ORIGINAL ARTICLE

The Haematological Intervention: Effectiveness of Convalescent Plasma Treatment of Patients with COVID-19

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ABSTRACT

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) sightings, coupled with the globally prevailing coronavirus disease 2019 (COVID-19) pandemic, are triggering public health emergencies worldwide. In order to assess any role and / or effectiveness of convalescent plasma (CP) therapy among patients presenting with COVID-19, the current descriptive study was conducted. One hundred patients, who were presenting COVID-19, were enrolled. These patients were then made to receive ABO-compatible CP transfusion. Effectiveness of this intrusion was then ascertained by recoveries in symptoms, changes in radiologic deformations, as well as through laboratory tests. This study did not observe any palpable adverse effect during the course of this mode of treatment. The elected course of CP led transfusion presented a lead to settlement of ground-glass opacities, along with strengthening among the enrolled COVID-19 patients, and removal of virus were relatively quicker. This study supported the effectiveness of CP therapy for patients with COVID-19. The selected mode of intervention, which also presented to carry a significant role to oust SARS-CoV-2, is also found to be a promising therapy mode for COVID-19.

Key words: Convalescent plasma, Lungs infiltrates, COVID 19.

INTRODUCTION

Presently, SARS-CoV-2 is escalating around the globe, and warning a pandemic that is affecting mass populations. SARS-CoV-2 is reported as the 7th Corona virus to taint mass human populations. Its other variants, including SARS-CoV, MERS-CoV, as well as, but not confined to SARS-CoV-2, may be associated with severe disease, whereas the others are associated with relatively milder symptoms. Sadly, neither any vaccine, nor any monoclonal antibodies (mAbs), nor a specific drug is currently at hand for SARS-CoV-2 (1). However, efforts to rapidly develop vaccines are underway and some of them may be available in near future. This theory supports the assertion that human CP would be an appropriate selection to dominate COVID-19 disease (2). This theory might be workable and quickly available as soon as there are adequate numbers of COVID-19-recovered individuals who are also termed to be eligible for the donation of immunoglobulin-containing plasma. Passive immunity therapy (PAT) includes application of antibodies (Ab) across a pathogen to suspectable individuals for preventions, and / or treatments (3). PAT carries a documented past going as far back as to 1890s when this was considered to be the lonely treatment option for some viral diseases (including, but not limited to polio myelitis, measles, mumps and influenza). This was a scenario preceding any development of proper anti-microbial treatment in the 1940s. This therapy (convalescents serum) was used for SARS1 epidemic in South Korea in 2003 and also in West African Ebola epidemic in 2013. Experiencing from the other outbreaks from other Corona Viruses, like SARS-CoV-1, reveals that all such convalescents serums contain neutralising antibodies for relevant viruses (4). It is anticipated that also for SARS-CoV-2, a course of action whereby passive antibody therapy mode would quite likely intercede a protection through neutralization of the virus, cellular cytotoxicity dependant on antibodies, and / or inflammatory responses modified through phagocytosis. The possible SARS-Cov-2 antibodies source is none other than human convalescents serums from COVID-19-recovered individuals. No specific treatment is available for it so far. The presented study, which aimed to explore, the feasibility and options of different treatment modes, considered convalescent plasma (CP) transfusion to be one to rescue severe COVID-19 patients.

MATERIAL AND METHODS

The presented study was carried out at Lahore and in Hameed Latif Hospital, National Hospital, DHA Lahore. It was Non-probability, descriptive study. Duration of study was three months from 01/06/2020 to 31-09/2020. 100 patients sample size was appraised with 95% level of confidence, 5% error margin with anticipated knowledge percentage. The eligibility criteria for the plasma donation were on the basis of diagnosis of COVID-19 based on symptoms, signs of illness and a positive RT PCR for symptoms presenting with, but not confined to, SARS COV-2 on, but again not limited to nasopharyngeal/throat swab. Of over 300 ex-COVID-19 patients who met the inclusion criteria to be screened for CP donation, the first 115 who fulfilled the COVID-19 donor criteria were screened for the presence of neutralizing antibodies. Most donor volunteers were males and part of the women were rejected as donor because of HLA/HNA antibodies. However, the final collection of the sample was collected on the basis on the IgG levels**.** CP was prepared from whole blood in CPDA double bag system. The bag was centrifuge at heavy spin 5000 x g for 5 mints at 4 ° C and frozen at –18° C or below within 8 hours of collection. Express approximately four fifth of plasma into satellite bag.

It was imperative to follow the selected channel despite the fact that same to be somewhat prescriptive occasionally. Yet experience show that disregarding appropriate channels would invite errors.

