

## DIAGNOSIS, TREATMENT AND CLASSIFICATION OF COVID-19 DISEASE BY COMPLETE BLOOD TEST

Qutaiba Mohammed Al Dulaimiee<sup>1</sup>, Hanan M. Ali\*<sup>2</sup>, Saad Shaheen Hammadi<sup>3</sup> and Zainab A. Khalaf<sup>4</sup>

<sup>1</sup>Rania Hospital, Al Sulaimania, MOH, Iraq,

<sup>2</sup>Department of Chemistry, College of Education for Pure Sciences, University of Basrah, Iraq.

<sup>3</sup>University of Basrah, Iraq.

<sup>4</sup>Department of Mathematics, College of Science, University of Basrah, Iraq.

\*e-mail : hanan1910@hotmail.co.uk

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**ABSTRACT :** Currently, there are no approved specific antiviral agents for novel coronavirus disease 2019 (COVID-19). Currently, in spite of the outbreak worldwide coronavirus disease 2019 (COVID-19), still there are no approved specific antiviral. In this study, the 44 patients symptomatically diagnosed COVID-19 were selected randomly from Rania Hospital, Al Sulaimania, north of Iraq. These patients were tested using a complete blood count (CBC) test before and after treatment using different types of drugs with a period of roughly 21 days. Several parameters were measured using the CBC test in order to measure the varying degrees of variables before and after treatment. The results showed a significant decrease in lymphocyte counts and lymphopenia. Further, the obtained CBC testing images used to build an automatic model as a diagnostic system for positive and negative COVID-19 cases. The diagnostic system was achieved 73% for classification accuracy and F-score. Due to endorse the used diagnostic system as a classifier system, we can conclude that the automatic system can be used to train laboratory images of CBC test of COVID-19 patient's datasets with reasonable accuracy before archive them.

**Key words :** COVID-19, lymphocyte, lymphopenia, azithromycin, hydroxychloroquin, vitamin, image processing, classifier.

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### INTRODUCTION

The rapid spread of the novel coronavirus (SARS-CoV-2) as a serious threat to the world public health is in dire need of finding potential therapeutic agents (Al-Masoudi *et al*, 2020). Chinese have tested several antiviral and antimalarial drugs as potent inhibitors for the novel virus, such as remdesivir, chloroquine, Hydroxychloroquine, umifenovir and favipiravir. COVID-19 disease is a systemic infection with a significant impact on the hematopoietic system and hemostasis (Terpos *et al*, 2020). Lymphopenia may be considered as a cardinal laboratory finding, with prognostic potential. Neutrophil/lymphocyte ratio and peak platelet/lymphocyte ratio may also have prognostic value in determining severe cases. During the incubation period, usually ranging from 1 to 14 days, and during the early phase of the disease, when non-specific symptoms are present, peripheral blood leukocyte and lymphocyte counts are normal or slightly reduced. Following viremia, SARS-CoV-2 primarily

affects the tissues expressing high levels of ACE2 including the lungs, heart, and gastrointestinal tract. Approximately 7 to 14 days from the onset of the initial symptoms, there is a surge in the clinical manifestations of the disease with a pronounced systemic increase of inflammatory mediators and cytokines, which may even be characterized as a "cytokine storm". At this point, significant lymphopenia becomes evident. Although more in-depth research on the underlying etiology is necessary, several factors may contribute to COVID-19 associated lymphopenia. Al Dulaimiee *et al* (2020) were observed that the lymphopenia tests should be involved in the diagnosis of COVID-19 disease. They were treated the COVID-19 patient by using a combination of azithromycin (AZM). (500 mg) daily for 6 days, zinc (50 mg) daily for 21 days, hydroxychloroquin (HCQ) caps (400 mg) daily for 10 days, vitamin C (500 mg), vitamin D3 (5000 mg), and doxycycline (100 mg). The results were displayed that the health of each patient was well recovered and all