Hemovigilance:
bacterial problems

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all hospital hemovigilance staff

26-6-2010

TRIP definitions 2003-2007

Non-hemolytic febrile transfusion reaction (NHFTR)

- Rise in temperature ≥ 2°C (with or without rigors) during or in the first two hours after a transfusion, with no other relevant symptoms or signs;
- or rigors with temp. ≥ 39°C (temp. may or may not be pre-existent); or rigors with 1 - 2 °C rise in temp during the same time limits
- Investigations: 2,3,4 all negative (see slide 7)

Old definitions

Bacterial contamination

- Bacteremia following a blood transfusion. Clinical signs may be indistinguishable from a hemolytic transfusion reaction.
- Investigations: 4 positive; 2 and 3 negative (see slide 7)

Bacterial contamination 2003-2007

- Imputability:

  definite requires pos patient blood culture and the same bacterial species on unit (or other material from same donation)

Old definition

Unsatisfactory!

What of:

Pt with temp, unit pos. bacteriological culture but blood culture negative

Pt with temp, unit negative but blood culture positive

Blood service finds pos bacteria screening result, pt no symptoms

New transfusion reaction definitions (2008)

Non-hemolytic transfusion reaction (NHTR)

- Rise in temperature of ≥ 2°C (with or without rigors) during or in the first two hours after a transfusion, OR rigors in the same period, without other relevant symptoms or signs; normalization within 24 hours of transfusion.
- Investigations: 1,2,3,4 all negative and there is no other likely explanation

Post-transfusion bacteremia/sepsis

- Clinical features of bacteremia / sepsis during, soon after or a longer time after a transfusion, with a relevant positive blood culture in the patient and sometimes with confirmation of a causal link with a transfused blood component.
- Investigations: 4 positive

New (incident) definitions (2008)

Bacterially contaminated blood component

- Using aseptic sampling and appropriate laboratory methods, demonstrating a relevant quantity of bacteria in a (remnant of a) blood component, material used for bacterial screening of platelets or a blood component derived from the same donation as a unit with an initial positive screening result; preferably with confirmatory typing of the bacterial strain.

Positive bacteria screening

- Any case where the blood service finds an initial positive result on a blood component but bacterial contamination is not confirmed on culturing the material or another component derived from the same donation(s). *(optional reporting to TRIP)*.

Reaction *if any*: **assign supplementary category, severity, imputability**

Recommended testing

1. Exclude administrative error
2. Hemolysis testing (biochemistry)
3. Blood group serology
4. Bacteriological investigation
5. Investigation in patient with difficulty in breathing/suspicion of TRALI
6. Further investigation following anaphylactic reaction

