

Treacherous Transfusions: A Case Presentation of Transfusion Related Acute Lung Injury (TRALI)

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LEARNING OBJECTIVES

To educate clinicians on Transfusion Related Acute Lung Injury (TRALI), and recognize the differences between TRALI and Transfusion Associated Circulatory Overload (TACO).

CASE PRESENTATION

A 69 y/o M with an extensive PMH including T-cell prolymphocytic leukemia (s/p chemotherapy) complicated by CMV viremia presented with abdominal pain and non-bloody diarrhea.

PHYSICAL EXAMINATION

- HR of 108 beats per minute
- A 2/6 holosystolic murmur was heard on auscultation of the right upper sternal border.

DIAGNOSTIC STUDIES

Hemoglobin (12-17.5 g/dl)	9.1
Troponin trend	0.05 -> 0.06 -> 0.05 -> 0.03

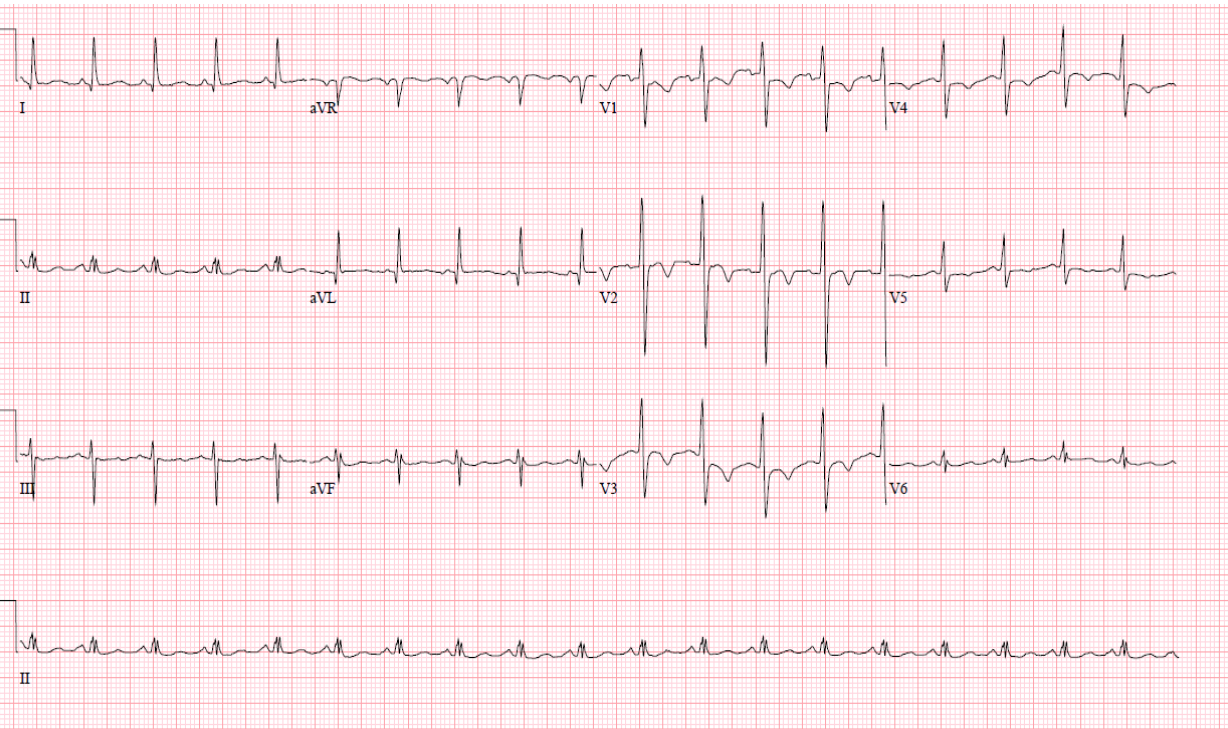


Figure 1. Patient's EKG which reveals sinus tachycardia with a HR of 109 bpm with T wave inversions in V1-V5.

