



Commentary

Serosurveys and convalescent plasma in COVID-19

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The current pandemic is not only overwhelming the health systems of the affected countries but also is killing thousands of other ways healthy adults. Convalescent plasma has been proposed [1] and approved to treat COVID-19 based on the experience acquired treating other viral diseases such as influenza, Ebola, and SARS [2]. It is considered a safe treatment (at least its side effects and contraindications are well known) and it has proven to be efficacious in several viral infections for more than a century. Currently, several countries and health institutions are trying to gather convalescent sera for either empirical treatment or clinical trials. Based on the WHO interim guidance developed for the 2014 Ebola outbreak [3], convalescent plasma has advantages over other proposed treatment: it requires low technology (and therefore it can be produced where required independent of pharmaceutical companies), it is low cost and its production is easily scalable as long as there are sufficient donors.

In other words, relative donor scarcity can threaten any plan to massively produce treatments based on plasma. Due to the exponential nature of the pandemic, the number of current patients is greater than the number of recovered patients at any given time until the peak is reached. The number of identified recovered patients equals approximately the number of identified active patients three weeks earlier minus the deaths. In a supposed population with a steady growth of identified contagions of 20% something similar to what is currently going on in several cities around the world the number of active patients is between 17 and 87 times greater than the number of identified recovered patients (potential donors). This means, in the best case scenario, there would be convalescent plasma available for 1–5% of the identified current patients. The actual number of donors will probably be much lower as not every convalescent patient willing to donate would be suitable (a great proportion are elder and have comorbidities) and not every suitable potential donor will be willing to donate.

Fortunately, infection by SARS-CoV2 is not as lethal as that caused by Ebola virus and many patients do not require treatment to

overcome COVID-19. Furthermore, the real number of convalescent patients may be much greater than the number based on the recovery of previously identified patients because of the existence of asymptomatic and mild infections. This might be especially true in countries where most of the incident infections had been acquired from not previously identified cases. This is currently the case in several western countries. The estimates from the Imperial College London COVID-19 Response Team also support the hypothesis that most of the cases go unrecognized. According to their calculations, among 11 European countries (comprising 375 million citizens) as of March 30th there were about 18 million cases [4]. Populations that have been fully or randomly tested confirm the existence of asymptomatic infections [5–7]. Accordingly, we propose two sources of donors, not frequently identified, should be explored: paucisymptomatic patients: and fully asymptomatic patients.

Serosurveys might identify as many donors as required for the growing number of patients who could benefit from convalescent plasma. Serosurveys have been used to evaluate the immunity of some populations to infections such as Ebola and SARS after controlling the outbreaks. They are very useful to evaluate the susceptibility of a population and therefore to calculate the peak of a current or subsequent outbreak using the SIR model (susceptible, infectious and recovered compartments) estimating the size of the recovered compartment. This in turn is used to decide health policies. To our knowledge, serosurveys have not been used to drive plasma donations. In these diseases, known to have greater mortality, a significant proportion of asymptomatics has been found seropositive among exposed populations [8,9].

To boost the ability of serosurveys to find potential donors, the approach could be modified to enrich the sample (albeit not obtaining representative data). Targeting populations at high risk of exposure such as contacts or health workers and self-identification of potentially convalescent patients using questionnaires could easily lead to as many plasma donors as required before the number of contagions peaks.

Declaration of Competing Interest

We declare no competing interests.

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