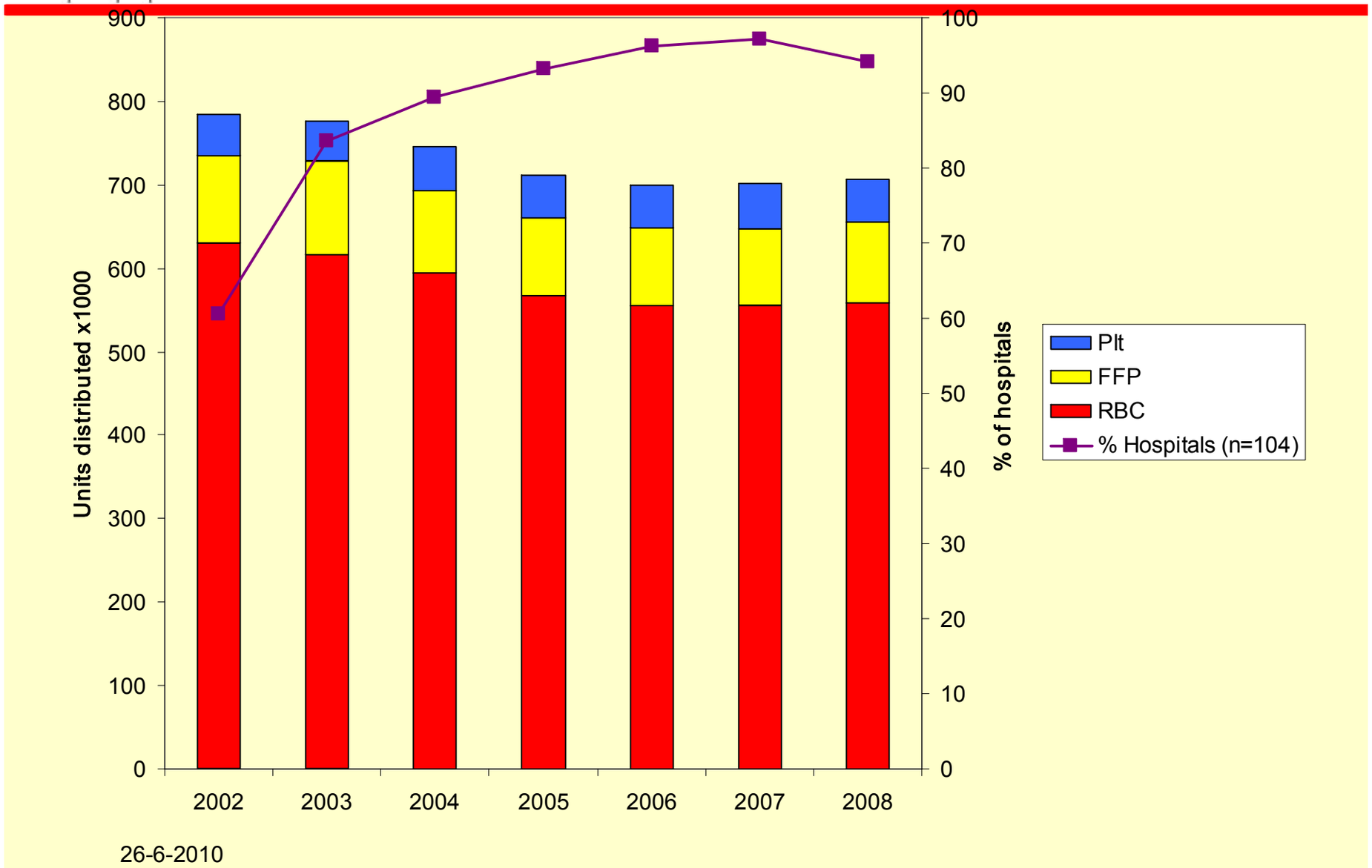
Recommended testing

1. **Exclude administrative error**
2. **Hemolysis testing (biochemistry)**
3. **Bloed group serology**
4. **Bacteriological investigation**
   - Take blood cultures (aerobic/anaerobic) from patient.
   - Take cultures (aerobic/anaerobic) from remnant of unit and all blood products administered before or during the transfusion reaction.
   - If the same bacteria are found in the patient as in the bag (providing this has been appropriately taken down and conserved) contamination is ‘certain’; preferably further testing will be carried out to confirm identity of the strains.
5. **Investigation in patient with difficulty in breathing/suspicion of TRALI**
6. **Further investigation following anaphylactic reaction**

TRIP rapport 2008
Hemovigilantie

26-6-2010

Setting


Units distributed x1000
% of hospitals
900
800
700
600
500
400
300
200
100
0
100
90
80
70
60
50
40
30
20
10
0
2002
2003
2004
2005
2006
2007
2008
Plt
FFP
RBC
% Hospitals (n=104)

Setting (2)

- Universal leukodepletion
- Pouch diversion
- Bacterial screening of all platelet concentrates
- Platelets >80% buffy coat 5-D

TTBI Transfusion transmitted bacterial infection

2003-7	Yearly average	2008	No. In 2008
Bacterial contamination	10	Post-transfusion bacteremia/sepsis	35
“Real” TTBI Definite imputability	1-2	“Real” TTBI Definite imputability	1
(Hospitals optionally reporting on pt following recall for pos bacteria screening) With TR approx.	35 1	Bacterially contaminated bp •Hospital •Sanquin, info from hosp With TR:	25 5 20 3
NHTR 26-6-2010	400-450	NHTR	453

Can be helpful (1)

- RBC transfusion, patient develops flushing + (later) temp. >39^{o}C
- Hospital: bacillus species (unit)
- Blood cultures negative (under AB treatment)
- Report registered as

