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Case Report

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# A CASE SERIES on the Convalescent Plasma use in SARSCOV2 PCR Positive Filipino Patients in Makati Medical Center

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**Abstract**

*The COVID-19 pandemic has caused tremendous stress in the healthcare system worldwide with millions of death and morbidities. Convalescent plasma therapy has given hope for cure at this time of great uncertainty. Multiple studies and literature review attempted to understand the efficacy of the therapy but unable to provide definite and clear answers. This case series presents data on 55 Filipino patients who were given convalescent plasma therapy. In this observation, mean age of patients is 63 ± 13 years old, predominantly male (67.27%, N=37), all Filipinos, with 2 or more co-morbidities, with severe and critical case (92.73%, N=51), with symptoms of fever, difficulty of breathing and body malaise. Majority of the plasma were collected in -house, given after 2 weeks of illness but within 7 days of hospital admission. More patients were discharged at 60%(N=33). No improvement in Vital signs, Laboratory results and Chest X-ray was noted after Convalescent plasma therapy. The lack of high quality studies on plasma therapy and definitive cure in COVID-19 infection maintains convalescent plasma therapy as a possible cure, mostly at times of infection in a pandemic scale. High quality clinical trials in the use of Convalescent plasma therapy is encouraged to provide high quality data as basis of treatment recommendation.*

**Keywords:** COVID-19+, Sarscov 2 PCR+, Convalescent Plasma Therapy, Filipino

## Introduction

It has been almost 3 years now since the COVID-19 pandemic, initially was a novel coronavirus infection, and was first detected in Wuhan, China [1]. It has spread in all countries and has reached 539, 119, 771 cumulative cases and 6, 322, 311 cumulative deaths with ongoing reported infection reaching 732, 529 cases worldwide as of June 23, 2022 at 06:43 pm CEST [2]. The significant reduction in global cases is due to increase efforts in achieving herd immunity through vaccination which has reached 11, 912, 594, 538 vaccine doses administered in the same time period [2].

In January 2020, the first two cases of COVID-19+ by PCR was detected in Manila, Philippines to a Chinese national couple travelling to the Philippines for a vacation [3]. Since then the total cases in the Philippines has reached 3, 697, 793 cumulative cases and 60, 484 deaths with vaccination doses administered reaching 151, 919, 132 as of June 23, 2022, 06:43pm [4].

Sarscov2 viral mutation and replication is typical for viral survival and has produced different variants of the virus. Out of 32 Sarscov 2 variants detected, five was marked as circulating variants of concerns [5]. This organic behavior explains the several case surges in different areas of the world despite vaccinations. The world still has a recorded active cases reaching 3,746,300 in the last 7 days. The Philippines has a recorded 3,689 in the same time period [4].

The novelty of the virus and the volume of affected patients posed a great challenge among physicians who are not familiar with the disease and available treatment modality or the lack of it. This internal challenges have been compounded by the ill-prepared health care system to accommodate pandemic-level healthcare requirement. The astuteness of Filipino physicians has been tested to its limits and academic-clinicians have to be prompt in processing available data and related clinical experience to provide guidelines in the diagnosis and treatment of then novel coronavirus infection. The Philippine Society of Microbiology and infectious Disease in partnership with the Department of health has released an interim treatment guideline in July 2020, the first few of many revisions and adaptations. In this guideline, treatment recommendations have been based on risk-stratification based on clinical severity of the disease. Treatments recommended to mild cases were supportive such as antipyretics, oral hydration and isolation. For hospitalized patients, the use of remdesivir, favipiravir, dexamethasone, tocilizumab and other anti-IL6 agents, IVIG, IFN, hemoperfusion, Vitamin C, Zinc and Convalescent plasma [6]. Treatment modalities utilized in different hospitals in the Philippines have been solely based on the preference of the treating physician thus were noted to be heterogenous [6].

