

Diego^a Antigen Frequency and Anti-Diego^a Frequency in a South Texas Community

CHRISTINA THOMPSON

OBJECTIVE: The objective of this study was to determine the percent of the donor population in a South Texas community positive for the red cell antigen Diego^a (Di^a) and to determine the percent of anti-Di^a in previously transfused patients.

DESIGN: Donor segments from 270 type A and type O donors were typed with anti-Di^a and 305 previously transfused patients were screened for anti-Di^a.

SETTING: The study was conducted using donor segments from units collected by the South Texas Blood Center and blood samples from patients in three hospitals in Corpus Christi TX.

PATIENTS OR OTHER PARTICIPANTS: The typing serum was from a type A donor, so only A and O donors were used for the antigen typing. The sera used for the antibody screens were from patients with previous transfusions in the local hospitals. Duplicate samples were eliminated.

RESULTS: Of the 270 type A and O donors, seven (2.6%) were found to be Di^a positive and four (1.3%) of the 305 previously transfused patients had anti-Di^a.

CONCLUSIONS: In 1985, red blood cell antigen typing of Mexican American blood donors in the Corpus Christi area revealed a Di^a antigen frequency of 14.7% with eight percent in Mexican American blood donors from two other areas of Texas. With an Hispanic population of 50.4%, it was expected that four percent to seven percent of the donor population would be positive for the antigen. The finding of only 2.6% Di^a positive donors demonstrates about a 20% Mexican American donor population. Anti-Di^a was found in 1.3%

of the plasma samples from previously transfused patients. These results would indicate a 0.03% to 0.05% transfusion incompatibility in patients with a negative antibody screen for the Corpus Christi area. Areas of the United States with a higher percent Mexican American donor population would expect a higher percent incompatibility. Since the Mexican American population is increasing in South Texas and several other areas in the United States, the antibody may become increasingly important in transfusion therapy and as a cause of hemolytic disease of the newborn.

ABBREVIATIONS: Di = Diego; RPM = revolutions per minute.

INDEX TERMS: antibodies; antigens; blood group; genetics; immunology; isoantigens.

Clin Lab Sci 2006;19(4):203

Christina Thompson is of Texas A&M University-Corpus Christi, Corpus Christi TX.

Address for correspondence: Christina Thompson EdD CLS(NCA), Texas A&M University-Corpus Christi, 6800 Ocean Drive, Corpus Christi TX 78412. (361) 825-2473, (361) 825-3719 (fax). cthomp@falcon.tamucc.edu.

The Diego (Di) blood group system was established in 1967 after the discovery of anti-Di^b. Anti-Di^a was previously described as the cause of hemolytic disease of the newborn from the serum of a Venezuelan female in 1956.¹ Often referred to as the "Mongolian antigen", the Di^a antigen is present in eight percent of Asian populations with Mongolian ancestry. The antigen has also been found in 20% to 40% of Mexican Indians.^{2,3} In the United States, Di^b is a high frequency antigen found in 99.9% of the population and Di^a is a low frequency antigen rarely found in the Caucasian and Black population. However, an increased incidence of the antigen is found in the Native American and Mexican American population.¹ In 1985, Edwards-Moulds and Alperin⁴ typed 1685 Mexican American blood donors from three South Texas communities for Di^a. They found an antigen frequency of 14.7% in Corpus Christi, 8.2% in Galveston, and 8.9% in McAllen.

The peer-reviewed Clinical Practice Section seeks to publish case studies, reports, and articles that are immediately useful, are of a practical nature, or contain information that could lead to improvement in the quality of the clinical laboratory's contribution to patient care, including brief reviews of books, computer programs, audiovisual materials, or other materials of interest to readers. Direct all inquiries to Bernadette Rodak MS CLS(NCA), Clin Lab Sci Clinical Practice Editor, Clinical Laboratory Science Program, Indiana University, Clarian Pathology Laboratory, 350 West 11th Street, 6002F, Indianapolis IN 46202. brodak@iupui.edu

Since commercial antibody screening cells do not contain the Di^a antigen, the purpose of this study was to determine the need for adding a Di^a positive cell to the routine antibody screen. Patient exposure to Di^a antigen in the Corpus Christi area was assessed by the determination of the percent of the normal donor population positive for Di^a. In addition, the incidence of anti-Di^a in previously transfused patients was determined.

MATERIALS AND METHODS

Donor segments from 270 type A and O donors were obtained and tested for Di^a using anti-Di^a supplied by Immucor. The typing serum was from a group A donor and contained anti-B, therefore, B and AB donors were not used for the screening. An 0.8% cell suspension from each donor was tested using the Micro Typing Systems gel cards by Ortho-Clinical Diagnostics. IgG gel cards were labeled with donor numbers then 50 microliters of 0.8% suspension of donor cells and 25 microliters of anti-Di^a was added to each well. Di^a positive and Di^a negative cells were used as controls.

Plasma samples from 307 previously transfused patients were collected for antibody testing. The samples were centrifuged at 6000 revolutions per minute (RPM) for three minutes and the plasma was separated into a labeled tube and refrigerated at 2°C – 6°C until testing was performed. All samples were screened for unexpected antibodies using a commercial three cell screen. The detected antibodies were identified.

Two different Di^a positive cells provided by Immucor were washed with normal saline and then diluted with saline to a 0.8% cell suspension. The Micro Typing Systems gel cards were labeled with identification numbers for each plasma sample. Fifty microliters of each Di^a positive red cell suspensions were added to wells in the gel cards. Twenty-five microliters of each antibody negative plasma sample was added to the two cells.

