Romiplostim as early treatment of immune thrombocytopenia with severe immunodeficiency

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Introduction

Immune thrombocytopenia (ITP) is characterized by an immune-mediated reduction of platelet count (<100x10^9/L) in absence of other obvious causative factors.1 Platelet destruction is mainly due to the formation of auto-antibodies against platelet surface antigens and to rapid elimination of antibody-coated platelets by macrophages and dendritic cells in the spleen. Additionally, auto-antibodies and activated T-lymphocytes seem to directly impair megakaryocytes in the bone marrow, causing a suboptimal platelet production. Standard front-line therapy for ITP are steroids (prednisone or dexamethasone), achieving initial responses in about 80% of the cases.2 However, response is sustained only in 10-30% of the cases, and most patients require further treatment. Splenectomy is an established second-line therapy for ITP, achieving a durable response in about 60% of patients; however, it might be unbearable in some patients, and is often delayed in other patients due to the risks related to the surgical procedure.3 Medical approaches for unresponsive/refractory ITP include conventional immunosuppressive agents and rituximab,1 a CD20 receptor antibody that impairs B-cell response and antibody formation.4 All these approaches are jeopardized by the risks of infectious complications consequent to immunosuppression. This is particularly relevant when the patient already carries comorbidities whose treatments increase the infectious risk, such as chronic immunosuppressive therapies. In this setting, the use of drugs with a mechanism of action alternative to immunosuppression may find particular indication. In 2008, agents that directly stimulate the thrombopoietin (TPO) receptor, increasing platelet production, were approved for treatment of chronic ITP5,6 TPO receptor agonists (TRAs), such as romiplostim and eltrombopag may be particularly efficacious for ITP patients with immunodeficiency. Ineffective platelet production may be a more prominent cause of thrombocytopenia in ITP with drug-induced immunodeficiency, since thrombocytopenia develops during the course of immunosuppressive treatments usually active in ITP. TRAs may provide more effective correction of this abnormality, and may also be safer than standard therapies. Indeed, TPO-mimetics can achieve rapid and sustained responses, without increasing the danger of serious infectious complications. To support the principle that TPO-mimetic agents are effective and safe long-term treatment for immunocompromised ITP patients, we report the case of a man who has been successfully treated for 12 months.

Case Report

A 47-year-old man was referred to our department in May 2010 because of isolated severe thrombocytopenia (platelet count: 8x10^9/L) with positivity of antiplatelet antibodies test, in absence of clinically significant hemorrhagic syndrome. His personal data were notable for a liver transplant which was performed in 1997, due to hepatitis B virus and hepatitis C-related cirrhosis. For that reason, the patient was treated with Ciclosporin A, Mycophenolate and low-dose prednisone. Additionally, the patient was on dialysis since February 2010, following bilateral nephrectomy occurred for detection of clear cell renal carcinoma. A bone marrow biopsy was suggestive with ITP, showing an activated megakaryocytic proliferation and normal reticulin distribution in absence of a myelodysplastic/lymphoproliferative disorder. According to standard clinical practice, the patient was treated front-line with prednisone 1 mg/kg/day, obtaining only a transient response of thrombocytopenia (Figure 1). After 3 weeks of consecutive treatment, the patient developed a septic shock, with cardio-respiratory failure, due to a Lysteria monocytogenes-induced meningoencephalitis. Leukocyte count and immunoglobulin levels were normal. To face the infectious problem, steroids and immunosuppressive agents were rapidly discontinued. Consequently, platelet count returned below 10x10^9/L and the patient experienced bleeding from the gastrointestinal tract, which required transfusions and intra-venous immune globulin (1 g/kg/d for 2 days). When the patient recovered from the infectious complication, Romiplostim treatment was initiated with weekly administrations, as per standard protocol. Doses were escalated from 1 to 2 g/kg after 2 weeks of treatment because of no response. A rapid and steady increase in platelet count over 50x10^9/L followed dose escalation. He is currently maintained on 2 g/kg of romiplostim weekly. Throughout the observation time, the patient has felt well, with no infectious complications or relapse of thrombocytopenia. No major side effects have been observed, including thrombotic events and worsening of comorbidities.

Discussion and Conclusions

The front-line therapy of ITP patients with immunodeficiency is particularly challenging, as these patients are more vulnerable to the toxicity induced by immunosuppressive agents.
Among available therapeutic options, only TPO receptor agonists act by stimulating platelet production and does not alter the normal immune function. In published clinical trials, the rate and the rapidity of response to romiplostim in chronic ITP patients were higher than those observed with other second-line therapies, including rituximab and conventional immunosuppressive drugs. Furthermore, romiplostim was associated with a favorable toxicity profile, and a better quality of life. The present experience supports the effectiveness and safety of TPO receptor agonists as treatment of ITP patients with drug-induced immunodeficiency or with active infections, and encourage their early administration in this setting.

**References**