

A DELAYED HEMOLYTIC TRANSFUSION REACTION SENDS A PATIENT TO THE ED

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NO FINANCIAL DISCLOSURES.

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OBJECTIVES

- Explain the laboratory diagnostic criteria for acute and delayed hemolytic transfusion reactions
- Discuss the differences and similarities between these types of transfusion reactions
- Have a better understanding of the variability in presentation of delayed hemolytic transfusion reactions

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CASE PRESENTATION



- 40 year-old female called her primary care doctor's office complaining that her eyes are yellow
- Doctor called patient to follow up and learned:
 - Yellow eyes for 24 hours
 - Dark urine for 24 hours
 - Abdominal pain
 - History of blood transfusion 10 days ago without any issues in outpatient setting
 - Patient was receiving transfusion for iron deficiency anemia
 - History of approximately 10 blood transfusions over past 5 years.
- **Patient instructed to go the ED.**

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CASE PRESENTATION

Blood

	Patient's results	Reference Range
Hemoglobin	8.3 g/dL	11.8 – 14.8
Lactate Dehydrogenase	1,189 U/L	135 – 214
Bilirubin Total	3.1 mg/dL	0.3 – 1.2
Bilirubin Direct	0.4 mg/dL	< 0.4
Haptoglobin	< 10 mg/dL	30 – 200

Urine

	Patient's results	Reference Range
Urobilinogen UA	4.0 mg/dL	< 2.0 mg/dL
Blood UA	1+	Negative

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BLOOD BANK WORK UP OF SUSPECTED TRANSFUSION REACTION

	Patient's results in ED	Patient's results prior to transfusion
Blood type	A Pos	A Pos
Antibody Screen	Positive	Negative
Direct Coombs Poly	Negative	N/A
Antibody ID	Anti-Jk ^a	N/A

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CLINICAL COURSE

- Patient admitted.
- Viral hepatitis panels sent, all negative.
- LD and total bilirubin drifted down during admission. Hemoglobin remained stable around 8.
- Patient discharged in stable condition, still jaundiced.

- Followed up with Primary Care doctor next week.
 - Jaundice, scleral icterus and dark urine had resolved.
- Patient to receive iron infusions and see gynecologist for consideration of endometrial ablation or hysterectomy.

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NATIONAL HEALTHCARE SAFETY NETWORK HEMOVIGILANCE MODULE



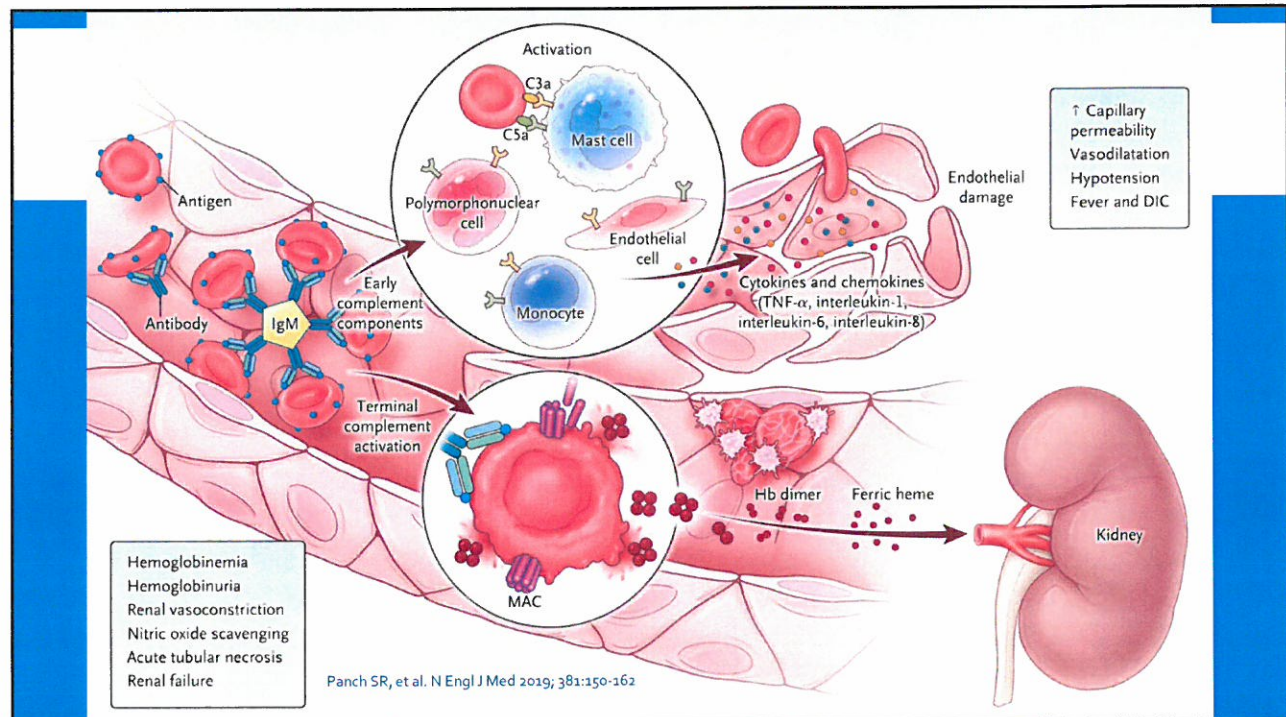
- Introduced by the CDC in 2009
- Purpose = national surveillance of transfusion associated adverse events
- Goals =
 - Improve patient safety
 - Minimize morbidity and mortality
 - Identify emerging complications and pathogens
- Requires a common definition of each reaction type

