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## Drug therapy in hospitalized patients with very severe symptoms following COVID-19

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### ABSTRACT

#### *Implication for health policy/practice/research/medical education:*

To treat COVID-19, the first choice should be antiviral drugs and sometimes a small dose of anti-inflammatory drugs to reduce inflammation. In this regard, chloroquine has both features including antiviral activity and anti-inflammatory effect.

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### Drug therapy in COVID-19

To date, there is no antiviral medication or vaccine to treat or prevention of coronavirus infection, however; there are some agents to help patients in the process of recovery like broad-spectrum antiviral agents. Various antiviral agents are used extensively to treat coronavirus infection, however the results are not clear, while there was not any drug to be effective against COVID19 (1). After understanding the genome of affected individuals with coronaviruses, the development of new medications may be possible. The crucial drawback is that anti-coronavirus activity of these agents is shown in vitro not in practice (2).

After emerging new version of coronavirus, as the cause of COVID-19, lots of efforts were made to discover efficient medication against this virus in the People's Republic of China (3). National health commission of this country presented a protocol to treat COVID-19, such as lopinavir/ritonavir named Kaletra as a protease inhibitor (400 mg/100 mg bid), interferon alfa (IFN- alpha) (5 million U bid) as antivirals were recommended in some protocols (4). In the meantime, Kaletra had strange effect to make the coronavirus titer negative or little (5). Additionally, when ribavirin is added to lopinavir/ritonavir, the effect

of antivirus activity increases and respiratory symptoms such as severe acute respiratory syndrome (SARS) can be improved in a shorter time (6).

One of the most common drugs which are used to treat COVID-19 in China is oral oseltamivir. Oral oseltamivir was used for treating influenza however there is no strong evidence that oseltamivir can treat COVID-19 (7, 8). Baricitinib is a drug for the treatment of rheumatoid arthritis and accompanied by antiviral drugs plays an effective role in the treatment of COVID-19 (9). Chloroquine phosphate as an old drug for the treatment of malaria was used widely in patients with COVID-19 to treat acute respiratory distress syndrome and had acceptable results in China (10). Additionally, chloroquine or hydroxychloroquine was tested in the pneumonia of COVID-19 and it was useful in shortening the disease period (11). Combination of chloroquine with remdesivir is effective to control the COVID-19 infection in a laboratory situation and has been used in patients with acceptable results (12).

Previously, Savarino et al investigated the effects of chloroquine on viral infections in 2003; showed how the anti-viral and anti-inflammatory activities of

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chloroquine may result in controlling COVID-19 disease (13). Furthermore it was administrated for HIV and had powerful antiviral effects (14).

Likewise, the Chinese traditional medicine named Lianhuaqingwen and Shufeng Jiedu may be effective in the treatment of COVID-19; however, it needs further clinical trials to approve the hypothesis (15). Theoretically, angiotensin-converting enzyme 2 (ACE2)-based peptide inhibitors can be chosen for treating the COVID-19 disease, but its administration also needs strong evidence such as cohort studies (16), while the virus enters the cells via ACE2 receptor; therefore, theoretically blocking this receptor might be effective

In summary, the first choice should be antiviral drugs and in some conditions a small dose of safe anti-inflammatory drugs to reduce inflammation. In this regard, chloroquine has both features including antiviral activity and anti-inflammatory effect.

#### Authors' contribution

Primary draft was prepared by ND, MMR, and RV. MHR and RV edited the paper. All authors read and signed the final paper.

#### Conflicts of interest

The authors report no conflict of interests.

#### Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

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