

A voluntary System of Haemovigilance in Denmark DART

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Introduction

The **Danish Registration of Transfusion Risks (DART)** is a part of the Danish haemovigilance system that covers registration of collected, produced and transfused blood components, and complications in connection with transfusion of these. DART is an organisation under the Danish Society of Clinical Immunology (DSKI), and is run on a voluntary and confidential basis similar to that of Serious Hazards of Transfusion (SHOT) in the UK. The DART report forms include the same questions as those of SHOT making comparison with SHOT reports possible.

Collection of DART reports began in 1999 and in 2001 collection of near miss reports was started as a pilot study involving the five largest transfusion centres in Denmark (data not shown).

Aim

To develop an open learning- and improvement culture for errors and risks in blood transfusion in Denmark in which DART reporting is a key element.

Methods

A report concerning a severe transfusion risk or error is filled out by the person responsible for the local hospital blood bank, and sent to the regional blood transfusion centre. After approval, the report is forwarded to DART.

Results

During the first five years, DART received 105 reports concerning a severe risk/error. In Denmark, approximately 450,000 blood components are transfused per year. Thus, the report rate to DART was about 4 per 100,000 components transfused. The cumulative data for distribution of events according to reporting category is shown in Figure 1. Half of the severe events (53%) concerned the transfusion of an incorrect blood component (IBCT), and the other half were concerned with immunological complications (43%). Only 4% of the reported events concerned transfusion transmitted infections (TTI).

Transfusion of an incorrect blood component (IBCT)

The IBCT events (56) included 10 cases with transfusion of AB0 major incompatible red cells (one blood group B patient died after receiving 100 ml type A blood). In 2 of the 10 cases the blood components were labelled with the wrong AB0 type. In 20 cases the unit was labelled with the name and social security number of another person but nevertheless given to the wrong patient, whereas in 34 cases the unit was dedicated to the patient, but the kind of component was wrong.

Immunological complications

The immunological complications included 6 acute haemolytic reactions (2 anti-Wra, 2 anti-Fya and 2 undetermined), 11 acute anaphylactic reactions (1 anti-IgA and 10 unknown), 9 transfusion related acute lung injury, and 17 delayed haemolytic reactions (Duffy, Kell, Kidd, Lutheran, Rhesus, and S).

Transfusion transmitted infections (TTI)

Three of 4 TTI cases were due to bacterial contamination caused by platelets and in 1 case transmission of HBV was observed.

Transfusion risks for each blood component

In Table 1 the transfusion risks calculated per 1 mill. transfusions of each component have been given. The data shows that incorrect transfusions of red cell component occurred two times more frequent than in transfusions of plasma. However, the risk for an immunological complication caused by fresh frozen plasma was two times the risk for red cells transfusion. The risk for TTI (bacterial contamination) was only seen after transfusions with platelets. The all over risks were similar for red cell and plasma transfusions.

Comparison of SHOT and DART

Table 2 shows a comparison of the data for risk of blood transfusion from SHOT and DART.

The risk of getting an IBCT and the total risks of blood transfusion in UK was two times the risk in Denmark. However, the report rate to SHOT was two times more frequent (about 8 per 100,000 components transfused) than the report rate to DART.

The risk per 100,000 transfused components (ratio) of death after blood transfusion in UK (0.4) was two times the risk ratio in Denmark.

The risk ratio of major morbidity for SHOT (1.0) and DART (1.1) patients was very similar (Table 3).

Conclusion

A systematic, countrywide, voluntary, and anonymous registration of transfusion risks in Denmark has shown that

- The biggest category reported to DART was blood transfusion errors
- The ratio of a fatal complication caused by blood transfusion error or immunological reaction occurred with the same ratio as transmission of HBV and HCV by blood transfusion (0.2/100,000)
- The risk of an immunological complication caused by transfusion of fresh frozen plasma was two times the risk for red cells transfusion
- The main risk of transfusion transmitted infections was bacterial contamination caused by platelet transfusion

The following recommendations have been implemented as a consequence of the DART results

- **To decrease the risk of TRALI:**
Fresh frozen plasma only from untransfused male donors is used for transfusion
- **To decrease the risk of transfusion transmitted bacterial infection:**
Bacterial control of all produced platelet units

Discussion has been started on how to implement electronic aids for bedside checking of identifications of the blood components against those of the patients.

An annual report has been sent to the directors of the hospital blood banks, to the chairmen of the transfusion committees, and to the national health authorities with the intention to increase the knowledge about the results.

