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## PEARLS OF LABORATORY MEDICINE

# Transfusion Associated Circulatory Overload (TACO)

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# TACO

- Definitions
- Signs and symptoms
- Risk factors
- Differential diagnosis
- Prevention/Management



# TACO

- In 2011, second most common cause of transfusion-related mortality reported to the FDA next to transfusion-related acute lung injury (TRALI).<sup>1</sup>
- Variable frequency: 1% in hemovigilance reports, 8% in postoperative elderly, 11% in critically ill.<sup>2</sup>
- Recent multicenter study utilizing active surveillance: TACO was widely underreported with true incidence of 1.1%.<sup>3</sup>
- Recent prospective study of ICU patients: 51 of 901 (6%) developed TACO.<sup>4</sup>



# National Healthcare Safety Network (NHSN) Hemovigilance Definition<sup>5</sup>

New onset or exacerbation of **3 or more** of the following **within 6 hours** of cessation of transfusion

- Acute respiratory distress
- Elevated brain natriuretic peptide (BNP)
- Elevated central venous pressure (CVP)
- Evidence of left heart failure
- Evidence of positive fluid balance
- Radiographic evidence of pulmonary edema

# Signs and Symptoms

- Dyspnea
- Orthopnea
- Cyanosis
- Hypoxemia
- Elevated BNP
- Tachycardia
- Increased blood pressure
- Pulmonary/pedal edema
- Cardiomegaly



# Risk factors

- Elderly patients
- Infants and small children
- Congestive heart failure
- Left ventricular dysfunction
- Chronic renal failure
- Positive fluid balance
- Faster rates of transfusion
- Infusion of large amounts of plasma



# Differential diagnosis

- Transfusion associated circulatory overload (TACO)
- Transfusion related acute lung injury (TRALI)
- Anaphylaxis
- Factors unrelated to transfusion

# Differential diagnosis

## TACO

- Dyspnea, orthopnea, rales
- Acute pulmonary edema, **hypertension**
- Tachycardia, **widened pulse pressure, widened cardiac silhouette**
- Presentation within 6 hours of transfusion



# Differential diagnosis

## TRALI

- Hypoxemia, acute pulmonary edema, **hypotension, fever**
- Dyspnea
- Presentation within 1-6 hours of transfusion of plasma containing products.
- **No improvement following diuretics.**



# Differential diagnosis

## Anaphylaxis / severe allergic reaction

- Dyspnea, cyanosis, **erythematous rash, pruritis, nausea/vomiting**
- **Hypotension (often severe)**, shock, tachycardia
- **No pulmonary edema**
- Usually presents **within seconds of transfusion** and with **as little as 10 mL of product.**



# Prevention

- Careful review of patient history and fluid status.
- Administration of diuretic therapy in high-risk patients.
- Ordering 1 red blood cell unit at a time.
- Decreasing the transfusion rate in at-risk patients.
- Evaluating the risk/benefit for transfusion.



# Management

- Stop the transfusion.
- Treat symptoms.
  - Supplemental oxygen.
  - Diuretics.
  - Place the patient in a sitting position.
- If symptoms do not abate:
  - Repeat diuretics.
  - Possibly perform therapeutic phlebotomy in 250 mL increments.



# Conclusions

- TACO is under-recognized and underreported.
- The elderly, patients with CHF, chronic renal failure, positive fluid balance and those receiving large volumes of plasma, especially at a fast rate, are at increased risk.
- Transfusion of as little product as medically necessary, judicious use of diuretics and slowing the rate of transfusion in at-risk patients are helpful measures to prevent TACO.



# Conclusions

When symptoms of TACO occur:

- Stop the transfusion immediately.
- Provide supplemental oxygen.
- Consider judicious use of diuretics.
- Place patient in sitting position to alleviate symptoms.
- Report reaction to Blood Bank.



# References

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