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ACUTE HEMOLYTIC TRANSFUSION REACTION

- May be caused by ABO incompatibility or other blood group incompatibilities
- Recipient antibodies react against antigen on donor cells
- **Complement is activated**
- **Intravascular hemolysis ensues**
- Can present in a variety of ways:
 - “sense of impending doom” often reported, fever, flank pain, hematuria

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ACUTE HEMOLYTIC TRANSFUSION REACTION



- Occurs during or within 24 hours of cessation of transfusion with new onset of ANY of the following:
 - Back/flank pain
 - Chills/rigors
 - Disseminated intravascular coagulation
 - Nosebleed
 - Fever
 - Hematuria
 - Hypotension
 - Oliguria/anuria
 - Pain/oozing at IV site
 - Renal failure
 - AND

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ACUTE HEMOLYTIC TRANSFUSION REACTION



- Two or more of the following:
 - Decreased fibrinogen
 - Decreased haptoglobin
 - Elevated bilirubin
 - Elevated LDH
 - Hemoglobinemia
 - Hemoglobinuria
 - Plasma discoloration consistent with hemolysis
 - Spherocytes on blood film
 - AND EITHER

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ACUTE HEMOLYTIC TRANSFUSION REACTION



Immune mediated:

- Positive DAT for anti- IgG or anti-C₃
- **AND** positive elution test with antibody present on transfused cells

Non-Immune mediated:

- Serologic testing is negative
- Physical cause is confirmed
 - Thermal
 - Osmotic
 - Mechanical
 - Chemical

