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**BLOOD RECEIVERS: ANOTHER POINT OF VIEW  
- ANALYSIS OF DATA FROM 5,463 PATIENTS  
TRANSFUSED DURING 2011**

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**Introduction**

Most of blood banks in industrialised countries can get a lot of information related to transfused patients. These data can be used as quality indicators as well as epidemiological information in the broad meaning of the term. The blood bank of the CHU of Liège (in Belgium) provides almost 35.000 blood units per year to more than 5.000 patients. The statistical analysis of data from all patients transfused during 2011 allowed us to turn out some interesting observations. The knowledge of the profile of transfused patients is an advantage as far as the improvement of transfusion quality is concerned.

**Material and methods**

Data of 5,463 patients transfused via the blood bank of the CHU of Liège in 2011 have been analyzed. There are two categories of patients: those who have been hospitalized in the CHU itself, and those who have been hospitalized in other clinics whose blood supply depends on the blood bank of the CHU.

For each patient the following parameters were available: age, gender, ABOD blood group, RHK phenotype (in a majority of cases), the existence or not of an anti-erythrocyte allo-immunization and the number of blood units received during 2011. Some patients have been hospitalized and transfused in two or more clinics in the same territory. In order to avoid double data for those patients, immuno-hematological characteristics have been taken into account only once, and the number of blood units transfused, globalized.

The search for irregular antibodies in the immuno-haematological laboratory is based on the Type and Screen principle, by using the immuno-capture method (Immucor) - and/or the gel technology (Diamed). The panels of phenotyped erythrocytes used for the antibody identification were from commercial origin (Immucor, Diamed). The methods used were: immuno-capture (Immucor) and micro-column agglutination (Diamed) with the use of antihuman globulin and enzyme medium for complex cases.

**Female/Male Ratio**

In the whole series of 5,463 patients transfused in 2011, female receivers were clearly dominants (56%).

**Immunized patients**

Globally, 5.2% of patients were allo-immunized: 3.5% were females and 1.7% males. Whereas females represented 55.7% of the whole series of patients, they accounted for 67.9% of those who were allo-immunized, indicating that in this series, females were significantly more often immunized than males ( $p < 0.0001$ ).

The majority of patients (70.1%) presented one single antibody whereas the remaining 29.9% presented a multiple immunization (21.1% had 2 antibodies; 4.6%, 3 antibodies; 0.7% 5 antibodies and 0.4% 6 antibodies).

Among the patients presenting multiple immunization (2 or more antibodies), females were dominant ( $p = 0.03$ ).

Antibodies from RH system were the most represented among immunized patients (52.8%), they were followed by those from

the following systems: KELL (15.9%); KIDD (10.5%); DUFFY (6.8%); MNSs (6.1%); LEWIS (4.4%); LUTHERAN (2%) and other (1.5%).

Classified in decreasing order by frequency, individual specificities show that the 5 more frequent antibodies were: anti-(RH3), anti-(KEL1) anti-(RH1), anti-(JK1) and anti-(RH2).

The ratio calculated by dividing the number of antibodies found in association with the number of unique antibodies allow us to distinguish those antibodies occurring more often as "single" or as "multiple" antibodies. In the series, anti-(RH3), (KEL1), (FY1), (LE1) and (MNS3) occurred more often as "single" antibody whereas anti-(RH2), (RH1), (RH4), (RH5), (KEL3), (JK1) occurred more often in combination. The most frequent associations observed were: anti-(RH2)+(RH1), anti-(RH4)+(RH3), anti-(RH3)+(JK1) and anti-(RH2)+(RH5). The mean ratio measured in our laboratory (1.27) indicates that multiple antibodies are more often detected than singles ones.

**Frequency of compatible blood donors (FCBD)**

For each immunized patient, the number of compatible blood donors was calculated by taking into account the frequency of "antigen negative" blood donors corresponding to each antibody specificity identified. Deliberately (in order to simplify the demonstration), the ABO and RH phenotypic compatibility were not taken into consideration for the calculation although in practice, they are. It appears that - as expected - the number of compatible blood donors decreases exponentially when the number of antibodies increases ( $r = 0.97$ ).

The median [minimum and maximum] frequency of compatible blood donors calculated for a patient with 1 antibody was 31% [0.9-87%], with 2 antibodies 7% [0.3-79%], for 3 antibodies 3% [0.4-16%] and for 4 antibodies 2% [0.1-15%].

But this frequency also strongly depends on the specificity of antibodies. For example: for 1 antibody, the FCBD can be as high as 98% for anti-(RH8) but also as low as 2% for anti-(RH5).

For the whole series of 284 immunized patients, we calculated that the FCBD was less than 10% for 30% of immunized patients but more than 50% for around 16% of immunized patients.

**Number of blood units transfused**

The range of the number of blood units transfused per patient widely varies: [1-160] blood units. A great majority of patients (91.7%) received [1-10] blood units, whereas 8.3% received [10-160] blood units. In the category of those who received [1-10] blood units, there were more females than males whereas males were dominant in the category of patients receiving [10-160] blood units. This tendency was confirmed by the calculation of the median of blood units received by females [ $2 \pm 0.23$ ] and by males [ $3 \pm 0.40$ ].

In parallel, we also calculated that the median number of blood units received by all patients was [ $3 \pm 0.22$ ]; it was greater for immunized patients [ $4 \pm 2.02$ ] than among non-immunized patients [ $3 \pm 0.20$ ].

The ABO blood group of the recipient has quite no effect on the number of blood units received, except for those patients with haematological diseases who had a graft of haematopoietic stem cells. These last ones were greatest blood consumers with a median of [ $7 \pm 4.57$ ] blood units per patient.

**Age of blood receivers**

We wondered how was distributed the age of transfused patients when compared to the age of all patients hospitalized in 2011 in