Managing Patients with Antibodies

Melanie Tokessy MLT3

Objectives

- Determine the risks associated with transfusing patients who have developed antibodies
- Assess the complications associated with a patient who has developed antibodies in the chronically transfused patient and consider the best approach to managing

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Disclosure

Faculty: Melanie Tokessy, Eastern Ontario Laboratory Association (EORLA)

Relationship with commercial interests: None

Potentials for conflict of interests: None

Risks of Transfusion – Non Infectious

• Minor Allergic	1 in 100
• TACO	1 in 100
• Febrile	1 in 300
• Delayed Hemolytic	1 in 7,000
• TRALI	1 in 12,000
• ABO-incompatible	1 in 40,000
• Serious Allergic	1 in 40,000

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TM Role to Reduce Risks of Transfusion – Non Infectious

Proper Pretransfusion Testing:

- ABORh
  - ABO most important test
  - Rh second
- Antibody Screen/Identification
  - Incubation time, additives
  - Training/experience/expertise
- Blood selection
- Automation/Barcoding

Patients with Alloantibodies

Varies widely due to:

- Disease of patient
- History of transfusion/pregnancy
- Antigen frequencies of patients vs donors

Estimation:

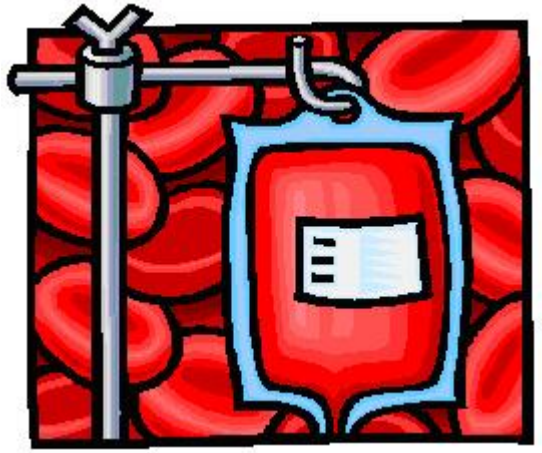
- 1-2% general population
- 5% multi-transfused
- 20% in transfusion dependent diseases

Patients with Alloantibodies

- Results in delay
  - Antibody workup
  - Finding Ag neg RBC
- HDFNB
  - Anemia
  - Increase bilirubin
- Hemolytic transfusion reactions
  - Decreased cell survival
  - By-products of hemolysis

Patient: DL

- 68y, male
- Liver Failure
- Specimen submitted for 2 PRBC
- History: 2 PRBC transfused 2 weeks ago
  - A positive
  - ABSC: negative
- Hgb today: 80 g/l



Patient: DL

Patient	Anti-A	Anti-B	Anti-D	A_1 Cells	B Cells	Inter.
DL	4+	0	4+	0	3+	A pos

	SI	SII	SIII	Inter.
DL	2+	1+	0	Positive

- Patient booked today in MDU
- Physician is keen to transfuse because the patient has been feeling “sluggish” and tired since last transfusion

Patient: DL

Cell	D	C	c	E	e	K	k	Fy^a	Fy^b	Jk^a	Jk^b	M	N	S	s	SP
1	+	+	0	0	+	0	+	+	0	+	0	0	+	0	+	2+
2	+	+	0	0	+	+	+	+	+	+	+	0	+	0	+	1+
3	+	0	+	+	0	0	+	0	+	0	+	0	+	+	0	0
4	+	0	+	0	+	0	+	0	0	+	0	+	+	+	+	2+
5	0	+	+	0	+	0	+	0	+	0	+	+	0	0	+	0
6	0	0	+	+	+	0	+	+	+	0	+	+	+	+	0	0
7	0	0	+	0	+	0	+	+	0	0	+	+	+	+	+	0
8	0	0	+	0	+	+	+	0	+	+	0	+	+	0	+	2+
9	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	1+
10	0	0	+	0	+	0	+	+	+	+	+	+	0	+	0	1+
11	0	0	+	0	+	0	+	+	0	+	0	+	+	0	+	2+
12	+	+	0	0	+	0	+	0	+	0	+	+	0	+	+	0
AC																1+

