



Article

Red Blood Cell Transfusion in the Emergency Department: An Observational Cross-Sectional Multicenter Study

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Etude rétrospective, observationnelle

- Tous les patients adultes transfusés en CGR jan-fev 2018
- 12 SAU:
 - A Paré (Boulogne)
 - A Mignot (Versailles)
 - Beaujon (Clichy)
 - Bichat (Paris)
 - Cochin (Paris)
 - Lariboisière (Paris)
 - HEGP (Paris)
 - H Mondor (Créteil)
 - Pitié-Salpêtrière (Paris)
 - Saint-Antoine (Paris)
 - Saint-Louis (Paris)
 - Tenon (Paris)
- Objectif essentiellement descriptif:
 - Quels patients?
 - Quels motifs?
 - Quels seuils transfusionnels?
 - Quels EIR?

N=529 patients

- Soit 0.7 patient par jour et par centre
- 4.4% des CGR de l'hôpital

Table 1. General characteristics of patients transfused with red blood cells in the ED.

Variable	Missing Data		
<i>N</i>	529		
Female gender, <i>n</i> (%)	277	(52.4)	0
Age (years), median (IQR)	74	(59–85)	0
Night shift (6 p.m.–8 a.m.), <i>n</i> (%)	185	(35.4)	6
Medical history, <i>n</i> (%)			
None	72	(13.7)	4
Hypertension	235	(44.8)	4
Coronary artery disease	144	(27.5)	4
Chronic heart failure	74	(14.1)	3
Chronic pulmonary disease	55	(10.4)	2
Renal insufficiency	18	(3.4)	4
Iron or vitamin deficiency	97	(18.3)	0
Solid malignancy	109	(20.7)	3
Hematological malignancy	69	(13.4)	4
Non-malignant hematological disease	15	(2.9)	4
Chemotherapy < 1 month, <i>n</i> (%)	62	(12.0)	12
Iterative transfusions <i>n</i> (%)	73	(14.1)	13
Bleeding risk, <i>n</i> (%)			
Medication	238	(45.6)	7
Antiplatelet therapy	135	(25.9)	
Vitamin K antagonist	48	(9.2)	
Direct oral anticoagulant	38	(7.3)	
Heparin	36	(6.9)	
Non-steroidal anti-inflammatory drug	8	(1.5)	
Thrombopenia	63	(12.9)	40
Other *	83	(15.8)	3
Patient referred by, <i>n</i> (%)	289	(56.0)	13
General practitioner	97	(18.8)	
Laboratory	72	(14.0)	
Nursing home care institution	50	(9.7)	
Pre-hospital emergency service	26	(5.0)	
Specialist	17	(3.3)	
Other	14	(2.7)	

Anémie chronique >40%

* Angiodysplasia, peptic ulcer, esophageal varices, recent surgery.

Table 2. Reasons for ED referral and clinical exams at arrival of patients transfused with red blood cells in the ED.

Variables			Missing Data
	<i>N</i>	529	
Reasons for ED referral, <i>n</i> (%)			0
Anemia	191	(36.1)	0
Bleeding	187	(35.3)	0
Fatigue	156	(29.5)	0
Dizziness	39	(7.4)	0
Thoracic pain	37	(7.0)	0
Trauma	32	(6.0)	0
Neurological disorders	18	(3.4)	0
Physical examination, <i>n</i> (%)			
Tachycardia (≥ 100 /bpm)	169	(32.6)	10
Dyspnea	101	(19.3)	6
Shock	57	(10.9)	4
Altered mental status	32	(6.1)	5
Any bleeding observed in the ED, <i>n</i> (%)	242	(46.0)	3
Gastro-intestinal	145	(27.6)	3
Cutaneous	29	(5.5)	3
Mucosal *	22	(4.2)	3
Genitourinary	21	(4.0)	3
Urinary	17	(3.2)	3
Peritoneal	3	(0.6)	3
Hemoptysis *	3	(0.6)	3

* One patient had both mucosal and hemoptysis.

