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Quick Response Code:

Website: www.ajts.org

DOI: 10.4103/ajts.AJTS_88_19

Immuno-hematological consequence of intravenous drug abuse?

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Abstract:

Intravenous (IV) drug abuse has been well established to be the source of transfer of infections, such as HIV, hepatitis C virus, and hepatitis B virus. However, often overlooked fact is that IV drug abusers have a potential for developing alloimmunization due to universal practice of flushing/washing out the syringe by own blood to rinse out the drug in the syringe. We present here a case of a 28-year-old man who presented with a rather unique predicament of having developed four different alloantibodies after exposure to allogenic blood through IV drug abuse. This case was detected promptly due to routine usage of type and screen policy for all the patients receiving transfusion. Such screening for atypical antibodies must be instituted to preemptively identify these antibodies and arrange compatible blood, which could have been difficult otherwise, at short notice during routine crossmatch. This is the first of its kind case ever reported from India and has no precedence.

Keywords:

Alloimmunization, intravenous drug abuse, select cells

Introduction

Intravenous (IV) drug abuse has been well established to be the source of transfer of infections, such as HIV, hepatitis C virus, and hepatitis B virus. However, often overlooked fact is that IV drug abusers have a potential for developing alloimmunization due to universal practice of flushing/washing out the syringe by own blood to rinse out the drug in the syringe. The blood left in the syringe and needle that can be passed to the next user has been estimated to be an average of 33 μL ranging from 1.2 to 260 μL.[1] This contamination of allogenic blood can lead to the development of alloantibodies against various blood group systems. There have been few cases in the literature to our knowledge where alloimmunization has been studied in IV drug abusers, but majority of these studies have been restricted to pregnant females.[2-4]

We present here a case of a 28-year-old man who presented with a rather unique predicament of having developed four different alloantibodies after exposure to allogenic blood through IV drug abuse. To the best of our knowledge and literature search, this is the first of its kind case ever reported from India and has no precedence.

Case Report

We present a case of a 28-year-old male who presented to the Emergency Department of Christian Medical College diagnosed with ruptured popliteal artery after a failed attempt to inject heroin IV. The patient had been injecting himself in the cubital vessels for the last 3–4 years and had recently shifted to popliteal vessels as he "could no longer find the cubital vessels."

Immuno-hematology laboratory received the patient's sample for providing

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Submitted: 21-08-2019
Accepted: 19-02-2020
Published: 24-07-2020

How to cite this article: Jindal A, Luther A, Tiwari AK, Mahajan A, Mitra S. Immuno-hematological consequence of intravenous drug abuse? Asian J Transfus Sci 2020;14:67-9.

compatible red cell units and underwent testing as per the routine type and screen policy. All procedures were performed as per the departmental standard operating procedure, and the reagent manufacturer's instructions were followed.

Blood grouping and irregular antibody screening

On blood grouping, the patient was B Rh (D)-negative with positive reaction with both A1 cells and B cells suggesting ABO discrepancy. The patient was further tested and found to be C−c+E−e+K+. Using column agglutination technology, the patient's plasma was screened for irregular antibodies using commercially available three cell reagent panel (Surgiscreen, Ortho Clinical Diagnostics, USA, Lot No. 3SS580), which showed the following agglutination in Screening Cells I (4+), Screening Cells II (4+), and Screening Cells III (Neg), respectively. Antigram is shown in Table 1. The ABO discrepancy was classified as type IV. The patient sample was direct antiglobulin test negative and auto control was negative.

Antibody identification

Eleven-cell identification panel "Resolve Panel A (Ortho Clinical Diagnostics, Johnson and Johnson, USA, Lot No. RA101)" showed positive reactions with cells 1, 2, 3, 4, 5, 6, 8, 9, 10, and 11 with varying strengths of reaction, which was suggestive of antibody against D, C, Le^b, and S antigens. Anti-E could not be ruled out. Antigram is in Table 2.

Random crossmatch

Randomized crossmatch was done with 18 B Rh-negative donor units, of which three units was found to be compatible.

Due to nonavailability of rare antisera with us, the sample was then sent to a regional reference laboratory for further testing and confirmation of the offending antibodies.

Selected cells

Four selected cells [Table 3] from Resolve Panel B (Ortho Clinical Diagnostics, Johnson and Johnson, USA, Lot No. RB481 and RB513) were used to confirm the presence of Anti-C, Anti-S, and Anti-Le^b alloantibody and to rule out Anti-E . Further, enzyme-treated cells 6, 9, and 10 (all D0 C0) of Panel A decreased agglutination reaction strength confirmed anti-S as shown in Table 2. The respective antibody titers are detailed in Table 4. The positive reaction in three antigen-positive cells and the negative reaction in three antigen-negative cells, respectively, confirmed the antibodies [Table 5].

The blood units that were transfused after random crossmatch were indeed negative for antigens D, C, Leb and S.

