Transfusion Reactions

Case 1

An 88 year- old group O+ man with chronic lymphocytic leukemia (CLL) presented to ER with 2d history of weakness, decreased urine output, and chills. He has a history HTN, CAD, and CHF; Medications include ASA, furosemide, ramipril, & metoprolol.

In ER, BP is 92/60. He is given 1L NS, broad-spectrum antibiotics, and antipyretics. Regular medications are held. CBC shows Hb 79 g/L; one month prior his Hb was 100 g/L. 2 units RBC were ordered:

Pre-transfusion HR 121, BP 100/60, T 37.3 O2 sat 100% R/A
After 1st unit: HR 140, BP 127/72, T 37.3 O2 sat 78% R/A;
→97% on 2L/min NP.

The 2nd unit is cancelled.

His JVP is at the angle of the jaw and he has bipedal pitting edema up to the knees. CXR shows bilateral infiltrates in keeping with pulmonary edema.

1. **Which one of the following is the most likely etiology of his transfusion-associated disturbance?**
   A. **Transfusion associated circulatory overload (TACO)**
   B. **Transfusion associated dyspnea (TAD)**
   C. **Transfusion related acute lung injury (TRALI)**
   D. **Underlying illnesses: decompensation coincidence**

2. **Which one of the following is the most broadly feasible action in TACO prevention?**
   A. **Diuretic between 1st/2nd unit in a 2u RBC order**
   B. **RBC transfusion rate of 10mL/min**
   C. **Split RBC (a half-unit order)**
   D. **Vital signs check during transfusion**

Case 2

You are called to the hematology ward to review an 87 year old woman admitted with febrile neutropenia after myeloma therapy. She is a grand multipara (G8) with hypertension.

She experienced fevers, rigors, and tachycardia following a 7-day-old platelet transfusion.

	Pre-transfusion	Post-transfusion
HR	75	110
BP	104/62	130/80
Temp	37.3°C	39.9 °C
RR	16	30
SpO_2	98% (room air)	95% (room air)

Labs:

Pre-transfusion: Hb 68, WBC 0.2, platelets <10
Patient blood group A, RHD positive
Platelets transfused: Group O, day 7, single donor apheresis collection

3. **Which one of the following is indicated at this time for investigation and management of this patient?**
   A. **repeat CBC, LDH, creatinine, PT/aPTT, and urinalysis**
   B. **review chart (temperature trends, antibiotics, cultures)**
   C. **repeat G&S, do DAT, culture patient & residual product**
   D. **no investigation needed; already admitted with febrile condition**

Repeat blood group, IAT, and DAT all negative.
Repeat CBC was unchanged.
LDH, bilirubin, and haptoglobin were all within normal limits.
The product and the patient's cultures were all negative.
Review of her chart reveals that she presented with fever 4 days ago and was started on piperacillin/tazobactam. She defervesced over the last 2 days.

4. **Which one of the following is recommended to prevent future febrile reactions in this patient?**
   A. **plasma volume reduction (PVR) of platelet products**
   B. **pre-medication with acetaminophen**
   C. **washing of RBC and platelet cellular products**
   D. **no interventions recommended**

Case 3

An athletic 17 year old male with ALL is undergoing induction chemotherapy.

His CBC today shows WBC 0.4, plt <10, Hb 69.
He is ordered 1 adult dose of platelets and 1u RBC.

The platelet transfusion is completed and the RBC unit is hung.
After 100mL of RBC have been transfused, the patient becomes febrile, dyspneic, tachypneic, and his spO2 drops to 78% on room air.

The transfusion is stopped and he transfers to the ICU.
He is given furosemide and salbutamol with no effect, and requires intubation.
CXR shows new bilateral infiltrates.

5. **Which one of the following is the most likely diagnosis?**
    A. **atypical pneumonia due to immune compromise**
    B. **chemotherapy-related ARDS**
    C. **transfusion-associated circulatory overload (TACO)**
    D. **transfusion related acute lung injury (TRALI)**

6. **The patient's parents are understandably upset and want to know what to expect. Which one of the following statement is most appropriate to make to the parents?**

    A. **IVIG will manage infectious & immunologic possibilities**
    B. **steroid therapy will enhance his recovery**
    C. **supportive care is mainstay; most recover within 48-96 hours**
    D. **there is no specific treatment; expected mortality is >50%**

7. **Based on what is known about the pathophysiology of TRALI, which of the following investigations is indicated?**
    A. **all donors re-screened for RBC antibodies**
    B. **all donors screened for HPA antibodies**
    C. **patient and donors tested for HNA types**
    D. **patient HLA type + donors' HLA antibody screening**

Case 4

A 52 year old male was in the OR for a 4-vessel CABG.
He received a 400mg dose of protamine at 17:15, then
1 dose of platelets, 2u FP, and 1u RBC.
As he was coming off bypass pump, he developed an extensive urticarial rash (75% TBSA) with shock (BP 70-80/40) and bradycardia (20-80).

He had no known history of allergies and no prior exposures to blood products.

He was bolused phenylephrine 40 mcg IV with dopamine at 3 mcg/kg/min IV & norepinephrine at 0.1 mcg/kg/min IV.
He was also given diphenhydramine 50 mg IV + hydrocortisone 100 mg IV.
There were no respiratory/oxygenation disturbances, with P/F ratio remaining >300 with FiO2 30 – 50% during mechanical ventilation, which was not discontinued, as he had significant airway and peri-orbital angioedema. On transfer to the CVICU at 19:15, he was extremely hypothermic (33.1C), and required ongoing boluses, pressors, and inotropes for a period of 12h.

8. **Which one of the following investigations yields a result most likely to guide future transfusion advice to the patient?**
    A. **CBC, PT, aPTT, fibrinogen**
    B. **culture patient and blood products**
    C. **baseline IgA level and presence of anti-IgA IgG**
    D. **repeat blood group, IAT, and DAT**

He recovers and is extubated on POD1.
He is discharged home on POD7 after an uneventful post-operative course.

Laboratory testing reveals evidence of IgA deficiency (on a pre-transfusion specimen) and post-reaction detection of anti-IgA IgG in the patient's serum. Two years later he is back, needing a hip replacement.

9. **Which strategy would you adopt for this case?**
    A. **4u RBC from IgA-deficient donors; prohibit all other products**
    B. **4u washed RBC units + IgA-deficient FP + careful intra-operative hemostasis with cell-saver**
    C. **cell-saver with only fractionated products**
    D. **optimize pre-op Hb and prohibit all transfusions**