

Polyagglutination

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Polyagglutination

- Definition: red cells are agglutinated by a large proportion of human serums, regardless of blood group, and are usually nonreactive with their autologous serum.
 - Cryptantigens: antigens not accessible on normal red cells with normal amounts of N-Acetylneuraminic acid (NeuAc)

Acquired

T

Tk

Th

Acquired B

Inherited

Tn

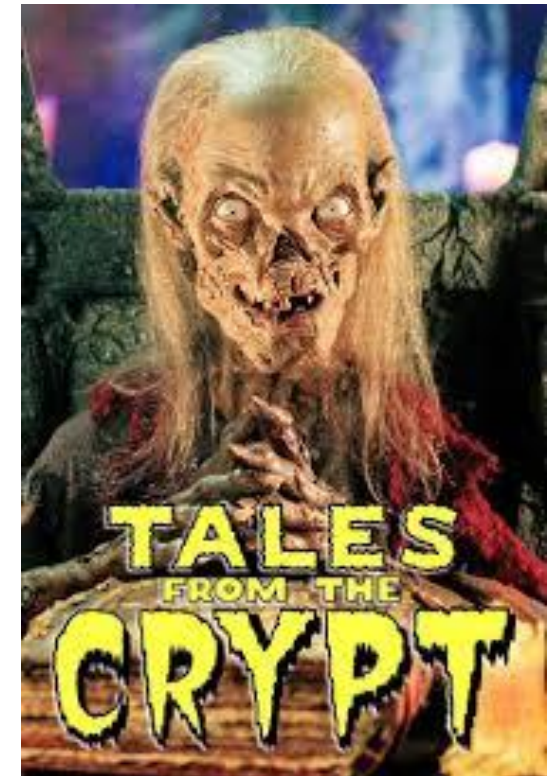
VA

NOR

HEMPAS

Cad

Hyde



Acquired

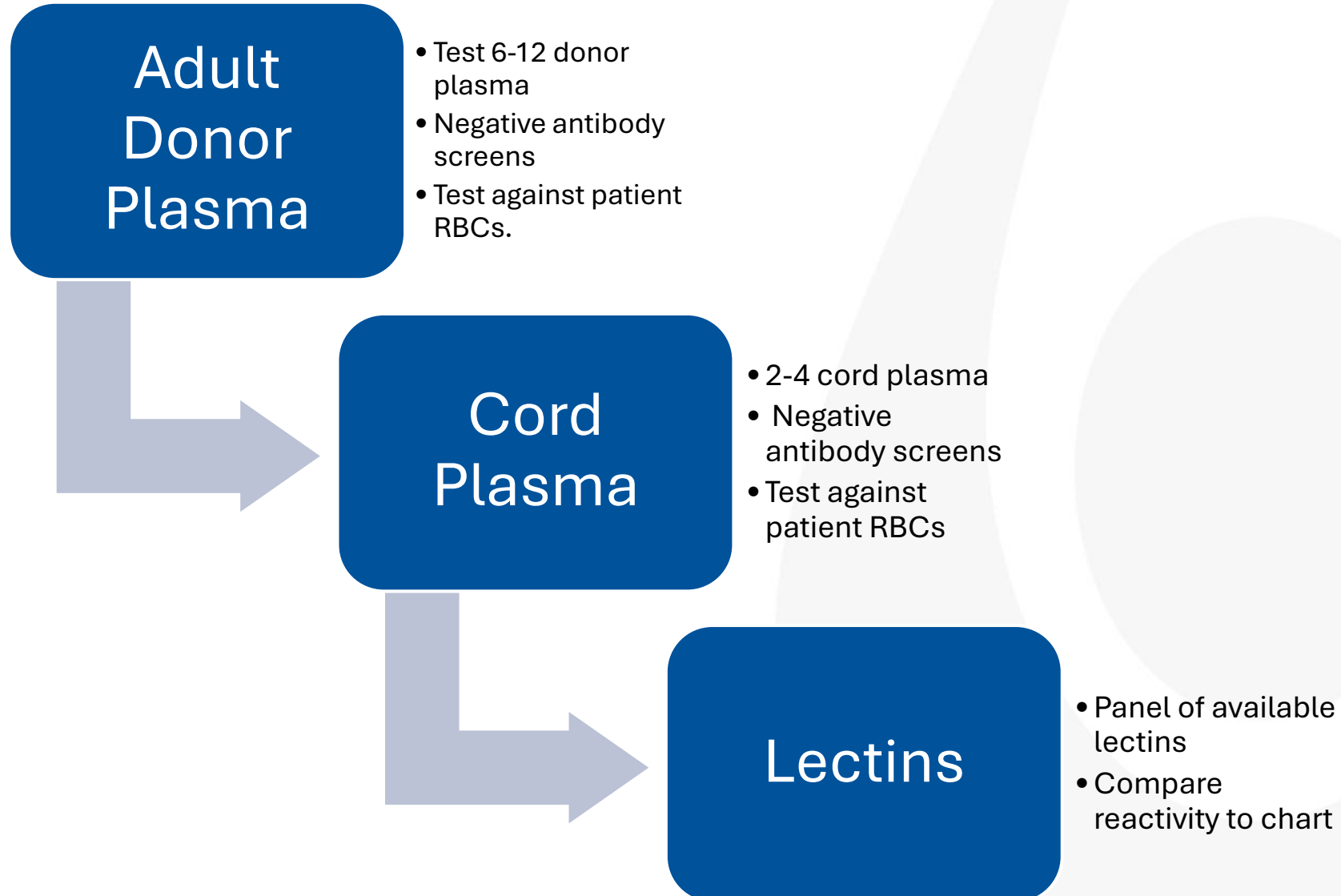
- Most commonly encountered form of polyagglutination
- Red cell membranes become desialylated due to microbial enzymes (bacterial neuraminidase), exposing cryptantigens such as T and Tk
- Almost all normal adult sera contain naturally occurring IgM antibodies to these antigens
- Most cases of T polyagglutination were originally detected due to an ABO discrepancy between the forward and reverse grouping
 - When human source antisera was used for ABO testing
 - Use of monoclonal reagents has decreased the amount of T polyagglutination detected in laboratories.
- Most often seen in infants and children with bacterial infections.
 - Most patients have no symptoms; however, some may present with hemolysis
 - Usually transient and resolves once the underlying cause has been treated

