Letter to The Editor

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Iron Chelating Agents: Promising Supportive Therapies in Severe Cases of COVID-19?

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Dear Editor

On December 2019, new cases of COVID-19 pneumonia were reported from Wuhan city of China that were consequences of 2019-nCoV or SARS-CoV-2 infection (1). Very soon this disease spread around the world and till now over than 3,000,000 person have been infected with this new virus. The most common clinical presentations of these patients were fever, dry cough, malaise, fatigue, myalgia, headache, shortness of breath, chest pain, ageusia, anosmia, gastrointestinal, cerebrovascular and dermatologic presentations (2-4). Since COVID-19 is a new disease, there isn't any approved treatment regimen. Till now many drugs have been studied under clinical trials projects such as (hydroxy) chloroquine, azithromycin, ribavirin, lopinavir/ritonavir, atazanavir, umifenovir, favipiravir, remdesivir, interferon alpha, tocilizumab, etc (5). Also many supportive therapies have been considered such as convalescent plasma therapy (6), high dose intravenous vitamin C therapy (7), extracorporeal membrane oxygenation (ECMO), etc. (8).

Severe cases of COVID-19, have accompanied tachypnea, shortness of breath, oxygen saturation levels of less than 90%, acute respiratory distress syndrome (ARDS), sepsis, septic shock and multi-organ failure (especially heart, kidney and liver damage). The adhesion of 2019-nCoV protein to heme could cause iron removal from hemoglobin in erythrocytes and then conversion to porphyrin which results in progressive hypoxia. During this process iron overload and iron toxicity complications would be expected. The released oxidative iron also might damage lungs and present as chest infiltrations in CT scans. Since erythrocytes could carry oxygen from lungs to all other organs, during COVID-19 infection and erythrocyte disturbance, multi-organ failure also would be expected. Iron toxicity complications are multi-stage processes. First stage is presentation of gastrointestinal reactions such as diarrhea, nausea and vomiting. Second stage is apparent recovery phase of gastrointestinal reactions. Third stage would be present with shock, metabolic acidosis, ARDS, and multi-organ failure such as liver dysfunction, kidney failure, cardiomyopathy, and coagulopathy. Fourth stage is elevation of aminotransferases and hepatic failure (9). Since severe cases of COVID-19 pneumonia, have similar clinical presentations of iron overload, it seems that deferoxamine would be a promising supportive therapy for resolving the complications of COVID-19 pneumonia. Deferoxamine is a chelating agent which can be administered as an antidote for management of acute iron toxicity and chronic iron overload. Checking the plasma iron levels in ICU admitted patients would be helpful to prevent iron related organ dysfunction. If the iron levels of plasma was more than 500 µg/dL administration of deferoxamine would be scheduled for hospitalized patients. The preferred route of administration of deferoxamine would be intravenous route with initial dosage of 1000 mg and followed by 500 mg every 4 hours for 2 other doses. Based on patients' clinical response, further doses of 500 mg every 4 to 12 hours might also be administered up to a maximum dosage of 6000 mg/day (10). Typical

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duration of deferoxamine therapy is 24 hours. Deferoxamine could remove extra iron from tissues and plasma and results in systemic toxicity inversion (9). Based on these evidences, deferoxamine can be considered as an alternative and supportive agent in management of this novel viral infection. Further studies and documented clinical trials are required to prove the safety and efficacy of deferoxamine as a supportive agent in management of severe cases of COVID-19 pneumonia.

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Conflict of Interest

None declared.

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