

Rode Kruis
Vlaanderen

From Rescue to Risk

The Immunological Cost of Transfusion for Transplant Candidates

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The Immunological Cost of Transfusion for Transplant Candidates

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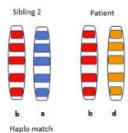
Introduction

Problem



HLA immunisation after transfusion

remains clinically relevant despite systematic leukodepletion of blood products



HLA-mismatched & haplo-identical transplants are increasing,

amplifying the risk exposure



Current transfusion programs

focus almost exclusively on anemia (in preoperative/pregnancy context)

Gap



Transfusion-related HLA immunization risk is rarely addressed, despite its clear clinical relevance for:

- Solid organ transplantation (SOT)
- Mismatched Hematopoietic Stem Cell Transplantation (HSCT)
- Haplo-identical HSCT

3 clinical case reports

Case 1

SOT – Age 5

**Planned kidney
transplantation could
not proceed**

Case 2

HSCT – Age 72

**HSCT for
hematological
malignancy performed
with increased
immunological risk**

Case 3

HSCT – Age 60

**No allotransplantation
possible for acute
lymphoblastic
leukemia**



Case 1



SOT – Age 5

**Planned kidney
transplantation could
not proceed**

Case 1

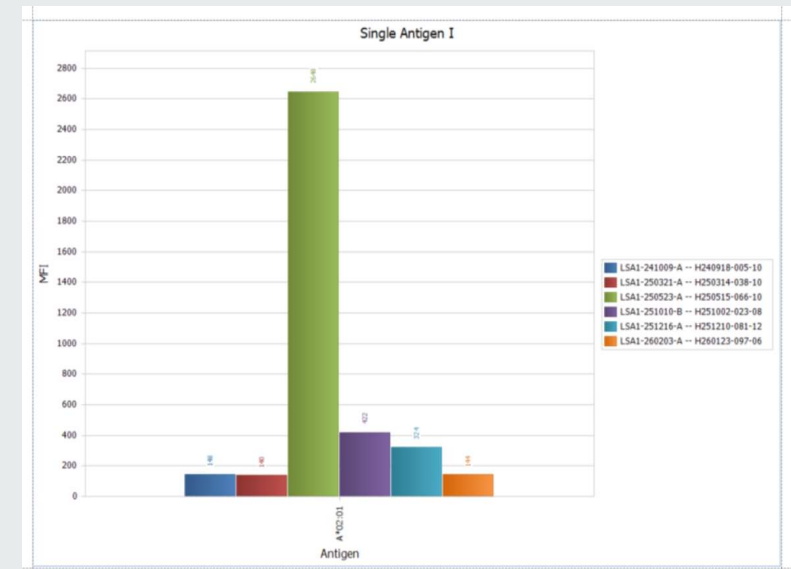
SOT – Boy
Age 5

In need of kidney
transplant

March 2025

- Jan & March 2025 – No HLA antibodies* detectable on available living-donor kidney
- March 2025 nefrectomy with 3 platelet transfusions (2 x pooled platelets, 1x one-donor platelets)
- **newly developed HLA antibodies:**
anti-HLA A2, A68, A69 and A24
- Living donor was **HLA*A2**
- Clinical outcome: **planned living-donor transplant had to be cancelled**

*HLA antibody detection: Luminex-based Single Antigen Bead (SAB) assay — LIFECODES®, Werfen
(anti-HLA-A, -B, -C, -DR, -DQ, -DP)



Case 2

HSCT – Age 72

**HSCT for
hematological
malignancy performed
with increased
immunological risk**

Case 2

HSCT – Woman
Age 72

hematological
malignancy
-
candidate receptor for
HSCT

April 2025

- Dec 2024 – search in worldwide database of candidate HSC donors
 - no 10/10 matched unrelated donor (MUD)
 - search broadened: selection of a 9/10 mismatched unrelated donor (MMUD)
- Jan 2025 – screening HLA antibodies (Ab):
 - present at low level and limited specificities
 - **low level** donor specific HLA-antibodies (**DSA**) anti-HLA A*24:02 (MFI 663)
 - => **do not preclude a HSCT transplant**
 - HLA immunisation history: unknown, HLA immunisation after childbirth?
- Apr 1st – same HLA Ab pattern
- Planned on Apr 9th – HSTC transplant

