Haemovigilance in France: annual report (2004)

For more than 10 years, haemovigilance has aimed to prevent the occurrence of adverse reactions related to the transfusion of labile blood products (LBP). Requirements of haemovigilance are:

- the notification of suspected adverse reactions observed in recipients to the competent authority, the French Health Products Safety Agency (Afssaps: Agence française de sécurité sanitaire des produits de santé)
- a high level of traceability, i.e. the ability to trace each individual unit of LBP from the donor to the recipient or disposal.

The evaluation of this data allows haemovigilance to achieve its goals that are to avoid the occurrence of such reactions.

Afssaps is responsible for the organization and the working of the haemovigilance network: 1,450 haemovigilance officers in 1,650 public and private hospitals (of which 275 with an hospital blood bank) and 151 blood establishments report the adverse reactions and ensure the traceability of LBP. The French blood establishment (EFS: Etablissement français du sang), the Army blood centre (CTSA: Centre de transfusion sanguine des armées) and 25 haemovigilance coordinators (CRH: Coordonnateurs régionaux d'hémovigilance) take part in the network, as well as the National institute for public health surveillance (InVS: Institut de veille sanitaire) for the epidemiological follow-up of donors.

That year, the Commission directive 2004/33/CE (implementing Directive 2002/98/EC of the European Parliament and of the Council as regards certain technical requirements for blood and blood components) and the law passed on August 9 (modifying the definition of the haemovigilance and extending the obligation to develop good practices guidelines in hospital blood banks) were published.

1. Source of data, scale of seriousness and imputability levels

Sources of data are:

- EFS, CTSA and InVS for donors and donation data.
- EFS, CTSA, public and private hospitals, CRH for recipients, LBP and traceability.
- Haemovigilance officers for reported adverse reactions.

Scale of seriousness

- grade 4: death during or after transfusion
- grade 3: life threatening adverse reaction
- grade 2: long-term morbidity (i.e. mainly: transfusion-transmitted viral infection and alloimmunization)
- grade 1: minor adverse reaction
- grade 0: inappropriate transfusion of a labile blood product consecutive to one or several dysfunctions, without any clinical or biological consequence for the recipient

Imputability levels

Temporal relationship to the transfusion and

- level 4: certain = conclusive evidence for attributing the adverse reaction to the blood transfusion
- level 3: likely = evidence in favour of attributing the adverse reaction to the blood transfusion without any other obvious causes
- level 2: possible = evidence is indeterminate for attributing the adverse reaction either to the blood transfusion or to alternative causes
- level 1: doubtful = other possible causes but no evidence for excluding the role of the blood transfusion in the occurrence of the adverse effect
- level 0: excluded = conclusive evidence for attributing the adverse reaction to causes other than the blood transfusion

Afssaps has developed in 2004 a new on-line reporting system, e-FIT (https://e-fit.afssaps.fr/rnhv/rnhv/loginApplet.html), enabling the haemovigilance officers of blood establishments and of hospitals to submit the notification form. The EFS, the CTSA, the CRH and the Afssaps have clearance to this website.

The actual traceability is the knowledge by the EFS of the final destination of LBP issued from its blood establishments. It requires a close collaboration between health care centres and blood establishments so that the information related to such traceability may be exchanged between the various centres and includes data on order, distribution and use of the products. Computerized registration of traceability data and transmission by Internet are implemented in some French administrative regions.

2. Transfusion data

1,535,900 volunteers, 25% of which being new donors, donated blood in 2004. They account for 4% of the French population and tend to be younger than the national average age, with a sex ratio equal to 1.
The EFS and the CTSA issued 2,546,620 LBP to 1,650 public and private hospitals. Transfusion was performed on about 465,500 recipients. The number of recipients was decreasing though the number of LBP issued was slightly increasing compared to the previous years. The number of LBP discarded by health care centres went down to 84,250.

Total issues of labile blood products from EFS and CTSA in 2004:

Red cells	2,012,590	
Platelets	184,848	(aphaeresis)
	26,041	(pooled)
Plasma	272,118	
Autologous	51,023	
TOTAL	2,546,620	

3. Haemovigilance data

3.1. Adverse reactions

7,557 adverse reactions were reported in 2004. Among them, 5,658 (75%) were of minor gravity (grade 1) and 1,494 (20%) caused a long-term morbidity (grade 2); 34 deaths and 223 life threatening adverse reactions were reported. Inappropriate transfusion was related to 148 case reports.
The imputability to transfusion was excluded or doubtful in 1,859 (25%) reports, certain or likely in 3,161 (42%) and possible in the 2,537 (33%) remaining cases.

The 5,465 reports in which the imputability level was equal to or higher than 2 were analysed. The risks were calculated onto the period 2000 – 2004, unless indicated otherwise.

