Ann Allergy Asthma Immunol 119 (2017) 299–303

Contents lists available at ScienceDirect

MOC-CME Review

# Practical aspects of immunoglobulin replacement

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ARTICLE INFO

*Article history:*
Received for publication May 31, 2017.
Received in revised form July 14, 2017.
Accepted for publication July 19, 2017.

**INSTRUCTIONS**

Credit can now be obtained, free for a limited time, by reading the review article in this issue and completing all activity components. Please note the instructions listed below:

- Review the target audience, learning objectives and all disclosures.
- Complete the pre-test.
- Read the article and reflect on all content as to how it may be applicable to your practice.
- Complete the post-test/evaluation and claim credit earned. At this time, physicians will have earned up to 1.0 *AMA PRA Category 1 Credit™*. Minimum passing score on the post-test is 70%.
- Approximately 4-6 weeks later you will receive an online outcomes assessment regarding your application of this article to your practice. Once you have completed this assessment, you will be eligible to receive MOC Part II credit from the American Board of Allergy and Immunology.

**Overall Purpose**

Participants will be able to demonstrate increased knowledge of the clinical treatment of allergy/asthma/immunology and how new information can be applied to their own practices.

**Learning Objectives**

At the conclusion of this activity, participants should be able to:

- Differentiate the advantages and disadvantages of IVIG and SCIg
- Discuss the approach to optimizing dosing of immunoglobulin replacement therapy in patients with antibody immune deficiency
- Describe the guiding principles for the effective use of immunoglobulin replacement therapy in patients with antibody immune deficiency

**Release Date:** October 1, 2017

**Expiration Date:** September 30, 2019

**Target Audience**

Physicians involved in providing patient care in the field of allergy/asthma/immunology

**Accreditation**

The American College of Allergy, Asthma & Immunology (ACAAI) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

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**Disclosures:** Dr Ballow reported the following disclosures: medical advisory boards: Shire, CSL Behring, and Grifols; speaker: Shire; research grant/phase 3 trial: Grifols, Shire, and CSL Behring; and data safety monitoring board: CSL Behring, Prometic, and Green Cross.

http://dx.doi.org/10.1016/j.anai.2017.07.020

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**All identified conflicts of interest have been resolved.**

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Any unapproved/investigative uses of therapeutic agents/devices discussed are appropriately noted.

M. Ballow – Advisory Board member for Shire, and Grifols and Speaker for Shire, he received fees; he has received research grants from CSL Behring and Grifols. J.A. Bernstein – PI, Consultant, Speaker for AstraZeneca, CSL Behring, Novartis/Genentech, and Shire, he received research grants and fees; Speaker for Baxalta, he received fees; Consultant for Imedics, he received fees; PI and Consultant for Boehringer Ingelheim and GlaxoSmithKline, he received research grants and fees. G. Krishnaswamy – Clinical Research for CSL Behring, he received a research grant; J. Oppenheimer – Consultant for DBV Technologies, GlaxoSmithKline, and Kaleo, he received other financial gains; Clinical research for AstraZeneca, Boehringer Ingelheim, and Novartis, he received research grants. M.H. Grayson – Clinical research for Polyphor, Ltd., he received a research grant. G.D. Marshall – Clinical Research for Stallergens and Sanofi, he received research grants

**Recognition of Commercial Support:** This activity has not received external commercial support.



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## Clinical Vignette

A woman was diagnosed with common variable immunodeficiency (CVID) at the age of 42 years. She began having infections when she was 24 years of age. Her history included chronic sinusitis and 3 bacterial pneumonias at different times in both lungs. Her infections necessitated antibiotic therapy almost every other month. A specialist in allergy and immunology finally made the diagnosis of immune deficiency and, specifically, CVID on testing. Her immunoglobulin levels were extremely low: serum IgG, 250 mg/dL; IgA, less than 7 mg/dL; and IgM, 40 mg/dL. She had very low specific antibodies to tetanus toxoid and pneumococcal polysaccharides and responded poorly to booster immunizations with these vaccines. T- and B-cell subsets were in the normal range as were her response to mitogens. High-resolution chest computed tomography revealed bronchiectasis in both the right and left lung fields.

Because of the extremely low serum IgG level and the presence of bronchiectasis, she was prescribed replacement intravenous immunoglobulin (IVIG) at 600 mg/kg per month. Her allergist/immunologist initiated her treatment in the local hospital infusion center, giving her half the first dose (20 g) and then repeating this dose 2 weeks later. Despite encouragement by her physician to switch to subcutaneous immunoglobulin (SCIG), the patient elected to continue receiving immunoglobulin therapy in the hospital infusion suite because she had made friends with the nursing staff. Unbeknown to the patient, the hospital switched their immunoglobulin formulary to a different product. The patient began to have headaches and myalgias with her infusions that lasted 48 to 72 hours. After conferring with her allergist/immunologist, she decided to go on home therapy with IVIG because she liked the idea of monthly treatments and her physician could choose an IVIG product with the home care company that he had previous experience with in other patients with primary immunodeficiency diseases who had a previous history of headaches. The patient did well for 6 months, with a marked decrease in infections, but thereafter noticed that at approximately the third week of a 4-week treatment cycle she felt fatigued, had increased nasal symptoms, and started to have episodes of sinusitis. Her allergist/immunologist changed her treatment regimen to every 3 weeks, which helped for a short period. With the recurrence of this wear-off effect even after reducing the treatment cycle to 3 weeks, her allergist/immunologist convinced her to switch to SCIG therapy. He explained all the options, including a 10%, 20%, and a facilitated SCIG product. The 10% SCIG product would have to be given every week into multiple sites (eg, 25 mL per site at 4 sites every week for a total of 40 g per month), whereas the 20% immunoglobulin product could be given every other week at 3 sites (eg, 35 mL per site at 3 sites twice monthly for 42 g per month) and the facilitated SCIG product once a month (eg, 200 mL at 2 sites monthly for 40 g). The patient elected to use the 20% SCIG product infusing every other week. Because the patient was infection free with IVIG, her allergist/immunologist switched her to the 20% SCIG product at the same dose as the monthly IVIG dose.

## Introduction

During the era of Robert Good and Charles Janeway, the mainstay for the treatment of patients with humoral (antibody) immune deficiencies was intramuscular γ-globulin, a product used during World War II to confer passive immunity to soldiers for tetanus toxoid. It was not until 1981 that the first IVIG was available commercially. This new IVIG treatment modality changed the landscape for the treatment of immune deficiency. Intramuscular immunoglobulin could only provide enough IgG to increase the serum level of IgG to approximately 100 mg/dL in a patient with agammaglobulinemia. Given intravenously, IVIG could actually normalized the serum IgG levels for age, although the initial recommended dose for IVIG was very low at 200 mg/kg. Subsequent clinical studies in the 1980s and 1990s found that larger doses of IVIG clearly led to improved outcome for infections, especially bacterial pneumonias in patients with antibody immune deficiency disorders. This clinical case illustrates many of the issues that face both patient and physician when deciding what immunoglobulin replacement therapy to prescribe.