

in PBSC relative to PB. The data have implications for HSCT and adoptive immunotherapy.

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References

- Gandhi MK, Khanna R. Human cytomegalovirus: clinical aspects, immune regulation, and emerging treatments. *Lancet Infect Dis*. 2004;4:725-738.
- Hislop AD, Taylor GS, Sauce D, Rickinson AB. Cellular responses to viral infection in humans: lessons from Epstein-Barr virus. *Annu Rev Immunol*. 2007;25:587-617.
- Gandhi MK, Wills MR, Okecha G, et al. Late diversification in the clonal composition of human cytomegalovirus-specific CD8+ T cells following allogeneic hemopoietic stem cell transplantation. *Blood*. 2003;102:3427-3438.
- Ottinger HD, Beelen DW, Scheulen B, Schaefer UW, Grosse-Wilde H. Improved immune reconstitution after allotransplantation of peripheral blood stem cells instead of bone marrow. *Blood*. 1996;88:2775-2779.
- Storek J, Dawson MA, Storer B, et al. Immune reconstitution after allogeneic marrow transplantation compared with blood stem cell transplantation. *Blood*. 2001;97:3380-3389.
- Palendira U, Chinn R, Raza W, et al. Selective accumulation of virus-specific CD8+ T cells with unique homing phenotype within the human bone marrow. *Blood*. 2008;112:3293-3302.
- Rooney CM, Smith CA, Ng CY, et al. Infusion of cytotoxic T cells for the prevention and treatment of Epstein-Barr virus-induced lymphoma in allogeneic transplant recipients. *Blood*. 1998;92:1549-1555.
- Nehring AK, Dua U, Mollee P, et al. Epstein-Barr virus T-cell immunity despite rituximab. *Br J Haematol*. 2007;136:628-632.
- Mackay CR. Moving targets: cell migration inhibitors as new anti-inflammatory therapies. *Nat Immunol*. 2008;9:988-998.

To the editor:

Antinuclear antibody (ANA)-positive thrombocytopenia: primary, but with a difference

In the recent Vicenza Consensus Conference,^{1,2} clinical-immunologic entities have been considered when defining the criteria for differentiating “primary” from “secondary” forms of immune thrombocytopenias. However, although the thrombocytopenia associated with the presence of antiphospholipid antibodies is discussed at some length (obviously within the limits of a standardization conference), this is not so for ITP with antinuclear antibodies (ANA), which is even more complex and challenging.

There are 2 eras in the study and in the gradual elucidation of this intriguing clinical and immunologic entity. The first clinical era included the description of distinct histologic patterns in spleens resected from apparently idiopathic ITP patients who then went on to develop systemic lupus erythematosus (SLE).^{2,3} At the same time there was a hot debate as to whether splenectomy for ITP could precipitate SLE,⁴ a hypothesis that was ultimately disproved.⁵ The second era is founded mainly on longitudinal studies of patients with ITP in which low-titered ANAs did not predict for the late development of SLE,⁶ but high-titer ANA, irrespective of subtype, did.^{7,8} In a recent study Abbadi et al⁹ have found that a positive ANA test (no pattern specified) predicted for a poor response to initial steroid therapy in adults with ITP.⁹

There is no doubt that an isolated positive ANA test in low titers does not contradict the diagnosis of primary chronic ITP, even if there already appears to be a different response to corticotherapy. However, the condition may progress, step by step, along with the increasing amount of ANA and, of course, of other antibodies such

as anti-ds DNA, anti-Sm and antinuclear ribonucleoprotein antibodies. In a landmark study, Arbuckle et al¹⁰ have found that in 115 of 130 patients with SLE (88%), at least one SLE autoantibody tested was present before the diagnosis (\leq 9.4 years earlier; mean, 3.3 years). In this clinical material ANAs appeared significantly earlier than the other, more “ominous” antibodies. Similarly, in an imprecise number of ANA-positive ITP patients, a progressive spreading of autoimmunity (“a crescendo of autoimmunity”¹⁰) may take place, from organ-specific to non-organ-specific antibodies.

In conclusion, the potential evolution from ITP to SLE depends on a galaxy of genetic and epigenetic factors that dictate the fate of any single case. However, the demonstration of varying degrees of steroid-refractoriness in the ANA-positive subgroup, together with long clinical and immunologic histories such as those that have been discussed warrant, in my opinion, a special consideration for this entity, which even at the stage of conventional “primariness” carries some degree of difference.

