Volume 4 | Issue 3 | 2024

ISSN | 2771-019X

Journal of
Clinical & Medical Images
Case Reports

Open Access |Short Report

Lymphocytes with prolonged filaments in a patient with immune dysfunction

***Corresponding Author:** Terezinha de Jesus Marques-Salles*

Email: terezinha.jms20@gmail.com

Galita Massoni Krakheche[1]; Márcio Antonio Wanderley de Melo[2]; Cristina Magalhães da Silveira[3]; Maíra Magalhães Ribeiro[4]; Lara Gonçalves de Assis Lima[2]; Terezinha de Jesus Marques-Salles[5]*

[1]*Virvi Ramos Laboratory, Brazil.*

[2]*University of Pernambuco, Brazil.*

[3]*Marcelo Magalhães Laboratory, Brazil.*

[4]*Alcides Carneiro Hospital, Brazil.*

[5]*Center of Pediatric Oncohematology, University Hospital Oswaldo Cruz, Brazil.*

Received: Apr 24, 2024

Accepted: May 31, 2024

Published Online: Jun 07, 2024

Cite this article: Marques-Salles TJ, Krakhechem TM, Wanderley de Melo MA, Silveira CM, Ribeiro MM et.al. Lymphocytes with prolonged filaments in a patient with immune dysfunction. J Clin Med Images Case Rep. 2024; 4(3): 1689.

Short report

The cytoskeleton is a complex network of protein fibres found in the cytoplasm of cells, made up of structures such as microtubules, microfilaments (actin) and intermediate filaments. The cytoskeleton responds to external and internal stimuli with rapid orchestrated reorganisation and is involved in processes such as endocytosis, cell division, intracellular transport, motility and immune function [1]. Patients with actin-related Primary Immunodeficiencies (PIDs) may have defects in haematopoiesis and immune cell development, with alterations in recruitment, migration, intercellular and intracellular signalling and the activation of innate and adaptive immune response [2]. In the majority of patients with PIDs, their genomes revealed mutations in the gene responsible for the synthesis of WDR1, an important protein for the renewal of actin filaments and the dynamic remodelling of the cytoskeleton, a fundamental role in supporting the immune function of cells [3,4]. Thus, mutations affecting the WD repeat-containing actin regulator protein 1 (WDR1) lead to aberrant lymphoid immunity, causing inflammatory disease [5,6]. Here we describe a rare case of a 60-year-old male alcoholic patient with type 2 Diabetes Mellitus (DM2) and dyslipidemia that developed acute inflammatory disease, which hemogram presented lymphocytes with long filaments. The patient was taken to emergency due to several episodes of vomiting that culminated in haematemesis. He was transferred to the ICU of a hospital in the South of Brazil. He was conscious and lucid, complaining of nausea and severe abdominal pain. On this occasion, he was diagnosed with a severe systemic inflammatory condition characterized by acute pancreatitis, pleural effusion and acute renal failure. The admission tests showed a hemoglobin of 9.8 g/dl, leukocytes of 12,900/mm^3 with a shift to the left, 13 of which were rods, 01 metamyelocyte and 01

myelocyte, and a platelet count of 166,000/mm^3. The blood smear showed 20% lymphocytes with prolonged actin filaments (Figure 1). The cytomorphological findings remained in the subsequent blood tests, carried out on different dates throughout the hospital stay. Pleural fluid cytology also showed the presence of several lymphocytes with prolonged filaments. Blood biochemistry showed acute pancreatitis, very high amylase and lipase-1.957 U/L and 8.440 U/L, respectively. The patient developed metabolic acidosis, lactate 13.8 mmol/l, worsening respiratory discomfort and anuria, urea-208 mg/dL and creatinine-9.8 mg/dL, requiring ventilatory support and haemodialysis.