Discussion

The IV drug abuse is prevalent in today's youth in Northwestern India, especially in the states of Punjab and Haryana. Apart from being a medium for the transmission of various blood-borne infections, it has also led to emergence of previously rarely seen phenomenon – alloantibodies in previously nontransfused patients. Alloantibodies have been found often in multitransfused patients such as thalassemia and patients suffering from leukemia, lymphoma, etc. This patient had developed multiple alloantibodies despite

Table 1: Antigram of 3-cell panel (Surgiscreen, Ortho Clinical Diagnostics, USA), Lot number 3SS580

3SS580	D	C	E	c	e	f	C^w	V	K	K	Kp^a	Kp^b	Js^a	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Xg^a	Le^a	Le^b	S	s	M	N	P1	Lu^a	Lu^b	AHG
1	+	+	0	0	+	0	0	0	0	+	0	+	0	+	0	+	0	+	+	0	+	+	0	+	0	+	0	+	4+
2	+	0	+	+	0	0	0	0	+	+	0	+	0	+	+	0	0	+	0	0	+	+	+	+	+	+	0	+	4+
3	0	0	0	+	+	+	0	0	0	+	0	+	0	+	0	+	+	0	0	+	0	0	+	+	+	0	0	+	0

AHG=Anti human globulin, +=positive

Table 2: Antigram of 11-cell panel (Surgiscreen, Ortho Clinical Diagnostics, USA), Lot number RA101

RA101	D	C	E	c	e	f	C^w	V	K	K	Kp^a	Kp^b	Js^a	Js^b	Fy^a	Fy^b	Jk^a	Jk^b	Xg^a	Le^a	Le^b	S	s	M	N	P1	Lu^a	Lu^b	RT	AHG	Papain
1	+	+	0	0	+	0	+	0	0	+	0	+	/	+	0	+	+	+	+	0	+	0	+	+	0	0	0	+	4+	4+	NT
2	+	+	0	0	+	0	0	0	0	+	0	+	0	+	+	+	+	0	0	+	0	+	0	+	0	+	0	+	4+	4+	NT
3	+	0	+	+	0	0	0	0	0	+	0	+	/	+	+	+	0	+	0	0	+	0	+	+	+	+	0	+	4+	4+	NT
4	+	0	0	+	+	+	0	+	0	+	0	+	0	+	0	0	+	+	0	0	0	0	+	+	+	+	0	+	4+	4+	NT
5	0	+	0	+	+	+	0	0	0	+	0	+	0	+	+	+	+	+	+	0	+	0	+	+	+	0	0	+	4+	4+	NT
6	0	0	+	+	+	+	0	0	+	+	0	+	/	+	0	+	+	+	+	0	+	+	+	+	0	+	0	+	2+	3+	1+
7	0	0	0	+	+	+	0	0	+	+	0	+	/	+	0	+	0	+	+	+	0	0	+	+	0	+	0	+	0	0	NT
8	0	0	0	+	+	+	0	0	0	+	0	+	/	+	+	0	+	0	+	0	+	+	0	+	+	+	0	+	2+	3+	NT
9	0	0	0	+	+	+	0	0	0	+	0	+	/	+	+	0	0	+	+	0	+	+	+	0	+	+	0	+	1+	3+	1+
10	0	0	0	+	+	+	0	0	0	+	0	+	0	+	+	+	+	0	+	0	0	+	0	+	0	+	0	+	2+	3+	0.5+
11	+	+	0	0	+	0	0	0	+	+	0	+	/	+	0	+	+	0	+	0	+	0	+	0	+	+	0	+	4+	4+	NT
																												A/C	0	0	

AHG=Anti human globulin, NT=Not tested, RT=Room temperature, A/C=Auto control

Table 3: Select cells used to confirm the presence or absence of antibodies

Lot number	Cell number	D	C	E	Le^b	S	AHG	Remarks
RB481	21	0	+	0	0	0	3+	Anti C confirmed
RB513	14	0	0	0	0	+	3+	Anti S confirmed
RB513	15	0	0	0	+	0	3+	Anti Le^b confirmed
RB513	21	0	0	+	0	0	0	Anti E ruled out

AHG=Anti human globulin

Table 4: Antibody types and titres

Antibody	Type of antibody	Titre
Anti-D	IgG	32
Anti-C	IgG	16
AntiLe^b	IgG	8
Anti-S	IgG	8

Table 5: Rule of three

Antibody	3 antigen-positive cells are reactive						3 antigen-negative cells are nonreactive					
	1		2		3		1		2		3	
	Lot number	Cell number	Lot number	Cell number	Lot number	Cell number	Lot number	Cell number	Lot number	Cell number	Lot number	Cell number
Anti-D	3SS580	2	RA101	1	RA101	4	3SS580	3	RA101	7	RB513	21
Anti-C	3SS580	1	RA101	5	RB481	21	3SS580	3	RA101	7	RB513	21
Anti-Le^b	3SS580	2	RA101	3	RB513	15	3SS580	3	RA101	7	RB513	21
Anti-S	3SS580	1	RA101	10	RB513	14	3SS580	3	RA101	7	RB513	21

having no history of transfusion due to admitted use of IV drugs using shared needle. The habit of flushing out the adherent IV drug from the syringe by flushing the syringe by withdrawing his own blood into the syringe and then pushing it back in the body, a technique used by all his friends, had exposed him to the antigens of other drug abusers. This case was detected promptly due to the routine usage of type and screen policy for all the patients receiving transfusion. Such screening for atypical antibodies must be instituted to preemptively identify these antibodies and arrange compatible blood, which could have been difficult otherwise, at short notice during routine crossmatch. The role of the reference laboratory has been an illuminating one. With access to extensive repertoire of selected cells, rare antisera, and enzyme treatment along with advanced immuno-hematological tools, the reference laboratories can provide support in difficult and tricky cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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