Patient Safety Authority

Transfusion-Associated Circulatory Overload (TACO): Strategies to Mitigate the Risk of Harm

What is Transfusion-Associated Circulatory Overload (TACO)? TACO has been defined as "acute or worsening respiratory compromise and/or acute or worsening pulmonary [edema] during or up to 12 hours after transfusion, with additional features including cardiovascular system changes not explained by the patient's underlying medical condition, evidence of fluid overload and a relevant biomarker."[1] Definitions of TACO vary across the literature[1,2] and some of its features may overlap with the definition and presentation of transfusion-related acute lung injury (TRALI).[2,3] Risk factors for and clinical presentation of TACO are reviewed in several resources[1,2,4] and we recommend that clinical staff read references 1, 2, and 4.

Occurrence of TACO and Impact on Patients. The Medicines and Healthcare products Regulatory Agency in the United Kingdom released an April 2024 National Patient Safety Alert informing the healthcare community of an increasing trend of TACO-related deaths and major morbidity.[1] Through an exploration of data in the Pennsylvania Patient Safety Reporting System (PA-PSRS), the Patient Safety Authority (PSA) also found that hundreds of TACO events have been reported across Pennsylvania in recent years, including reports of serious patient harm and death. PSA encourages the healthcare community to be aware of risk factors for, clinical presentation of, and strategies to mitigate the risk of TACO.

Strategies to Mitigate the Risk of TACO.[1]

- Use a pretransfusion risk assessment.
- Ensure that only necessary transfusions are performed.
- Use weight-based dosing of red blood cells, particularly for patients with low body weight.
- Consider using a validated red blood cell calculator to estimate the amount of transfusion required to meet the target hemoglobin.
- Transfuse a single unit or the minimum number of units necessary to achieve the hemoglobin target.
- Transfuse at recommended rates, no faster.
- If appropriate, administer a diuretic, oxygen, or other adjunct treatments.
- During and following transfusion, closely monitor the patient's vital signs, and promptly intervene, if necessary.

1. Medicines and Healthcare products Regulatory Agency. National Patient Safety Alert: Reducing Risks For Transfusion-Associated Circulatory Overload. MHRA. https://www.gov.uk/drug-device-alerts/national-patient-safety-alert-reducing-risks-for-transfusion-associated-circulatory-overload-natpsa-slash-2024-slash-004-slash-mhra. Published April 4, 2024. Accessed April 11, 2024.
2. Roubinian N. TACO and TRALI: Biology, Risk Factors, and Prevention Strategies. *Hematology Am Soc of Hematol Educ Program*. 2018;2018(1):585-94. doi: 10.1182/asheducation-2018.1.585
3. Cho MS, Modi P, Sharma S. Transfusion-Related Acute Lung Injury. StatPearls. https://www.ncbi.nlm.nih.gov/books/NBK507846/. Updated September 15, 2023. Accessed April 11, 2024.
4. Medicines and Healthcare products Regulatory Agency. FAQ Document to Support the National Patient Safety Alert: "Reducing Risks for Transfusion-Associated Circulatory Overload." MHRA. https://www.shotuk.org/wp-content/uploads/myimages/TACO-Safety-Alert-FAQ-document-April-2024.pdf. Published April 10, 2024. Accessed April 11, 2024.

Event Reporting Case Study: Transfusion-Associated Circulatory Overload (TACO)

This case study is an example of how to report an event into PA-PSRS.

Narrative: A 54-year-old male patient admitted for gastrointestinal (GI) bleed received two units of packed red blood cells. Shortly after the second unit was transfused, the patient complained of shortness of breath. He became tachycardiac and tachypneic, and his oxygen saturations dropped into the 50s. The patient was placed on oxygen via nasal cannula at 6 L/minute, and intravenous (IV) Lasix was administered. A chest X-ray was indicative of pulmonary edema, and the patient was transferred to a higher level of care. Final interpretation of the event was consistent with transfusion-associated circulatory overload.

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Code Blood Bank

In response to an emergent blood transfusion scenario, emergency department (ED) staff followed policy and contacted the blood bank to start the unmatched blood acquisition process in case rapid transfusion was needed. However, once the order was received, the blood bank encountered several barriers to complete the request. When the ED was unable to contact the required personnel, a bedside clinician had to leave the unit to investigate what was happening in the blood bank. The clinician discovered that laboratory personnel were not receiving phone calls and pages as they were covering other critical areas. They informed the ED clinician that they had just received a call that the blood transfusion would not be needed and that the process was no longer indicated.

While any crisis was averted, this near miss incident demonstrated a lack of escalation process for this type of scenario, prompting a team of medical providers; nursing, laboratory, and blood bank staff; and quality staff to implement an action plan. During a cause-and-effect analysis, the team identified contributing factors: The event occurred on an off-shift that was experiencing staffing challenges, such as interdepartmental cross coverage, and unexpected telephone and information technology issues prevented communication.

To prevent future barriers related to information technology and assure prioritization of the requested intervention could be clearly communicated, the team enacted a “Code Blood Bank” response. In a situation where stat blood may need to be prepared and administered, Code Blood Bank is called on the overhead paging system. This alert will be heard in all areas of the facility to alert blood bank personnel of what and where the need is.

In addition, the team improved the telephone escalation process. The assigned remote phone for these emergent situations will be called and will ring a set number of times before transferring to the next staff member’s phone. If not answered by that member, the blood bank desktop and department cordless telephone will ring. If not answered in four rings, the phone will transfer out to the general laboratory area.

The blood bank staff were educated that if they leave the office for any reason, they must bring the remote telephone with them. All providers and nursing staff were oriented to the process, ensuring that they do not hang up after only four rings when contacting the blood bank. Communication officers were also educated with the process and its rationale.

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