2 YEARS EXPERIENCE WITH PATHOGEN INACTIVATION FOR ALL PLATELET CONCENTRATES IN SWITZERLAND

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Background

To the ongoing controversial discussion about the safety and efficacy of platelet transfusions, we contribute our Haemovigilance data covering 2 years routine transfusion of Intercept® pathogen inactivated platelet concentrates (PI-PC). Previously published data originating from clinical trials and regional active Haemovigilance surveillance programmes indicate that PI eliminates infectious transfusion complications and reduces frequency and severity of platelet related transfusion reactions (TR) in general[1-3]. Exposure of platelets to ultraviolet light (as applied during the Intercept® procedure) has been associated with an apparent increase in pulmonary adverse events (PAE) in clinical trials[4].

Aims

To analyse the frequency and severity of non-infectious TRs and specifically TRs with respiratory symptoms for conventional platelet concentrates (cPC) and PI-PC.

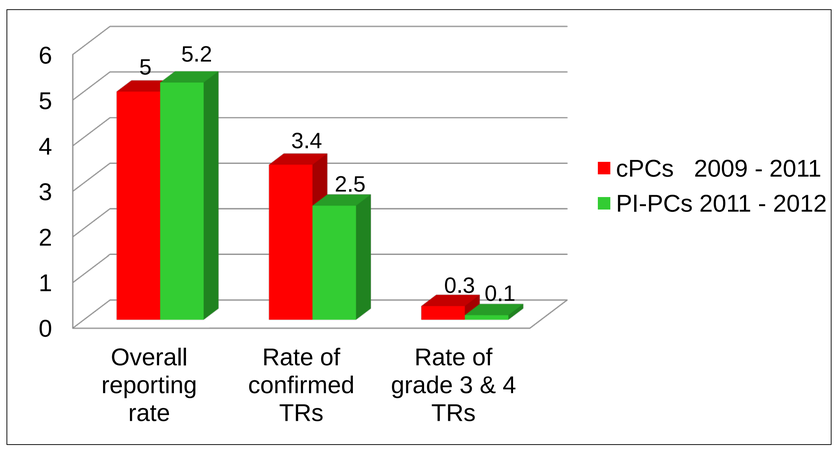
Methods

Based on numbers of transfused units and mandatorily reported adverse events, we compare the risks associated with cPC (2009/2010) and PI-PC (2011/2012) in Switzerland.

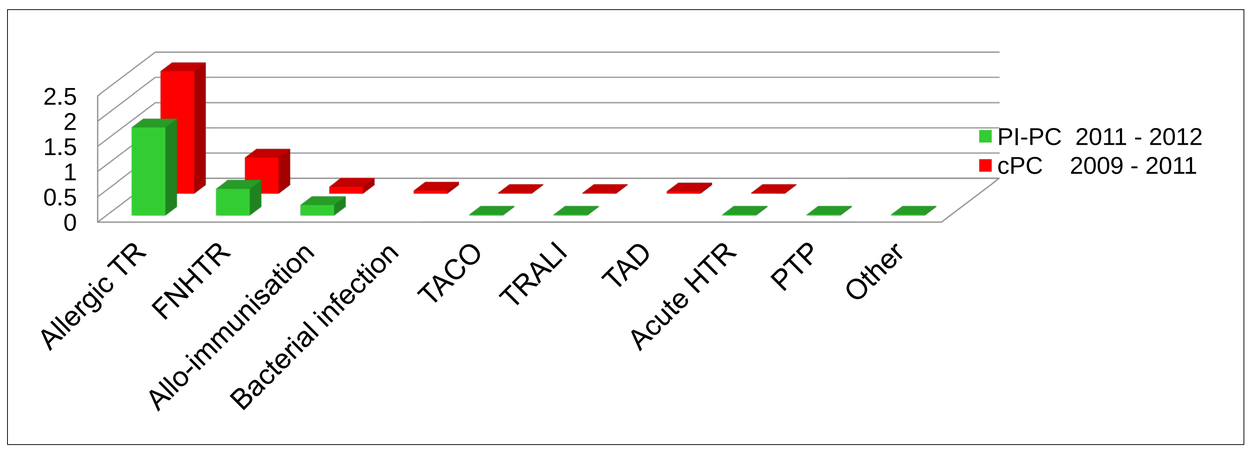
Results

The average annual increase in PC consumption of 10% over the past five years did not change significantly, nor did the red blood cell (RBC) consumption following introduction of PI for all PCs[5]. 66'000 cPCs were transfused in 2009, 2010 and 2011 whereas in 2011 and 2012, approximately 62'500 PI-PCs were administered (estimate for 2012 based on 2011 figures + 10%). During these periods, the weighted reporting rates for all blood components were 2.2 (2009-2001) and 2.7 (2011-2012) respectively. Accordingly, the total number of reports on suspected TRs to platelet concentrates correlate to reporting rates of 5.0 reports per 1000 cPC and 5.2 for PI-PC. Reporting rates of confirmed (imputability certain or probable) non-infectious transfusion reactions were lower for PI-PC (2.5/1'000) than for cPC (3.4/1'000) and life threatening TRs occur less frequently after PI-PC (0.1/1000 PC) than following cPC transfusion (0.3/1000). The distribution of the reported TRs by category for cPC and PI-PC is illustrated below. We observed 4 septic transfusion reactions (3 life threatening, 1 fatal) following cPC transfusions in 2009 and 2010. None were reported after PI-PC transfusion.

