

Blood shortage – another crisis during COVID-19 pandemic

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ABSTRACT

As COVID-19 pandemic continues to test the medical world, due to rapid viral transmission and subsequent mutations, the old burning health crisis continues to surface, one of them being the blood shortage. The current situation has disrupted the fragile balance between blood donors and the real need of blood in hospitals, especially due to repetitive lock-downs, isolation, social-restrictions, and ongoing anxiety promoted by social media, threatening the quality of medical cares.

Keywords: COVID-19 pandemic, medical crisis, blood shortage, haematological optimization

OVERVIEW OF ESSENTIAL MEDICAL CRISIS DURING COVID-19 PANDEMIC

SARS-CoV-2 (severe acute respiratory distress syndrome coronavirus 2), responsible for coronavirus disease 2019 (COVID-19), along with the Middle East Respiratory Syndrome (MERS), and the SARS represent the main pandemics of the modern age [1,2]. Since March 11, 2020, when The World Health Organization (WHO) marked the debut of COVID-19 pandemic [3], various problems of the worldwide medical systems were brought to surface.

Starting from the personal “protective equipment crisis” after the pandemic debut, and continuing with the unique demand for intensive care unit (ICU) beds which led to the appearance of „ICU bed crisis”, especially in low- and middle-income countries, the COVID-19 pandemic created continuous challenges for medical systems [4,5]. Then, the „psychological crisis” was not only a matter of public mental health that needed specific intervention, especially through the online services [6], but affected the worldwide medical staff, with depression, anxiety and insomnia being the leading causes [7,8].

Not least, the „blood crisis”, reported by numerous countries after the pandemic persistence and associated social restrictions, is the consequence between continuous decreasing number of blood donors and high demands, associated with improper systemic measures. This is especially due the high blood requirements with the regular medical activities (e.g., trauma, cancer and obstetric surgeries, chronic renal disease), and the requirements of COVID-19 patients, from the use of convalescent plasma, to different types of blood products in case of specific critical care management (e.g., extracorporeal membrane oxygenation, renal replacement therapies) [9-12].

WORLDWIDE BLOOD SHORTAGE DURING ONGOING COVID-19 PANDEMIC

Every year, millions of patients require blood transfusion, especially due to severe trauma, cancer surgery, hereditary anemia, obstetric or gastrointestinal bleedings [9,13]. In this context, specific guidelines and recommendations were published

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over the years, with the intent of controlling blood transfusion strategies, to reduce complications related to blood products transfusion and to optimize patients' outcome [14,15].

There are developed countries where the blood donation systems are well established and sustained, capable to predict and overcome a blood shortage scene [16], and low-income countries where blood shortage is a continuous problem, situation that worsened during COVID-19 pandemic [17,18].

Reports from Spain, which had to deal with severe SARS-CoV-2 outbreak, showed that only decreasing the blood consumption with suspended elective surgeries and minimally invasive interventions is not enough, because managing critically ill COVID-19 patients is associated with high demands of red blood cells (RBCs) and other blood products transfusion. Therefore, specific measures like restrictive transfusion strategies and strict blood transfusion guidance according with national recommendations were necessary, both in adult and child medical care [19-21].

Despite the fact that Italy had faced a severe COVID-19 outbreak [22], with proper, evidence-based measures implementation, after a minor drop in blood supply following the first week of March, they enforced governmental actions and successfully managed the blood shortage during this crisis, as well as continuing the activity of therapeutic apheresis units [23-25]. Pati et al. also demonstrated the importance of using forecasting model for obtaining data about usual donors' engagement during such outbreaks [26].

Another perspective about blood donation in Europe during this pandemic came from a study published by Chandler et al., which included 7 developed countries (Denmark, Germany, France, Italy, UK, Portugal and Netherlands), showing that a high number of blood donors decreased their activity, due to the concerns regarding the healthcare systems overloading or risk of infection during the time of donation. The authors suggested some solutions, such as particular campaigns aimed at targeting the altruistic motivation of blood donors [27].

