

Research Article

THE UNDESIRABLE EFFECTS AND INFECTIOUS RISKS LINKED TO BLOOD TRANSFUSION IN PEDIATRIC EMERGENCIES OF THE MOTHER AND CHILD HOSPITAL CENTER (CHU-ME) OF N'DJAMÉNA

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Abstract

Introduction: blood transfusion is not a trivial act because it is a transmission route for many germs and adverse effects can occur. **Objectives:** Our study aimed to contribute to improving the quality of blood transfusion in the pediatric emergency department of the University Hospital Center for Mother and Child. **Material and Methods:** This was a prospective, cross-sectional and descriptive study carried out in the pediatric emergencies of the CHU-ME and the CNTS from March 2020 to August 2020, i.e. a period of six (6) months. It concerned all patients admitted to pediatric emergencies aged two (2) months to fifteen (15) years during the study period. Our inclusion criteria were: being between 2 months and 15 years old; having been transfused with whole blood or one of the blood derivatives during the study period; not present a positive reaction to the search for the main markers of ITTS (HIV, HBV, VHV and Syphilis). Parental consent was obtained prior to inclusion. The data collected on the pre-established collection sheet were entered into the SPSS20 and Excel databases then used and analyzed with the same software. **Results:** During the study period, 2822 children were admitted, of whom 127 were included, 49 of whom were followed up to three months and benefited from post-transfusion marker monitoring. Infants received the most transfusions (51.2%); the M/F sex ratio was 1.01. History of transfusion was noted in 37% of children. The main reason for transfusion was severe post-malarial anemia (46.5%). The pre-transfusion hemoglobin level $\leq 5\text{g/dl}$ was noted in 45.7% of patients. Whole blood was exclusive (100%) in our series. The ultimate bedside compatibility test was performed in only 10% of transfused patients. The majority of patients were transfused in August (47.2%). Adverse effects were observed in 38 patients (29.9%). 5% of died during their hospital stay against 14% after their discharge. No case of seroconversion was noted during post-transfusion serological controls. **Conclusion:** This study conducted in the pediatric emergency room on blood transfusion did not find any case of residual transfusion infection. However, the assessment of transfusion safety remains uncertain requires other complementary studies if necessary multicentric.

Keywords: Blood transfusion, Adverse effects, Infectious risks, Pediatrics.

INTRODUCTION

Blood transfusion consists of administering blood or one of its cellular or plasma components from one or more healthy subjects called donors to a sick subject called the recipient (WHO, 2020). Blood transfusion is not insignificant, it constitutes a way of transmission of many germs (bacteria, viruses and parasites) which are at the origin of many and the undesirable effects (WHO, 2020). In France in 2012, the French Blood Establishment (EFS) assessed the residual risks for certain germs: HIV1/2,900,000 donations; HCV1/700000 donations, HBV1/1350000.HTLV1/3700000; bacterial risks 1/135,000 donations (Abdala and Shindano, 2016). In Africa, several studies have been conducted, particularly in Niger where the risk of infectious transmission was 2.4% for HIV, 6.93% for HBV, 0.5% for HCV and 1% for syphilis (Malam-Abdou *et al.*, 2016); in Cameroon this risk was estimated at 5.8% for HIV; 7.1% for HBV and 9.7% for HCV (Zouhouina *et al.*, 2004). CAR has reported the following rates: 6% for HIV and 14% for HBV (Gody *et al.*, 2014). On the other hand, in Congo in 2007, a study targeting sickle cell patients noted a contamination rate of 11.3% for HIV and 10% for HBV (Tshibolo *et al.*, 2007). In Chad, apparently no study has been undertaken on the infectious risks associated with blood transfusion, which is common practice, especially among

women and children, when we know that the frequency of infectious markers is still relatively high among almost family donors. HIV, HBV, HCV and Syphilis, the respective frequencies of which in 2019 were: HIV 01.72%; HBV 07.55%; HCV 02.32% and Syphilis 04.14% (CNTS, 2019). So it seemed appropriate. To try to address a subject that is undoubtedly a public health problem.

MATERIALS AND METHODS

This was a cross-sectional and descriptive study carried out in the pediatric emergency department of the CHU-ME from March 2020 to August 2020, i.e. a period of six (6) months. It concerned any patient admitted to the emergency room pediatric patients aged two (2) months to fifteen (15) years during the study period. The verbal and/or tacit consent of the parents was obtained before the inclusion of their child. The search for ITT markers was carried out in the internal quality control laboratories of the CNTS using the Mini Vidas Automate, before any transfusion and three months after the transfusion, for HIV, HBV and HCV. For Syphilis, TPHA was used. The data collected on a pre-established form for this purpose were entered into the SPSS20 and Excel database and then used and analyzed with the same software. The following variables: socio-demographic (age, sex, place of residence and profession of parents); clinical (conjunctival pallor, jaundice, consciousness, heart rate (HR), respiratory rate (FR),

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temperature (T°), SPM, HPM, history of transfusion and reason for admission); biological (hemoglobin level, blood group and Rhesus D serologies (HIV, HBV, HCV and syphilis) were specifically analyzed.