Convalescent plasma has been at the forefront of possible treatment during the time of peak of COVID-19 ravaging even the most prepared and organized health care system in the world. Death was inevitable as the novelty of this virus gives a perplexing chills among expert medical specialists and scientists. The concept of convalescent plasma began as early as 1890. It has been then be utilized as treatment options during the Spanish influenza pandemic and other disease entity such as Scarlet fever in the 1920's, Pertussis in 1970's followed thereafter by its use in patients with measles, Argentine hemorrhagic fever, Chickenpox, Cytomegalovirus, Parvovirus B19, Cytomegalovirus, interestingly in Ebola Virus infection and more recently during the SarsCOV1 outbreak in 2003, Middle east respiratory coronavirus outbreak in 2012, H1N1 and H5N1 avian influenza [7]. Studies focusing in the use of convalescent plasma therapy (CPT) in different coronavirus infection has been collated in the Journal of Clinical Investigation which showed that CPT improved clinical outcome among recipients of the blood product. The studies were conducted in Hong Kong, Taiwan, China, South Korea, and Saudi Arabia. A meta-analysis and systematic review on the use of convalescent plasma therapy in treating severe infectious diseases was done in September 2020 and has shown its potential effective treatment for COVID-19. Although, most studies were mostly low or very low quality with a moderate to high risk of bias [8]. A recent publication in JAMA has summarized the direction of Convalescent plasma therapy use for COVID-19 infection limiting its use to severely ill, immunosuppressed patients, and in patients with high risk of progression to a more serious illness and no other treatment options are available. Nonetheless, the use of convalescent plasma still provides hope as timing of administration, plasma titer measurement, clinical parameters for its early administration are not definite and further clinical trials are needed to clarify these points [9].

Makati medical Center, a 600-bed-capacity and JCI-accredited hospital, has been one among the tertiary hospitals at the forefront fighting the COVID-19 surges in the Philippines. Despite its commitment to quality care, research-driven training programs, evidence-based care and well-experienced and credentialed medical specialists, the hospital found itself grappling with the best scientific approach to manage the local demand for in-patient care and in understanding the best treatment approach to improve survival from COVID-19 infection, most especially to high risk member of the populace. The center has seen a total of 1,152 and 2,759 COVID-19 PCR + patients in the year 2020 and 2021 respectively. To date the center has admitted 4,657 COVID-19 patients and about 10.7% (N=497) has succumb to the disease [10]. In the year 2020, a multi-center study has been pioneered by the Philippine College of Hematology and Transfusion Medicine to provide real-time data of the use of convalescent plasma therapy in the treatment of COVID-19 infection. Several challenges have been noted in institutionalizing the study and in coordinating data collection mostly due to overwhelming demand from the participating institutions and physicians (hematologists) as a medical frontliner, researcher and some are getting infected as well.

This study aims to document and share the local data of Makati medical center in the local and international literature to the use of convalescent plasma therapy with the best available treatment among Filipinos infected with COVID-19 virus. The objectives of this study are to (1) identify the clinical profile of Filipino COVID-19 patients treated with convalescent plasma therapy; (2) Know the laboratory and diagnostic findings before and after convalescent plasma therapy; and (3) Know the treatment outcome of convalescent plasma therapy recipients.

## Case Presentation

There are a total of 70 referrals to the section of hematology for convalescent plasma therapy. But, only 55 patients were given convalescent plasma mostly due to donor scarcity. Out of 55 donors, 40 convalescent plasma were collected in the center and 15 were outsourced from other medical institution. The standard of the Department of health based on circular 2020-0216 guidelines in the collection of convalescent plasma among certified collection facility were followed [11].

The mean age of the recipients is 63±13 years old; with the youngest at 25 years old and oldest at 90 years old. More than two-thirds of the recipients were male (67.27%) while 32.7% were female. No non-Filipino patients were given convalescent plasma and almost all comes from the National Capital Region. Although there were noted a few who came from Laguna, Pampanga, Cavite, Benguet, and Cebu. About 90% of them has 2 or more co-morbidities, most commonly, Hypertension, Diabetes Mellitus Type II, and Chronic Kidney Disease. Blood Type has been identified which follows the normal blood type distribution in the population which is mostly Type O followed by Type A and Type B respectively. Majority of the cases admitted were critical (52.7%) followed by severe cases at 40% and Moderate cases at far 7%.

The admission case classification is based on the arbitrary severity classification by PSMID and WHO [6].

The most common chief complaints are fever (34.55%), difficulty of breathing (21.36%), and shortness of breath (16.36%). Most of the patients has all of these three complaints with concomitant easy fatigability, and cough. Rarely, patients were admitted as a case of high risk, COVID-19 but remained asymptomatic on admission day. Almost 70% of the patients were able to seek consult within 7 days of the start of the symptoms, followed by 25% of the consults within 14 days of the illness.

