

Reactive Lymphocytes in Blood Film of A COVID-19 Iraqi Patient: A Case Report

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ABSTRACT

Approved diagnosis of coronavirus disease 2019 (COVID-19) depends on the golden-standard of molecular detection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). However, hematological parameters play a pivotal role in the diagnosis and progress of the disease. This case report of a 51-year-old COVID-19 Iraqi male patient, showed the presence of reactive lymphocytes in his peripheral blood film. Although the presence of these cells was regarded as a hallmark in certain viral infections, this was a striking feature in comparison with coronavirus family infections other than caused by SARS-CoV-2. This hematological finding can play a role in COVID-19 diagnosis as a feasible, rapid, and cheap tool, especially in low medical resources countries.

Keywords: Reactive; Atypical; lymphocyte; Blood film; COVID-19; Iraq.

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INTRODUCTION

The World Health Organization (WHO) announced the outbreak of 2019 novel coronavirus (COVID-19) a Public Health Emergency of International Concern (PHEIC) and further declared it as a pandemic on March 11, 2020 [1]. Although the diagnosis of the disease is usually approved by reverse transcriptase-polymerase chain reaction (RT-PCR), it can be anticipated by clinical presentations with radiological and laboratory tests [2]. This infectious disease is caused by a novel pathogen of the coronavirus family, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[3]. It causes a wide spectrum of clinical features, mostly as fever and respiratory symptoms progressed to multi-organ failure [4, 5]. Chest computerized tomography (CT) showed characteristic pulmonary consolidations or bilateral patchy ground-glass appearance, with variable degrees of changes in biochemical, hematological, immunological and serological laboratory parameters were reported [5–7]. Hematological changes in diagnosed cases of COVID-19 usually displayed variable abnormalities, which correlate to the disease severity [8, 9]. In addition to the coagulation abnormalities, complete blood count (CBC) is regarded as a crucial indicator for the diagnosis, assessment

of the disease severity, and follow-up [10, 11]. Lymphopenia was reported as a common abnormality in white cell count (WCC) subsets which correlate with the severe disease form [12]. Reduced lymphocyte count was more apparent in severe clinical form and of absolute value less than $1.0-1.1 \times 10^9/L$ or a WCC percentage of $< 20\%$ [7, 8, 13].

Examination of peripheral blood smear remains an important diagnostic tool, even in the presence of advanced and sophisticated laboratory tests [14]. Reactive lymphocytes 'atypical mononuclear cells' present in blood film is heterogeneous cells that vary in size and morphologic features (amount and color of the cytoplasm and nuclear shape) [15]. The cells could be as large cell with abundant pale to dark blue cytoplasm with indentations between red blood cells (RBCs) [16]. Plasmacytoid lymphocyte (Türk cell), is another form of reactive lymphocyte, which displays deeply basophilic (blue) cytoplasm and clear perinuclear zone and contains an eccentric nucleus with condensed chromatin [15]. These cells are commonly seen in certain viral infections, mostly infectious mononucleosis (glandular fever) caused by Epstein-Barr virus (EBV) [15, 17]. Besides, it is a feature in other viral infections such as cytomegalovirus (CMV), hepatitis, rubella, and dengue fever [18, 19]. Drug fever and serum sickness-like reactions may be also associated with the presence of such atypical lymphocytes [18]. This case report presents an unusual hematological change noticed in COVID-19 patients. This finding was not reported with other coronavirus strains infection [20, 21].

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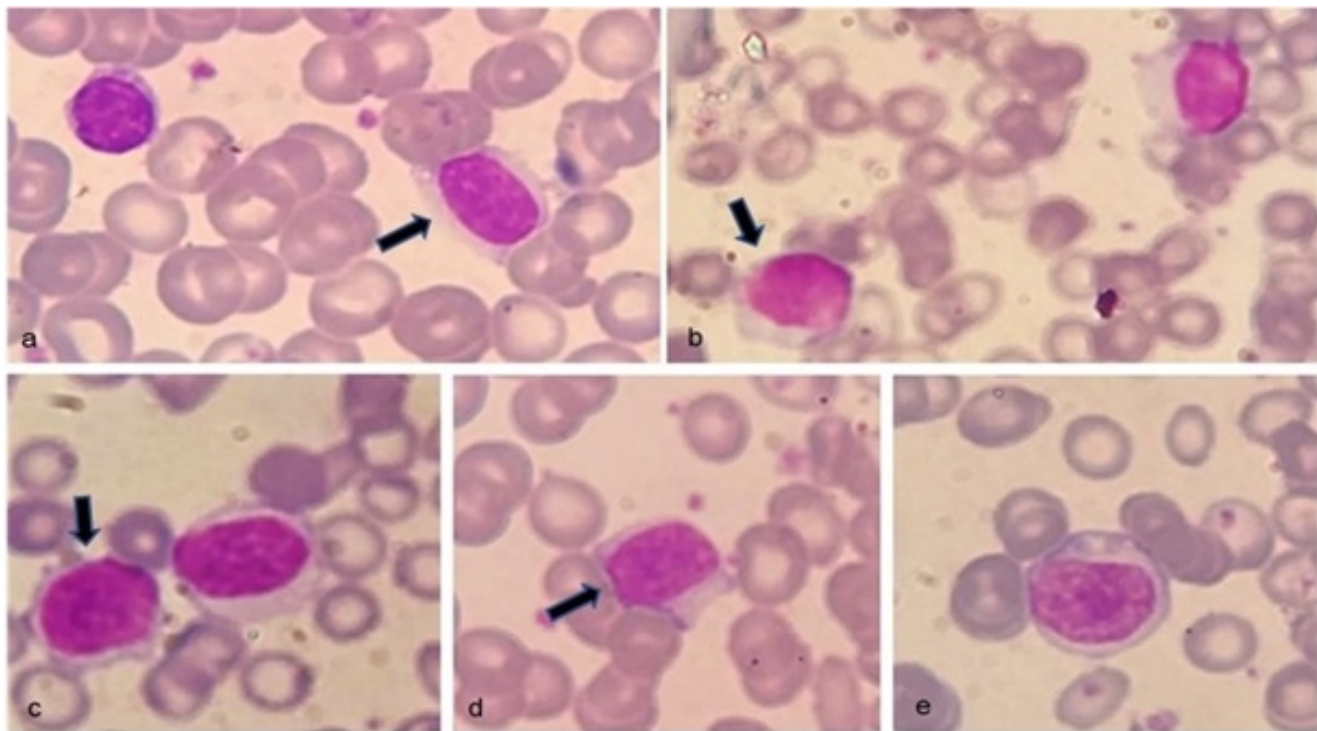