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Patient: DL

Cell	D	C	c	E	e	K	k	Fy^a	Fy^b	Jk^a	Jk^b	M	N	S	s	SP
1	+	+	0	0	+	0	+	+	0	+	0	0	+	0	+	2+
2	+	+	0	0	+	+	+	+	+	+	+	0	+	0	+	1+
3	+	0	+	+	0	0	+	0	+	0	+	0	+	+	0	0
4	+	0	+	0	+	0	+	0	0	+	0	+	+	+	+	2+
5	0	+	+	0	+	0	+	0	+	0	+	+	0	0	+	0
6	0	0	+	+	+	0	+	+	+	0	+	+	+	+	0	0
7	0	0	+	0	+	0	+	+	0	0	+	+	+	+	+	0
8	0	0	+	0	+	+	+	0	+	+	0	+	+	0	+	2+
9	0	0	+	0	+	0	+	0	+	+	+	0	+	+	+	1+
10	0	0	+	0	+	0	+	+	+	+	+	+	0	+	0	1+
11	0	0	+	0	+	0	+	+	0	+	0	+	+	0	+	2+
12	+	+	0	0	+	0	+	0	+	0	+	+	0	+	+	0
AC																1+

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Patient: DL

Next steps to testing:

- Further exclusions
  - selected cells
- Crossmatch Jka- units
  - 23% compatibility
  - Full IAT crossmatch
- Direct Antiglobulin Test
- Eluate

Patient: DL

Cell	D	C	c	E	e	K	k	Fy^a	Fy^b	Jk^a	Jk^b	M	N	S	s	Peg IAT
2a	+	+	0	0	+	+	+	+	0	0	+	0	+	0	+	$0^{\surd}$
4a	+	0	+	+	0	0	+	+	+	0	+	0	+	0	+	$0^{\surd}$
9a	0	0	+	0	+	+	+	0	+	0	+	0	+	+	0	$0^{\surd}$
10a	+	0	+	0	+	0	+	0	0	+	0	+	+	+	+	2+

	Poly	Poly 5’	6% alb	-IgG	$-C_3$	$-C_3$ 5’
DL	2+	1+	0	2+	1+	1+

Cell	D	C	c	E	e	K	k	Fy^a	Fy^b	Jk^a	Jk^b	M	N	S	s	Elu	LW
1	+	+	0	0	+	0	+	+	0	+	+	0	+	0	+	2+	$0^{\surd}$
2	+	+	0	0	+	+	+	+	+	0	+	0	+	0	+	$0^{\surd}$	$0^{\surd}$
3	+	0	+	+	0	0	+	0	+	0	+	0	+	+	0	$0^{\surd}$	$0^{\surd}$
4	+	0	+	0	+	0	+	0	0	+	0	+	+	+	+	2+	$0^{\surd}$

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Patient: DL

- Antigen type pretransfusion specimen
- Repeat pretransfusion antibody screen
- Jka type transfused segments if available

Patient: DL Pretransfusion

Cell	Anti-Jk^{a} Imm25966
DL Pretransfusion	0
C055515485810	3+
C055515492321	0
Jk(a+b+) Positive	3+
Jk(a-b+) Negative	0

	SI	SII	SIII
DL Solid Phase	0	0	0
DL PegIAT	$0^{\surd}$	$0^{\surd}$	$0^{\surd}$

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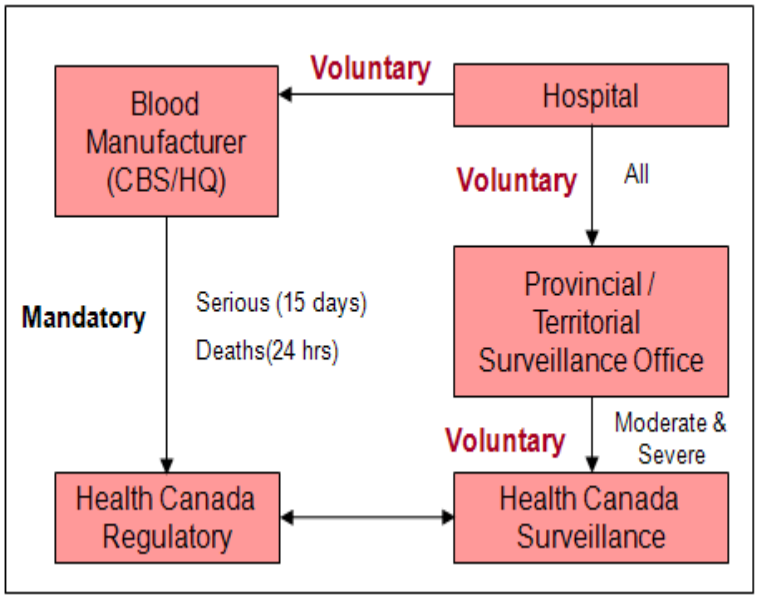
Patient: DL
Final Steps

