RED CELL ANTIBODIES IN POLYTRANSFUSED PATIENTS IN MANSOURA UNIVERSITY HOSPITAL DURING PERIOD (1986-1990)

By

H. R., GHONEIM AND A. A. K. IBRAHIM

From

Clinical Pathology Department, Mansoura Faculty of Medicine, Mansoura University

Received for Puplication : 10/4/1990.

INTRODUCTION

Despite advances in modern blood banking procedures and all precautions taken, a small but significant number of blood transfusions are still complicated by various kinds of adverse reactions, some patients with transfusion dependent disease becomes difficult to transfuse due to multiple blood group antibodies, also the haemolytic reactions are serious and potentially harmful to patients having these antibodies (Hu.h and Lichtiger, 1987).

Brantley and Ramsey (1988), recorded red cell alloantibodies in 9.5% and multiple antibodies in 3.7% in polytransfused patients. While Walker and Hartrick (1989) estimated alloantibody frequencies in patients following blood transfusion, they revealed a gradual decline in the frequencies of anti-D and anti-CD, whereas anti-K, anti-E and anti-JKa showed increases in relative and absolute frequencies, these problems may pose additional risks to the transfused recipient.

For this reason we planned this work to find the incidence of alloantibody Production in patients, received multiple blood transfusions during period (1986-1990).

MATERIAL AND METHODS

We studied 4265 patients with conditions commonly requiring multiple blood transfusions to determine the incidence of blood group antibody formation. The patients were selected during period (1986-1990). Records of transfusions and immunohaematological studies were made for each case. Informations collected included

age, sex, previous transfusions (date, quantity, type of blood product) and history of pregnancy in women.

During this four years period a variety of immunohaematological screening test were employed, patients who received no transfusions or had follow up periods less than 6 weeks were excluded to provide a time interval to produce antibodies.

Testing recipient serum against two or three reagent red cell preparations was done (Diamed cell I & II screen) of known Phenotype using antiglobulin technique. The test procedure was selected to Provide optimum conditions for detection of antibodies in Rh, Kell, Duffy, Kidd, MNSs, lewis, lutheran, Xg systems. When an antibody had been detected, we identify its specificity using eleven red cell preparations "Diamed cell Identification". The incidence of each type is calculated relative to total blood units, total number of patients and to type of blood group antibody specificity (Simmons, 1980).

RESULTS

Table (I) shows the prevalence of red cell antibodies among blood recipients at Mansoura University Hospital. Only 43 out of 4265 patients showing incompatibilities.

The specificity of the antibodies was confined to : Anti-D in 4 patients (9.3%):2 males obliged to be transfused by Rho positive due to insufficiency of Rho negative, one woman due to previous transfusion of Rho positive blood (before-marriage) resulting in HDNB and one girl aged 12 years underwaiting splenectomy, previously transfused also with Rho positive blood.

- Anti-D+ anti-C in one woman (2.33%) aged 28 years, Rho. negative and appears as D-positive due to previous blood transfusion with Rho-positive.
- Anti-C in 2 patients one male and one female (4.65%). - Anti-C+ anti-e in one female patient (2.33%). -Anti—c in 4 patients, 2 males and 2 females (9.3%).
- Anti-E in 3 patients, one male and 2 females.
- Anti-Cw in a man on haemodialysis program (2.33%) due to previous many blood transfusions from his brother Cw+.
- Anti-K in 4 patients, 3 males and one female (9.3%).

- Anti-Fya in 3 patients, one male and 2 females (6.98%).
- Anti-JKb in one male and one female (4.65%). -Anti-S in 2 male patients (4.65%).
- Anti-s in one female patient (2.33%).
- Anti—N in one male and one female patient (4.65%).
- Anti-Lea in 8 patients, 3 males and 5 females (18.60%).
- Anti-Lea+ anti-Leb in a female patient (2.33%).
- Anti-Leb in 4 patients, 2 males and 2 females (9.30%).

Table (2) : Shows the prevalence of red cell antibodies among 130 patients on a program of haemodialysis in Mansoura Nephrology Center. The antibodies (6.154%) were detected in 8 patients and the specificity of these antibodies were confined to :

Anti-D in a male patient, anti-D+ anti-C in a female patients, anti-C+ anti-e in a female patient, anti-Cw in a male patient, anti-Fya + anti-E in male patient, anti-K in a male patient, anti-S in a male patient and anti—Lea+ anti-Leb in a female patient.