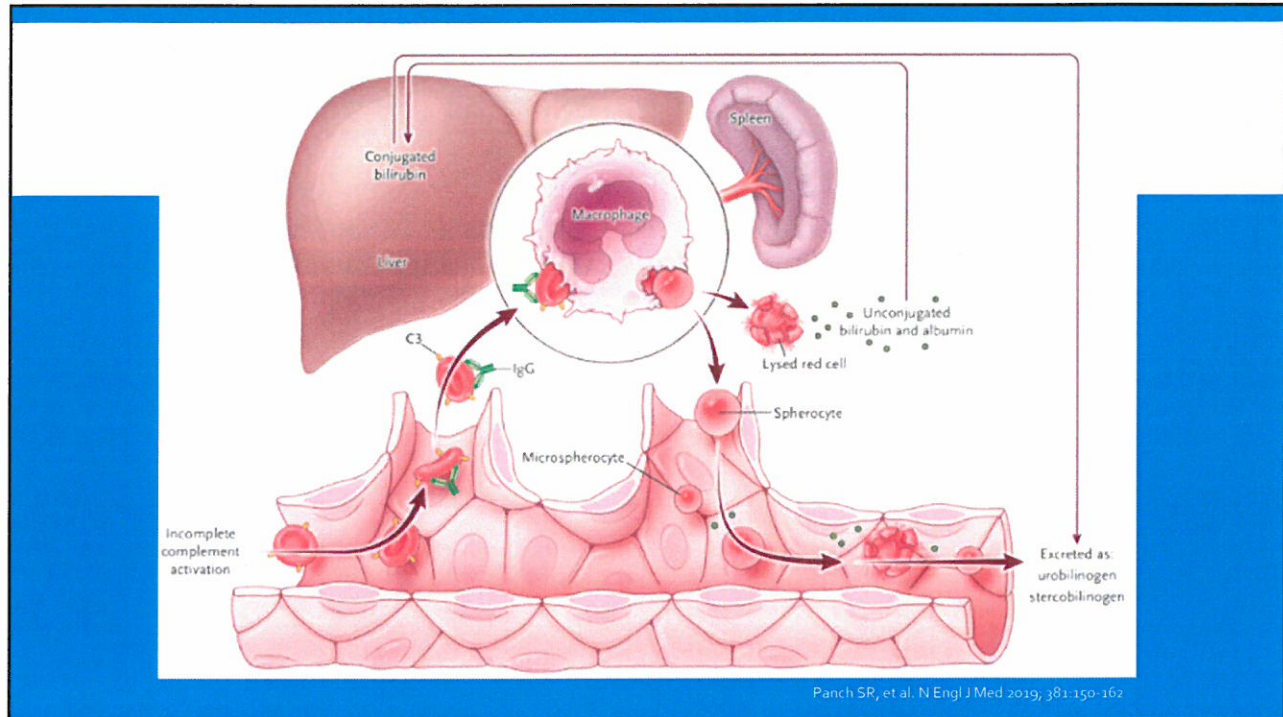
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DELAYED HEMOLYTIC TRANSFUSION REACTION



- Very similar to acute hemolytic transfusion reaction, except **complement is not activated.**
- RBC destruction is **extravascular** (in the spleen)
- Clinical symptoms are much milder and may not be present at all
- Lab confirmation: +DAT, ↓hemoglobin, ↑LDH, ↓haptoglobin, ↑ visible hemolysis in serum and urine, +/- antibody in eluate

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DELAYED HEMOLYTIC TRANSFUSION REACTION



DEFINITIVE

- Positive DAT for antibodies developed between 24 hours and 28 days after cessation of transfusion

AND EITHER

- Positive elution test with alloantibody on transfused RBCs **OR**
- Newly identified red blood cell antibody in recipient serum

AND EITHER

- Inadequate post transfusion rise in hemoglobin levels or rapid fall back to pre-transfusion levels **OR**
- Otherwise unexplained appearance of spherocytes

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DELAYED HEMOLYTIC TRANSFUSION REACTION



PROBABLE

- Newly identified red blood cell alloantibody demonstrated between 24 hours and 28 days after cessation of transfusion

BUT

- Incomplete laboratory evidence to meet definitive case definition criteria.

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SEVERITY OF DELAYED HEMOLYTIC TRANSFUSION REACTIONS



Non-severe

- Medical intervention (e.g. symptomatic treatment) is required but lack of such would not result in permanent damage or impairment of a bodily function.

Severe

- Inpatient hospitalization or prolongation of hospitalization is directly attributable to the adverse reaction, persistent or significant disability or incapacity of the patient occurs as a result of the reaction, or a medical or surgical intervention is necessary to preclude permanent damage or impairment of a body function.

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SEVERITY OF DELAYED HEMOLYTIC TRANSFUSION REACTIONS



Life-threatening

- Major intervention required following the transfusion (e.g. vasopressors, intubation, transfer to intensive care) to prevent death.

Death

- The recipient died as result of the adverse reaction. Death should be used if death is possibly, probably, or definitely related to transfusion. If patient died of a cause other than the transfusion, the severity of the reaction should be graded as appropriate given the clinical circumstances related to the reaction.

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LABORATORY CONCLUSION

- Based on findings of
 - new alloantibody
 - ↓hemoglobin
 - ↑LDH
 - ↑bilirubin
 - ↑ visible hemolysis in serum and urine
- Note: DAT negative
- Classified as Delayed Hemolytic Transfusion Reaction (Severe)

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