The alteration, "lymphocytes with prolonged actin filaments" in peripheral cytology is a very rare event and few cases have been published. Lauréne Pfafer et al. 2023 describes a study in which six patients presented with severe infections of the lung, skin and oral mucosa. In these families, a heterozygous missense mutation of the WDR1 gene was detected and they presented with an immunodeficiency/inflammatory syndrome associated with aberrant morphology. These patients had lymphocytes with abnormal actin structures, with actin arches, spicules and filopodia. This is a finding that is rarely seen in peripheral blood, but is of great importance, especially when associated with inflammation/immunosuppression for investigating cases of actin-related Primary Immunodeficiencies (PIDs). In a study published on WDR1 protein deficiency, a series of extensive analyses found that WDR1 deficiency leads to aberrant T-cell activation and affects B-cell development. Although the T lymphocytes appeared to have normal development, they accumulated atypical actin structures. Even more serious, however, are the abnormalities observed in B lymphocytes.

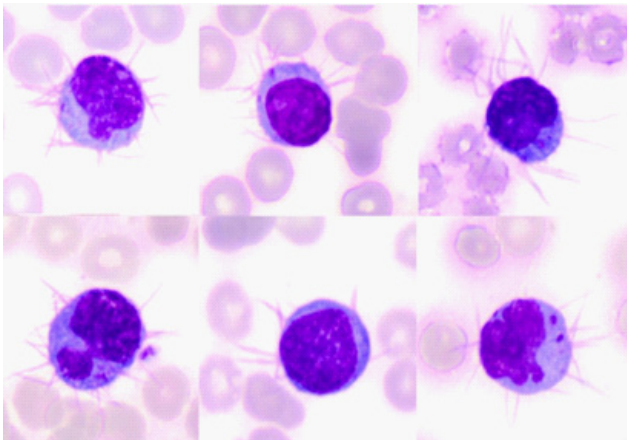

Figure 1: The blood smear showed 20% lymphocytes with prolonged actin filaments.

In this study, although only a few B cells were found in the circulating blood and in the progenitors in the bone marrow. The few B cells found in the blood all showed a range of abnormalities, including reduced clonal diversity, abnormal dissemination and increased apoptosis when their receptors were activated [3,8]. Despite recent knowledge about this rare disease. Early diagnosis can lead to better management of these patients.

References

1. Tim Hohmann and Faramarz Dehghani. The Cytoskeleton—A Complex Interacting Meshwork. Cells. 2019 Apr; 8(4): 362.
2. Evelien G.G. Sprenkeler; Steven D.S. Webbers; Taco W. Kuijpers. When Actin is Not Actin' Like It Should: A New Category of Distinct Primary Immunodeficiency Disorders. J Innate Immun. 2020; 13(1): 3–25.
3. Laurène Pfajfer, Nina K Mair, Raúl Jiménez-Heredia, Ferah Genel, Nesrin Gulez, Ömür Ardeniz, et al. (2018). Mutations affecting the actin regulator WD repeat-containing protein 1 lead to aberrant lymphoid immunity. J Allergy Clin Immunol. 2018; 142(5): 1589- 1604.e11
4. Kuhns DB, Fink DL, Choi U, Sweeney C, Lau K, Priel DL, Riva D, et al. Cytoskeletal abnormalities and neutrophil dysfunction in WDR1 deficiency. Blood. 2016; 27; 128(17): 2135-2143.
5. Bolger-Munro M, Choi K, Cheung F, Liu YT, Dang-Lawson M, Deretic N, Keane C, Gold MR. The Wdr1-LIMK-Cofilin Axis Controls B Cell Antigen Receptor-Induced Actin Remodeling and Signaling at the Immune Synapse. Front Cell Dev Biol. 2021; 9: 649433.
6. Kile BT, Panopoulos AD, Stirzaker RA, Hacking DF, Tahtamouni LH, Willson TA, Mielke LA, et al. Mutations in the cofilin partner Aip1/Wdr1 cause autoinflammatory disease and macrothrombocytopenia. Blood. 2006; 1; 110(7): 2371-80.
7. Ono S. Functions of actin-interacting protein 1 (AIP1)/WD repeat protein 1 (WDR1) in actin filament dynamics and cytoskeletal regulation. Biochem Biophys Res Commun. 2018; 25; 506(2): 315-322.
8. Mikko R J Seppänen. Novel cytoskeletal mutations with immunodeficiency: Why is the raven like a writing desk? Allergy Clin Immunol. 2018; 142(5): 1444-1446.