



Molnupiravir Effectiveness in Worldwide, the Reason Not Using for Iranian Covid Patients

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Abstract

As of 22 August 2022, more than 601 million people has been infected, with approximately 6.47 million deaths. Various drugs have been used during the pandemic and several research studies are proceeding to recognize potential antivirals or different drugs to treat COVID-19 patients. Hydroxychloroquine, Chloroquine and Molnupiravir are some of drugs that used for treatment of COVID-19. Molnupiravir is one of the antivirals that has been used in some countries for COVID-19 treatment. A Phase III clinical trial, which including 1433 nonhospitalized patients with mild-to-moderate COVID-19, reported satisfactory results of molnupiravir treatment using a dosage of 800 mg at 2×/day for 5 days. Both studies confirmed the safety and tolerability of molnupiravir due to similar occurrence of adverse events in the molnupiravir or placebo group. Although molnupiravir is effective, this drug is not used in some countries.

Keywords: COVID-19; molnupiravir; hydroxychloroquine; chloroquine

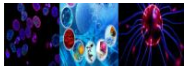
Introduction

The COVID-19 pandemic, which is caused by the SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), is one of the most dangerous challenges this world has faced in our lifetime. It is above all a human crisis with severe health and socio-economic consequences. As of 22 August 2022, more than 601 million people has been infected, with approximately 6.47 million deaths. Various drugs have been used during the pandemic and several research studies are proceeding to recognize potential antivirals or different drugs to treat COVID-19 patients. In addition to whether the drugs used are effective or not, there also is concern whether they have mutagenic effects. Hydroxychloroquine, Chloroquine and Molnupiravir are some of drugs that used for treatment of COVID-19.

Molnupiravir is one of the antivirals that has been used in some countries for COVID-19 treatment. Caraco et al. indicated that treatment with molnupiravir essentially reduced hospitalization and/or death in comparison with the placebo group. A Phase III clinical trial, which including 1433 nonhospitalized patients with mild-to-moderate COVID-19, reported satisfactory results of molnupiravir treatment using a dosage of 800 mg at 2×/day for 5 days. Both studies confirmed the safety and tolerability of molnupiravir due to similar occurrence of adverse events in the molnupiravir or placebo group (Bernal et al., 2021).

Hydroxychloroquine and Chloroquine are other drugs that are used for COVID-9 treatment. Since both Hydroxychloroquine and Chloroquine have a very similar chemical structure with a basic side chain. The only difference is the presence of an additional hydroxyl (-OH) group in hydroxychloroquine (Browning, 2014).

The result of investigation of Thomas et al. on the mutagenic effect of chloroquine in *E. coli* and *Salmonella typhimurium* indicated that chloroquine has a mutagenic pose (frame shift mutation) on DNA. The mutagenic effect of chloroquine was boosted via the addition of Aroclor-induced rat-liver S9 mix. In addition, some researchers reported that chloroquine induced mutagenic resulting in bacterial chromosome (Shubber et al., 1986). Similar results observed by chatterjee et al. (1998), who found increased frequency of chromosomal aberrations and sister chromatid exchanges induced by chloroquine in bone marrow cells of mice. On the other hand, results obtained by Roy et al. (2008) found that in bone marrow cells, chloroquine causes chromosome aberration, as well as micronucleus. Gasemi et al. reported that prolonged Chloroquine and hydroxychloroquine treatment can induce oxidative stress and thus worsen the condition of COVID-19 patients. There are reports that there was little to no effect of Chloroquine and hydroxychloroquine against SARS-CoV-2, and many reports have raised



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concerns about their cardiac toxicity. In contrast to chloroquine and hydroxychloroquine, in another report employing heterogeneous human lung tissue, molnupiravir was efficient in inhibiting SARS-CoV-2 replication compared to chloroquine and remdesivir that showed negligible effects (Scaller et al., 2021). In contrast to chloroquine and hydroxychloroquine, number of studies proved that molnupiravir didn't have mutagenic effect on different cells. For example, the mutation analysis described from Githaka (2022) showed no signs of increased mutations in molnupiravir treated golden hamster lung cells. Supporting the Githaka study, Painter et al. suggested that molnupiravir have no genotoxic effect in animal cells.

Conclusion

Although chloroquine and hydroxychloroquine have genotoxic effect and no effect against COVID-19, they have sold 75 billion Rial. Also, Molnupiravir does not have genotoxic effect and is effective against COVID-19; however, Molnupiravir has not been approved for COVID-19 treatment in Iran.

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