The convalescent plasma administered to this set of patients were collected in-house (70%) while few were outsourced (30%) from different centers in Metro Manila. Most patient were given convalescent plasma therapy within 14 days of illness (34.5 %) and within four weeks or more (32.73%). Although, majority of patients (95%) were treated with plasma within 14 days of hospital admission (72.73 % within seven days, 23.64 % within 14 days). Majority of patients stayed admitted more than three weeks (38.18%) with longest stay of 169 days followed by 30.91% of patients who stayed for three weeks or less and 30.91% was admitted for 14 days. The shortest stay was at 4 days which is a 70 year old male, critical case with more than 3 co-morbidities.

On admission, the mean vital signs of the 55 recipients shows systolic blood pressure of 128.62±17.14 mmHg, diastolic blood pressure of 77.87±10.56 mmHg, heart rate of 86.43±15.36 bpm, respiratory rate of 22.62±4.32 cpm, temperature of 37.14±0.72 °C, and oxygen saturation of 94.33±13.5 %. Majority of the admitted patients were intubated due Critical case status (52.72%, N=29). The mean inflammatory markers measured were all elevated. Specifically, a mean value of LDH of 544.62±546.84 U/L (Range: 12.9- 4,105 U/L)(NV:221-442 U/L), a CRP mean value of 15.71±21.86 mg/L (Range: 0.22-139.85 mg/L) (NV: 1-3 mg/L), a DDMER mean value of 3,290.81±7,505.34 ug/mL (Range: 0.18- 35,200 ug/mL), and a Ferritin mean value of 2,561.15± 2,988.58 ng/mL (Range: 60.26-20,618 ng/mL) (NV: 0.5-5 ng/mL). The mean procalcitonin remained to be acceptable at 1.07±2.27 ng/mL (Range: 0.02-9.65 ng/mL) (NV: <0.5 ng/mL: Low risk of severe sepsis and or septic shock, 0.5 to <2 ng/mL: systemic infection is possible but other conditions may induce significant rises, 2 or higher: High risk of severe sepsis and or septic shock). The mean liver function tests were 2 times elevated of the upper limit of normal where mean SGPT is at 79.97±67.56 U/L(Range: 8.36-377 U/L) and SGOT is at 92.80±70.56 U/L (Range:14.78-353 U/L). The mean arterial blood gas shows a mean pH of 7.42±0.07 (Range: 7.14-7.56), paO2 of 106.69±54.53 mmHg (Range: 53-325 mmHg), PaCO2 of 36.01±6.5 mmHg (Range: 26-57 mmHg), HCO3 of 23.6±4.18 mmol/L (Range: 11.9-33.9 mmol/L), Oxygen support of 73.17±35.43% (Range: 21-100%). Mean Rox index was computed at 8.1±5.72 (Range: 2.35-25.4) (NV: ROX>4.88is associated with lower risk of failure of oxygen by high flow nasal cannula (HFNC) and need for intubation). The complete blood count of the patients shows a mean Hgb of 13.51 ±2.40 g/dL (Range: 8.11-18.6 g/dL) (NV: 12.3-15.3 g/dL), Hematocrit of 38.95 ±6.37 % (Range: 22-50.8 %), White Cell Count of 9.88±5.15 x10^3/uL (Range: 2.55-27 x10^3/uL), Differential Count was noted be predominantly neutrophilic predominance where Neutrophils shows a mean value of 78.96±10.99 % (Range: 43-95 %) (NV: 40-70%), mean Lymphocytes value of 13.14±8.98 % (Range: 1-40%), mean Monocyte value of 8.64±12.08% (Range: 1-88 %) (NV: 22-43%), very few was noted to have reported basophils and eosinophils. The Platelet was noted to have a mean value of 245.82±95.34 x10^9/L (Range: 86- 541 x10^9/L) (NV: 150-450 x10^9/L). The chest x-ray done on admission was noted to have a mean assigned score of 2.78±1.03 (Assigned Numerical Value in this study: 0- Normal findings, 1-one lobe, one lung affected with infiltrates, 2- three Lobes and one lung, 3- two lobes, two lungs, 4- both lungs, 5- no test done) where majority shows affectation of both lungs with infiltrates.

