Platelets

Past, Present and Future

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Why do we use platelet transfusions?



Haematology patients use the majority of platelet transfusions



Data from North West of England and Wales Audit of platelet use and wastage.

Pendry & Davies 2011. Blood and Transplant Matters. 17-19.

Platelet usage increasing



Majority of platelet transfusions are prophylactic

Reason for Transfusion	Audited episodes in each category	Appropriate	Indeterminate	Outside guidelines
Prophylactic	69%	60%	6%	34%
Pre -procedure	15%	64%	13%	23%
Therapeutic	13%	84%	12%	5%
Unclear	3%	0%	100%	0%

Platelet Transfusions in Haematology Patients: Are we using them appropriately? Estcourt *et al* 2012. Vox Sanguinis;103(4):284-293



Current Issues in Prophylactic Platelet Transfusion Studies

• Platelet dose

• Platelet threshold

• Therapeutic versus prophylactic

• Type of platelet component



Platelet Dose Number of Patients with clinically significant bleeding



Prophylactic platelet transfusion for prevention of bleeding in patients with haematological disorders after chemotherapy and stem cell transplantation Estcourt *et al* 2012. Cochrane Database of Systematic Reviews



Platelets Don't use two...





...when one will do

For prophylactic use in a 70kg adult, one adult therapeutic dose (ATD) typically gives an immediate rise in platelet count of

approximately 20 - 40 x 10%/I

Do not administer double dose platelets for prophylactic transfusions as this practice does not decrease the risk of bleeding

Request and administer one unit/ATD, then reassess your patient.

A platelet increment can be obtained 10 minutes after completion of the transfusion

- 1. McClelland 68L (Ed) (2008) Handbook of Transholon Medicine 4th Edition, The Stationery Office
- Sichter SI, Kashnan KM, Assmann SP, et al. Door of prophylicitic platelet translutions and presention of havenorthage. N Engl 1 Med 2010;362:600-13.
- O'Convell B, Lee EJ, Schiffler CA. The value of 10-minute post translation plateter counts. Translation 1998; 39: 66–67.

Further copies available from NHSBT CustomerSen/cedin/hibt nhs.uk December 2011 V1



Platelet Threshold Number of Patients with clinically significant bleeding

	Lower trigger		Higher trigger		Risk Ratio		Risk Ratio		
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl	M-H, Fixed, 95% Cl		
2.2.1 Platelet threshold < 10 vs. < 20									
Heckman 1997	17	37	7	41	14.9%	2.69 [1.26, 5.75]			
Rebulla 1997	29	135	24	120	57.2%	1.07 [0.66, 1.74]			
Subtotal (95% CI)		172		161	72.1 %	1.41 [0.95, 2.10]			
Total events	46		31						
Heterogeneity: Chi ² = 4.01, df = 1 (P = 0.05); l ² = 75%									
Test for overall effect: Z = 1.69 (P = 0.09)									
2.2.2 Platelet threshold < 10 vs. < 30									
Diedrich 2005	14	79	13	87	27.9%	1.19 [0.59, 2.37]			
Subtotal (95% CI)		79		87	27.9 %	1.19 [0.59, 2.37]			
Total events	14		13						
Heterogeneity: Not applicable									
Test for overall effect: Z = 0.48 (P = 0.63)									
Total (95% CI)		251		248	100.0%	1 35 [0 95 1 90]			
Total quanta	60	231		240	100.070	1.55 [0.55, 1.50]	-		
Heterogeneity. $Cn^2 = 4.17$, $u^2 = 2 (P = 0.12)$, $P = 52\%$ $0.1 \ 0.2 \ 0.5 \ 1 \ 2 \ 5 \ 10$									
Test for overall effect:	∠ = 1.69 (F	r = 0.09	,				Favours lower trigger Favours higher trigger		

Prophylactic platelet transfusion for prevention of bleeding in patients with haematological disorders after chemotherapy and stem cell transplantation Estcourt *et al* 2012. Cochrane Database of Systematic Reviews

Morning platelet count is a poor predictor of bleeding risk



Dose of prophylactic platelet transfusions and prevention of hemorrhage. Slichter *et al. NEJM* 2010;362:600-613

Relationship between number of platelet transfusions, platelet increments and days to next transfusion





Multicentre trials of prophylaxis vs. no prophylaxis



	German Study	/ (Wandt 2012)	TOPPS (Stanworth 2013)		
	Prophylaxis	No Prophylaxis	Prophylaxis	No Prophylaxis	
Number of Patients	194	197	298	300	
AML Patients	96	94	55	55	
Autologous SCT	98	103	210	210	
Platelet transfusions/ patient	2.44 (2.22 to 2.67)	1.63 (1.42 to 1.83)	3.0 ± 3.2	1.7 ± 2.6	
Proportion of patients receiving platelet transfusions	NR	NR	89% (266/298)	59% (176/300)	
Clinically significant bleeding	19%	42%	43% (128/298)	50% (151/300)	
Severe or life- threatening bleeding	2% (7/343 Rx cycles)	6% (21/301 Rx cycles)	0.3% (1/298)	2% (6/300)	
Bleeding in autologous sub-group	8% (3 to 14)	28% (19 to 37)	45%	47%	

Wandt *et al.* Therapeutic platelet transfusion versus routine prophylactic transfusion in patients with haematological malignancies: an open-label, multicentre, randomised study. *Lancet 2012. Stanworth et al.* A no-prophylaxis platelet transfusion strategy for hematologic malignancies. *NEJM 2013*

Pathogen-reduced platelets Number of Patients with any bleeding



Pathogen-reduced platelets for the prevention of bleeding. Butler et al. 2013. Cochrane Database of Systematic Reviews.

Pathogen-reduced platelets Number of platelet transfusions/day



Pathogen-reduced platelets for the prevention of bleeding. Butler et al. 2013 Cochrane Database of Systematic Reviews

Pathogen-reduced platelets platelet refractoriness



Pathogen-reduced platelets for the prevention of bleeding. Butler et al. 2013 Cochrane Database of Systematic Reviews

Review of current Issues in Prophylactic Platelet Transfusion Studies

• Platelet dose

• Platelet threshold

• Therapeutic versus prophylactic

• Type of platelet component

Future research

 More evidence required for use of platelet transfusions prior to procedures

 A better understanding of all haemostatic changes in patients with haematological disorders

 A more patient-centred approach to platelet transfusions required

Blood and Transplant



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