

Top blood transfusion-related complication more common than previously reported

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Two studies published in the January issue of *Anesthesiology*, the official medical journal of the American Society of Anesthesiologists (ASA), shed new light on the prevalence of transfusion-related acute lung injury (TRALI) and transfusion-associated circulatory overload (TACO), the number one and two leading causes of blood transfusion-related deaths in the United States. According to researchers, postoperative TRALI is significantly underreported and more common than previously thought, with an overall rate of 1.4 percent. While the rate of TACO was found to be on the decline, the risk to surgical patients remains high, at a rate of 4 percent, similar to previous TACO estimates in non-surgical patients.

"An accurate understanding of the risks associated with [blood](#) transfusions is essential when determining the safety and appropriateness of transfusion therapies for patients," said Daryl Kor, M.D., senior author of both studies and associate professor of anesthesiology at Mayo Clinic in Rochester, Minn. "Our research provides a greater awareness of the incidence of TRALI and TACO in surgical patients, a population that has been perhaps underrepresented in studies in this area. We believe this to be an important first step in our efforts to prevent these life-threatening transfusion complications."

TRALI occurs when air spaces in the lungs become acutely inflamed and filled with fluid following the administration of blood products. Symptoms of TRALI include shortness of breath, [low blood pressure](#) and fever. In contrast, TACO generally occurs in patients susceptible to fluid overload who then receive [blood transfusion](#) and develop

symptoms of heart failure. Classic symptoms of TACO include shortness of breath and rapid increases in blood pressure.

In the retrospective studies, the authors examined the incidence of TRALI in 3,379 patients and TACO in 4,070 patients who received blood transfusions during non-cardiac surgery under general anesthesia in 2004 and 2011. Using a novel algorithm, followed by a rigorous manual review, the authors performed a detailed epidemiologic analysis for both complications.

The first study found that TRALI occurred in 1.4 percent of surgical patients, with higher rates in specific surgical populations such as those having surgery inside the chest cavity, on major blood vessels, or having an organ transplant. Those who received larger volumes of blood were also at increased risk. Previous studies investigating TRALI rates have primarily focused on the critically ill and report quite variable incidence rates. Many studies have reported incidences between 0.02 to 0.05 percent.

The second study found that TACO occurs in 4.3 percent of [surgical patients](#), with higher rates associated with increased volume of blood transfused, advanced age and total intraoperative fluid balance. Again, patients having surgery inside the chest cavity, on major blood vessels, or organ transplants were at greatest risk. Researchers also observed that TACO decreased significantly from 2004 to 2011 from 5.5 to 3 percent. The decline in the incidence of TACO was not fully explained by any of the patient or transfusion characteristics evaluated in the study, the authors note.

An accompanying editorial commented favorably on the studies' results:

"Whether [blood] transfusion-related adverse reactions are not reported due to human error or under-recognition, the risk to patients remains

high," said editorial authors Jean-Francois Pittet, M.D. and Jeffrey Simmons, M.D., department of anesthesiology, University of Alabama at Birmingham. "In 2013, the Food and Drug Administration reported that 38 percent and 24 percent of the deaths after blood transfusion were attributable to TRALI and TACO, respectively. Consequently, accurate reporting of these complications is crucial in mitigating risk to patients. The current studies will help to pave the way for tailored transfusion practices to patients at high risk for TRALI and TACO. The authors of these studies have taken an enormous step in providing better detection of these common adverse reactions."

The authors note that future studies are needed to further explore which mechanisms and risk factors are responsible for the development of these complications. "With improved understanding of the mechanisms underlying TRALI and TACO, we may be able to refine the novel electronic algorithms used to screen patients in these studies. Ultimately, we hope to develop a real-time prediction model for these complications so that we can identify those at greatest risk and perhaps implement strategies to reduce this risk," said Dr. Kor.

Approximately 30 million blood components were transfused in the United States in 2011, with nearly half of all blood transfusions occurring in the operating room. A substantial proportion of [patients](#) who experience TRALI and TACO do so after intraoperative blood transfusions.

Provided by American Society of Anesthesiologists

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