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Case Report Article

Omenn syndrome: the drama of a family, congenital ichthyosis is not always mundane!

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Abstract

Background: The case we are reporting is about one of the rare manifestations of severe combined immunodeficiency, Omenn syndrome (OS).

Case presentation: A 43-days-old female presented with thick diffuse erythrodermic scaly ichthyosiform lesions on the scalp, face, and trunk since birth. lymphadenopathy, splenomegaly, and growth retardation as well as eosinophilia and increased serum IgE levels. A pregnancy was planned for an allograft of bone marrow, but the procedure was not carried out due to a persistent post-covid pneumopathy with bilateral parenchymal condensation that resulted in death.

Conclusion: This case report intends to incite clinicians to be alert to this possible diagnosis and not to underrate an immune deficiency in the case of neonatal erythroderma.

Keywords: Omenn Syndrome, Ichthyosis, Severe Combined Immunodeficiency, Congenital, Morocco

Background

Omenn syndrome is a rare expression of serious combined immune deficits. The presence of a self-reactive clone requires the use of intense conditioning, a major source of morbidity, and mortality, and the management of which still needs to be improved [1]. Omen's disorder is one of a few shapes of severe combined immunodeficiency deficiency (SCID). Individuals with SCID are inclined to repeat diseases that can be exceptionally genuine or life-threatening. Infants with Omenn syndrome are often presenting with pneumonia and constant diarrhea because of opportunistic microorganisms [2]. Children with Omenn syndrome suffer from alopecia, pachydermy, polyadenopathy, hepatosplenomegaly, fever, and possibly digestive signs. The main biological abnormalities are spinal and blood eosinophilia, hypergammaglobulinemia E, an increase in circulating HLA lymphocytes Dr + and CD 25 +, and hypogammaglobulinemia related to a deficiency in B lymphocytes. The treatment consists of a marrow transplant [2,3]. Omenn syndrome can be caused by a mutation of the RAG1 and RAG2 genes on chromosome 11p and the Artemis gene on chromosome 10p [3].

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Case presentation

We report here the case of a 43-day-old infant who was hospitalized in April 2022 at the University Hospital Center of Oujda, Morocco. The only daughter of her parents, with 1st-degree parental consanguinity, resulting from an unremarkable pregnancy carried to term with a notion of gestational diabetes in the mother put on insulin therapy in the 7th month. of pregnancy, delivered by high route on a scarred uterus, eutrophic at 3300g, without delay in cord fall, with the notion of congenital ichthyosis, the notion of vomiting and chronic diarrhea, and history of two deaths in the siblings in a similar picture of neonatal ichthyosis, the first of which is a female infant who died at 4 months of life in an array of meningitis with recurrent bronchiolitis and dermatitis, and the second is a boy who died at D18 of life in an array of congenital ichthyosis. Clinical examination revealed ichthyosiform erythroderma with erosive and dry skin surmounted by fine desquamation of the entire skin covering, and hyperkeratosis of the folds and neck. On examination of the integuments, the scalp is covered with a scaly whitish coating, the eyebrows absent, and the nails of normal appearance. On examination of the mucous membranes, the presence of mouth ulcers was noted. In addition, splenomegaly was objectified 2 fingerbreadths on abdominal palpation, failure to thrive with a weight of 3kg700 (-2SD) and a height of 52cm (-2SD). On examination of the lymph nodes, the presence of left inguinal adenopathy measuring 2cm,

bilateral cervical poly adenopathy, the largest of which on the left measuring 1.5cm on the long axis with bilateral subcentimetric, inguinal, and axillary adenopathy. In addition, the patient was febrile at 39°C with symptoms of a respiratory infection. The biological assessment revealed hyperleukocytosis at 45,480/mm3 with lymphocyte predominance at 30,017/mm3 and eosinophilia at 18,870/mm3. The immune assessment first ruled out an acquired cause, the HIV serology was negative, then showed severe hypogammaglobulinemia at 0 .6g/l, hyper IgE at 9843ng/ml with a normal level of the other weight assays of IgG, IgM, and IgA, deep B lymphopenia affecting CD 19 at 0% with a level of normal T lymphocyte subpopulations. Regarding the infectious
assessment, the Cytomegalovirus (CMV) detection by Real-Time Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) came back negative <35UI/ml, COVID PCR positive with a C-reactive protein (CRP) at 27mg/l. A thoracic CT scan was performed showing COVID-19 pneumopathy classified by the COVID-19 Reporting and Data System (CO-RADS) with a degree of involvement of 25.0% to 50.0% associated with bilateral parenchymal condensation. Preventive measures based on Cotrimoxazole and infusion of immunoglobulins 0.5g/kg were taken with topical emollients. Thus, she was put under the therapeutic protocol of Covid 19, and Ganciclovir intravenously and which was stopped once the result of the CMV PCR came back negative. The evolution led to the death of the girl in the context of persistent pneumopathy post-sars-cov2 with bilateral parenchymal condensation despite adequate management.