Figure 1. Peripheral blood film shows different morphological forms of reactive lymphocytes. The a, b, c, and d panels show large cells with abundant pale cytoplasm indented by 'hug' adjacent red blood cells (black arrows), and e: a lymphoplasmacytoid lymphocyte.

CASE PRESENTATION

A 51-year-old Iraqi male had investigations done on June 29, 2020, by Istishari Medical - private - Laboratory in Baghdad, Iraq. He was already confirmed as a case of COVID-19 by RT-PCR test, and clinically categorized of moderate severity. The CBC showed normal hemoglobin of 15.71 g/dL (packed cell volume, PCV of 49.4%), WCC of $7.4 \times 10^9/L$, neutrophils of $5.3 \times 10^9/L$ (71.7%), lymphocytes of 1.0×10^9 (14.1%), monocytes and platelets count $125 \times 10^9/L$. Serum ferritin of 664.0 $\mu\text{g/L}$ (NR: 30.0 - 400.0), CRP of 59.0 mg/L (NR: < 5.0) and D-Dimer of 0.27 mg/ml (NR: up to 0.5). The biochemical changes for the liver and renal functions expressed unremarkable changes.

Stained peripheral blood smear showed the presence of many characteristic large atypical lymphocytes, constituting about 43% of all lymphocytes (14.5% of the WCC) Figure 1. The most common subtype seen in the patient's blood film displayed a distinctive abundant pale blue cytoplasm, sometimes confined to its irregular margins which indented by "hug" the surrounding RBCs (Figure 1; a-d). The nucleus exhibits loosely condensed chromatin with inconspicuous nucleoli. Less frequently, lymphoplasmacytoid lymphocyte was noticed in the stained blood smear (Figure 1; e). These cells showed ample pale blue unevenly stained cytoplasm with paranuclear hof which contains an eccentric nucleus with condensed chromatin.

DISCUSSION

Diagnosed cases of COVID-19, generally displayed certain hematological abnormalities, which correlate to the disease severity [8]. In CBC, lymphopenia was observed as a com-

mon abnormality in the severe form [13, 21]. Low lymphocyte count was noticed in this patient who has a moderate-severity form, which corresponds with other reports of non-severe infection [22–24]. Despite the changes in CBC and coagulation markers, reactive lymphocytes are impressive in this COVID-19 patient.

The presence of such reactive lymphocytes was in contrast to other coronavirus infections such as SARS [20]. This finding is compatible with new reports showed the presence of reactive lymphocytes in COVID-19 [21, 25]. An alteration was observed in the peripheral lymphocyte subset which could be associated with the clinical characteristics and treatment efficacy of COVID-19 [9]. The presence of other forms of atypical lymphocytes, lymphoplasmacytoid lymphocytes were also reported [21, 26]. For supporting of this finding, the use of leukocytes scattergram of COVID19 patients became of interest, reflecting the presence of circulating reactive lymphocytes. Using of the scattergram for the presence of such lymphoplasmacytoid cells can be an important tool assisting in early COVID-19 diagnosis, with high specificity and sensitivity [27].

CONCLUSION

This case emphasized the importance of blood film examination as an important hematological parameter in the diagnosis of COVID-19. Atypical lymphocytes in blood film may accompany other diseases such as viral infections, hyperimmunization, or underlying hematological malignancies; therefore, it is important to recognize and report these cells, which could be due to illnesses other than COVID-19. Apart from other hematological findings during this pandemic, the

detection of these cells can be a valuable feature. Despite many new observations in the era of COVID-19 challenging health services across the world, this finding may support the disease diagnosis. Further studies are needed to confirm the presence of atypical lymphocytes as a hallmark in COVID-19.

Owing to that the blood film examination is cheap, rapid, and feasible tool in the diagnosis of the disease, we recommend to use it especially in countries of low medical resources.

CONFLICT OF INTEREST

The author declare that there is no conflict of interest.

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