Analysis of the Use of Labile Blood Products: The Case of the General Hospital of Dabou (Cote D’Ivoire)

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Abstract

Context and General Objective
Blood transfusion is a strictly necessary substitutive therapeutic procedure because there is no popular and known product to serve validly as a human blood substitute. The general framework of this study is to analyze the use of human labile blood in the General Hospital of Dabou,( Côte d’Ivoire.)

Method
We made a retrospective transversal descriptive study. This began from January 2017 to September 2017 at the General Hospital of Dabou, in the Southern part of Côte d’Ivoire. It dealt with the blood transfusion order forms, from January 1st, to June 30th, 2015. The selection criterias allowed us to retain 250 blood order forms. The pieces of information were selected from a questionnaire. The data analysis was made through Excell 2010.

Results
The average age was 3 years. A well-balanced dispatching of male and female subjects, respectively 50.4% and 49.6%, has been observed in our study with a sex-ratio of about 1.02. The age group from 0 to 10 years predominated in our study with 78.4% of the cases.

The pediatric service represented 80% of the transfusion cases.
At the biological level, the O blood group predominated followed by the A blood group, respectively 39.6% and 28.4%.
The positive rhesus represented 98.4% of our study.
In 86.8% of the cases, the blood transfusion was iso group – iso rhesus and compatible in 13.2% of the cases.
In 49.6% of the cases, the justification of the transfusion was in majority for anaemia.

Conclusion
The outcoming profile of this study is that of a young male or female patient, admitted to pediatric service, from O positive blood rhesus group who have received a transfusion iso group – iso rhesus.

In emergency cases, blood transfusion is a capital medical act in saving human lives ; but this should be performed in absolute necessity fearing immunological risks as well as other transfusional accidents. Moreover, in situation of scarcity of blood products, it should be performed with rationalism in order to allow those who are really in need to benefit from it.

Key words : Analysis – blood products – General Hospital of Dabou (Côte d’Ivoire).

Abreviation
LBP : Labile blood products
CNTS : Centre National de Transfusion Sanguine
WHO : World Health Organisation
HIV : Human Immunodeficiency Virus
BTD : Blood Transfusion Departement
INTRODUCTION

The blood transfusion is a strictly necessary substitutive therapeutic procedure because there is no popular and known product to serve validly as a human blood substitute. It consists of administrating to the patient in need, one of the human blood components: red blood cells, platelets or thrombocytes, plasma. They are called labile blood products (LBP). They are derived from blood donation taken during organized collections. They are taken, processed, qualified and secured according to the defined principles of good practices [1].

In Côte d’Ivoire, The Centre National de Transfusion Sanguine (CNTS) in Abidjan Treichville is the only center allowed to collect, process, and distribute blood. According to the World Health Organisation (WHO), the needs for blood and blood products increases each year in several countries, particularly in those with intermediate or low income [2]. The World Heath Organization (WHO) suggests ten donations of blood per 1000 inhabitants to guarantee a sufficient general availability of blood directed to a given country [2]. In 2015, the Ivorian population was 23 million of inhabitants [3] and therefore according to the norms of the WHO, CNTS should collect 230000 blood pouches to meet the national need. CNTS is not self-sufficient in blood products to the extent to which it has collected only 143 691 blood pouches in 2014 [4] and 155 534 in 2015 [5] ; A number of reasons could explain such situation : the limited number of blood donators, the inadequate policies in population movitation to blood donation. Furthermore, a great deal of blood pouches are thrown out. For example in 2014, 126,713 pouches of blood have been set aside, and 138,288 in 2015.

In fact, most of the thrown out pouches had been previously disqualified because of serological markers of viral hepatitis (B : 6.99%, C : 58%) and 0.4% syphilis. HIV is becoming less and less alarming for the Ivorian transfusional system (from 0.35% in 2014, was decreased to 0.04% in 2015). Facing this insufficiency of the available quantity in blood products, the medical workers should use them rationally. Moreover, there is no data base for efficient management of blood products conferred to sanitaries structures by CNTS. It is in this framework that we have found it timely to make this study. The General Hospital of Dabou was justified by its avarage of 89 transfusions per month in 2014 [5]. The general objective of this study was to analyze the use of labile blood products in this hospital and particualrly to :

- Identify the socio-demographic profile and the most used blood rhesus group
- To describe the transfusional indications.

