Transfusion Medicine Reviews 29 (2015) 3–13

Contents lists available at ScienceDirect

Transfusion Medicine Reviews

journal homepage: www.tmreviews.com

Original Articles

Guidance on Platelet Transfusion for Patients With Hypoproliferative Thrombocytopenia

See Editorial, pages 1–2

Susan Nahirniak [a,*], Sherrill J. Slichter [b], Susano Tanael [c], Paolo Rebulla [d], Katerina Pavenski [e], Ralph Vassallo [f], Mark Fung [g], Rene Duquesnoy [h], Chee-Loong Saw [i], Simon Stanworth [j], Alan Tinmouth [k], Heather Hume [l], Arjuna Ponnampalam [m], Catherine Moltzan [n], Brian Berry [o], Nadine Shehata [p], for the International Collaboration for Transfusion Medicine Guidelines (ICTMG)

[a] Department of Laboratory Medicine and Pathology, University of Alberta and Alberta Health Services, Edmonton, Canada
[b] Puget Sound Blood Centre and University of Washington School of Medicine, Seattle, WA
[c] Canadian Blood Services, Toronto, Canada
[d] Centre of Transfusion Medicine, Cellular Therapy and Cryobiology, Foundation Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy
[e] Department of Laboratory Medicine, St Michael's Hospital, Department of Laboratory Medicine and Pathobiology, and the Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Canada
[f] American Red Cross Blood Services, Penn-Jersey Region, Philadelphia, PA
[g] Department of Pathology and Laboratory Medicine, University of Vermont and Fletcher Allen Health Care, Burlington, VT
[h] Department of Pathology, University of Pittsburgh Medical Centre, Pittsburgh, PA
[i] HLA Laboratory, Hematology Division, McGill University Health Centre, Montreal, Canada
[j] National Health Service Blood and Transplant, Oxford University Hospitals Trust, Oxford, United Kingdom
[k] Department of Medicine, Ottawa Hospital and University of Ottawa, and the Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Canada
[l] Département de Pédiatrie, Universtié de Montréal, CHU Sainte-Justine Montréal, Montreal, Canada
[m] Department of Pathology, University of Manitoba, Winnipeg, Canada
[n] Department of Internal Medicine, University of Manitoba, Winnipeg, Canada
[o] Division of Medical Sciences, University of Victoria, Victoria, Canada
[p] Departments of Medicine and Obstetric Medicine, Mount Sinai Hospital, Toronto, Canada

ARTICLE INFO

Available online 27 November 2014

Keywords:
Hypoproliferative thrombocytopenia
Platelet products
Platelet transfusion

ABSTRACT

Patients with hypoproliferative thrombocytopenia are at an increased risk for hemorrhage and alloimmunization to platelets. Updated guidance for optimizing platelet transfusion therapy is needed as data from recent pivotal trials have the potential to change practice. This guideline, developed by a large international panel using a systematic search strategy and standardized methods to develop recommendations, incorporates recent trials not available when previous guidelines were developed. We found that prophylactic platelet transfusion for platelet counts less than or equal to 10×10^9/L is the optimal approach to decrease the risk of hemorrhage for patients requiring chemotherapy or undergoing allogeneic or autologous transplantation. A low dose of platelets ($1.41 \times 10^{11}/m^2$) is hemostatically as effective as higher dose of platelets but requires more frequent platelet transfusions suggesting that low-dose platelets may be used in hospitalized patients. For outpatients, a median dose ($2.4 \times 10^{11}/m^2$) may be more cost-effective to prevent clinic visits only to receive a transfusion. In terms of platelet products, whole blood–derived platelet concentrates can be used interchangeably with apheresis platelets, and ABO-compatible platelet should be given to improve platelet increments and decrease the rate of refractoriness to platelet transfusion. For RhD-negative female children or women of child-bearing potential who have received RhD-positive platelets, Rh immunoglobulin should probably be given to prevent immunization to the RhD antigen. Providing platelet support for the alloimmunized refractory patients with ABO-matched and HLA-selected or crossmatched products is of some benefit, yet the degree of benefit needs to be assessed in the era of leukoreduction.

Contents

* Corresponding author. Susan Nahirniak, MD, FRCPC, 4B1.23 WMC University of Alberta Hospital, 8440-112 St Edmonton, AB Canada T6G 2B7.
E-mail address: Susan.Nahirniak@albertahealthservices.ca (S. Nahirniak).

http://dx.doi.org/10.1016/j.tmrv.2014.11.004
0887-7963/

One of the most common indications for platelet transfusion is for supportive care of patients with marrow suppression due to primary bone marrow dyscrasias, infiltrative disorders, cytoreductive therapy, or hematopoietic stem cell transplantation (SCT). As more intensive therapies are developed, the number of patients with severe hypoproliferative thrombocytopenia and the duration of thrombocytopenia have increased, as has the need for platelet support to reduce the risk of hemorrhage. This guideline was developed by an international panel of experts to incorporate information from recently published key platelet transfusion trials. There have been various national guidelines published for platelet transfusion therapy [1-9], some of which are now over 10 years old since publication.

An international team of adult and pediatric hematologists, hematopathologists, methodologists, and transfusion medicine physicians was convened to complete a guideline for the management of platelet transfusion using a systematic approach and standardized method to develop recommendations. This guideline is aimed to assist hematologists, oncologists, and transfusion medicine specialists on optimizing platelet transfusion therapy for patients with hypoproliferative thrombocytopenia, as the benefits of platelet transfusion need to be balanced against the risks. Unless otherwise specified, the data available are generalizable to the adult and pediatric population but not to neonates.

Methods

The Process of Guideline Development

The International Collaboration for Transfusion Medicine Guidelines (ICTMG) was established in 2009 to develop guidelines promoting evidence-based transfusion therapy to optimize patient care. The expert panel that developed this guideline was composed of 24 members representing 6 countries and included internationally recognized specialists in platelet transfusion therapy (C-LS, MF, PR, RD, RV, SS, and SSt).

The scope of the guideline included the need for prophylactic platelet transfusions; the threshold platelet count for prophylactic platelet transfusion; the need for ABO, Rh, HLA, and crossmatch compatibility; and the merits of using apheresis or whole blood–derived (WBD) platelets.

Relevant questions were formatted using the analytic framework developed by the US Preventative Services Task Force [10]. A question was developed for each topic that considered the primary and surrogate outcomes and adverse events including cost and inventory. Each question was discussed by teleconference before finalizing the search strategy.

A systematic literature search was conducted of 3 databases: Medline, EMBASE, and the Cochrane Library from 1946 until December 2013. The Transfusion Evidence Library was also searched for systematic reviews (http://www.transfusionguidelines.org.uk). References identified from bibliographic searches and by panel members were also included. Conference proceedings were not routinely searched. All evidence tables and search strategies are included in Appendices A and B, respectively. If a systematic review was published, it was included, and the database search started at the year of publication. If a systematic review on the topic had not been previously published, the ICTMG conducted the systematic review.

Two reviewers for each systematic review independently assessed citations to identify studies that met all the following inclusion criteria: (1) original article; (2) included 10 or more patients with hypoproliferative thrombocytopenia; and (3) included any of the outcomes of interest, that is, mortality, hemorrhage, refractoriness, alloimmunization, adverse events, increment, and platelet utilization. Content experts with previous related publications did not partake in the systematic review. We limited the search to patient studies that