RESULTS

Table 1. Distribution of patients according to age group age

Age (months)	n	%
[2 à 29]	65	51,2
[30 à 59]	29	22,8
≥60	33	26,0
Total	127	100,0

Table 2. Distribution of patients according to father's profession

Occupation	n	%
Pupil/Student	10	7,9
Taxi/Mototaxi	11	8,7
Farmer	15	11,8
Others	18	14,2
Official	35	27,6
Trader	38	29,9
Total	127	100,0

Others: Masons, security guards, fishermen, tailors

Table 3. Distribution of patients according to mother

Occupation	n	%
Official	5	3,9
Others	5	3,9
Peasant	6	4,7
Trader	8	6,3
Pupil/Student	12	9,4
Household	91	71,7
Total	127	100,0

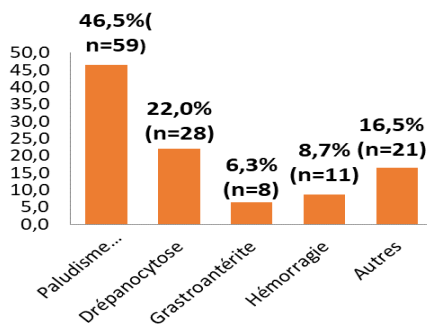


Figure 1.

Table 4. Distribution of patients according to transfusion reactions

Reaction	n	%
Urticaria	2	1,6
Dyspnea	2	1,6
Jaundice	3	2,4
Chill-hyperthermia	8	6,3
None	112	88,2
Total	127	100,0

Table 5. Distribution of patients according to transfusion reactions

Reaction	n	%
Nausea/Vomiting	1	0,8
Urticaria	2	1,6
Dyspnea	5	3,9
Chill-hyperthermia	15	11,8
None	104	81,9
Total	127	100,0

DISCUSSION

Limitation of this study

This study coincided with the unexpected appearance of the COVID 19 pandemic, with its corollary of confinement which paralyzed activities, just as it focused all attention to the detriment of routine health activities. Our study extended over six (6) months from March 2021 to August 2020, during this period 2822 children were admitted to the service, of which 127 were included and transfused, i.e. a frequency of 4.50%. This population was represented by as many male children as female, but with a slight predominance of the male sex; the sex ratio was 1.01. The comparison of the proportions made did not show a significant difference. Other authors have also found the same thing (Mayuku *et al.*, 2013; Hioui *et al.*, 2009). Since the sampling is random, the clear explanation about it does not exist. We believe that sex has no influencing factor. This study involved children from 2 months to 15 years old. The age group of infants (2 to 29 months) represents more than half, or 51.2%, followed by that of preschool children which represented 22.8%. In total, 74% of children transfused were aged under 5, regardless of gender; which agrees with the results of Traoré *et al* in 2020 who found 76.2% of transfused children were under 5 years old and Diakité in 2017 reported that 80% of transfused children were under 5 years old year. This could be explained by the fact that in this age group children are very vulnerable and therefore exposed to several diseases including malaria, malnutrition, bacterial infections and especially that the survey period corresponded to the period high malaria transmission. Nguefack *et al* in 2012 made the same observation. Regarding the area of residence, the majority of children transfused came from urban areas, ie 85.4%. This result is slightly higher than that of Hioui *et al.* (2009) who reported 62.4%. This could be justified by the fact that the study was carried out at the CHUME, it is obvious that the populations most concerned are those of proximity. Observation and analysis of the socio-economic situation of the parents reveal that it was a population mainly and overall of modest conditions since 29.9% of the fathers were traders, 27.6% were civil servants against 71% of housewives. Moreover, the majority of mothers were uneducated. El Hioui *et al.* in 2009 in Morocco also noted that 77.5% of mothers were housewives. This situation corroborates the overall rate of illiteracy in Chad, which is even more accentuated among women, which means that most mothers were housewives. Among the transfused patients, 37% had a history of transfusion. Other studies such as that of Mayuki (2013) and Kakemba (2017) found respectively 6.5% and 39.6% of patients with a history of transfusion.

