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LETTER TO THE EDITOR

Adaptable stewardship during a pandemic: a multifaceted approach to sustaining the blood supply for individuals with sickle cell disease

Dear Editor,

The blood supply in the United States (US) has often faced shortages due to fluctuations in donations during holidays or more isolated events, such as hurricanes and other natural disasters.[1,2] While supply shortages during holidays are often short-lived, and natural disasters are relatively localized, these events can still create challenges for the national blood supply. Contrastingly, a pandemic presents several unique challenges secondary to its ubiquitous, lingering, and contagious nature. From pathogen transmissibility and physical distancing requirements to donor participation and other logistical constraints, teamwork is required to meet both the short- and long-term challenges imbued by a pandemic (Figure 1A). This brief report describes a multifaceted approach at the University of Alabama at Birmingham (UAB) Hospital that was instituted in response to the COVID-19 pandemic. Our goal was to sustain the blood inventory to continue providing optimal care for individuals with sickle cell disease (SCD), a vulnerable population in whom red blood cell (RBC) transfusions are lifesaving.

With calls to action from several national organizations and blood suppliers, such as the American Red Cross, the UAB blood bank and SCD clinician team developed and implemented practical approaches to RBC inventory management.[3,4] With national shortages looming from cancellations of blood drives, decreased donor participation, and other factors, several general strategies were used. Efforts were made to hold additional blood drives in alternative locations closer to the community and with ample space for physical distancing. Donor recruitment efforts were enhanced, especially among minority populations, in an attempt to increase the availability of RBC units negative for the C, E, and K antigens.[5,6] Such units are needed to provide antigen-matched transfusions to individuals with SCD who are at a disproportionately high risk of alloimmunization.

Within the UAB Hospital system at large, among all services and teams that routinely utilize blood products for patient care, there were renewed efforts to implement targeted, judicious use of O-negative RBC units. Elective surgeries were postponed, and patient blood management practices, such as administering one unit at a time and reconsidering transfusion parameters, were highly encouraged. In addition, the blood bank immediately began closer monitoring of its daily product inventories and usage data, and widely distributing that information for planning purposes (Figure 1B). Furthermore, in order to conserve RBC units, we requested that all individuals with SCD admitted to UAB Hospital have a consult from a clinician who specializes in SCD in order to help determine the best transfusion strategy on an individual basis.

Additional strategies were put in place for individuals with SCD requiring large volumes of antigen-matched RBCs to undergo previously scheduled chronic automated RBC exchange (RCE) procedures. In the outpatient setting, RCEs continued to be performed with increased physical distancing and individuals were asked to wear masks. Though postexchange hemoglobin S was targeted at 15% prior to the pandemic, it was transiently increased to 20% in order to conserve RBC units, particularly in individuals negative for the C, E, and K antigens. As individuals with SCD began to develop COVID-19 in the outpatient setting, an approach was needed to avoid exposing others while continuing to provide RCEs in order to prevent life-threatening complications. As UAB had established an infusion space for those with COVID-19 receiving convalescent plasma, it was subsequently used to also perform RCEs for individuals with SCD and COVID-19. Likewise, additional strategies were needed for inpatients with SCD and COVID-19 requiring emergent RCEs for possible acute chest syndrome. This included apheresis staff using extension tubing to remain outside of the rooms in order to conserve personal protective equipment for other hospital staff.

In order to assess the impact of these multifaceted efforts, we analyzed our RBC inventory and usage data prior to the start of the pandemic and shortly into the pandemic (Figure 1B). We were specifically interested in assessing the ability to maintain outpatient RCE procedures entering into the pandemic, and compared the number of RCEs performed and the number of RBC units ordered for these procedures during different periods of time. We also assessed the number of RBC units ordered by the inpatient surgical teams during these periods of time as they were identified as a group with high utilization. Regarding inventory, the mean (m) number of RBC units in the blood bank per week remained stable as the pandemic began (03/15/2020-05/03/2020; $m = 785 \pm 56$) but subsequently began to decrease (05/10/2020-06/28/2020; $m = 596 \pm 77$, $P < .001$) (Figure 1B). Concordantly, the weekly mean of RBC units ordered by the inpatient surgical teams initially declined with the postponement of elective procedures as the pandemic began (03/15/2020-05/03/2020; $m = 387 \pm 44$) but subsequently began to rise with the resumption of elective procedures (05/10/2020-06/28/2020;