MATERIALS AND METHODS

Type and Period of Study

It was about a transversal retrospective study that was made from January 2017 to September 2017: During the aforementioned period, it was the other form of blood belonging to hospitalized patients that were analyzed.

Framework

The survey was made at the General Hospital of Dabou: It is a town located in the southern part of Côte d’Ivoire from a distance of 30 km from Abidjan, the economic capital.

Material of Study

The order forms of blood were delivered to the patients by the referring physician: They entail two sections (a white section which represents the original copy of the order form, a yellow one which represents the receipt of the order form of blood): An order form of blood includes the following information: the name of the sanitary structure, the service, the name of the patient, the sex, the patient weight, the patient blood group rhesus, the justification of the transfusion, the level of hemoglobin, hematocrit, level of blood platelet, the type of transfusion (immediate, differed or polytransfused), the blood product at stake, the required quantity, the stamp and signature of the prescribing doctor, the provided blood product (the number of the delivered product), the blood rhesus group of the delivered product, the date and time of the issue.

Sample

- Inclusion criteria
It refers to the order forms of blood delivered to patients from 1 January to 30 June 2015.

Non inclusion criteria

It concerns all the order forms of blood cited except for the above mentioned period.

Data collection

To collect the data, the manager of the blood stock in service at the general hospital of Dabou, in line with the responsible blood transfusion department (BTD) of Dabou have been required. The order forms of blood products (the white and yellow sections above mentioned) are transported by a health agent to the blood stock at the general hospital of Dabou. Pieces of information related to the structure, patients, type of the required product, justification of the transfusion, referring doctor are written on these order forms. All these pieces of information are added by those appearing on the blood pouches.

The manager of the blood stock adds on the original section or the white section of the order form instructions related to the bag blood (the number of the delivered product, rhesus blood group of the product, date and time of issue). He also keeps safe the original section or the white section and provides a delivery note, with the receipt or the yellow section to the health agent who conveys the bag blood to the service where the patient is hospitalized.

The Director of the blood transfusion center (ATS) of Dabou sends to the national center for blood transfusion (CNTS) of Abidjan, the white or original sections of the purchase order forms for blood transfusion. Then, with a questionnaire, those data were analyzed.

Analysis of data

The data were typed through Word software. The process of data analysis was carried out on Excel 2010.

Ethic aspects

The blood bags were anonymous. No indication capable of suspecting the identities of recipients has been revealed. An anonymous questionnaire guidebook was used. The collecting and the management of the pieces of information have been confidentially carried out through the work.

RESULTS

Socio-demographic profile.

Chart I: Dispatching of transfused patients according to age, sex and hospitalisation service

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-10</td>
<td>196</td>
<td>78.4</td>
</tr>
<tr>
<td>11-20</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>21-30</td>
<td>8</td>
<td>3.2</td>
</tr>
<tr>
<td>31-40</td>
<td>12</td>
<td>4.8</td>
</tr>
<tr>
<td>41-50</td>
<td>8</td>
<td>3.2</td>
</tr>
<tr>
<td>51-60</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>61-70</td>
<td>03</td>
<td>1.2</td>
</tr>
<tr>
<td>71 et plus</td>
<td>03</td>
<td>1.2</td>
</tr>
<tr>
<td>Non précisé</td>
<td>17</td>
<td>6.8</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>126</td>
<td>50.4</td>
</tr>
<tr>
<td>Female</td>
<td>124</td>
<td>49.6</td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pediatrics</td>
<td>200</td>
<td>80</td>
</tr>
<tr>
<td>Medicine</td>
<td>50</td>
<td>20</td>
</tr>
</tbody>
</table>
The pediatric service predominated with 80%; the range of age from 0 to 10 years was identified with 78.4% with a mean age of 3 years and the male sex with 50.4%.