Recipient criteria for plasma therapy were who undergo the clinical trials for use of COVID-19 CP to treat Confirmed or suspected Covid-19 patients, who have Lungs infiltrate (X-ray or CT scan chest), Oxygen saturation to be equal to or less than 94%. This was further accompanied by observation that limited strain of arterial oxygen to part of inspired oxygen ratio to be less than 300. Priority was given the less than 50 years old and Patient with comorbidities, such as Diabetes, Obesity, Ischemic heart disease or hypertension.

RESULTS

The data reflects out the total of 100 patients, 95 patients presented with fever, 89 had respiratory symptoms such as cough, running nose, sore throat and / or difficulty in breathing. 96 patients complained fatigue, 75 patients had gastrointestinal symptoms such as nausea, vomiting and / or diarrhoea. Furthermore, 65 patients required oxygen support during their hospital stay. Out of those 100 patients, 72 patients presented radiological improvements after CP therapy.

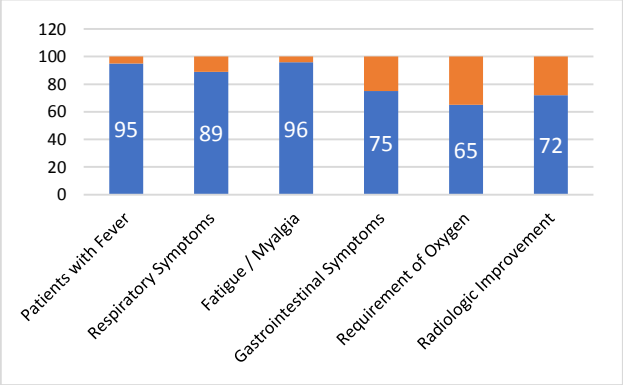

Fig. 1: Reflection of Pre and Post CP Infusion in COVID-19 Patients

DISCUSSION

This study highlights that for COVID-19, CP therapy was productive and distinct. Corresponding to SARS and severe influenza earlier experiences, CP is endorsed for usage at the earliest possible stages. This is based on the understanding that the generation of endogenous antibodies like IgM and IgG are at their highest between respectively 2nd and 4th post-infection week [(5)]. However, in the case of those patients who have been subject to admissions and / or any alternate mode of treated anywhere else, the span of time from the dawning of disease to all / any of such admission generally exceeds such mentioned period of 4 weeks. Auspiciously, CP therapy still remains useful in patients as observation was noticed in their X rays and oxygen requirement. The discharge principle was made to be based on a alleviation of symptoms, ingestion in chest CT abnormalities, fever discount, and, consecutively, twice clearing of tested virus (sampled through throat swab). In the currently presented study, detectable SARS-CoV-2 was found in patients already standing discharged from some other hospitals. This is bound to lead to some serious implications for re-assessing patient isolation span, discharge principle, and would invite much efficient mode of treatment that can erase SARS-CoV-2. CP therapy was found effective in patients with COVID 19, and their viral load was found to have markedly dropped following transfusion. Anti-SARS-CoV IgM and IgG was found to have enhanced (with variation in times) after such transfusion (6,7). The selected mode of treatment can also be useful in influenza A (H5N1) infection, where CP mode of therapy has showed 12-fold reduction in the load of blood virus during the initial post-transfusion 8 hrs. The virus was then completely undetected within 32 hours of the mentioned time. All such findings suggest a definite and adequate strategy to erase lingering virus [(8)]. Concurring to this hypothesis, the currently presented study observed absence of SARS-CoV-2 virus in throat swabs tests for patients who underwent those mode of treatment and received CP transfusion. Such findings strongly suggest that CP transfusion is a definite and adequate strategy to treat COVID-19. Another significant observation in the currently presented study are the powerful changes in radiologic abnormalities. Patients presented remarkable improvements in their symptoms which were further accompanied by progressive consolidation.

The currently presented study is unlike the previous studies focussing on SARS and / or influenza cases. This is so because CP was resorted to at a relatively much later course of the disease. This study has found that doing so continues to be clinically beneficial. The selected action structures in those settings were not completely understood [(9)]. We, however, contemplated that anti-SARS-CoV-2, IgM, as well as IgG bear a direct neutralizing effect on this virus, and their anti-inflammatory constituents may contribute towards preventing cytokine storms [(10)].

The currently presented study is limited by a limited size of sample. Yet, owing to the inclusion of representative patients bearing entirely distinct radiologic findings, clinical, as well as laboratory diagnosis, it is believed that this study involves a reasonable representative population facing COVID-19. As higher number of patients are recovering from COVID-19, all / any volunteering activity to donate CP should be appreciated as well as encouraged.

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