The efficacy of Chloroquine derivatives in COVID-19: a meta-analysis based on the first available reports

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Background

In the context of the current COVID-19 pandemic, we aimed to conduct a meta-analysis on the effects of chloroquine derivatives in COVID-19 patients, based on all available information from pre-prints and peer-reviewed published reports.

Methods

We conducted a meta-analysis of studies evaluating the effects of chloroquine derivatives (chloroquine (CQ) or hydroxychloroquine (HCQ)) against SARS-CoV-2 in groups of COVID-19 patients as compared to control groups. The keywords “hydroxychloroquine”, “chloroquine”, “coronavirus”, “COVID-19” and “SARS-Cov-2” were used in the PubMed, Google Scholar and Google search engines without any restrictions as to date or language till May, 6, 2020. A randomized model was used. Heterogeneity was considered substantial when $I^2 > 50\%$.

Results

Fourteen comparative studies were identified involving 2,803 patients (1,353 patients treated with a chloroquine derivative) from six countries (Brazil, China, France, Iran, Spain, and USA). Three studies (1 internet only and 2 pre-prints) were considered as not reliable because of major methodological pitfalls. Two studies used a combined HCQ+AZ therapy. These 5 studies were removed in a sensitivity analysis. When considering all fourteen included studies, chloroquine derivatives were associated with a lower mortality (Odds ratio (OR) 0.43,

p = .022) with consistent effect size among studies (I^2 = 39%, p = 0.16). Other significant summary effects included a lower need for hospitalization (0.35, p = .024), shorter duration of cough (0.13, p = .001), decreased C-reactive protein level (0.55, p = .045), and decreased Interleukin-6 levels (0.43, p = .002). In sensitivity analysis which included nine studies, the favourable effects on duration of cough, C-reactive protein and interleukin-6 levels were unchanged. In addition, a significant beneficial effect was observed for clinical cure (0.48, p = .022) and for the outcome "death or transfer to the intensive care unit" (0.04, p < .0001). Strikingly, the beneficial effect on death appeared much more significant (two studies, 0.28, p <.0001) without heterogeneity (I^2 = 0%, p = 0.88).

Conclusion

A meta-analysis of available reports demonstrates that chloroquine derivatives are effective to improve clinical and biological outcomes but, more importantly, it reduces mortality by a factor of 2 to 3 in patients infected with COVID-19.