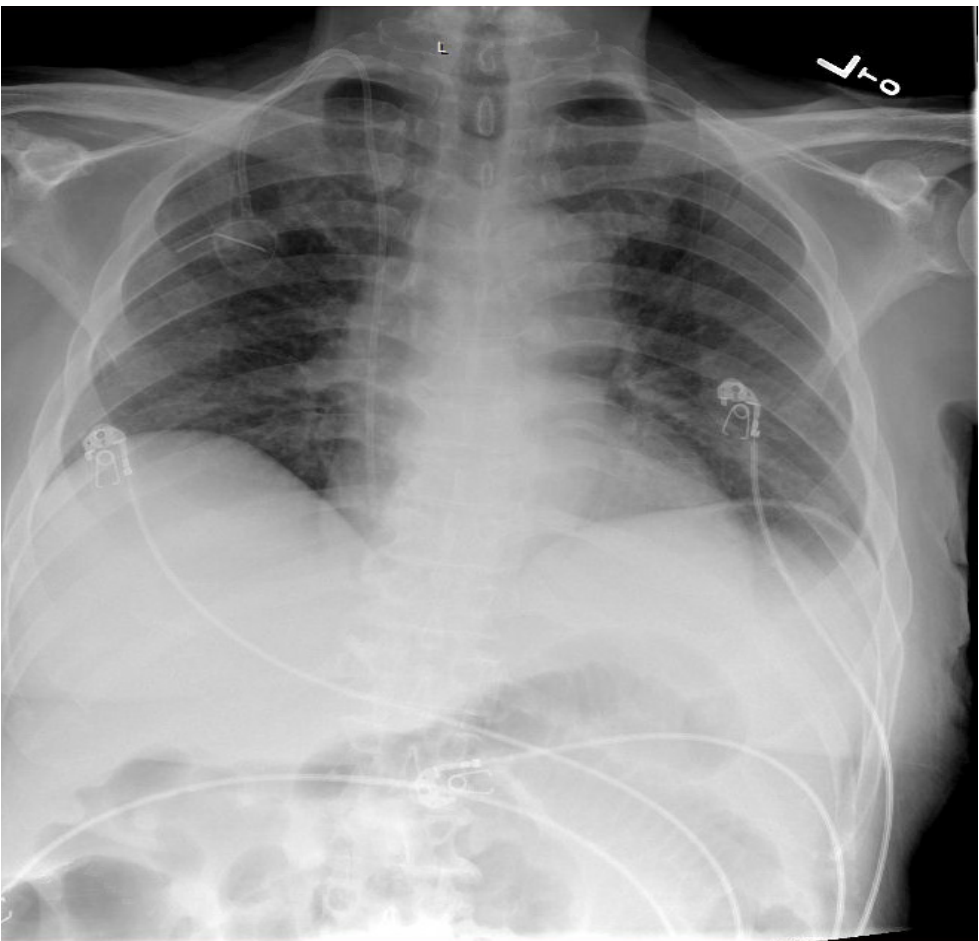


Figure 2. Patient's initial chest x-ray (CXR) obtained on the day of admission which shows a port located in the right chest wall with no focal consolidation, effusion, or infiltrate.

- ECHO: EF of 55% with mild to moderate mitral regurgitation, moderate calcification of the aortic valve, and a pacemaker wire in the right atrium.
- CT abdomen/pelvis: dilated small bowel loops with findings suggestive of an early or partial small bowel obstruction and a 2 cm intramural abscess of the sigmoid colon and mild mesenteric lymphadenopathy.

INTERVAL HISTORY

- As the patient had prior CMV viremia and a positive CMV PCR, it was determined he likely had CMV colitis and his home Valacyclovir dose was increased.
- The following day, his hemoglobin was as follows:

Hemoglobin (g/dl)	Blood Transfusion
6.7	Given 1 unit of PRBCs
6.8 (~5 hours later)	Given 1 unit of PRBCs

- The patient's hemoglobin was stable after the blood transfusions; however, he became progressively weak.