**BIOLOGICAL DATA**

**Chart II: Dispatching of transfused patients based on blood groups, rhesus and type of transfusion**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Size n =250</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>71</td>
<td>28.4</td>
</tr>
<tr>
<td>B</td>
<td>70</td>
<td>28</td>
</tr>
<tr>
<td>AB</td>
<td>10</td>
<td>04</td>
</tr>
<tr>
<td>O</td>
<td>99</td>
<td>39.6</td>
</tr>
<tr>
<td>Rhesus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>246</td>
<td>98.4</td>
</tr>
<tr>
<td>Négative</td>
<td>04</td>
<td>1.6</td>
</tr>
<tr>
<td>Iso rhesus blood transfusion</td>
<td>217</td>
<td>86.8</td>
</tr>
<tr>
<td>Compatible Transfusion</td>
<td>33</td>
<td>13.2</td>
</tr>
</tbody>
</table>

There was a preponderance of O group with 39.6% and positive rhesus group with 98.4% of the cases. In 86.8% of the cases, transfusion was iso group – iso rhesus and compatible in 13.2%.

**Chart III: Dispatching of transfused patients based on hemoglobin rate**

<table>
<thead>
<tr>
<th>Rate of hemoglobin (g/dl)</th>
<th>Size n =250</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0-3.9</td>
<td>42</td>
<td>16.8</td>
</tr>
<tr>
<td>4.0-6.9</td>
<td>185</td>
<td>74</td>
</tr>
<tr>
<td>7.0-9.9</td>
<td>23</td>
<td>9.2</td>
</tr>
</tbody>
</table>

There was a prevalence of the range of hemoglobin from 4.0 - 6.9 g/dl with 74% of the cases; in 16.8% of the cases, the range of hemoglobin was 1.0 - 3.9g/dl and in 9.2% of the cases, the range of hemoglobin was 7.0 – 9.9 g/dl.

**Chart IV: Dispatching of transfused patients based on transfusion justification**

<table>
<thead>
<tr>
<th>Justification</th>
<th>Size n =250</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>124</td>
<td>49.6</td>
</tr>
<tr>
<td>Severe Anaemia</td>
<td>94</td>
<td>37.6</td>
</tr>
<tr>
<td>Decompensated Anaemia</td>
<td>32</td>
<td>12.8</td>
</tr>
</tbody>
</table>
In our study, anaemia justification represented 49.6% of the cases followed by the severe anaemia justification in 37.6% of the cases.

DISCUSSION

Due to its retrospective character, this survey involves limits. We have not been able to get the exact number of blood bags put at the disposal of the place of survey during the specific survey period. We could not assess, in real time, serious symptoms of the anemia that motivated the transfusion of patients in this survey. Furthermore, the age group from 0 to 10 years old predominated in this survey with 78.4% of the cases; although this result differs from that of Perrichet et al[7]. These ones, through a survey in the University Hospital of Reennes, provided a report on the pertinence of the use of labile blood products in 2015, a mean age of 55 but our result is corroborated by the World health Organization (WHO) which reveals that in countries with low income, up to 65% of blood transfusion are administered to children under 5, while in countries with high income, the group of patients most transfused is that of over 65, which represents 76% of transfusion.

In the tropics, that could be explained by the fact that due to parasitic diseases and malnutrition, it is the most vulnerable age group. A well-balanced dispatching of male and female subjects, respectively 50.4% and 49.6%, has been observed in our study with a sex-ratio of about 1.02. This result is different from that of Perrichet et al. in 2015 and from the one of Brunot Ojeda et al. in 2006, which have respectively reported a male predominance of 69% and 70.5% of blood transfusion cases [7.9]. This study shows that unlike received ideas, female subjects do not always outnumber men in the request of blood transfusion.

Our study has shown that 80% of transfused patients were hospitalized/admitted in the paediatric service comparing to 20% in that of medicine. This can be explained by the existence, in that service, of anaemic diseases such as parasitoses hematophagous as anguilluloses, hookworms and severe malaria of anaemic type. About blood groups, the group O represented 39.6% in our study followed by the group A with 28.4%, then the group B and finally the group AB with 4%. The positive Rhesus group predominated in our study with 98.4%. This dispatching is superposable to that of DULAT in 1989 which had found 48.1% for group O, 23.7% for group A, 23.6% for group B, and 4.6% for group AB[10].