Positive CON MFI:		Negative CON MFI:		Analysis Mode:					
20223		180				Manual			
Bead	Raw Value	BCM	BCR	AD-BCR	Assignment	A	B	C	Bw
136	7954	7704	66.99	37.76	Positive		B*08:01		Bw6
106	3361	3108	23.55	16.93	Positive	A*02:02			
108	3209	2909	22.04	16.37	Positive	A*02:03			
107	3028	2745	20.80	13.88	Positive	A*02:03			
104	2990	2740	20.76	16.55	Positive	A*02:01			
146	2449	2247	19.53	11.41	Positive		B*15:18		Bw6
174	1984	1761	15.31	9.54	Positive		B*57:01		Bw4
175	1442	1165	10.13	7.98	Positive		B*58:01		Bw4
130	1423	1211	9.17	6.18	Positive	A*68:02			
129	1310	1119	8.47	5.77	Positive	A*68:01			
158	1289	1037	9.02	5.90	Positive		B*41:01		Bw6
131	1270	977	7.40	6.54	Positive	A*69:01			
103	1146	926	7.02	5.10	Positive	A*01:01			
125	1030	778	5.89	3.74	Weak	A*36:01			
167	672	448	3.90	2.40	Negative		B*50:01		Bw6
113	663	400	3.03	2.00	Negative	A*24:02			Bw4
114	660	355	2.69	1.66	Negative	A*24:03			Bw4
166	545	345	3.00	1.74	Negative		B*49:01		Bw4
159	492	185	1.61	1.12	Negative		B*42:01		Bw6
151	490	217	1.89	1.34	Negative		B*39:01		Bw6
170	470	239	2.07	1.49	Negative		B*53:01		Bw4
110	460	276	2.09	1.28	Negative	A*11:01			
111	451	208	1.58	0.92	Negative	A*11:02			
161	443	82	0.71	0.43	Negative		B*44:03		Bw4
145	430	172	1.50	0.91	Negative		B*15:16		Bw4
144	421	175	1.52	0.96	Negative		B*15:13		Bw4

Case 2

HSCT – Woman
Age 72

hematological
malignancy
-
candidate receptor for
HSCT

April 2025

- HSCT planned on Apr 9th was delayed
- April 2025: patient **received multiple transfusions**
 - April 13th – R/Erythrocyte concentrate (ECL)
 - April 15th – R/ECL
 - April 17th – R/ECL
 - April 20th – R/ platelet concentrate (**PLC**)
 - following which the patient developed a **transfusion reaction (fever and chills)**
 - **April 22th – check HLA antibodies**
 - investigation febrile transfusion reaction and
 - refractoriness to platelet transfusions

Case 2

HSCT – Woman
Age 72

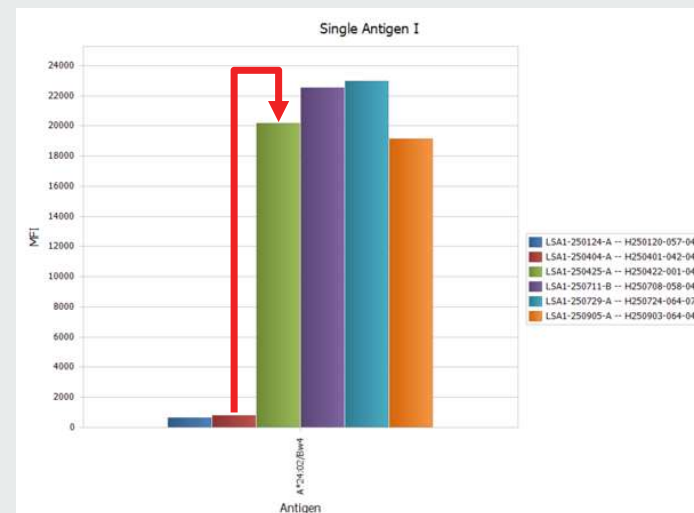
hematological
malignancy
-
candidate receptor for
HSCT

April 2025

- **Result: HLA antibodies boosted spectacularly**
- **Patient became highly sensitised with DSA anti-HLA A*24:02 MFI >20 000**

Positive CON MFI: 20155 Negative CON MFI: 149 Analysis Mode: Manual

Bead	Raw Value	BCM	BCR	AD-BCR	Assignment	A	B	C	Bw
107	21220	21013	151.17	100.92	Positive	A*02:03			
106	21043	20864	150.10	96.22	Positive	A*02:02			
108	21024	20822	149.80	107.69	Positive	A*02:05			
104	20909	20720	149.06	102.59	Positive	A*02:01			
125	20852	20642	148.50	85.20	Positive	A*36:01			
110	20643	20497	147.46	89.32	Positive	A*11:01			
129	20622	20472	147.28	97.28	Positive	A*68:01			
130	20551	20394	146.72	95.96	Positive	A*68:02			
111	20527	20350	146.40	85.51	Positive	A*11:02			
103	20489	20315	146.15	95.59	Positive	A*01:01			
113	20210	20005	143.92	91.38	Positive	A*24:02			Bw4
174	19976	19812	146.76	96.93	Positive		B*57:01		Bw4
131	19975	19737	141.99	123.79	Positive	A*69:01			
109	19923	19764	142.19	86.12	Positive	A*03:01			
175	19872	19681	145.79	109.61	Positive		B*58:01		Bw4
114	19852	19622	141.17	86.29	Positive	A*24:03			Bw4
166	18826	18667	138.27	77.29	Positive		B*49:01		Bw4
167	18112	17941	132.90	76.91	Positive		B*50:01		Bw6