Signes de gravité : 30%

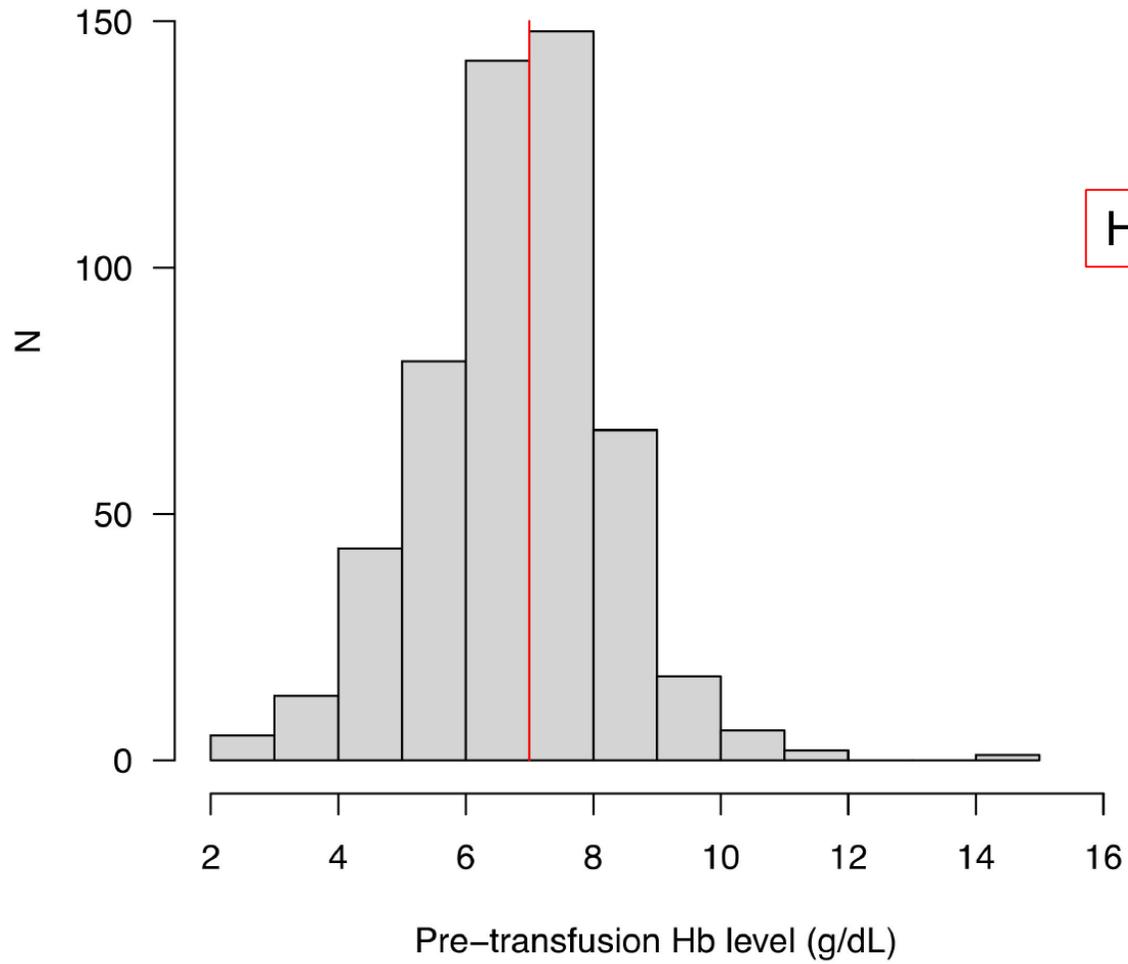
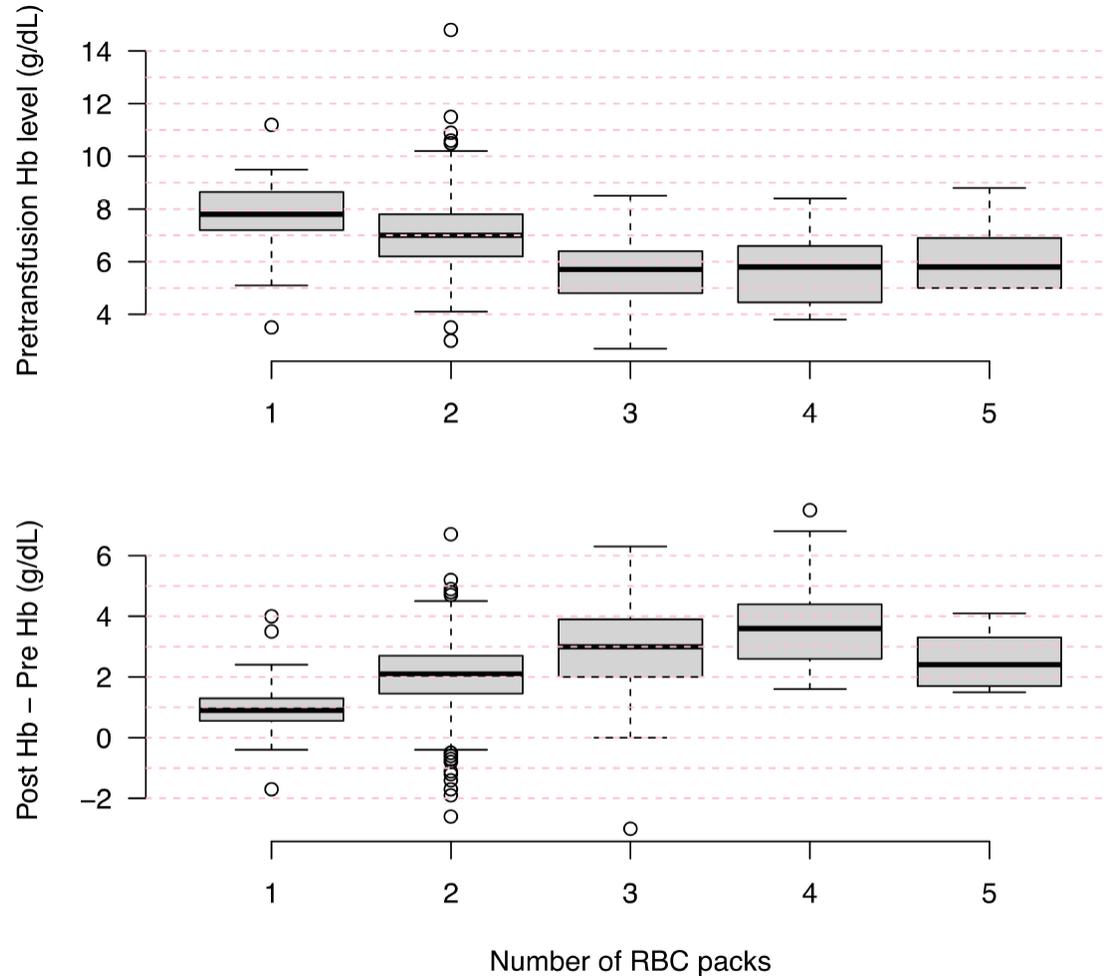


