

EDITORIAL

Interdisciplinary Approach at the Border Between Hematology and Cardiology

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Cardiovascular diseases remain the main causes of mortality and morbidity worldwide, and an interdisciplinary approach addressing the inter-relation between various diseases and cardiac pathologies may notably improve the current knowledge and state-of-the-art in this field. Cardiovascular risk factors play an important role in the development of cardiac disorders; however, in certain cases, the lack of such risk factors does not exclude the possibility of the disease.

Patients with hematological disorders present an increased systemic inflammation and significantly modified blood homeostasis, exhibiting a tendency for either bleeding or thrombosis. It has been proved that hematological diseases are linked to an increased cardiovascular risk, which can be related to the disease itself or secondary to various therapies.¹ Due to continuous developments in treatments and overall management, onco-hematological patients have increasing survival rates. However, the increased life expectancy is associated with an increased rate of comorbidities and development of cardiovascular disorders at the same time.² Heart failure, acute coronary syndromes, cardiomyopathies, pericardial disease or venous thromboembolism are among the most frequent cardiovascular afflictions in oncologic patients.^{3,4}

The role of the cardiology specialist in the therapeutic management of patients with hematological and onco-

hematological disorders is very important, due to the increased cardiovascular risk that these patients encompass. A review article recently published, has evaluated the current knowledge in regards to acute coronary syndromes in patients with hematological disorders.¹ Onco-hematological disorders, including leukemia, myelodysplastic syndromes, multiple myeloma and Hodgkin and non-Hodgkin lymphoma, have been shown to present higher rates of acute myocardial infarction and coronary artery disease.¹ This might be explained by the increased tendency towards thrombosis and exhibiting an enhanced inflammatory status leading to coronary plaque vulnerabilization, thus causing the acute coronary event.^{5,6}

It is not uncommon that treatments used in onco-hematology affect the cardiac and vascular function. The cardiotoxicity induced by chemotherapy (anthracyclines, alkylating agents, biological therapies) can take the form of acute myocarditis, acute heart failure, dilated cardiomyopathies, arrhythmias and occasionally reversible cardiac dysfunction.⁷

Radiotherapy has also been shown to correlate with the presence of coronary artery disease in patients with Hodgkin lymphoma, with or without association of chemotherapy after the first 10 years of treatment, concluding that the efficacy of cardiovascular screening is low within the first 10 years.⁸

Furthermore, patients with onco-hematological disorders that include leukemia, multiple myeloma as well as lymphoma either have a hypercoagulable status, secondary to the tumor itself, or caused by antineoplastic treatment or the use of central venous catheters, leading to high

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rates of venous thromboembolic events (deep vein thrombosis and pulmonary embolism). The therapeutic management of such patients should include preventive strategies, cardiovascular and anticoagulant treatments.⁹

An interdisciplinary team that incorporates cardiologists, hematologists and oncologists, is required for onco-hematological patients' management, for the short and long-term effects of the disease itself, as well as for their specific treatments.¹⁰

Cardiovascular screening in hematological patients is required especially before undergoing chemo and radiotherapies.¹¹ A review published in this issue of JIM addresses the methods used for non-invasive assessment of coronary arteries in subjects with hematological and onco-hematological disorders.¹² A particular attention is given to the associated risk that such patients might have during invasive investigations, including traditional coronary angiography, which is associated with a higher risk of hemorrhage in hemophilic or anemic patients, and with an increased rate of catheter thrombosis in patients with hypercoagulable states (thrombocytosis, polycythemia vera).¹²⁻¹⁴

WHAT IS THE ROLE OF THE HEMATOLOGIST IN THE THERAPEUTIC MANAGEMENT OF CARDIOVASCULAR PATIENTS?

Therapies using stem cell transplantation in patients with cardiovascular disease have emerged in the last decade as a regenerative strategy.¹⁵ Several clinical trials have been conducted on the role of mesenchymal stem cells (autologous and allogeneic) for acute myocardial infarction.¹⁶ The delivery of stem cells into the infarcted myocardium can be performed by intravenous injection or directly into the coronary arteries. Both methods have shown an improvement in the overall clinical status at 6 months and 3 months respectively, with fewer arrhythmias, improved left ventricular ejection fraction (LVEF), a decreased perfusion defect, as well as a lower rate of left ventricular remodeling.^{17,18} Furthermore, the results of the MESAMI 1 pilot study showed that stem cell implantation within the remote viable myocardium (at the border of the LV scar tissue) in patients with chronic ischemic cardiomyopathy who were not candidates for revascularization, was associated with significant improvement in LVEF, LV end-systolic volume, and the NYHA 6-minute walk test.¹⁹

The hematology specialist, under specific conditions performs the harvesting of bone marrow derived stem cells that are used in cell based cardiac therapies. Another article published in this issue of JIM by Lázár *et al.*, describes

one of the methods that can be used in mobilizing stem cells, for their use in autologous transplantation, although in multiple myeloma and lymphoma patients.²⁰

Heart failure due to various ischemic and non-ischemic causes is accountable for more than a third of cardiovascular deaths in the world.²¹ Despite the recent development of pharmacological management, ventricular assisting devices, and cardiac resynchronization therapy, a considerable number of patients have an unfavorable prognosis and limited therapeutic options. For these patients, stem cell therapy can be the last, life-saving therapeutic option.²² Vrtovec *et al.* demonstrated that patients diagnosed with dilative cardiomyopathy and severe heart failure had low ventricular remodeling, a better exercise tolerance, and improved chances of survival and quality of life following intracoronary stem cell injection.²³

In conclusion, interdisciplinary medical teams formed by hematologists and cardiologists encounter various challenging situations that are not always faced by other kind of groups. Such challenges include the disputative characteristics of the medical vocational interdependence and expertise, planning and therapeutic decision-making processes, whilst offering a high quality medical care in complex clinical settings, for the complex patient with onco-hematological disorder with co-existing cardiac disease.²⁴

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