- There were 10 transfusion related deaths with an imputability level from possible (imputability 2) to certain (imputability 4). Five were related to an acute haemolytic transfusion reaction (among them, one ABO incompatible red cells transfusion). One patient died due to TRALI, one death was reported as circulatory overload and one was related to an allergic reaction. In two cases, no explanation could be found for the death. No death due to bacterial infection from transfused blood products was reported in 2004. The overall risk of death due to transfusion onto the 5-year period from 2000 to 2004 is 1 per 163,910 issued LBP.
- 1,580 allergic reactions were reported of which 39 were considered as life threatening and 1 caused death of the patient. The risk of allergy is 1 per 1,720 issued LBP (1/190 for aphaeresis platelets). Many patients (21%) had a history of allergy or had already been reported for adverse reactions to transfusion.
- 1,073 case reports of febrile nonhaemolytic transfusion reactions (FNHTR) were analysed. The risk vary from 1 per 570 platelets units to 1 for 1,400 red blood cells units, onto the five-year period.
- There were 1,216 case reports of alloimmunization following red blood cells (RBC) transfusion. Main antibodies are Jk1, KEL1, RH3, Fy1, Lu1, RH1, RH4, MNS3, RH2 and KEL3. The risk for the considered period is 1 per 1890 LBP.
- Among 298 acute reactions due to immunological incompatibility, 22 were related to ABO incompatible transfusions. Of these 22 cases, aphaeresis platelet concentrate was the implicated component in 4, fresh frozen plasma in 1 and RBC in the remaining 17. One death was reported. In

all cases, errors occurred in the hospital, and in two cases in the blood establishment also. The risk of developing an ABO incompatible acute reaction is 1 per 111,220 LBP. For other blood group systems and mainly for HLA system, it is 1 per 8,900 LBP.

- Transfusion associated circulatory overload (TACO) was diagnosed in 186 adverse reactions. One patient died. The risk of TACO is 1 per 13,580 issued LBP and the risk of death is 1 per 541,620 LBP. TACO is the most common cause of transfusion related death for the reference period.
- In 2004, 19 reports of suspected transfusion transmitted viral infections (TTVI) were forwarded to Afssaps. Only 3 were related to transfusions done in that year (1 HCV, 1 HBV, 1 CMV) and the relationship with the transfusion was considered possible (imputability 2) in the three cases. The observed risk of transfusion related viral infection onto the period from 2002 (implementation of NAT for HIV and HCV) and 2004 is 1 per 7,500,000 LBP (HIV), 1 per 1,500,000 LBP (HCV and HBV), and 1 per 1,250,000 LBP (CMV).
- 18 cases of transfusion-related acute lung injury (TRALI) were reported. The risk is 1 per 138,900 LBP. One death occurred.
- There were 15 reports of suspected transfusion transmitted bacterial infection (TTBI). Bacteria were isolated from 10 LBP. The risk onto the five-year period is 1 per 22,080 pooled platelets concentrates, 1 per 25,540 aphaeresis platelets concentrates and 1 per 336,790 RBC concentrates. The most frequent germs are staphylococci, propionibacteria, streptococci and bacilli.
- Many adverse reactions could not be related to a specific diagnosis.

3.2. Grade 0

A grade 0 transfusion incident is defined as an inappropriate transfusion of blood component due to one or several failures without immediate clinical or biological consequences for the recipient. In 2004, 140 events were reported.
Quantitatively, 45% of grade 0 transfusion incidents correspond to attribution errors. The site of origin of grade 0 incidents is for almost 75% linked to health establishment, clinical unit or hospital blood bank, for 22% linked to both blood and health establishment, and for 3% linked to the blood establishment only. Complete analysis has notably shown that 9% of the incidents are due to errors in blood component prescription.
Near miss events are not reported as grade 0 because LBP are not transfused in theses events.

3.3. Traceability

In 2004, the overall traceability, that is information about transfused or discarded LBP, reached 99.05%. Disposal by hospitals of issued LBP constantly decreases each year; 84,250 LBP were destroyed in 2004.

3.4. Post donation information

Blood establishments receive post donation information (PDI), from donor or other sources, after the blood donation. Because the safety of components issued from this donation is uncertain, measures have to be taken by the blood establishment. If LBP were issued from this blood donation, a report is transmitted to Afssaps.
Afssaps received 296 reports of PDI in 2004 (1 per 8,600 blood donation).

4. Conclusion and recommendations

The analysis of transfusion related mortality confirms the needs for continuing clinical staff education and training.
Because of their frequency, febrile nonhaemolytic and allergic reactions must be better assessed.
Number of TRALI justifies a working group under the guidance of Afssaps.
A thought on prevention measures is needed considering the number of alloimmunization and immunological incompatibility reports.
Investigation of bacterial infections by transfused blood products should continue and prevention measures should be evaluated.
Traceability should be maintained at a high level.