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References

- Rodeghiero F, Stasi R, Gernsheimer T, et al. Standardization of terminology, definition and outcome criteria in immune thrombocytopenic purpura of adults and children: report from an International Working Group. *Blood*. 2009;113:2386-2393.
- Kaiser LC. The specificity of periarterial fibrosis of the spleen in disseminated lupus erythematosus. *Bull J Hopkins Hosp*. 1942;71:32-35.
- Breckenridge RT, Moore RD, Ratnoff OD. A study of thrombocytopenia. New histologic criteria for the differentiation of idiopathic thrombocytopenia and thrombocytopenia associated with disseminated lupus erythematosus. *Blood*. 1967;30:39-53.
- Rabinowitz Y, Dameshek W. Systemic lupus erythematosus after "idiopathic" thrombocytopenic purpura: a review. A study of systemic lupus erythematosus occurring after 78 splenectomies for "idiopathic" thrombocytopenic purpura, with a review of the literature. *Ann Intern Med*. 1960;52:1-15.
- Best WK, Darling DR. A critical look at the splenectomy-SLE controversy. *Med Clin North Am*. 1962;46:19-25.
- Panzer S, Penner E, Graninger W, et al. Antinuclear antibodies in patients with chronic idiopathic autoimmune thrombocytopenia followed 2-30 years. *Am J Hematol*. 1989;32:100-103.
- Perez HD, Katler E, Embury S. Idiopathic thrombocytopenic purpura with high-titer, speckled pattern antinuclear antibodies: possible marker for systemic lupus erythematosus. *Arthritis Rheum*. 1985;28:596-597.
- Anderson MJ, Peebles CJ, McMillan R, Curd JG. Fluorescent antinuclear antibodies and anti-SSA/Ro in patients with immune thrombocytopenia subsequently developing systemic lupus erythematosus. *Ann Intern Med*. 1985;103:548-550.
- Abbadi SY, Milhem M, Zarn L. A positive antinuclear antibody test predicts for a poor response to initial steroid therapy in adults with idiopathic thrombocytopenic purpura. *Ann Haematol*. 2008;87:459-462.
- Arbuckle M, McClain M, Rubertone MV, et al. Development of autoantibodies before the clinical onset of systemic lupus erythematosus. *N Engl J Med*. 2003;349:1526-1533.

Response

Immune thrombocytopenic purpura: terminology and definitions

We thank Professor Marmont for his interest in our work and for the opportunity to further discuss some controversial aspects on terminology and definitions in immune thrombocytopenic purpura (ITP).¹

Primary ITP is a diagnosis of exclusion, characterized by a great heterogeneity in the pathogenesis and clinical outcomes.² The International Working Group (IWG) is aware that certain cases of primary ITP may be accompanied by coexisting antibodies such as antiphospholipid or antinuclear antibodies (ANA). However, the IWG classifies as secondary ITP only those cases in which the underlying disorder modifies the natural course or influences the treatment approach. A significant proportion of patients diagnosed with ITP has been found to have ANA. For example, in a prospective study in 186 adult patients,³ weak positivity (titer from 1:40 to 1:80) or definite positivity (titer higher than 1:80) were found in 18 (10%) and 7 (4%) of cases, respectively. However, the impact of ANA as an adjunctive prognostic marker in isolated thrombocytopenia, otherwise meeting our criteria for primary ITP, is not defined. Although the development of other autoimmune disorders, including systemic lupus erythematosus, has been reported in a minority of cases during prolonged follow-up (around 5%),⁴ in a more recent retrospective analysis of 108 adult ITP patients the presence of ANA (titer higher than of 1:80) was found in 36 (33%), but no case of systemic lupus erythematosus was recorded after a mean follow-up of 3.6 years (range, 2.1-7 years).⁵ This finding was also confirmed in a prospective evaluation in patients with high ANA titer (1:160 or higher) after a similar follow-up period.⁶ Regarding the less favorable response to steroid therapy, the study cited by Marmont⁷ refers to a small cohort of patients (41 cases, 10 with ANA). In a larger study,⁸ 39 patients with a positive test for ANA showed a response to steroids similar to that of 506 negative cases. Thus, IWG maintains that isolated ANA positivity at diagnosis should not shift toward a secondary form of ITP, unless large-scale prospective studies will provide evidence of a significant clinical impact of this finding.

We hope that Professor Marmont's comments will raise interest in such studies.

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References

- Rodeghiero F, Stasi R, Gernsheimer T, et al. Standardization of terminology, definition and outcome criteria in immune thrombocytopenic purpura of adults and children: report from an International Working Group. *Blood*. 2009;113:2386-2393.
- Cines DB, Bussel JB, Liebman HA, Luning Prak ET. The ITP syndrome: pathogenic and clinical diversity. *Blood*. 2009;113:6511-6521.
- Aledort LM, Hayward CPM, Chen MG, Nichol JL, Bussel JB, for the ITP Study Group. Prospective screening of 205 patients with ITP, including diagnosis, serological markers and the relationship between platelet counts, endogenous thrombopoietin and circulating antithrombopoietin antibodies. *Am J Hematol*. 2004;76:205-213.
- Vantelon JM, Godeau B, André C, Bierling P. Screening for autoimmune markers is unnecessary during follow-up of adults with autoimmune thrombocytopenic purpura and no autoimmune markers at onset. *Thromb Haemost*. 2000;83:42-45.
- Altintas A, Ozel A, Okur N, et al. Prevalence and clinical significance of elevated antinuclear antibody test in children and adult patients with idiopathic thrombocytopenic purpura. *J Thromb Thrombolysis*. 2007;24:163-168.
- Kurata Y, Miyagawa S, Kosugi S, et al. High-titer antinuclear antibodies, anti-SSA/Ro antibodies and anti-nuclear RNP antibodies in patients with idiopathic thrombocytopenic purpura. *Thromb Haemost*. 1994;71:184-187.
- Abbasi SY, Milhem M, Zaru L. A positive antinuclear antibody test predicts for a poor response to initial steroid therapy in adults with idiopathic thrombocytopenic purpura. *Ann Hematol*. 2008;87:459-462.
- Li HQ, Zhang L, Zhao H, Ji LX, Yang RC. Chronic idiopathic thrombocytopenic Purpura in adult Chinese patients: a retrospective single-centered analysis of 1791 cases. *Chin Med J*. 2005;118:34-37.