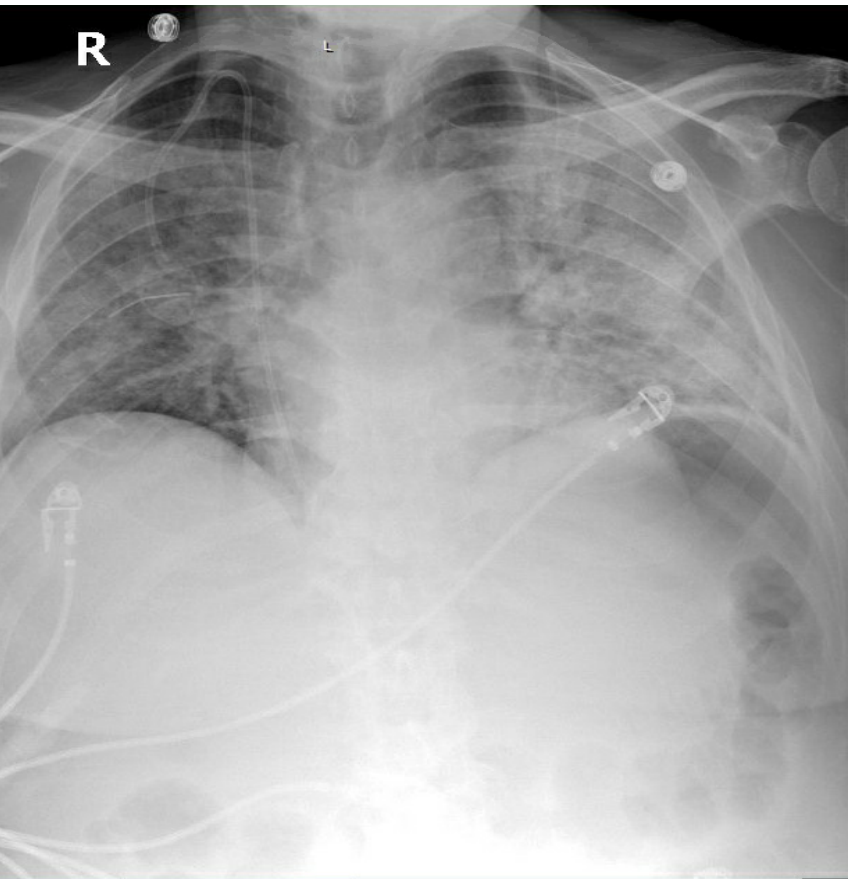


Figure 3. CXR after having 2 units of PRBCs showing new diffuse perihilar airspace disease left greater than right with a differential including pulmonary edema, ARDS, hemorrhage, or diffuse pneumonia.

- The patient was given 40 mg Lasix intravenously.
- Later that evening, his repeat hemoglobin was 6.3 g/dl and was given an additional unit of PRBCs.
- The following morning, he was using his accessory muscles to breathe and his respiratory rate was elevated.
- The patient was placed on a non-rebreather at 10 lpm; however, his oxygen saturation dropped to less than 88% and he was placed on Bipap.