DISCUSSION

From our study we found that, the antibodies which have the high incidence are anti-Lea which cannot be ignored. Generally the anti-lewis (anti-Lea, anti-Leb and anti-Lea+ anti-Leb) can be found naturally without antigenic stimulus in Le (a - b-). Anti-Leb can be ignored when found in recipients, this is similar to the observation of Petz & Garatty (1983) and Molthan et al., (1984). Anti-lea is sometimes clinically important when interacts at 37 C with indirect coombs test, as it may cause delayed haemolytic transfusion reaction (DHTR), this has been proved in one case of haemodialysis and confirms the previous publication of Matson et al. (1955) and Peterson & Chisholn (1958).

Anti-Kell, anti-c and anti-E follow anti-D in strength, this is in agreement with the observation of Brantley and Ramsey (1988). However, in our work we found that both anti and anti-c have high incidence, because it is now routinely employed to ensure the Rho group prior to transfusion and that the blood of a recipient and donor is compatible in Rho group, so anti-D was revealed a decline. These findings accords with Economidou et al. (1971), Honig & Bove (1980) and Walker &

Hartrick, (1989).

Anti-Fya is clinically significant as reported by Aubuchon and Anderson (1985), also anti-JKb caused immediate haemolytic transfusion reaction in one female patient, this accords with Seymanski and Grandhi (1983).

Thorough examination of blood recipients, we found that patients on a program of haemodialysis has the highest incidence of immunization, 6.185% (8 out of 130 cases). This incidence is higher than that recorded by Habibi and Lecolier, (1983) in France, who found only 1.72% of patients underwaiting kidney transplantation developed alloantibodies of immunized cases.

Five out of the eight immunized patients underwent DHTR. The first was due to anti-C+ anti-e and this case resemble multiple previous cases of DHTR caused by anti-C that was recorded by many investigators as Pickles et al., (1978); Davey et al., (1980); Wisett & Pierce (1981) and Patten et al, (1982), while Synder et al, (1978) reported a case of HTR caused by anti—e. The second case was due to anti-Lea as mentioned before. The third case was due to anti-Fya+ anti—E, this is in agreement with Economidou et al., (1971) also Aubuchon and Anderson (1985) found a case of DHTR caused by anti-Fya and Walker & Hartrick (1989) recorded anti-E in their study while Maynard et al., (1988) observed anti-JKa, anti-C and anti—E in a single case. The fourth case was due to anti-D+ anti—C as reported bY Economidou et al., (1971) who found anti-D+ anti-C in 4 patients Rho-negative and the fifth case was due to anti-Cw this accords with Issitt and Issitt (1981).

SUMMARY

During four years study period (1986-1990), 30185 units of blood transfusion were given to 4265 recipients, each recipient received a mean of 7.25 transfusions ranged (2 to 13) compatable with ABO and to a great extent with Rho, of these recipients, 130 cases were on a program of haemodialysis. Antibody screening was performed to all specimens using antiglobulin test. The overall incidence of alloimmunization was 0.143% of al 1 transfused units and 1.008 of transfused patients. We found the fol lowing specificity : anti-Lea & anti Lea + anti Leb (20.93%), followed by anti-D & anti-D+ anti-C (11.63%), then the sum of anti-D+ anti-C, anti-C and anti-C+ anti-e (9.31%), anti-K and anti-Leb

each having 9.30%, anti-E and anti-Fya each possessing 6.98%, anti-S and anti-N each recording 4.65%, f inal ly anti-5 having 2.33% . These f indings are indication of the alleged advantage of extending antigen determination in donor and recipient, this may lead to the prevention of transfusion induced red cell alloimmunization as in haemodialysed patients who have 8 out of 130 cases.

CONCLUSIONS

Our study add support to the alleged advantage of extending antigenic determination in donor and recipient by the following :

- Appropriate measures to prevent red cell alloimmunization are outlined by prophylactic use of blood matched for multiple antigens other than ABO and Rho in some clinical situations.
- Prophylactic measures are suggested to be focussed in one hand to the most immunogenic red cell antigens (C, E, K, D, JK) and on the other hand to the high risk individuals as in girls, young women and multitransfued patients.