Reporting rates for cPC and PI-PC

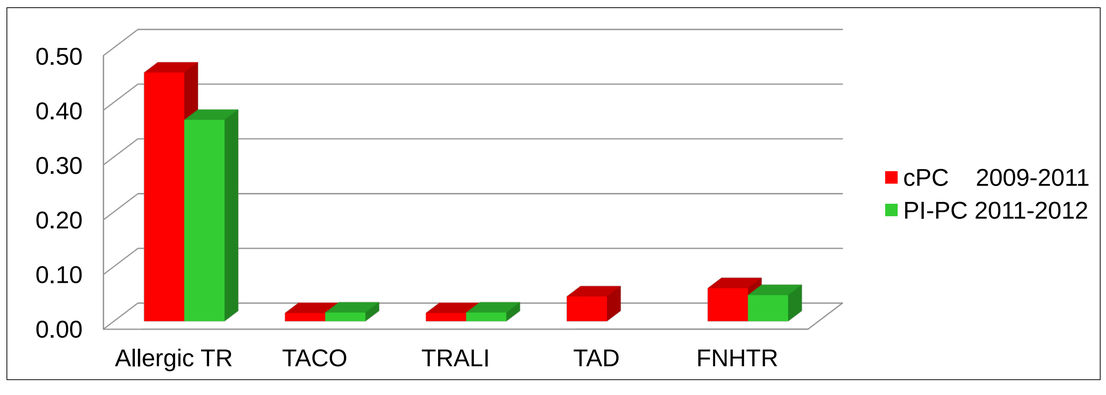


TR-rate for cPC and PI-PC by category

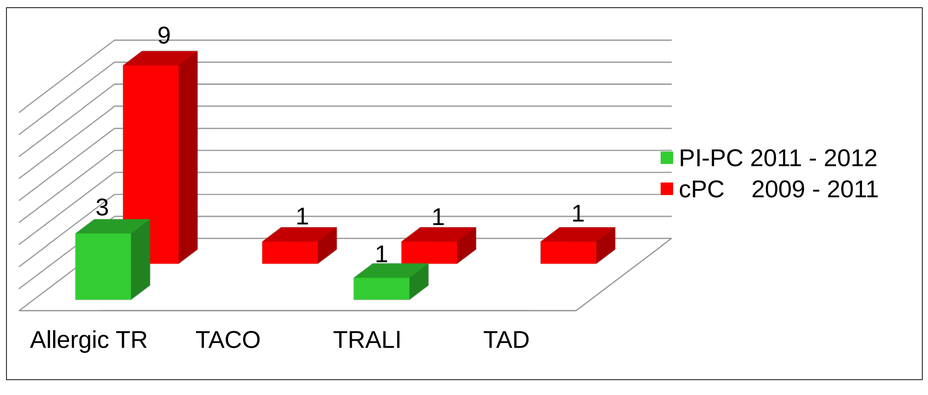


23 life threatening or fatal TRs following cPC transfusion were reported, including 4 cases of transfusion associated sepsis, 12 adverse pulmonary events and 7 allergic reactions without respiratory symptoms. The 6 grade 3 TRs after PI-PC transfusion consisted of 3 allergic reactions with respiratory symptoms, 2 without and 1 TRALI. Altogether 39 TR with respiratory symptoms were reported after cPC and 28 after PI-PC.

Rate of TR's with respiratory symptoms for cPC and PI-PC



Grade 3 TRs with respiratory symptoms for cPC and PI-PC



Risks of any and life threatening or fatal transfusion reactions for cPC and PI-PC

Transfusion reactions	2009 – 2011 cPCs		2011 – 2012 PI-PCs	
Units transfused	66'000		62'500	
Risk = 1 reaction per x PC transfusions	Reports	Risks	Reports	Risks
All High Imputability reports	223	~ 1:300	160	~ 1:400
High imputability grade 3 & 4 reports	23	~ 1:3'000	6	~ 1:10'000

Transfusion of cPC was associated with a risk of 1 confirmed TR in 300 transfusions, whereas the equivalent for PI-PC is 1 in 400. Life threatening events occurred with a frequency of 1 in 3'000 cPC and have declined to 1 in 10'000 PI-PC

Summary / Conclusion

The introduction of PI for all platelet concentrates was not associated with a higher platelet or RBC consumption.
Pathogen inactivation for all PC successfully prevents septic transfusion reactions. Non-infectious transfusion reactions in general and especially severe adverse events are less frequently reported since introduction of PI. The observed reduction of adverse transfusion events is probably due to the reduced plasma content in PI-PC (53 – 68% additive solution prerequisite for procedure). Gamma irradiation - applied to prevent residual leukocyte mediated transfusion associated graft versus host disease - is known to substantially impair platelet integrity and potentiate storage lesions. The PI-procedure renders gamma irradiation unnecessary and presumably causes less severe platelet damage and possibly fewer subsequent transfusion reactions. In contrast to the presumed association of the pathogen inactivation procedure with an increase in adverse pulmonary events, our data originating from daily clinical practice demonstrate fewer and less severe transfusion reactions with respiratory symptoms than after the transfusion of cPC. Our Haemovigilance data further support the favourable safety profile of PI-PC as described previously and do not indicate an increased risk for pulmonary adverse events.

References :
1) Osselaer JC, et al. Transfusion 2008;48:1061-1071, 2) Osselaer JC, et al. Vox Sanguinis 2008;94:315-323, 3) Infanti L, et al. Transfus Apher Sci 2011;45:175-181,
4) Corash L, et al. Blood 2011;117:1014-1020, 5) Jutzi M, et al. Transfus Med Hemother 2012;39(suppl 1):41 P3.16