The treatment of patient in the center in this difficult time mainly utilized a multidisciplinary/specialty approach that is complex with individual clinical experience and the provided guidelines in the care of patient in the intensive care unit and/or acute respiratory distress syndrome and latest COVID-19 treatment guidelines as provided by the Department of Health in collaboration with different society and organization, particularly, Philippine Society of Microbiology and infectious diseases, World health organization and Center for Disease Control. One of the treatment options placed in the frontline was the administration of convalescent plasma. Due to the absence of standardized titer system and the technology itself, convalescent plasma was not quantitative tittered initially; instead, antibodies were determined by identifying presence or absence of the Sarscov2 antibodies in the serum of donors using Innovita 2019-nCov Ab test (Colloidal gold) by Innovita (Tangshan) Biological Technology Co., Ltd. This test is a portable test kit utilized by the blood bank processor to determine presence of IgM and IgG. Guideline for the use of convalescent plasma is provided by the department of health in collaboration with the Philippine Blood Council and National Voluntary Blood Services Program [12]. In the last quarter of 2020, the quantitative titer tests have been introduced using different technologies such as the Snibe Maglumi 800, Elecsys Anti-SarsCov 2 analyzer, and Architect Assays. Despite the presence of tests, the lack of standardized acceptable local titer level as reference to ensure high titer convalescent plasma administration and related study has been a challenge. On the other hand, viral load tests to convalescent plasm recipient was not done due to the unavailability of the test in the local setting.

After convalescent plasma therapy has been administered, subsequent laboratory tests were done as part of the surveillance to monitor clinical progress or deterioration of the admitted patients. In this case series, laboratory exam done nearest to the day post administration of the therapeutic plasma has been recorded, the mean value of the enrolled patients were identified and compared to the admission laboratory results to note any improvement in the vital signs, inflammatory markers, liver function test, arterial blood gas, complete blood count, and chest plain X-ray radiography. The mean value of the patients vital signs show a mean systolic blood pressure of 118.08±14.39 mmHg, diastolic blood pressure of 73.82±11.20 mmHg, heart rate of 83.16±13.21 bpm, respiratory rate of 21±3.3 cpm, temperature of 36.51±0.50°C and oxygen saturation 96.47±2.33%. Inflammatory markers after plasma treatment were noted to have a mean LDH value of 531.99±211.06 U/L, CRP of 4.95±5.81mg/L, DDMER of 9,028.96±8,701.22 ug/mL, Ferritin of 1,892.34±1,1304.94 ng/mL and Procalcitonin of 1.37±2.99 ng/mL. Liver function test were noted to be elevated with mean SGPT of 128.09±325.08 U/L and mean SGOT of 924.49±4526.07 U/L. The arterial blood gas mean values were noted to be at a Rox index of 9.42±6.43, pH 7.41±0.10, paO2 86.11±25.50 mmHg, paCO2 40.95±7.44 mmHg, HCO3 26.24±5.41 mmol/L, and Oxygen support 64.87±29.71%. The complete blood count were noted have a mean Hemoglobin of 88.67±59.79 g/dL, hematocrit 37.85±6.34, Wbc of 14.78±11.13 x10^3/uL, Neutrophil of 77.68±17.69%, Lymphocytes of 13.42±12.48%, monocytes of 5.71±3.60% and Platelet of 290.67±104.78 x10^9/L. Subsequent repeat Chest X-rays shows majority of the patients having both lungs still affected with infiltrates with a mean assigned value of 2.62±1.51.

The standard sets of treatment noted in these patients were the use of antibiotics, steroids (dexamethasone), tocilizumab, remdesivir and other antivirals (lopinavir/ritonavir, oseltamivir), anticoagulant (Enoxaparin), Vitamin C and Zinc, other supportive organ, symptoms and disease specific treatments such as bronchodilators, insulin, anti-hypertensive, proton-pump inhibitors, electrolyte replacements, hemofiltration support, and oxygen (HFNC) and mechanical ventilation support.

It was noted in this series that more than half of the recipients of CPT were discharged (60%, N=33) while 40% of whom have expired (N=22).