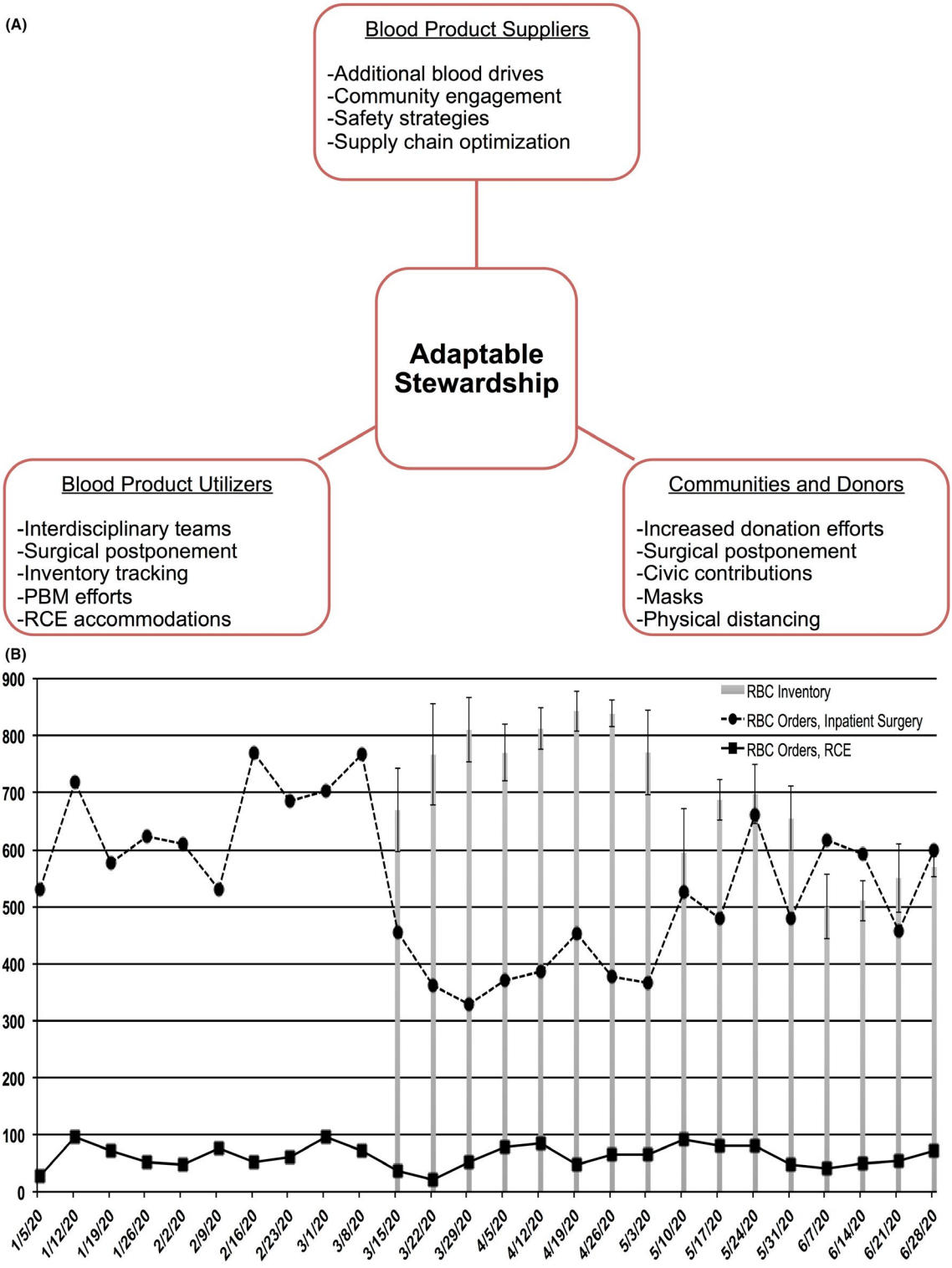

FIGURE 1 A Multifaceted approach for individuals with sickle cell disease promotes sustainability in automated RBC exchanges during COVID-19. (A) In order to maintain an adequate blood supply, teamwork is required among blood product suppliers, blood product utilizers, communities, and donors. (B) The weekly mean of RBC units ordered for RCEs remained constant despite fluctuations in RBC inventory and inpatient surgical orders. PBM, patient blood management; RBC, red blood cell; RCE, red blood cell exchange

m = 552 ± 76, $P < .001$) (Figure 1B). Over the same periods of time, the weekly frequency of RCEs performed did not decrease (m = 8.75 ± 2.19 vs 7.88 ± 1.89, $P = .2$), and the number of antigen-matched RBC units ordered remained constant (m = 57 ± 21 vs 64 ± 19, $P = .2$) (Figure 1B). Although the weekly number of RBC units ordered by inpatient surgical teams increased upon resumption of elective procedures, it did not return to its prepandemic volume (01/05/2020-03/08/2020; m = 652 ± 90, $P = .01$).

In summary, we were able to provide optimal care to individuals with SCD by continuing to perform outpatient RCEs using antigen-matched units by implementing various multifaceted efforts. However, this required teamwork involving blood suppliers, blood donors, and providers throughout the hospital, especially those in surgical specialties (Figure 1A). As the pandemic and its strains continue, especially in regard to blood supply inventories around the world, blood banks and hematologists should collaborate closely with all aspects of the healthcare systems and communities at large in order to strategically develop plans of care for individuals with SCD and particularly those requiring regular RCEs in order to improve their quality of life and reduce morbidity and mortality.

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KEYWORDS

blood products, blood transfusion, red cell antigens, sickle cell, transfusion medicine

CONFLICT OF INTEREST

The authors declare none.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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