An Approach to Evaluate a New Rapid Method for Detecting Antigen of SARS-CoV2 from Blood Samples

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Abstract

The current pandemic caused by COVID-19 is raging across the world now. The causative agent is SARS-CoV2. Till now more than 5 lakh deaths have been reported in India, alone because of this pandemic. The diagnosis of COVID-19 rests upon detecting the pathogen or its antigen in nasopharyngeal swabs by PCR and rapid diagnosis by various lateral flow techniques of rapid ICT tests. So far ICT tests from blood samples have not been tried. We are here to present our research to find out the evaluation of ICT tests from blood samples.

Keywords: COVID; Research; ICT.

Introduction

COVID 19 pandemic is in its third wave in India and other countries due to the parent strain and its numerous mutants, variants, and recombinations.[1] Diagnosis of COVID-19 is carried out by Real-time PCR or rapid diagnostic kits from the nasopharyngeal swab, or by other nucleic acid amplification techniques like CBNAAT.[2] However, till now no effort has been made to detect viral antigens using existing rapid test kits and lysis buffer provided, from plasma samples.

This should be important because COVID-19 due to parent wild strain of virus or latter mutants is associated with some degree of viremia where the SARS-CoV2 virus is seen in blood. This viremia can also be associated significantly with severity of disease.[3] Viral particles are found in plasma also and are seen more in ICU admitted patients than non-ICU patients.[3]

Materials and Methods

We tested 194 plasma samples in EDTA vials, collected in November 2021 from a blood donation camp in Diamond Harbour, near Kolkata. Two ml of the leftover samples after blood donation were put in EDTA vial and were brought to Department and kept at 4oC till use. A Rapid diagnostic kit for COVID-19 were purchased (Confirm It, Alpine diagnostics) and kept at 4oC . Sixty (60) ul of whole plasma was mixed with 80 ul lysis buffer provided in the kit. The mixture in the aliquot bottles was stirred briefly for 2 minutes and then 3 drops were poured in the well of the kit. Then, the results were read after 15 minutes. After 20 minutes the card kits

were discarded if found negative or positive.

Results

All samples showed the Control Band but in 2 test samples faint band was detected. Thus, out of 194 tests in 2 samples where test bands were found. Thus all samples were negative except 2 samples.

Discussion

Viremia, cellular oxidation and immune dysfunction are the 3 key elements linked with disease severity in COVID-19.[4] Hence this test can be an alternative for screening for COVID-19, in blood samples only. As far as we know, such studies have not been carried out yet. Thus donors can be safely screened from blood samples only, using ICT test.

Conclusion

Blood sample can be safely used as an alternative to nasopharyngeal swab for diagnosis of COVID-19 if the present new test using plasma is established.

This is a pilot study using a new method where few plasma samples were tested from volunteers who can be tested from different areas of the state to find out the sensitivity and specificity of this new method if clear cut band from the samples are seen. If this method is successful, the cost of the test will be very low and the test can be performed anywhere, at least as a suitable screening test from humans having suspected COVID signs/ symptoms.

In order to establish this method, larger samples from different group of people and of different category of people with known status of covid-19 should be considered. The sample size will be provided for Statistics Department of the Institute. Blood collected from the donors are tested for the presence of different blood-borne diseases and if significant result is obtained by this new technique, then a policy decision for considering this test be included for donated blood which may prevent COVID-19 to the recipient of blood.

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