All gel cards were incubated at 37°C for fifteen minutes then centrifuged at 895 RPM to 905 RPM for ten minutes using the Micro Typing Systems Centrifuge. The cards were graded on a scale of 0, 1+, 2+, 3+, 4+ and MF according to the descriptions provided by the system.

The protocol was reviewed and approved by the Institutional Review Board at Texas A&M University-Corpus Christi.

RESULTS

Of the 270 type A and O donors, seven (2.6%) were found to be Di^a antigen positive. Using the routine three cell screen,

a total of 18 unexpected antibodies were found in 12 (3.9%) of the plasma samples. When the plasma samples were tested with the two Di^a positive cells, an additional four samples (1.3%) were found with anti-Di^a. Anti-Di^a was the second most common antibody found in previously transfused patients after anti-K (Table 1).

DISCUSSION

Several reports in the literature describe hemolytic disease of the newborn and hemolytic transfusion reactions associated with Diego antibodies.⁵⁻⁸ Although the Di^a antigen is usually associated with Mongolian populations in Japan and China, the antigen is also found in eight percent to 40% of the populations with Native American ancestry.¹⁻³

In the 2000 US Census, the Corpus Christi Hispanic population was 54.3% with most identified as Mexican American. Since 14% of the Corpus Christi Mexican American donors and eight percent of Mexican American donors from two other cities in southeast Texas tested in 1985 were Di^a positive,⁴ the expected Di^a antigen positive donors would be four percent to seven percent. The current study found 2.6% Di^a positive donors, reflecting a Mexican American donor population of approximately 20%. When previously transfused patients were tested for the presence of anti-Di^a, 1.3% of the patients with negative antibody screens were found positive with both Di^a cells.

The transfusion services in the Corpus Christi routinely perform type and screen on patients for selected surgical procedures and only perform immediate spin crossmatches for antibody negative patients receiving transfusion. Only

Table 1. Unexpected antibodies found in 305 donors

Antibodies found	Number	Percent
Anti-K	6	1.9
Anti-Di ^a	4	1.3
Cold auto anti-I	3	0.9
Anti-E	3	0.9
Anti-c	2	0.6
Anti-Le ^a	1	0.3
Anti-M	1	0.3
Anti-C	1	0.3
Anti-e	1	0.3

patients with positive antibody screens are crossmatched using an antiglobulin procedure with antigen negative blood. The commercial screen cells used for the type and screen are Di^a negative. With a 2.6% to four percent Di^a positive donor population and a 1.3% antibody incidence, a 0.03% to 0.05% incompatibility would be expected in patients with a negative antibody screen. Areas of the United States with a higher percent Mexican American donor population would expect a higher percent incompatibility.

The results of this study demonstrate a relatively high frequency of anti- Di^a in previously transfused patients from an area with 20% to 54% Mexican donors. Since the Mexican American population is increasing in South Texas and several other areas in the United States, the antibody may become increasingly important. For those communities with Mexican American donors, it is recommended that antibody screens routinely include a Di^a positive cell to prevent complications in transfusion therapy and hemolytic disease of the newborn.

ACKNOWLEDGEMENTS

The author thanks Immucor for providing the typing sera and Diego^a cells, the Coastal Bend Blood Center for providing donor segments, Christus Spohn Shoreline and Corpus

Christi Medical Center for providing patient samples, Christus Spohn Shoreline for providing Micro Typing Systems gel cards, and Nellie Neal, Nicole Peters, Tim Dewees, Bettina Martinez, Carla Stanfill, Tolu Adesanya, and Christy Aguilar for technical assistance.

REFERENCES

1. Poole J. The Diego blood group system-an update. *Immunohematol* 1999;15(4):135-43.
2. Kotmatsu F, Hasegawa K, Yanagisaw Y, and others. Prevalence of diego blood group Di^a antigen in Mongolians; comparison with that in Japanese. *Transfus Apheresis Sci* 2004;30(2):119-24.
3. Mallen MS, Arias T. Inheritance of Diego blood group in Mexican Indians. *Science* 1959;130(3368):164-5.
4. Edwards-Moulds JM, Alperin JB. Studies of the Diego blood group among Mexican-Americans. *Transfusion* 1986; 26(3):234-6.
5. Hundric-Haspl Z, Balen-Marunic S, Tomasic-Susanj E and others. Anti-Diego^a red blood cell alloantibody as a possible cause of anemia in a 3-week old infant. *Archives of Medical Research* 2003;34(2):149-51.
6. Hinckley ME, Huestis DW: Case report. An immediate hemolytic transfusion reaction apparently caused by anti- Di^a . *Rev Fr Transfus Imu Hematol* 1979; 22(5):581-5.
7. Kusnierz-Alejska G, Bochenek S, Aukowska B. The first example of anti- Di^a antibody in Poland. *Mater Med Pol* 1990;22(1):15-6.
8. Kusnierz-Alejska G, Bochenek S. Haemolytic disease of the newborn due to anti- Di^a and incidence of the Di^a antigen in Poland. *Vox Sang* 1992;62:124-6.

ASCLS SIGNATURE LINE -CUSTOMIZED APPAREL-

Sport shirts * Denim shirt * T-shirts
* Sweatshirt/pants * and more!
Affordable leisure wear

American Society for
Clinical Laboratory Science
301-657-2768 www.ascls.org joanp@ascls.org



ORDER YOURS AT THE ASCLS
ONLINE STORE
www.ascls.org,
click on Education,
then click on the link to the Store