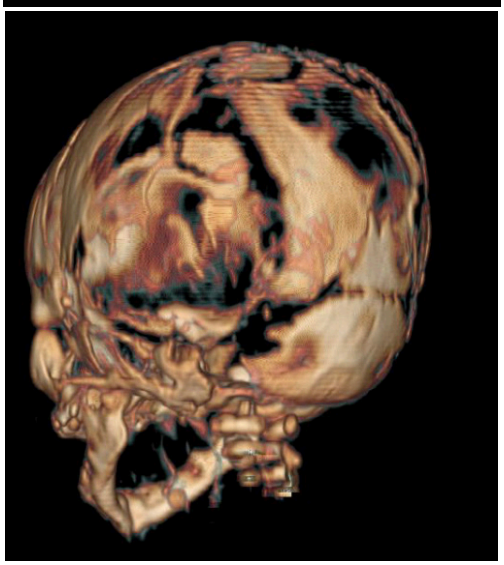
CASE DESCRIPTION

Patient daughter of a 43-year-old mother, with a history of recurrent UTI (prophylaxis with Cephalexin) and nephrolithiasis using double J since 2019, G3P3, without use of chronic medications, without family history of malformations or genetic diseases. Adequate prenatal care was carried out with 12 consultations, negative serology, with USG indicating intrauterine growth restriction and limb malformations questioned as dwarfism. Without prenatal diagnosis, she was born eutocic at 39 weeks and 6 days, hypotonic and did not cry, the cord was immediately clamped and taken to a warm crib. After performing initial maneuvers, the patient evolved with HR > 100 bpm, with gradual improvement in tone and maintained on inhaled oxygen for around 03 minutes due to central cyanosis and drop in saturation. At around 15 minutes of life, she developed mild respiratory distress

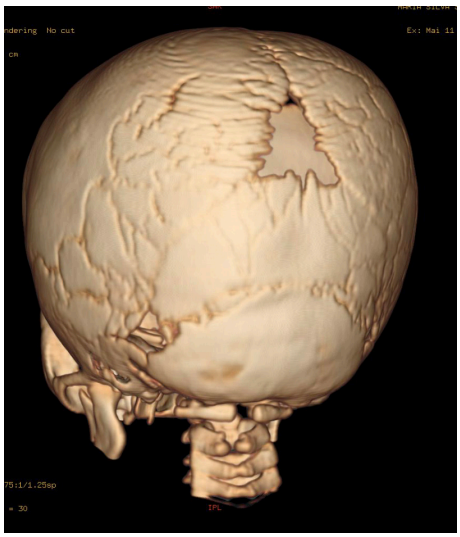
and tachypnea with RR 86 irpm, and was referred to the UCINCO. On site, infectious screening and imaging tests were carried out, which showed significant bone rarefaction and multiple fractures, raising the hypothesis of osteogenesis imperfecta.

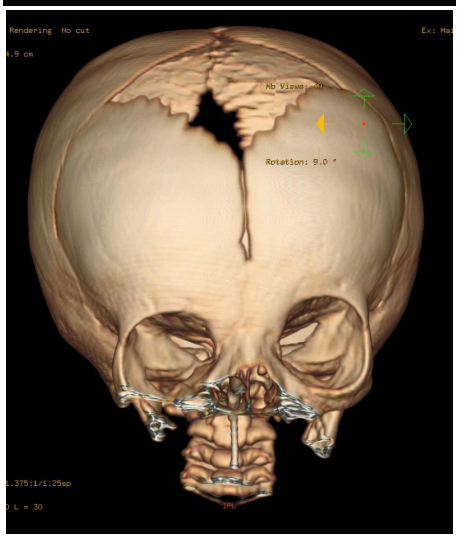
These images below show the first cranial tomography performed by the patient.





Due to the complex condition and high risk of complications, the patient was referred to the neonatal ICU of the same hospital. At the location, he remained in room air, uneventfully, collected tests and started a dose of pamidronate, on 13/09 but suspended due to hypocalcemia, starting vitamin D 1000 IU and calcium carbonate, according to guidance from the hospital's endocrinology team. To normalize serum calcium levels, the dose of pamidronate was restarted on September 16, for 2 consecutive days. He was discharged from the ICU to UCINCO on 09/22. She remained there for diet development, clinical observation and mainly for family training. The patient returns to the hospital every 60 days for a new cycle of pamidronate.





Showing a significant improvement in the patient's ossification after approximately 6 months of treatment. Below is another CT scan of the patient's skull carried out in May 2023.

DISCUSSION

This study presented the case of a child with OI without prenatal diagnosis, with clinical and radiological characteristics showing a higher probability of type II OI (Andersen PE,1989).

Type II OI is considered the second most common type (Andersen PE,1989) of OIs and is characterized by bone fragility, with multiple fractures "in utero", with significant deformities, blue sclera, short extremities and angular deformity; broad fontanelles, susceptibility to pre-senile deafness and autosomal dominant inheritance (Sillence DO,1979). In the case under analysis, it was found in the obstetric ultrasound that the fetus had shortened bones and that at birth it was found that, in addition, it had fractures, some consolidated and others that were later. Although the literature cites rare prenatal fractures (Stoll C, 1989), they can occur, however, it was not seen during the prenatal care of the patient above, making it difficult for doctors to take certain precautions during her birth.

Despite the greater probability of OI types I and II observed, it can still be said that the RN presented one of the characteristics of OI type III. Type III OI is a relatively rare type of OI, comprising around 20% of OI cases (Forlino A, 2016). In general, these are not lethal cases, but everyone is seriously affected; characterized by extreme bone fragility causing multiple fractures, marked and progressive deformity of long bones, skull and spine. Patients are born at term or near term with normal weight; are short in stature, especially due to deformities of the limbs, resulting from fractures and tibial bending that occurred during intrauterine life (Trejo P, 2016).

Prenatal diagnosis, namely obstetric ultrasound, is a fundamental element in the assessment of OI. Ultrasonography is of relevant importance for establishing the diagnosis and gestational prognosis, based on the evaluation of the texture of the long bones (calcification) and their presence or absence, in addition to the observation of possible shortening or fractures thereof (Andersen PE,1989). It is important to remember that fractures can undergo consolidation during fetal life. Considering these items, morphological US has high sensitivity (greater than 90%) for the definition and discrimination of skeletal defects.

Nowadays, treatments have significantly improved the lives of these patients, increasing both their survival and their quality of life (Forlino, 2011). It is clear that even if incurable (Folkestad, 2016), the progression of the disease can be controlled, as was done with the patient above with the use of pamidronate every 60 days. In addition to this, there is also zoledronic acid which would have a better dosage, taken every 6 months. An important evolution can be seen in the quality of life of these patients.

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