Lectins

- Used for blood group antigen specificity
- Less expensive alternative typing reagents or occasionally as stand-ins for rare antisera
- Very useful in their ability to detect and differentiate various forms of polyagglutination
- *Glycine soja*
- *Arachis hypogaea*
- *Salvias*



T-Activation/Polyagglutination



	Polyagglutination Category										
Lectin	T	Tk	Th	Tx	Tn	Cad	NOR	VA	HEMPAS	HBM _{Hyde Park}	Acq-B
<i>Arachis hypogaea</i>	+	+	+	+	0	0	0	0	0	w	+/-0
<i>Glycine soja/max</i>	+	0	0	0	+	0	0	0	0	+	0
<i>Salvia sclerea</i>	0	0	0	0	+	0	0	0	0	0	0
<i>Salvia horminum</i>	0	0	0	0	+	+	0	0	0	w	0
<i>Dolichos biflorus*</i>	0	0	0	0	+	+	0	0	0	0	w/0
<i>BSII</i>	0	+	0	0	0	0	0	0	0	+	0
<i>Vicia cretica</i>	+	0	+	0	0	0	0	0	0	w	0
<i>Helix pomatia</i>	+	0	/	/	+	+	0	+	+	+	+

* normal group A1 cells will be reactive, w = weak, / = not tested

Transfusion Considerations

- Most likely to encounter acquired polyagglutination
- Common belief that patients had worsening hemolysis after transfusion
 - Fueled belief that anti-T was pathogenic
- Led to the belief that transfusion of any plasma products was bad
 - Fear of triggering or making hemolysis worse
- Practice of washed RBCs and platelets
- Blood centers would screen blood donors for anti-T levels to identify “low T” plasma

Patient History

First Facility

- After several days of viral upper respiratory infection symptoms and fevers, a 2-year-old patient presented in the ER with moderate respiratory distress, tachycardia, tachypnea, and hypoxemia
- Patient was admitted on 1/1/2026 due to acute hypoxemic respiratory failure.
 - Patient was sedated, intubated, and mechanically ventilated
- CT showed right upper lobe consolidation
- PCR panel positive for influenza A, *Moraxella catarrhalis*, and *Streptococcus pneumoniae*
- She had scant urine output and became completely anuric.
- Labs showed:
 - Elevated inflammatory markers
 - Pancytopenia

Patient History

Second Facility

- Patient was transferred to the Kansas City area
- Diagnosis:
 - Acute hypoxemic failure in the setting of lower respiratory tract infection
 - Septic shock secondary to *S. pneumoniae*
 - Anuric kidney failure secondary to suspected hemolytic uremic syndrome (HUS)
- Lab Results:
 - Anemia
 - Thrombocytopenia
 - Azotemia
 - Markedly elevated serum creatinine
- Due to suspected HUS due to *S. Pneumoniae* T-activation

IRL Testing-Initial

- ABORH: O Positive
- DAT: Positive
 - Polyspecific: micro
 - IgG: negative
 - C3: micro
- Eluate: the hospital did not want an eluate performed as only submitted for polyagglutination testing

IRL Testing

Adult Donor Plasma

Antibody Screen of Pooled
Plasma Donors

	I	II	III
5'RT	0	0	0
PEG IAT	(0)✓	(0)✓	(0)✓

Testing of donor plasma against
patient red cells

Donor Plasma	5'RT
1	1+
2	2+
3	1+
4	1+
5	3+
6	1+
7	1+
Autocontrol	0

Cord Plasma

- Testing of 2-4 cord plasma with negative antibody screens

Antibody Screen of pooled cord plasma

	I	II	III
5'RT	0	0	0
PEG IAT	(0)✓	(0)✓	(0)✓

Cord plasma vs. patient red cells

Cord Plasma	5'RT
1	0
2	0
3	0

Lectin Panel

Lectin	Polyagglutination Category											Patient Results
	T	Tk	Th	Tx	Tn	Cad	NOR	VA	HEMPAS	HBM _{Mayde} Park	Acq-B	
<i>Arachis hypogaea</i>	+	+	+	+	0	0	0	0	0	w	+/0	4+
<i>Glycine soja/max</i>	+	0	0	0	+	0	0	0	0	+	0	4+
<i>Salvia sclerea</i>	0	0	0	0	+	0	0	0	0	0	0	0
<i>Salvia horminum</i>	0	0	0	0	+	+	0	0	0	w	0	0
<i>Dolichos biflorus*</i>	0	0	0	0	+	+	0	0	0	0	w/0	0

Treatment

- Sedated
- Intubated and mechanically ventilated
- On vasoactives (initially)
- Antibiotics
- Continuous renal replacement therapy (CRRT)
- Washed blood products
- 2 Therapeutic Plasma Exchanges (TPE)

Further Questions

- Are washed products necessary?
- After the initial polyagglutination testing, is there more follow-up testing we should do
 - Repeat testing, if so, how often?
 - Titration?



Thank you!