Figure 1. Histogram showing the distribution of the Hb level before transfusion ($N = 529$).



1 CGR : 72 (14.1%)
2 CGR : 333 (65%)
3 CGR : 70 (13.7%)
> 3 CGR : 37 (7.2%)

Hb post-transfu : **8.9 (8.1–9.8) g/dL**



103 patients (19.5%) ont été « trop » transfusés (Hb post-transfu >10 gr/dL) :

- Cardiopathie ischémique
- HTA
- IC chronique



68 (68%) ont reçu 2 CGR
22 (22%) ont reçu > 2 CGR

Figure 5. Boxplots of the pretransfusion Hb level and the Hb difference before and after transfusion depending on the number of transfused red blood cell packs in the ED (N = 512).

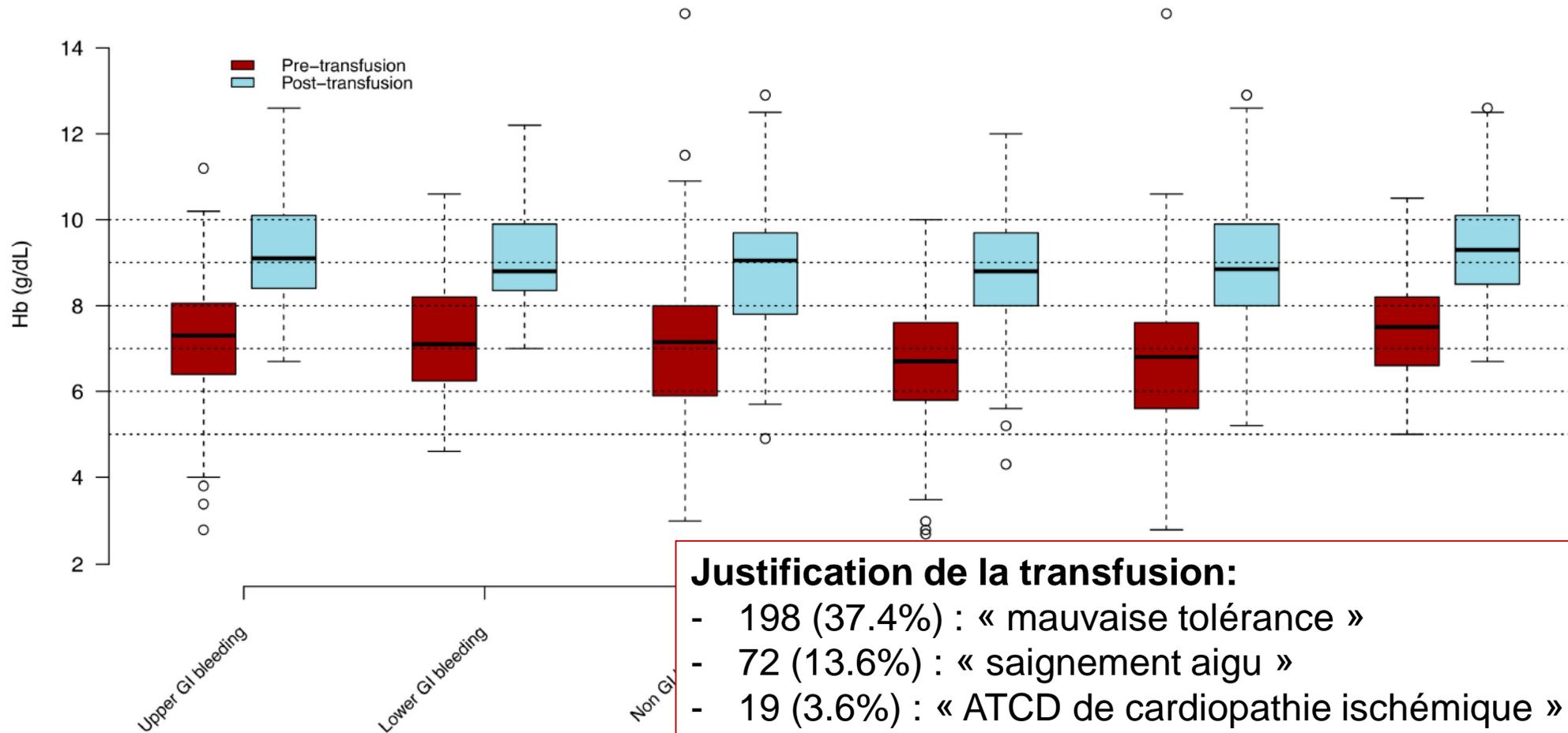


Figure 6. Boxplots of the pre-transfusion and post-transfusion hemoglobin levels in patients with acute bleeding in the ED, a life-threatening condition, and without a history of coronary artery disease.

Justification de la transfusion:

- 198 (37.4%) : « mauvaise tolérance »
- 72 (13.6%) : « saignement aigu »
- 19 (3.6%) : « ATCD de cardiopathie ischémique »
- 14 (2.6%) : « cinétique rapide de l'anémie »
- 13 (2.5%) : « post chimiothérapie »
- 7 (1.3%) : « Hb basse »

Aucune justification dans le dossier : 206 (38.9%) patients

VARIABLES ASSOCIÉES À TRANSFUSION >8 g/dL

Régression logistique (ajustement sur la gravité clinique):

- ATCD de cardiopathie ischémique (OR: 2.09; 95% CI: 1.29–3.41)
