TRALI: Party of One; Real-Time Hemovigilance Demonstrates Multiple Event-Free Transfusions

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Background

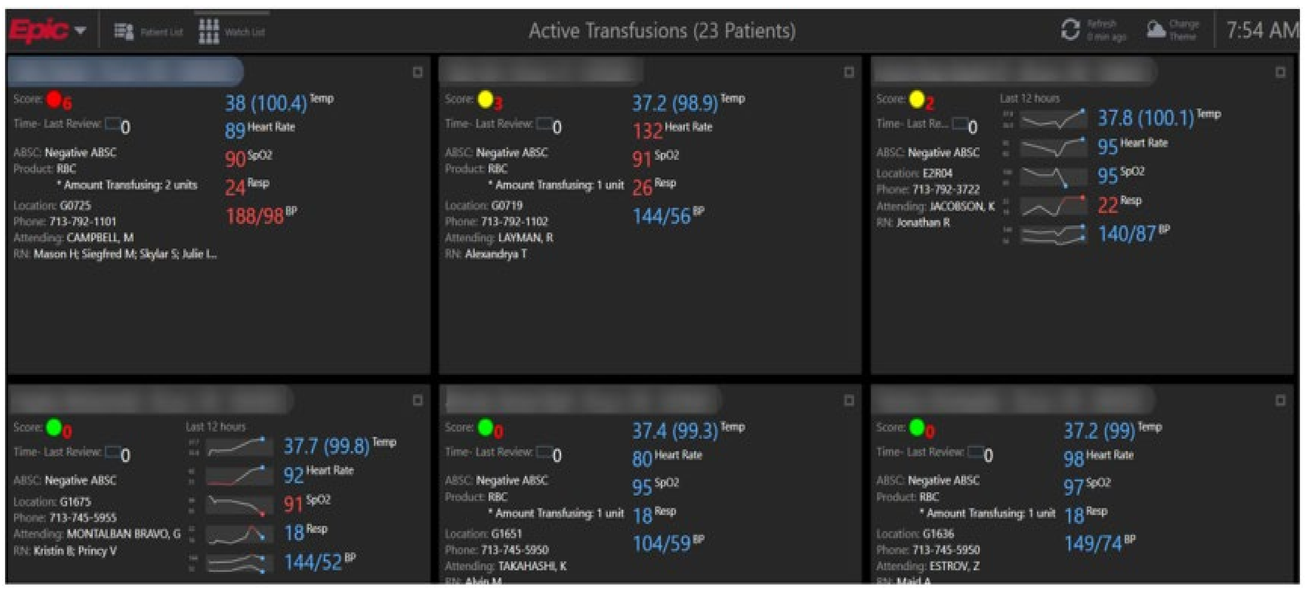
Transfusion-related acute lung injury (TRALI) is a potentially life-threatening transfusion related adverse event (TRAE). It is characterized by hypoxemia, hypotension, and fever. Both HLA and HNA antibodies have been implicated as causative agents. Real-time Hemovigilance (RTHV) surveillance programs are uniquely positioned to capture data surrounding these events and aid in diagnosis.