## Discussion

The clinical profile of Filipino COVID-19 patients treated with convalescent plasma therapy observed in this series is consistent with the heterogenous data in view of age and sex in the systematic review and quantitative analysis done in July 2021 but initially published in November 2020 [13]. In contrast to some of the published observational studies where convalescent plasma therapy was given as early as 6 years old and as late as 100 years old, in this study patients have a mean age of 63.05±13.8 with the youngest recipient was at age 25 years old, male, with no co-morbidities, who was discharged and the oldest was at 90 years old, female, with Hypertension, and who was also discharged. In terms of sex distribution, male predominates the recipients of the plasma in a ratio of 3:1. Most likely this is a random effect since the pandemic infection is not selective and the degree of exposure appears to be uniform in all ages and sex. Despite the noticeable increase in the Chinese's and Korean's presence in the Philippines for the past decade [14], all patient enrolled in this series area all Filipinos. Since Makati Medical center is situated in the National Capital Region (NCR), understandably, majority of the admitted patients in the center and enrolled in this series lives in the NCR. But trickles from Nearby Provinces were noted as far as Cebu City. The recommendation in the administration of convalescent plasma therapy as guided by treatment guidelines is restricted to severe cases under compassionate use or moderate to severe cases under clinical trial [6]. It is therefore not surprising that 93% of cases given CPT were Severe and Critical cases in this study. Although, there are reports that there is a theoretical advantage and mortality benefit of administering convalescent plasma early in the disease course (10-14 days) [15-17], the impact of giving CPT early in the disease process prior to having severe or critical symptoms is not yet clear due to the lack of RCTs comparing early and late administration of the plasma in COVID-19 infection [13]. This theoretical advantage cannot be attested by this study since 87% of the recipient were given plasma between Day 8 to Day 74 of the illness with a mean days of 19.95±14.97 days. Only 12.73% were given plasma within 7 days of the illness development. Days from exposure to development of symptoms were not included in the study due to difficulty in establishing the day of exposure and the widespread local transmission of the virus. The co- morbidities seen in this set of patients were consistent with the literature in which Hypertension and Diabetes Mellitus Type II predominates among those who are infected with the virus. The number of co-morbidities has been considered a risk factor for a worse case of COVID-19 infection thus affects mortality [18-21]. The symptoms of the patients with COVID-19 did not vary with classic respiratory viral prodrome consists of fever, body, respiratory symptoms, and body malaise. What is striking in COVID-19 patients is the degree of hypoxemia and the speed of development of acute respiratory distress syndrome (ARDS) [22].

Laboratory data on admission was analyzed by looking at the numerical value of vital signs, complete blood count, inflammatory markers, liver function test, arterial blood gas and chest x- ray after convalescent plasma therapy was given. There was no standard timing of the repeated blood test but preference was given to the nearest day the lab test was done to the day the CPT was administered. The Vital Signs post CPT was noted to have better systolic blood pressure at a mean value of 118±14.39 from 128.62±17.14 mmHg, while the rest appears to be the same on admission. (Diastolic blood pressure of 73.82±11.2 from 77.87±10.56mmHg, Heart rate of 83.16±13.21 from 86.42±15.36 bpm, Respiratory rate of 21±3.3 from 22.62±4.32 cpm, Temperature of 36.51±0.50 from 37.14±0.72 °C and oxygen saturation of 96.47±2.33 from 96.23±2.89 %). The liver function test appears to have worsened after convalescent plasma administration (SGPT 128.09±325.08 from 79.97±67.56, SGOT 924.49±4526.07). The arterial blood gas of the patient has shown better mean Rox index of 9.42±6.43 from 8.10±5.72 and HCO3 26.24±5.41 while PaO2, PaCO2, pH and Oxygen support values has worsened or did not show significant numerical difference post CPT (pH 7.41±0.10 from 7.42±0.07, paO2 86.11±25.5 from 106.69±54.53 mmHg, paCO2 40.95±7.44 mmHg from 36.01±6.50 mmHg, HCO3 26.24±5.41 mmol/L from 23.6±4.18 mmol/L and oxygen support of 64.87±29.71% from70.68±28.11%). The inflammatory markers has shown improvement in the CRP and Ferritin after CPT administration (CRP of 4.9±5.81 mg/L from 21.86±0.22, Ferritin 1892±1304 from 2561±2988) while the LDH and procalcitonin remained within near range of 531.99±211.06 U/L from 546.84±12.9 U/L and 1.07±2.27 from 1.37±2.99. The DDMER has worsened from 3290±7505 to 9028±8701. These lab markers were used as surrogate markers of inflammation and clinical status of COVID-19 patients and predictors of severity of the disease [23]. The complete blood count was also used as a marker for bacterial co-infection with the virus as well as the level of platelets and hemoglobin. In this study, there was no significant numerical difference in the level of the hemoglobin from a mean value of 13.51±2.4 to 12.92±2.30, hematocrit mean value from 38.95±6.37 to 37.85±6.34, platelet count from 245.82±95.34 to 290.67±104.78 x10^9/L, while the White cell count was noted to be higher after treatment from 9.88±5.15 to 14.78±11.13 x10^3/uL predominantly neutrophils of 9.88±5.15 to 14.78±11.13 % followed by Lymphocytes of 13.14±8.98 to 13.42±12.48. Rarely, that a transfusion is required to maintain the level of hemoglobin in this series. The recorded minimum value of hemoglobin was 8.1 before plasma therapy and 8.5 after plasma therapy. Chest X-ray was also observed which showed a pre-CPT mean assigned value of 2.78 which signifies both lungs have pulmonary infiltrates then post CPT mean assigned value of 2.68 which indicates no improvement in the infiltrates with plasma therapy.