Case 2

HSCT – Woman
Age 72

hematological
malignancy
-
candidate receptor for
HSCT

April 2025

- HSCT was postponed until July 16th
 - July 8th – peri-transplant bilan: DSA anti-A*24:02 MFI 23 000
 - Nevertheless HSCT went ahead
 - Clinical outcome: **high risk transplant with acute graft failure**
- New HSCT with haplo-identical daughter planned on Sept 17th
- Sept 10th 2025 – Patient died before the second HSCT



Case 3



HSCT – Age 60

**No allotransplantation
possible for acute
lymphoblastic
leukemia**

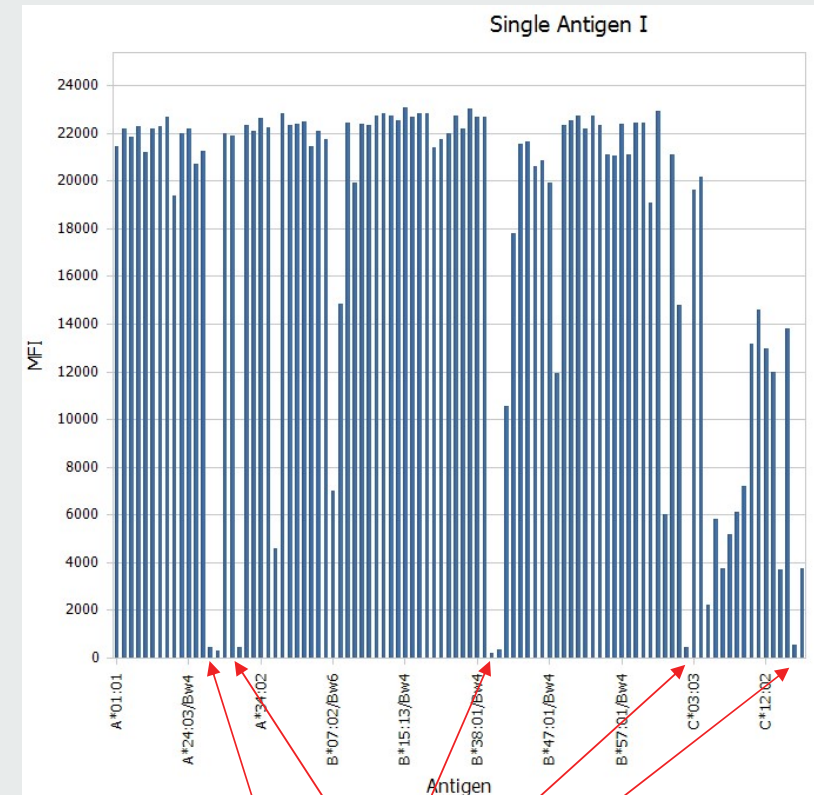
Case 3

HSCT – Male
Age 60

Acute lymphoblastic
leukemia

May 2025

- **May 2025: transfusions of 3 PLC and 1 ECL**
 - > patient became highly immunised
 - > complete HLA class I immunization (except own HLA type*)
 - > MFI's up to 23 000
- **HLA antibodies status prior the immunising event: unknown**



*HLA type patient A*32, A*29, B*40, C*02, C*17

Case 3

HSCT – Age 60

**Acute lymphoblastic
leukemia**

May 2025

- **High and broad immunisation suggests a boost reaction after a primary immunising event**
- **Upon further enquiry, it appears that the patient had previously received a large amount of blood following a serious injury**
- **Clinical outcome:**
 - > **haplo-HSCT and 9/10 MMUD was no longer an option**

CONCLUSION & IMPLICATIONS

Underrecognised Risk

Transfusion-related HLA immunization is a critical, underrecognized issue in current transfusion strategies with **direct impact on transplant access**.

Awareness Needed

Physicians **prescribing transfusions** for **transplant candidates** must **weigh HLA immunization risk**. **Post-transfusion follow-up** is essential.

Transplant-Oriented transfusion policies

Call for integrating **transplant-specific transfusion policies** with explicit attention for **prevention of allo-HLA immunization**.

An **appropriate transfusion policy** can

1. preserve pre-transplant donor access
2. facilitate compatible donor selection peri-transplant
3. mitigate immunological risk post-transplant



Questions?