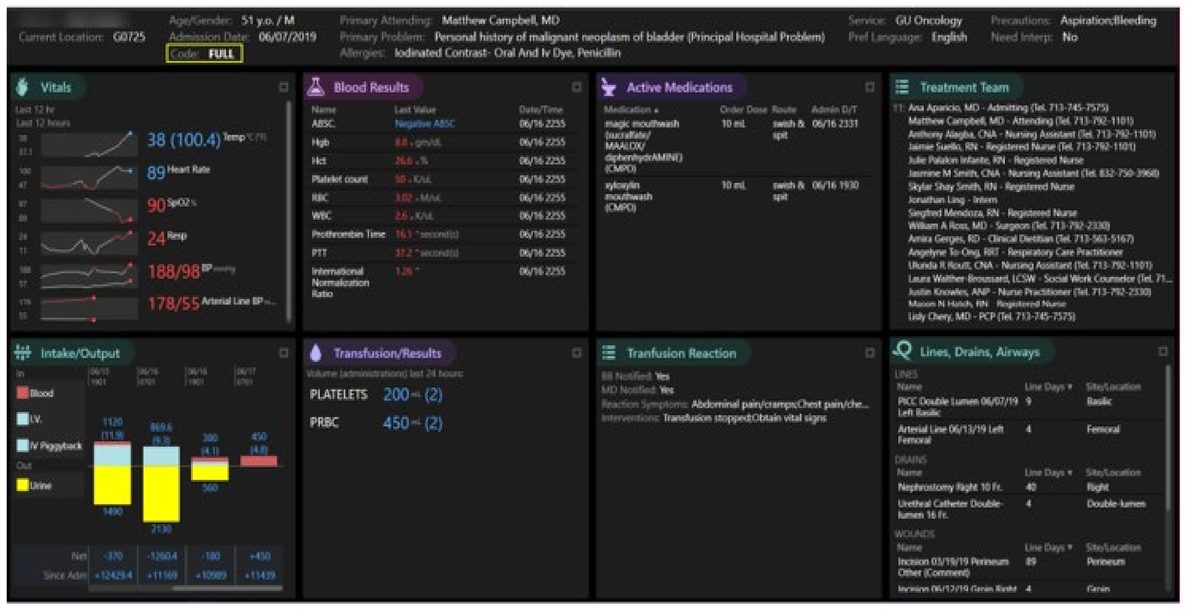
Aim

We aim to highlight the diagnostic utility of a RTHV system and demonstrate the critical role it plays in patient care.

Methods

Our institution is a 678-bed hospital and ambulatory center which dispenses blood components for 100,000 patients annually. We have a RTHV system that monitors for TRAE. This system consists of a digital dashboard monitored by specialty-trained nurses in a remote hemovigilance unit (HVU). Patients receiving a transfusion have vital signs recorded at regular intervals in the electronic medical record (EMR). This data livestream-populates on the dashboard and generates a transfusion risk score during and up to 12 hours posttransfusion. If a reaction is suspected, transfusion medicine (TM) advanced practice provider is deployed bedside to assess the patient. The encounter is then reviewed by a TM physician using the NHSN hemovigilance protocol to classify the event. Stored data is accessible for retrospective review. Once a TRALI case was recognized, quarantine proceedings prompted a retrospective review of the donor's history, the HVU dashboard and the EMR for 5 tangentially related patients.





Results

Over the course of a one-month period the implicated donor donated three single-donor platelets which were split into six products. HLA antibody testing performed prior to each donation was negative. Our RTHV system confirmed 5 out of the 6 patients did not exhibit a hypoxemic event. The isolated hypoxemic event was noted to have transient neutropenia, bilateral infiltrates on imaging and hypotension. Four out of six patients had no evidence of a TRAE. One patient, with a history of severe allergic reactions, was documented to have an allergic reaction characterized by itching, hives, and hypotension. While the patient was put on oxygen, no desaturation event was captured and posttransfusion imaging was unremarkable. Subsequent donor testing demonstrated the presence of HNA antibodies.

Three Donations (Single Donor Platelets Transfused to Six Patients)

	HVU Initial Score	HVU Highest Score	Initial Vital Signs	Cessation Vital Signs
Donation 1 on 5/31				
Patient 1	0	8	BP: 100/45 RR: 18 O2 Sat: 94% RA	BP: 83/55 RR: 29 O2 Sat: 100% 2L/min NC
Patient 2	0	0	BP: 119/65 RR: 20 O2 Sat: Not Measured	BP: 115/64 RR: 20 O2 Sat: Not Measured
Donation 2 on 6/7				
Patient 1	1	1	BP: 164/69 RR: 18 O2 Sat: 100% RA	BP: 160/97 RR: 14 O2 Sat: 100% RA
Patient 2	0	4	BP: 108/59 RR: 18 O2 Sat: 97% RA	BP: 102/72 RR: 17 O2 Sat: 96% RA
Donation 3 on 6/21				
Patient 1	0	16	BP: 113/73 RR: 18 O2 Sat: 99% RA	BP: 90/60 RR: 24 O2 Sat: 90% RA
Patient 2	1	1	BP: 110/51 RR: 18 O2 Sat: 98% 2L/min/NC	BP: 117/57 RR: 18 O2 Sat: 95% RA

Conclusion

Informatics systems expand the realm of available data and eliminate underreporting of TRAE. Neither lack of antigenic target nor failure of clinical recognition account for the paucity of symptoms reported in the tangentially related cases. These observations further highlight the importance of patient factors in the pathophysiology of TRALI.