In view of mortality as an end-point with different parameters, it can be assumed that in terms of severity CPT has shown survival advantage. All patients given with CPT with moderate cases (N=4) have survived and were discharged. The advantage of CPT was also seen as 81.8% of patients with severe cases (N=22) were discharged (N=18) while 4 four patients died. In contrast, majority of patients that is critical (N=29) did not survive (N=18, 62.07%) while 37.93% (N=11) was discharged. The timing of CPT administration regardless of severity did not show a clear advantage for those given within 7 days of illness

(Discharge N=3, 42.86% vs Died N=4, 57.14%) as opposed to those given beyond 7 days where advantage has been noted in favor of CPT with mean discharge rate of 62.5% (N=30) and a mean mortality rate of 37.5% (N=18). This supports the lack of clear association of timing of CPT and mortality in the literature. The same is true in view of the computed rate of discharge and mortality among those with co-morbidities which does not correlate to the number of co-morbidities in this set of samples such that those with two co- morbidities has shown higher mortality (54.17%, N=13) as opposed to those with three or more co- morbidities (47.06%, N=8).

In summary, in this case series the age and gender distribution is a random effect of the local transmission in the community. Signs and symptoms of patients did not differ in this group with the rest of the population infected with the virus including the signs of ARDS. Severity of the disease and administration of CPT is based on expert recommendation thus creates a high selection bias. Co-morbidities seen in the patients are consistent with the published literature but not on the risk of mortality. Timing of administration of CPT remains independent of outcome. Vital signs and laboratory results and chest x-ray after administration of CPT does not appear to be positively affected by the transfusion.

In interpreting these data, caution must be taken since many confounding variables affect the values of the lab tests such as the development of hospital acquired infection, instituting other treatment that is specific to the practice of the individual specialist and understanding of the available literature, and the lack of standardized, proven treatment. Thus, treatment is enclosed in a trial-and-error phase of decision making. The lack of antibody titer of the administered plasma puts doubt on the efficacy of the transfused plasma product and contributes to its effect heterogeneity.

## Conclusion

COVID-19 pandemic has put a strain in the word's healthcare system. It challenged even the most experienced physician. The use of convalescent plasma therapy has provided hope for cure among those infected but the lack of strong studies on its use especially in COVID-19 infection has created doubt in its efficacy. This case series has shown that convalescent plasma therapy may be an option among COVID-19 patients at risk of developing severe disease as an adjunct treatment to provide cure. Standardization of convalescent plasma pre-treatment evaluation to include plasma titers, patient antibody titers, antigen screening, viral load measurement and treatment response monitoring and a standardized COVID-19 team approach, although impossibly difficult in view of the local setting, must be done to reduce confounders. Thus, a well-controlled clinical trial in the local setting must be done to ensure control of the variables and provide a more accurate result on the use of convalescent plasma therapy. Until efficacy is proven to be false using data from strongly powered studies, convalescent plasma therapy remains to be at the forefront of possible cure in novel virus's infection, mostly, in a pandemic scale of spread.

## List of abbreviations

COVID-19 – Coronavirus Disease 2019
SARS - Severe Acute Respiratory Syndrome
ARDS - Acute Respiratory distress Syndrome
RCT - Randomized Controlled Trial
CPT - Convalescent Plasma Therapy
CRP - C- Reactive protein
AST - Aspartate Transaminase
ALT - Alanine Transaminase
HCO3 - Bicarbonate
LDH - Lactate Dehydrogenase

## Consent

This study underwent the Makati Medical Center's Internal Research Board approval. Please see appendix B for Copy of Certificate of Approval.

## Competing interests

There is no competing interest in making this case report.

## Author's information

The author is a registered nurse, trained in Oncology and intensive care; A graduate of Medical Doctor degree in University of the East Ramon Magsaysay Memorial Medical Center Inc.,; Had his Internal Medicine training in Victor R Potenciano Medical Center; currently doing his Hematology fellowship, Year 3, in Makati Medical Center. Has presented and published research papers in Hongkong, Dubai, UAE and Valencia, Spain.

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