Concerning the Rhesus group, our study corroborates also that of DULAT which reported in 1998 a predominance of the positive Rhesus [10]. These results might be explained by the fact that negative Rhesuses are very rare with 5.3% in the ivorian population. Dans 86.8% of cases, the transfusion was iso group- iso rhesus and in 13.2% of cases, the transfusion was compatible. The blood compatibility means that a blood group does not entail agglutinins (or antibodies) directed against the antigens of another blood group [11].

For compatibility principles ABO, the principle for the concentration of red blood cells is not to support an antigen A and/or B when the receiver possesses one or several corresponding regular natural antibodies [12]. Thus, in the transfusion Iso group – iso rhesus, the blood group A gives to the receiver of group A, the blood group B gives to the receiver of group B, the blood group AB gives to the receiver of group AB and the blood group O gives to the receiver of group O.

However in the compatible transfusions, the blood O group gives to receivers of group A, B, AB and also to group O. The blood group A gives only to receivers of group A and AB; the blood group B gives exclusively to receivers of group B and AB [12]. The weak percentage of compatible transfusion in our study (13.2%) might be explained by a need of improvement in transfusional compatibility rules by practicians. According to literature, the transfusion of concentrated red blood cells restrictively iso ABO group is generally preferable for reasons of blood products economy and because the interpretation of the control card to the sick bed is then more simple. But the transfusion of concentrated red blood cells « ABO-compatible » is also effective and without particular risk if one respects the rules of transfusional compatibilities [12] It can also allow saving more human lives. Practicians should be educated to a better mastership of transfusional compatibility rules.

Anaemia is an abnormal decrease of the rate of hemoglobin in the blood. Hemoglobin is a protein contained in blood red cells which allows them to transport the oxygen in the body via the blood [13]. In this study, the 4.0 - 6.9 g/dl of hemoglobin range predominated, with 74% of the situations, followed by the 1.0 – 3.9 g/dl hemoglobin group with 16.8% of the situations. The decision to transfuse those patients was justified, for according to literature, when the hemoglobin rate is strictly inferior to 7g/dl, one must often transfuse[14]. In 9.2% of the cases, the hemoglobin range was 7.0 – 9.9 g/dl.

According to literature, whenever the hemoglobin rate is comprised between 7 and 10 g/dl, one must evaluate the potentials of tolerance to anaemia before establishing the indication for transfusion [14]. Our results may be due to the fact that in 12.8% of the cases, patients presented signs of decompensation.

In children up to 2 years old, a threshold of 7g/ dl is recommended for the transfusion toward patients without any particular antecedents [15]. These data highlight the ones found in our study which reveals an average age of 3.
With regard to literature, the blood transfusion indication seems to be justified in that hospital as regards the transfusion, considering the rate of hemoglobin.

According to literature, faced with any anemia, one must find out the signs of severity before therapeutic decision-making, particularly transfusion. In effect, beyond the biological signs (hemoglobin), these are some functional signs (dyspnea) dizziness, tachycardia endured with great difficulty, oedems, angora, signs of deficit vascular…) [16]; we notified 49.6% of people that the justification of transfusion in our study was linked to anemia without any signs of the associated severity; A prospective study might help appreciate the signs of severity of anemia and then argue with more conviction, the rational use of blood products in the General Hospital of Dabou

CONCLUSION

The outcome profile of this study is that of a young male or female patient, admitted to pediatric service, from O positive blood rhesus group who have received a transfusion iso group – iso rhesus.

In emergency cases, blood transfusion is a capital medical act in saving human lives; but this should be performed in absolute necessity fearing immunological risks as well as other transfusional accidents. Moreover, in situation of scarceness of blood products, it should be performed with rationalism in order to allow those who are really in need to benefit from it.

RIVAL INTERESTS

No rival interest

AUTHORS’ CONTRIBUTIONS

All the named authors have contributed either in data collection or in this article writing.

ACKNOWLEDGEMENTS

Our thanks to both Abidjan (Côte d’Ivoire) CNTS Manager and Dabou general hospital manager, for we did this work as a result of their permission.

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