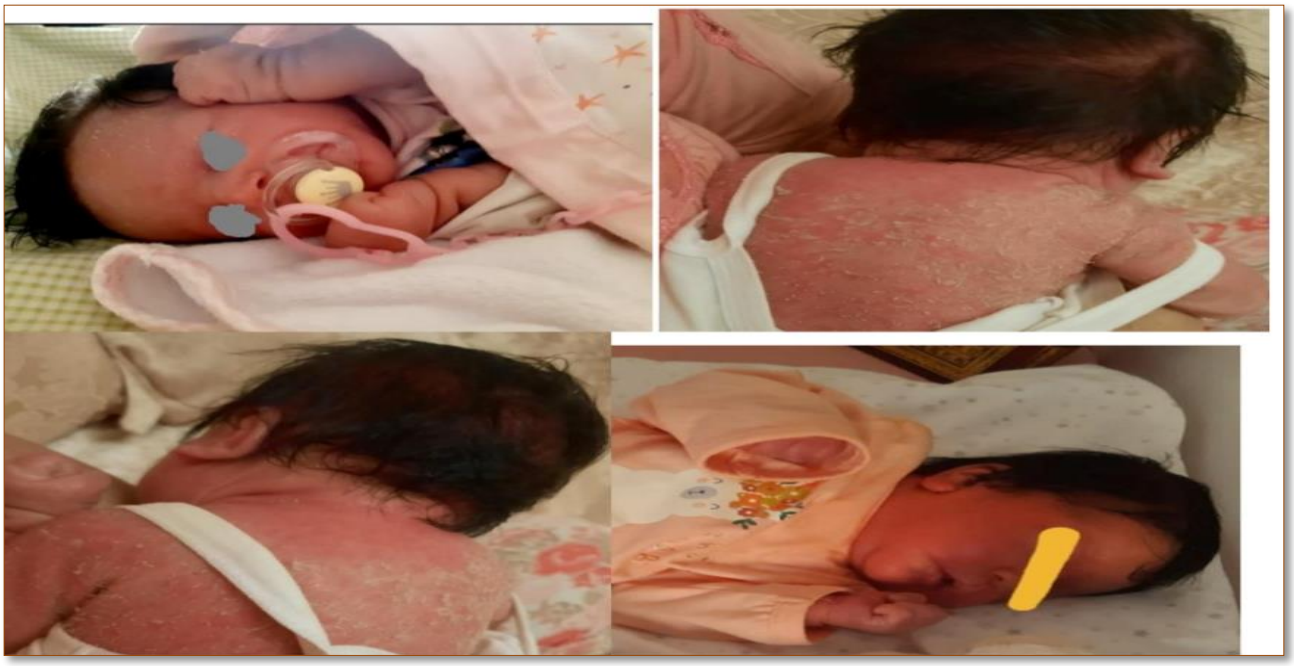

Figure 1: 43-days -old girl presented with generalized exfoliative dermatitis.

Discussion

Omenn syndrome originally reported as familial reticuloendotheliosis with eosinophilia, is an autosomal recessive form of severe combined immunodeficiency (SCID) characterized by erythroderma, desquamation, alopecia, chronic diarrhea, growth retardation, lymphadenopathy, hepatosplenomegaly, eosinophilia, and elevated serum IgE levels [4,5]. Patients are very susceptible to infection and develop fungal, bacterial, and viral infections typical of SCID. In this syndrome, SCID is associated with low levels of IgG, IgA, and IgM and a near absence of B cells with a high number of T cells with impaired function [4]. Omenn syndrome is caused by mutations in the RAG1 or RAG2 genes [6]. Normally, the enzymes RAG1 and RAG2, which are restricted to immature lymphocytes, initiate V(D)J (Variable, Diversity, Joining) recombination which leads to the development of T and B cells. Lack of V(D)J recombination results in SCID, such as OS. In OS, the V(D)J recombination defect is partial and characterized by the presence of only a small number of clones of T cells, which infiltrate the skin, intestines, liver, and spleen leading to clinical manifestations. Indeed, in a study of nine patients with clinical and immunological features of SG, seven had no detectable mutations in the RAG or ARTEMIS genes, suggesting that mutations in as yet undiscovered genes may cause immunodeficiency syndrome immunologically and phenotypically similar to OS [6]. Low to absent numbers of CD19þ B cells are characteristic of OS associated with mutations in RAG1, RAG2, ARTEMIS, or DNA ligase. Pruszkowski et al. [7] conducted a retrospective review of 51 cases of neonatal erythroderma. On average, the etiological diagnosis was established 11 months after the onset of erythroderma. The underlying causes observed were immunodeficiency (30%), simple or complex ichthyosis (24%), Netherton syndrome (NS) (18%), and eczematous or papulosquamous dermatitis (20%), atopic dermatitis and seborrheic dermatitis were less common in neonatal erythroderma. Other causes of erythroderma include fungal infections, graft versus host disease (GVHD), and drug rashes. The cause remains unknown in 10% of cases. The differential diagnosis of erythroderma with immunodeficiency and growth retardation in neonates is mainly based on OS, GVHD, and NS [7]. The clinical presentation of these neonates can be very