- Keep 2 units on hold when patient in-house
- Antibody card
  - Mailed to patient with letter
- Report TTISS
  - Delayed serological transfusion reaction



Managing Patients with Antibodies

- Most are straight forward and routine
  - But still must be done well and timely
- Sometimes complex and difficult
  - Challenging
  - Rewarding
  - Time consuming: delays
  - Know when to refer out: CBS

Chronically Transfusion Patients

- Oncology
- Heme-Onc
  - Leukemia
  - Auto immune
- Thalassemia
- Sickle Cell Anemia

Transfusion Support of Sickle Cell Patients

- Leukoreduced
  - Universal in Canada
- “Fresh” units
  - <10 days old
  - Last longer?
- Sickle trait negative
  - Trait RBCs function normally
  - May cause problems with post measurement of HbS

Transfusion Support of Sickle Cell Patients

- High rate of alloimmunization
  - 19-37% patients
- Racial disparity between donor base and patient population
  - Differences in antigens expressed on RBC
- Higher rate of transfusion
- Most common allo antibodies: Rh (-C, -E) and Kell (-K)

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Antigen Matching to Reduce Alloimmunization

- Phenotype all identified sickle cell patients
  - C, c, E, e, K, k, Fya, Fyb, Jka, Jkb, S, s
- Genotype when possible
  - CBS
  - Large centres
- Prophylactically crossmatch to match for Rh and Kell

Antigen Matching to Reduce Alloimmunization

- Full phenotype match for sickle cell patients with one or more allo antibody:
  - Neg for antigen(s) identified
  - C, c, E, e, K, e, Fya, Fyb, Jk Jkb, S, s
  - Challenging to meet
  - Ok to “drop” some antigens
  - GATA box mutation? Drop Fyb neg requirement

O Negative (mis)Use

- Rh positive sickle cell patients
  - Commonly $R_o r$ (ccDee)
  - Crossmatch C-E-
- Rh positive donors
  - 70% C+/30% E+
- Easy to crossmatch Rh neg
  - Most Rh neg C- E-

O Negative Utilization

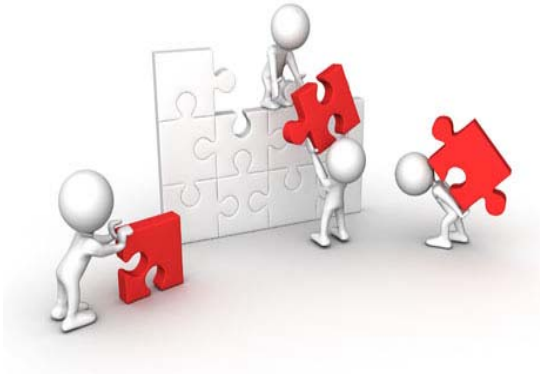
- High ranking for TOH-General
  - No O negative wastage/discard
- Review of O negative to non-O negative recipients:
- 2013: 49% O neg to non-O neg
  - Sickle Cell: 44% (444 units)
  - Antibodies: 21% (211 units)

O Negative Utilization

- Stricter O negative crossmatching strategies
  - Perform in house phenotyping for common antigen typing
  - Discussion with CBS: increase typing of non-O negative donors
- 2014: 24% vs 44%
  - Sickle Cells: 47% (289 units vs 444)
  - Antibodies: 21% (130 units vs 211)

Managing Patient with Special Requirements

- Communication
  - Clinical
  - CBS
  - TM staff
- Assess your patient population
  - Hematological vs trauma
  - Sickle cell
- Don’t always rely on O negative donor units for special typing



Thank you!


My Blood type is
BE NEGATIVE