- Présence d'un saignement aigu (OR: 2.44; 95% CI: 1.53–3.94)
- Age (OR: 1.02/année; 95% CI: 1.01–1.04).

EIR

- 8 (1.5%)
 - 6 OAP
 - 1 HTA
 - 1 hémolyse

Aucune admission en réa ou décès

Supplementary Table 3. Characteristics of the 6 patients that experienced pulmonary edema after ED RBC transfusion.

Patient	Age (years)	Medical history	Arterial BP at ED arrival	Acute bleeding	Transfusion justification	Life-threatening condition*	Pre-transfusion Hb level (g/dL)	Number of RBC packs
1	88	Hypertension	120/69	Non-GI bleeding	Poor tolerance	Yes	7.2	1
2	77	Missing data	169/78	No	Poor tolerance	Yes	8.9	1
3	96	Hypertension / Coronary vessel disease	136/52	No	Poor tolerance	Yes	6.7	2
4	81	Hypertension / Coronary vessel disease	189/68	No	Dyspnea	Yes	7.8	1
5	63	Hypertension	119/41	No	Missing	No	3.9	4
6	97	Hypertension / Coronary vessel disease	103/47	Non-GI bleeding	Hemorrhagic shock	Yes	5.1	3

BP blood pressure, ED emergency department, GI gastro-intestinal, Hb hemoglobin, RBC red blood cell

* Shock, dyspnea or altered mental status

Hospitalisation et devenir

448 (84.7%) sont hospitalisés en unité d'hospitalisation de courte durée (« portes »)

Parmi ces patients, 130 (29%) y sont restés <24h avant de rentrer chez eux

- 49 (9.3%) ont été admis en réa durant leur séjour dont 28 (57.1%) directement à partir des urgences
- Durée de séjour : 4 (1–11) jours.