Table (1) : The Prevalence irregular antibodies due to multiple blood transfusions among recipients at Mansoura University Hospital.

Antibody specificity	No. of cases	Incidence relative to No. of blood units (30185)	Incidence relative to all blood specimens (4265)	Incidence relative to all antibodies
Rhesus system				
Anti-D	4	0.013%	0.094%	9.30%
Anti-D+anti-C	1	0.003%	0.023%	2.33%
Anti-C	2	0.007%	0.094%	4.65%
Anti-C+anti-e	1	0.003%	0.023%	2.33%
Anti-C	4	0.013%	0.094%	9.30%
Anti-E	3	0.007%	0.070%	6.98%
Anti-Cw	1	0.003%	0.023%	2.33%
Kell system				
Anti-K	4	0.013%	0.094%	9.30%
Duffy				
Anti-Fya	3	0.10%	0.070%	6.98%
Kidd system				
Anti-Jkb	2	0.007%	0.047%	6.98%
MNSs system				
Anti-s	2	0.007%	0.047%	4.65%
Anti-s	1	0.003%	0.023%	2.33%
Anti-N	2	0.007%	0.047%	4.65%
Lewis system				
Anti-Lea	8	0.027%	0.188%	18.60%
Anti-Leb	4	0.013%	0.094%	9.30%
Anti-Lea + Anti-Leb	1	0.003%	0.023%	2.33%
Total	43	0.143%	1.008%	

Table (2) : The Prevalence of red cell antibodies in 130 patients on a program of haemodialysis.

Groups	No. of cass	Incidence relative to all blood specimens
Anti-D	1	0.796%
Anti-D+anti-C	1	0.796%
Anti-C+anti-e	1	0.796%
Anti-Cw	1	0.796%
Anti-Fya+anti-E	1	0.796%
Anti-K	1	0.796%
Anti-S	1	0.796%
Anti-Lea + Anti-Leb	1	0.796%
Total	8	6.154%

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الملخص العربى

د./ أمال عبدالقادر د./ هيام غنيم

نسة الأجسام المناعية فى الحالات المستقبلة لكثير من الدم من عام ٨٦-١٩٩٠ بمستشفى المنصورة الجامعى

تمت دراسة عدد ٤٢٦٥ مستقبل للدم خلال فترة ٤ سنوات من عام ١٩٨٦-١٩٩٠ حيث تم نقل ٣٠١٨٥ قربة دم لهم فأخذ كل مريض متوسط ٧ر٢٥ قربة دم (مابين ٢-١٣ قربة دم) متوافق من حيث الفصيلة ABO والـ Rh .

من بين هؤلاء المرضى كان هناك ١٣٠ حالة يعمل لهم غسيل كلوى وقد تم لجميع المرضى الكشف عن الأجسام المناعية المضادة لفصائل الدم الغير متوافقة باستخدام اختبار كومب غير المباشر وكان المعدل الكلى بالنسبة لعدد مرات نقل الدم ٤٢ر١٪ أما بالنسبة لمجموع عدد الحالات وكانت ٠٨ ٠ر١٪ من المرضى الذين تعرضوا لنقل الدم.

وكانت أنواع الأجسام المناعية كالآتى :

anti-le^a + anti-le^b & anti-le^a بنسبة ٩٣ر٢٠٪ يليها

anti-D + anti-C & anti-D بنسبة ٦٣ر١١٪

ثم مجموع anti-C + anti-e & anti-D + anti-C

بنسبة ٣١ر٩٪ وكذلك anti-le^b & anti-k . وبنسبة ٩٨ر٦٪ anti-F & anti-E

وبنسبة ٦٥ر٤٪ كل من anti-N & anti-S وأخيراً anti-S بنسبة ٣٣ر٢٪

وهذا يشير إلى مزايا امتداد تعيين الفصائل الأخرى فى كل من المستقبل والمتبرع وبذلك يتم منع المناعة الناتجة عن نقل الدم وخاصة فى حالات غسل الكلى حيث كان هناك ٨ من ١٣٠ حالة اكتسبوا الأجسام المضاده.