similar; therefore, blood work, skin biopsy, immunocytochemical analysis, and molecular genetic analysis are required to establish the diagnosis. Early recognition of this condition is important for genetic counseling and early treatment. If left untreated, Omenn syndrome is fatal. Prognosis may be improved with early diagnosis and treatment with compatible bone marrow or cord blood stem cell transplantation [1,2].

Conclusion

Neonatal ichthyosis and erythroderma are rare but can be rapidly fatal. They remain a diagnostic challenge for pediatricians, dermatologists, immunologists, and geneticists. Family history, pattern of onset, associated clinical signs, existence of recurrent infections, and statutory retardation, should be sought not to miss an immune deficiency that must be excluded even in the absence of systemic manifestation, and make think of performing an immune check.

Abbreviation

OS: Omenn Syndrome; SD: Standard Deviation; SCID: Severe Combined Immunodeficiency; NS: Netherton Syndrome; GVHD: Graft Versus Host Disease; WHO: World Health Organization; COVID-19: Novel Coronavirus Disease; CMV; Cytomegalovirus; RT-PCR: Real-Time Reverse Transcriptase Polymerase Chain Reaction; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; CRP: C-Reactive Protein; CO-RADS: The COVID-19 Reporting and Data System

Declaration

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Availability of data and materials

Data will be available by emailing boumidi@gmail.com.

Authors' contributions

All authors contributed equally to the concept, design, literature search, writing, editing, and review of the manuscript. Massilia Bouhmidi (MB) is responsible for the accuracy of all information related to the case report. All authors read and approved the final manuscript.

Ethics approval and consent to participate

We conducted the research following the Declaration of Helsinki. Ethical permission was granted by [University Hospital Center of Oujda, Morocco, 2022]. The parents' consent form was secured. All Omenn syndrome-related images (in Figure 1) presented in the current study belong to the University Hospital Center of OUJDA, Morocco.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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References

1- Fournier B, Hogan J, Neven B. Syndrome d'Omenn: caractéristiques cliniques et thérapeutiques d'une série de 30 patients. Revue d'Oncologie Hématologie Pédiatrique 2015; 3(4): 228. https://doi.org/10.1016/j.oncohp.2015.10.015.

2- Omenn Syndrome, National Library of Medicine. MedLine Plus, Medical Encyclopedia.Available at: https://medlineplus.gov/genetics/condition/omenn-syndrome/#description [Accessed on 15th May 2023].

3- Taghian M, Thierry P, Girardin P, Coupé B, Haghiri N, Baumann F, L. Theuriet L, Puzenat E. P419 - LE SYNDROME d'OMENN, à propos d'une observation révélée par une érythrodermie néonatale, intérêt d'un diagnostic précoce.2010 ;17(6-supp-S1), 1. doi :10.1016/s0929-693x (10)70813-7.

4- Elnour, IB, Halim K, Nirmala V.Omenn's Syndrome: A rare primary immunodeficiency disorder. Sultan Qaboos University medical journal vol. 7,2 (2007): 133-8.

5- Aleman K, Noordzij JG, de Groot R, van Dongen JJ, Hartwig NG. Reviewing Omenn syndrome. Eur J Pediatr. 2001 Dec;160(12):718-25. doi 10.1007/s004310100816.

6- Zhang ZY, Zhao XD, Jiang LP, Liu EM, Cui YX, Wang M, Wei H, Yu J, An YF, Yang XQ. Clinical characteristics and molecular analysis of three Chinese children with Omenn syndrome. Pediatr Allergy Immunol. 2011 Aug;22(5):482-7. doi: 10.1111/j.1399-3038.2010.01126. x.

7- Pruszkowski A, Bodemer C, Fraitag S, Teillac-Hamel D, Amoric JC, de Prost Y. Neonatal and infantile erythrodermas: a retrospective study of 51 patients. Arch Dermatol. 2000 Jul;136(7):875-80. doi: 10.1001/archderm.