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Creating A Diagnostics Program "Cytokine Storm" During Covid-19 For Electronic Computers

Introduction: Currently, about 100 cytokines are known, the level of which in the peripheral blood increases in many diseases, in some cases exceeding the normal concentration by tens and hundreds of times. At the same time, a peculiar clinical and laboratory picture of a "cytokine storm" develops, indicating a violent reaction of immune system cells to hyperproduction of pro-inflammatory cytokines. "Cytokine storm" is characteristic of a new coronavirus infection caused by SARS-Cov-2.

Purpose: development of a program for electronic computers for the diagnosis and prognosis of the course of a cytokine storm in COVID-19.

Materials and methods: The results of clinical and laboratory studies of the levels of cytokine storm biomarkers (IL 1 β , IL6, IL2, IL8, IL10, IL12, IL7, C-reactive protein, ASLO, LDH, Ferritin, D-dimer, Aldosterone, Renin, S100B, IP-10, MCP-1, Angiotensin I, Angiotensin II, ACE in 244 patients admitted to the Zangiota-1 Specialized Hospital for the Treatment of Patients with COVID-19 in 2021. Patients aged 20-85 years (mean age 61.2 ± 12.3 years) were divided into 2 groups by gender: group 1 - 80 (32.8%) women, group 2 - 164 (67.2%) men.

Research results: A computer program has been developed to detect the first signs of an increase in the activity of immunocompetent cells, taking into account clinical data, levels of anti-inflammatory and pro-inflammatory cytokines.

The computer program is built on the basis of the deductive fuzzy logical inference algorithm using the base of fuzzy production rules obtained by the expert method. This model allows to represent both declarative and procedural knowledge.

The use of fuzziness in the construction of conditional statements makes it possible to formally include expert knowledge expressed in verbal categories such as "a lot", "average", "little", "often", "probably", "approximately so much", etc.

The functionality of the computer program consists in registering patients taking into account 300 criteria (passport, anthropometric, radiological, symptoms and course of the disease, comorbid status, examination data, hematological, biochemical blood and urine tests).

Conclusion: The probability of establishing the correct diagnosis and state of cytokine storm, sensitivity and specificity make it possible to use this computer program as a screening method for diagnosing and assessing the prognosis of the course of COVID-19. This helps to reduce the number of diagnostic errors, especially among doctors of non-infectious specialties. This program can be applied in the field of healthcare (family clinics, outpatient and inpatient facilities, infectious dispensaries) to diagnose the severity of coronavirus infection.

Biography

Nargiza Jumanova was born in 1975, graduated school with good marks and 1992 year enter to the University, ended in 1998. From 1998 to 2000 years has worked as family doctor. 2002-2005 was junior researcher at the Tashkent Medical Institute, between 2005 and 2011 - junior researcher at the Tashken Medical Academy. Worked as a doctor in the Clinic of Tashkent Medical Academy since 2011 till 2013. 2013-2019 Head of the Central Laboratory of the Clinic of Tashkent Medical Academy. From 2019 till today, Head of the Department of the Multidisciplinary Clinic of the Tashkent Medical Academy. Now she works under her research investigation on topic "Creating a diagnostics program "cytokine storm" during COVID-19 for electronic computers.

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