In this sample, there were as many poly transfused children as those with a history of a single transfusion. This result could be explained by the high prevalence of sickle cell disease in the Central African region of which Chad is a part and children with sickle cell disease often have a lot of anemia. In our study, severe anemic form of malaria was the main cause of anemia with 46.5% followed by sickle cell disease with 22% of cases. This primacy of malaria could be explained by the fact that we are in a malaria-endemic zone where malaria remains the leading disease in terms of morbidity and above all our study coincides with the period of high malaria transmission. Our results can be superimposed on those found by Diaketé *et al.* (2015) with 64%, Koko *et al.* in 1997 in Gabon with 54.7% and Mayuku *et al.* (2013) with 87.7%. The

prevention of this pathology (malaria) is of great interest because it will reduce infant mortality and also the risks associated with the administration of blood from one individual to another. As for the rate of sickle cell disease found in our series, it could be explained by the presence within the CHUME, of the care unit for children with sickle cell disease. Other authors, particularly in Mali (Diakité *et al.*, 2015), Cameroon (Chelo, 2016) and Benin (Diouf *et al.*, 2018) have a different classification of the reasons for transfusion in a hospital environment: bacterial infection then malaria. On admission, 20% of patients had altered consciousness while 91% presented with severe conjunctival pallor, witness to the seriousness in which these patients reach. This result is comparable to those of Kakemba *et al.* (2017), Achidi *et al.* in 2012 in Cameroon with respectively 96.8% and 91%. Tachycardia was noted in 62% of patients, while 54.3% had polypnea. This is surely the consequence of the anemic syndrome and its signs of intolerance attested by very low average hemoglobin levels at the entrance. thus justifying an emergency transfusion. Other authors have reported the same results (Kakemba *et al.*, 2017; Gody *et al.*, 2014). Hyperthermia was observed in 40.9% of the patients included. This result is similar to that of Bouyou *et al.* in 2013 who found 53.5%. Diarra in 2017 found 80%. This hyperthermia is related to the causal condition. It appears from our study that malaria is the most found pathology and the latter was often accompanied by fever clinically. Our work indicates that, in 45.7% of the patients included, the hemoglobin (Hb) on arrival was ≤ 5 g/dl. The average pre-transfusion Hb was 5.6g/dl, which shows the very low level of hemoglobin in children brought to hospital and the onset of signs of decompensation due to late seeking care. Indeed, the functional value in hemoglobin determines the clinical state and severity of severe anemia. This very low hemoglobin level explains the extremely serious condition in which children are brought to the emergency room, probably out of ignorance of the signs of seriousness or through lack of financial means. Our results do not differ from those of KaKemba (2017) and Diakité (2015) with 56.8% and 58.1% respectively.

Compared to the temporal distribution of blood transfusion, we realize that the incidence seems higher at the beginning of the rainy season, with a peak observed in August with 47.2%. The high frequency of transfusions during this period was related to the resurgence of certain pathologies during the rainy season, such as malaria. Transfusion safety requires more vigilance and investigation of cases. Among the transfused patients, 29.9% presented per and post transfusion reactions. During our study, 18.1% of patients presented adverse effects such as nausea-vomiting, urticaria, dyspnea and shivering-hyperthermia. This result is similar to that of Mayuku *et al.* (2013) who described 28% of adverse effects such as nausea, vomiting, urticaria, dyspnoea and shivering-hyperthermia. Traore in 2020 noted 1.6% shivering-hyperthermia, but other authors, Diakité (2015), Christelle (2016). These adverse effects could be related to plasma proteins or incompatibility of the ABO and Rhesus system. This could be avoided by using cellular components. Among the transfused patients, 11.8% presented post-transfusion reactions such as urticaria, dyspnea, jaundice and shivering-hyperthermia. Our result is superior to those of Diakité (2015) and Traoré *et al.* (2020) who found 4.8% and 4.4% respectively. Our high results compared to the others could be explained by the fact that post-transfusion monitoring was required in all patients transfused during their hospital stay. This worrying situation

could demonstrate that blood transfusion is a risky medical practice that deserves special attention. Regarding seroconversion, no case was observed in the 49 patients regularly followed. Malam-Abdou *et al.* in 2016 in Niger also found no cases of seroconversion. While several African studies had reported the often high infectious risk in transfused subjects. Gody *et al.* in CAR in 2014 found 6% HIV and 14.3% HBV. These figures show that blood transfusion remains one of the transmission routes for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV) and treponema palea. (Syphilis).

Conclusion

Blood transfusion in pediatric emergencies was without residual infectious risk. However, the assessment of transfusion safety remains uncertain.

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