Al-Riyami AZ et al. published a paper regarding the negative impact of COVID-19 pandemic on blood supply in Eastern Mediterranean Region, showing that in the initial phase, they have faced a blood supply shortage, but with proper measures, ensuring donor, staff and recipient safety, associated with specific governmental acts, this crisis can be well managed [28].

Various reports from China, right from the beginning of the pandemic, warned about the blood shortage, even in developed countries, caused especially by the donors' unavailability [29]. There were

also some authors conducting social surveys in order to identify a correlation between intrinsic or extrinsic rewards among donors, with the intent of using that as a strategy to increase blood donation [30].

In West Africa sub-regions (16 countries, from Nigeria to Cape Verde), this pandemic revealed old problems of the transfusion services, with concomitant blood shortage, due to difficulties in implementing national blood strategies, in face of lacking funding or voluntary donation. COVID-19 crisis drastically reduced blood availability, the main incriminated reasons being the mass lockdown, fear of getting infected visiting high-risk units, and the shortage of consumables used within the blood donation process. Authors of a recent report emphasize the fact that governments should take actions, to prepare and properly ensure a blood supply, for the daily practice as well as for future threats [31-33].

Regarding the United States, To and al. developed an epidemiologic model to estimate the real number of potential blood donors, estimating that there are around 5% eligible donators. Therefore, a series of collaborative measures have been taken, including blood donors, transfusion units, administration and public space, in order to overcome the blood shortage during the pandemic. Reports have shown that, few weeks after the pandemic debut, blood donation has fallen significantly, urging transfusion services to triage the blood orders and to prioritize the blood use, as well as implementing hospital-based blood donor centres [34-37].

Colombia, maintaining the already mentioned trend, reported a 17% decrease in blood donation during pandemic waves, especially due to mandatory national lockdown, with negative impact on medical practice [38].

Not in the end, India reported a drastic negative impact of the COVID-19 pandemic on blood transfusion practice, showing the real problems of the healthcare system [39]. Further, in specific oncological centres, where blood donation systems were well designed, the decrease was not significant, the medical activities were continued, and the implementation of preventive measures through education of the blood units staff made the entire process extremely safe [40,41].

POSSIBLE SOLUTIONS TO "BLOOD CRISIS"

It is well known that the best way to control a health system problem is to anticipate it, to create and ensure specific strategies in order to provide the most adequate response [42]. As we emphasized before, there are various published guidelines with the intent of providing a proper bleeding patient

TABLE 1. Measures to overcome blood shortage during COVID-19 pandemic

Medical measures	Institutional measures
Restrictive transfusion threshold	Reducing the number of elective surgery and minimally invasive interventions
Strict utilization of current guidelines	Specific national campaigns to raise awareness across population to ensure blood supply
Prioritization of medical cases	Transfusion Medicine restructuring
Patient haematological optimization with pharmacological agents	Prioritizing actions regarding blood donation activity
Minimal invasive surgical techniques	Measures to ensure donor, staff and recipient safety
Triage the blood orders	Implementation of transfusion responsive systems
	Continuous education for blood centres staff
	Social studies to identify extrinsic or intrinsic factors behind donors motivation
	Creation of hospital-based blood donor centres

approach in order to reduce blood transfusion and to manage chronic diseases with influence on patients' haematological status [14,15,43].

In face of blood shortage, different countries and societies have taken various measures to avoid endangering patients or to decrease the quality of medical care. In Table 1 are summarised the main reported actions adopted or proposed for adoption by worldwide healthcare systems to face this new crisis [19-21,23,27,30,35,37].

CONCLUSIONS

As the COVID-19 pandemic has shown, blood is a valuable and limited resource, therefore healthcare facilities need a proper management to ensure appropriate supplies. This is a critical time, with various issues from which the entire medical world have something to learn, as well as hospitals and medical units' managers, and governments. We presented a series of reported measures meant to face the blood shortage created by COVID-19 pandemic, but we must keep in mind that this is a puzzle yet to be deciphered.

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