Au final:

- 335 (77.2%) rentrent chez eux
- 76 (17.5%) sont transférés dans un autre hôpital
- 21 (4.8%) décèdent (97 missing data).

Conclusion

- Beaucoup de patients avec anémies chroniques (K, hémopathies, carences...)
- Mais aussi des patients graves et saignements aigus
- Seuils plutôt bas mais 20% de patients « trop transfusés »
- Manque de justification dans les dossiers
- Modalités transfusionnelles:
 - Objectifs d'Hb et nb de CGR (privilégier le séquentiel)

Transfusion de globules rouges homologues : produits, indications alternatives

PARTIE 2 : ANESTHÉSIE, RÉANIMATION, CHIRURGIE, URGENCE

5.1 Indications, modalités et seuil transfusionnel en anesthésie

5.2 Indications, modalités et seuil transfusionnel en réanimation

- ▶ **Prise en charge en réanimation**
- ▶ **Cas particulier du seuil transfusionnel chez le patient traumatisé**
- ▶ **Cas particulier de la transfusion massive**
- ▶ **Cas particulier de la neuroréanimation**
- ▶ **Cas particulier de la prise en charge des hémorragies digestives**

B	<p>Le seuil transfusionnel de 7 g/dl est recommandé en l'absence d'insuffisance coronarienne aiguë, y compris chez les patients ayant une cardiopathie chronique équilibrée.</p> <p>En présence d'une insuffisance coronarienne aiguë, le seuil transfusionnel est alors de 10 g/dl d'Hb.</p>
B	<p>Le seuil transfusionnel recommandé est de 7g/dl dans le cadre d'une hémorragie digestive.</p>
B	<p>Hors traumatisme crânien et hors transfusion massive, le seuil transfusionnel recommandé est de 7 g/dl en l'absence de mauvaise tolérance clinique.</p>

Patient Blood Management Recommendations From the 2018 Frankfurt Consensus Conference

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Table 2. Clinical Recommendations: Red Blood Cell Transfusion Thresholds

Clinical Recommendation	Level of Evidence
CR5—Restrictive RBC transfusion threshold (hemoglobin concentration <7 g/dL) in critically ill but clinically stable intensive care patients	Strong recommendation, moderate certainty in the evidence of effects
CR6—Restrictive RBC transfusion threshold (hemoglobin concentration <7.5 g/dL) in patients undergoing cardiac surgery	Strong recommendation, moderate certainty in the evidence of effects
CR7—Restrictive transfusion threshold (hemoglobin concentration <8 g/dL) in patients with hip fracture and cardiovascular disease or other risk factors	Conditional recommendation, moderate certainty in the evidence of effects
CR8—Restrictive transfusion threshold (hemoglobin concentration 7-8 g/dL) in hemodynamically stable patients with acute gastrointestinal bleeding	Conditional recommendation, low certainty in the evidence of effects

Abbreviations: CR, clinical recommendation; RBC, red blood cell.

QUESTION Is a restrictive strategy of blood transfusion noninferior to a liberal strategy among patients with acute myocardial infarction (MI) and anemia?

CONCLUSION This trial found that a restrictive transfusion strategy vs a liberal one resulted in a noninferior rate of MACE among patients with acute MI and anemia, but the confidence interval included what may be a clinically important harm.

POPULATION

385 Men
281 Women



Adults with MI and anemia
(hemoglobin, 7-10 g/dL)

Median age: 77 years

LOCATIONS

35 Hospitals
in France and Spain



INTERVENTION



668 Patients randomized
666 Patients analyzed



342

Restrictive transfusion

Transfusion triggered by hemoglobin ≤ 8 g/dL

324

Liberal transfusion

Transfusion triggered by hemoglobin ≤ 10 g/dL

PRIMARY OUTCOME

MACE (composite of all-cause death, stroke, recurrent MI, or emergency revascularization prompted by ischemia) at 30 days. (Noninferiority = upper CI of < 1.25)

FINDINGS

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Occurrence of MACE at 30 days

Restrictive transfusion

36 of 342 patients
(95% CI, 7.5% to 14.6%)



11%

Liberal transfusion

45 of 324 patients
(95% CI, 10.0% to 17.9%)



14%

Between-group difference:

-3.0% (95% CI, -8.4% to 2.4%)

Relative risk for the primary outcome:

0.79 (1-sided 97.5% CI, 0 to 1.19), meeting criteria for noninferiority