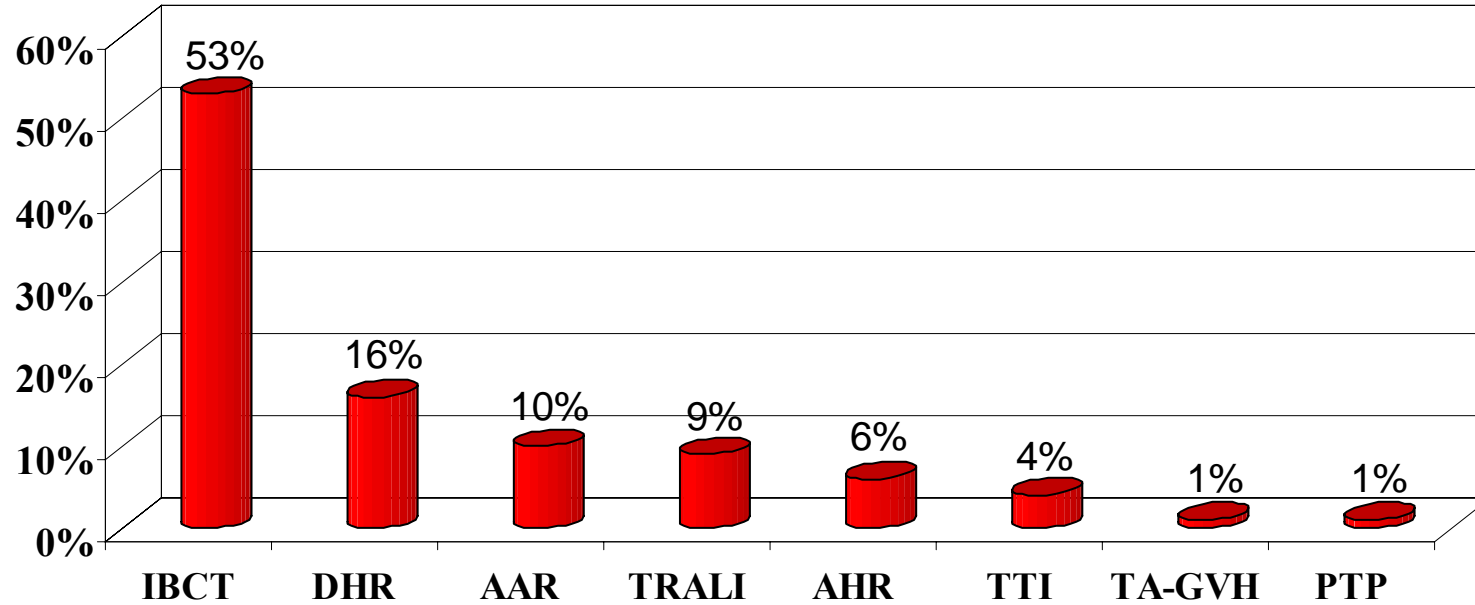
We acknowledge that incidents may go unrecognised or unreported, and that our data cannot provide a full picture of transfusion risks. However, the results obtained by DART have given rise to initiatives and recommendations aimed at reducing the transfusion risks.

References

1. Standards of Transfusion Medicine. Danish Society of Clinical Immunology. 2003.
2. Williamson LM and Love E: Reporting Serious Hazards of Transfusion: The SHOT Program. Transfus Med Rev 12: 28-35,1998.
3. Web site: <http://www.shot-uk.org>
4. Web site: <http://www.dski.suite.dk>

Figure 1 Data from DART reporting 1999-2003

N=105



ABBREVIATIONS

- IBCT** Incorrect blood component transfused
- DHR** Delayed haemolytic reaction
- AAR** Acute anaphylactic reaction
- TRALI** Transfusion-related acute lung injury
- AHR** Acute haemolytic reaction
- TTI** Transfusion-transmitted infections
- TA-GVHD** Transfusion-associated graft-versus-host disease
- PTP** Post-transfusion purpura

**Transfusion risk calculated per 1 mill. transfusions of each blood component
Cumulative data from DART 1999—2003**

	Blood Component		
	Red cell	Platelet	Plasma
Incorrect blood/component transfused	31	0	15
Immunological complication	19	5	37
Transfusion transmitted infection	1	7	0
All risks	51	12	52

Table 1

Risk of blood transfusion: Comparison of SHOT and DART

Type of event	Number		%		Ratio*	
	SHOT	DART	SHOT	DART	SHOT	DART
Incorrect blood component transfused	1045	56	64	53	5.2	2.3
Immunological complication	541	45	33	43	2.7	1.9
Acute transfusion reaction	194	17	12	16	1.0	0.7
Delayed transfusion reaction	188	17	12	16	0.9	0.7
PTP	43	1	3	1	0.2	0.1
TA-GVHD	13	1	1	1	0.1	0.1
TRALI	103	9	6	9	0.5	0.4
Transmitted infection	37	4	2	4	0.2	0.2
Unclassified	7	0	<1	0	0.1	0
Total	1630	105	100	100	8.2	4.4

*Risk per 100,000 transfused components

SHOT (1996-2002): Transfused components: 20 million

DART (1999-2003): Transfused components: 2.4 million

Table 2

Transfusion related mortality/morbidity or 'Clinical Outcome' (SHOT)											
	IBCT	ATR		TRALI	DHR	PTP	TA-GVH	TTI	Total	SHOT Ratio*	DART Ratio*
Clinical outcome		AHR	AAR								
Death	2	0	0	0	1	0	1	0	4	0.4	0.2
Major morbidity	9	1	9	5	0	1	0	2	27	1.0	1.1
Minor or no morbidity	45	5	2	4	16	0	0	2	74	6.8	3.1
Total for all groups	56	6	11	9	17	1	1	4	105	8.2	4.4

IBCT Incorrect blood component transfused
 ATR Acute transfusion reaction (AHR and AAR)
 AHR Acute haemolytic reaction
 AAR Acute anaphylactic reaction
 TRALI Transfusion-related acute lung injury
 DHR Delayed haemolytic reaction
 PTP Post-transfusion purpura

TA-GVHD Transfusion-associated graft-versus-host disease
 TTI Transfusion-transmitted infection

*Risk per 100,000 transfused components
 SHOT: 20 million total
 DART: 2.4 million total

Table 3

“Learn from the mistakes of others--you can't live long enough to make them all yourself”