  Bacterially contaminated unit

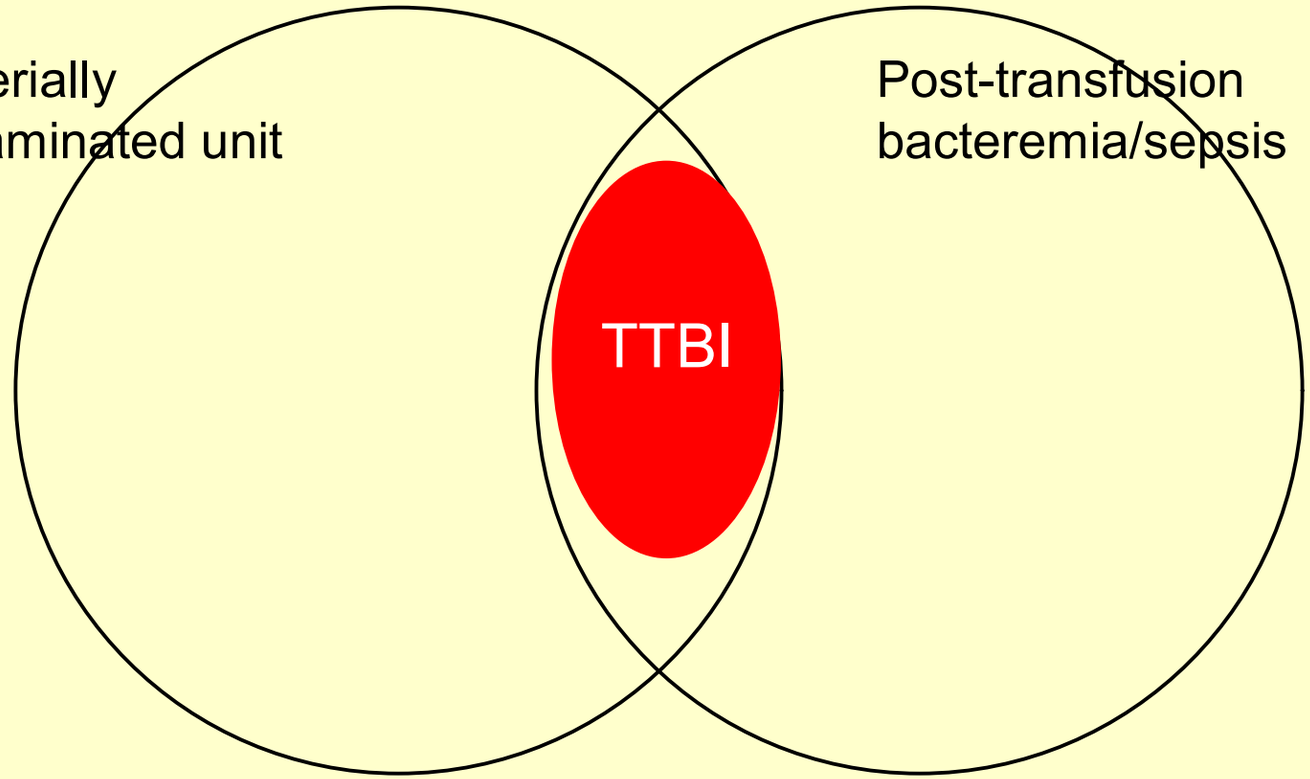
  Supplementary category other reaction, gr 1, probable

Can be helpful (2)

- Patient develops temp and rigors, 1 hour after start platelet transfusion
- Unit: no growth
- Blood cultures taken: st. epidermidis (3 out of 4 bottles)
- Rx: vancomycin
- IV placed just before tf.
- Report registered as

  Post-transfusion bacteremia, severity grade 2

  Imputability …. ?


Bacterially
contaminated unit
Post-transfusion
bacteremia/sepsis
TTBI

Assessing imputability

Blood culture	Unit culture	Platelet unit screening (if relevant)	Micro-organisms identical?
Pos Neg Not done	Pos Neg Not done	Pos Neg Not done	Yes Maybe Different
Cultures taken under appropriate conditions? Rare or common micro-organism Other possible source?			

Still not perfect

- Patient receives 2 platelet concentrates
- Rise in temp during second unit
- Later Sanquin fax: first unit screened positive (Propioni species)
- Patient blood cultures negative
- Report registered as

  Bacterially contaminated unit

  Subsidiary category NHTR (grade 1) ?
  imputability definite ?

Bacteria

- Blood service screening (info from hospitals)

B. Cereus	1	Prop. bacterium	20
Micrococcus sp.	1	Gram pos rods	1
Gram pos cocci	1	Staph. epidermidis	2
Micrococcus luteus	1		

- Bacterially contaminated blood component (detected by hospitals)

Coag neg staph	1	Corynebacterium sp	1
Bacillus sp	1	Hemolytic str. Gr B	1
Staph epidermidis	1		

“True TTBI” 2002-8

Pt blood culture	Unit	Bact screening	Sev. grade	Component
B cereus	B cereus	Neg	2	Platelets 3x
Group G B-hemolytic str	Group G B-hemolytic str	Neg	2	Platelets 2x
Coagulase negative staph.	Coagulase negative staph.	N/A	2	RBC
Staph epidermidis	Staph epidermidis	Neg	2	Platelets
Coagulase positive staph.	Coagulase positive staph.	Neg	3	Platelets
Staph epidermidis and salivarius	Staph epidermidis and salivarius	N/A	2	Plasma
Staph epidermidis	Staph epidermidis	Neg.	1	Platelets
Staph aureus	Staph aureus	Neg.	3	Platelets

Conclusions

- Criteria needed for imputability
- For international comparison only ‘true’ TTBI should be included
- New TRIP definitions help in capturing data for analysis
- Comments and suggestions welcome