

2-Deoxy-D-Glucose as an Armament against COVID-19: The Key to Return to Normality?

Sir,

In this battle against COVID-19, the emergence of new therapeutic agents has become one of the priorities of healthcare professionals, eager to manage, and treat this disease. Newer drugs are being developed, among which there is 2-deoxy-D-glucose (2-DG). This drug has been developed by the Institute of Nuclear Medicine and Allied Sciences, a laboratory of the Defence Research and Development Organization (DRDO-India), in collaboration with DrReddy's Laboratories, Hyderabad; this was done after conducting experiments with help of the Centre for Cellular and Molecular Biology.^[1]

In April 2020, at the initial stages of clinical trials, DRDO scientists found that this molecule works effectively against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus and inhibits viral growth. Based on this positive response and promising results of the drug, the Drugs Controller General of India's (DCGI) Central Drugs Standard Control Organization permitted Phase-II clinical trial of 2-DG in COVID-19 patients in May 2020. The Phase-II trials, which also included dose ranging, were conducted between May and October 2020 and revealed that the drug was found to be safe in COVID-19 patients and showed significant improvement in their recovery. Phase IIa and phase IIb (dose ranging) were conducted in 6 and 11 hospitals, respectively, all over the country on a total of 110 patients. On basis of successful results, the DCGI permitted the Phase-III clinical trials in November 2020 and this clinical trial includes 220 patients between December 2020 and March 2021 at 27 COVID-19 hospitals from 10 different states.^[1]

2-DG is a glucose antimetabolite and anticancer drug. As the entry of the virus reprograms the metabolism of cells to meet the increased demand of nutrients, this drug serves as an antimetabolite by inhibiting both glycolysis and glycosylation. It was stated that 2-DG acts by inactivating the SARS-CoV-2 viral receptor. The uniqueness of this drug comes from its

accumulation and action selectively against the viral infected cells.^[2] Scientists have expressed that the drug is made in sachets of powder which is to be taken orally by dissolving it in water. This drug reached the expected outcomes by improving the high proportion of patients symptomatically and decreased dependence of on oxygen, as well as reducing the duration of hospital stay.^[1] The DCGI granted permission on May 1st, 2021 for emergency usage of 2-DG to treat the moderate to severe COVID-19 patients as an adjunct therapy with the drug. As 2-DG is an analog of glucose, large quantities can be easily produced. In trends of efficacy, patients treated with 2-DG showed faster symptomatic cure than Standard of Care (SoC) on various endpoints. A significantly favorable trend (2.5 days difference) was seen in terms of the median time to achieve normalization of specific vital sign parameters when compared to SoC.^[1]

In conclusion, 2-DG could be a revolutionary drug as it improves patient's outcomes significantly, it can be easily manufactured in large quantities and made readily available for low source areas. It would be a key component of the COVID-19 treatment and could help to the whole world to return to normality.

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Conflicts of interest

There are no conflicts of interest.

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