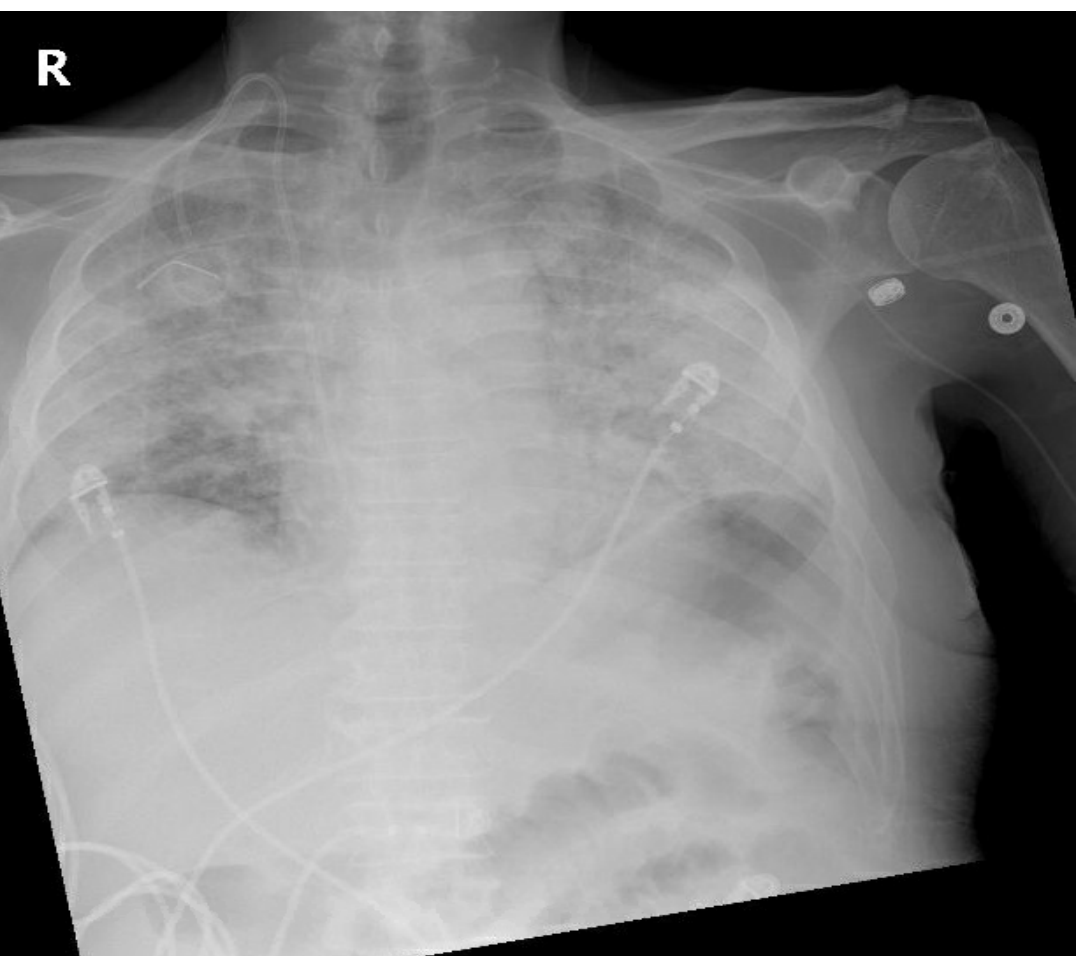


Figure 4. CXR revealing moderate increase in diffuse airspace disease throughout both lungs.

- The patient was ultimately intubated.
- He was unable to tolerate prone positioning due to persistent hypotension and hypoxia.
- Over the course of his hospitalization he received a total of 24 units of PRBCs.
- An endoscopy was negative for a GI bleed or ulcer.
- The patient's family decided not to escalate care and he expired shortly thereafter.

TRALI

- TRALI is an acute lung injury that occurs within 6 hours of blood product administration.
- Prior to 2016, it was the leading cause of transfusion-related mortality; it has since been surpassed by TACO.
- TRALI occurs in 0.04-0.1% of transfused patients (1 in 5000 transfused blood components).
- The mechanism involves neutrophil sequestration in lung tissue followed by neutrophil activation due to factors in the blood product.

Diagnosis of TRALI
1. Acute onset within 6 hours of transfusion
2. Hypoxemia: PaO2/FiO2 < 300 or SpO2 < 90% on room air
3. Bilateral infiltrates on frontal chest radiograph
4. No evidence of circulatory overload or left atrial hypertension
5. No pre-existing acute lung injury or ARDS before the transfusion

TRALI vs. TACO

Parameter	TRALI	TACO
Temperature	*Fever may be present*	Unchanged
Blood pressure	*Hypotension may be present*	Hypertension may be present
Respiratory Symptoms	*Acute dyspnea*	Acute dyspnea
Neck veins	Unchanged	May be distended
Auscultation	*Rales*	Rales and S3 may be present
CXR	*Diffuse bilateral infiltrates*	Diffuse bilateral infiltrates
EF	*Normal*	Decreased
Pulmonary artery occlusion pressure	≤ 18 mmHg	> 18 mmHg
Pulmonary edema fluid	Exudate	Transudate
Fluid balance	*Neutral or negative*	Positive
Response to diuretics	*Inconsistent*	Significant improvement
White cell count	Transient leukopenia may be present	Unchanged
BNP	< 250 pg/ml	> 1200 pg/ml

* Denotes presence in this patient.

TRALI TREATMENT

- The main treatment is supportive care; however, some patient's may require ventilatory support.
- Ventilator management should be applied in a similar fashion to treating ARDS, including proning as tolerated to increase lung recruitment.
- Diuretics and corticosteroids can worsen the course, as the injury is to lung parenchyma and not a fluid overload picture.

CONCLUSIONS

- TRALI is a medical complication that may occur in patients who receive a blood transfusion.
- The mechanism of injury appears to be in the lung parenchyma, rather than fluid overload (as seen in TACO).
- Therapies for ARDS should be considered.
- As it is a significant cause of transfusion-related mortality, it is of benefit to all physicians to understand the condition.