

Benedek Lazar Erzsebet^{1,2}, Benedek I.^{1,3}, Benedek I. Jr.^{1,2}, Kopeczi Judit Beata¹, Jakab Szende¹, Tatar Cristina Maria³, Tilea I.^{2,4}

Double Hematological and Cardiologic Benefits of Autologous Stem Cell Transplantation in a Case of stage III B IgG Myeloma multiplex and Dilatative Cardiomyopathy – a Case Report

¹Hematology and Bone Marrow Transplantation Clinic, Clinical Emergency County Hospital, Tirgu Mures, Romania

² Family Medicine, Dept. M3, Faculty of Medicine, University of Medicine and Pharmacy Tirgu Mures, Romania

³ Internal Medicine, Dept. M3, Faculty of Medicine, University of Medicine and Pharmacy Tirgu Mures, Romania

⁴ Cardiovascular Rehabilitation Clinic, Clinical Emergency County Hospital, Tirgu Mures, Romania

ABSTRACT

We present a case of a 51 year old multiple myeloma patient due to the complexity of his disease. After prior high dose therapy with cardiotoxic cytostatic drugs patient developed cardiac arrest due to a ventricular fibrillation. Cardiopulmonary resuscitation was successfully but the hematologist stopped the cytostatic treatment due to the high cardiac risk.

The only way to control his myeloma was an autologous transplantation but this also had a very high cardiotoxic potential due to the high dose of Melphalan administered as conditioning treatment.

We present the difficulties and the results of this complex case. It also arises the potential beneficial effects of the megadose of stem cells on the myocardium but this needs further studies.

Keywords: multiple myeloma, dilatative cardiomyopathy, autologous transplantation, mega-dose of stem cells

Tatar Maria Cristina

Internal Medicine Clinic III, Dept. M3, Faculty of Medicine, University of Medicine and Pharmacy Tirgu Mures, Romania, 35 Revolutiei st., 540042, Tirgu Mures, Romania, email: mcristina.tatar@yahoo.com

Introduction

It is a well known fact that in the modern treatment of myeloma multiplex autologous hematopoietic stem cell transplantation has a major role as the most important therapy of consolidation which can lead to a prolonged remission with a good quality of life [1]. The success of autologous transplantation in this malignant hematological disease depends on the possibility of sufficient stem cell collection after an adequate mobilizing treatment. Mobilization correlates with prior therapies administrated to the patient. Many of the cytostatic drugs have toxic effect on stem cells (ex Melphalan) and make impossible sampling of necessary number of CD34+ cells for a successful transplantation [2].

Also it is a well known fact that chemotherapy can have a high cardiac toxicity (doxorubicin, farmarubicin) and can cause toxic dilated cardiomyopathy which has a negative effect on the patient's performance status and it limits significantly ulterior cytostatic treatments for multiple myeloma [3].

In these cases of cumulative toxicity the

patient and doctor are trapped because practically it is impossible to treat the patient for his myeloma due to his cardiac status.

In cardiology stem cell therapy is being used in the two ways of administration of stem cell in myocardial infarction. One way is to administrate the cells in the myocardium perilesionally and the other way is direct intracoronary administration. Some provable benefits are being described in the literature [4].

Clinical case

We present the case of a 53 year old male patient with stage III B IgG multiple myeloma with severe dilated cardiomyopathy of toxic origin after high dose cytotoxic therapy with cardiotoxic effect.

This was a very severe case due to the young age of the patient when myeloma was diagnosed (at 51 y.o.) and especially due to the fact that after 1 year of chemotherapy severe cardiac complication occurred and after the last cycle of chemotherapy he presented a ventricular fibrillation with cardiac arrest for which he was resuscitated. The cardiologic examination after his cardio-pulmonary resuscitation demonstrated the diagnosis of toxic dilated cardiomyopathy with low cardiac output syndrome (BP: 80/50mmHg) and heart failure class II according to NYHA classification.

Advanced cardiac involvement practically made impossible the continuation of cytotoxic therapy. As a consequence his myeloma aggravated.

In figure 1-2 we present the osteolytic bone lesions of our patient at the level of his skull.

Figure 1 Osteolytic bone lesions of the skull (INSERTION)

The patient presented permanent pain at the level of his left scapulo-humeral articulation. The radiological examination revealed a pathological fracture of the left clavicle with subluxation of the humerus deficiently healed with subluxation of the humerus as presented in Figure 2



Figure 2 Pathological fracture of the left clavicle with subluxation of the humerus (INSERTION)

He presented to our Bone Marrow Transplantation Unit in a very bad clinical condition

with poor performance status, high level of IgG (24.5g/l) and evident bone lesions. His blood pressure was between 85/50 to 90/60 mmHg and the clinical examination revealed the symptoms of left heart failure.

The rest ECG recording shown left bundle branch block and sinus tachycardia (figure 3 and 4).



Figure 3 - ECG recording before transplant (INSERTION)



Figure 4 - ECG recording after transplant (INSERTION)

The transthoracic echocardiography revealed: left ventricular dilation with apical rocking aspect and severe LV systolic dysfunction (EF :35%), also a mild functional mitral regurgitation.

The decision of treatment from the hematologic point of view was a very difficult one. It was practically impossible to continue the chemotherapy courses due to the risk of cardiac arrest. Autologous transplantation could be practically the only treatment to stop the evolution of myeloma but due to the cardiac toxicity of high dose Melphalan 200mg/m2 used as conditioning treatment is nephro- and cardiotoxic and also had a very high cardiovascular risk. Taking everything into consideration after discussing the life threatening risk of the procedure with the patient and the cardiologist, a decision to perform the autologus transplantation was considered if a mega-dose CD34+ stem cells would be obtained. We were also counting on the possible beneficial effects of the high dose of stem cells administrated in during the transplant to possible have a beneficial effect on his cardiac status too. The mobilizing treatment was done only with granulocytic growth factors (GCSF) 10μ g/kg and it was highly successful because we obtained a very highly number of stem cell 11.45 x 106/kg.

This convinced us to proceed with the transplant trying by pretransplant craniological treatment to prevent major ventricular arrhythmias.

An 1200 mg intravenous loading dose of Amiodarone was administered followed by 200 mg per day orally for 10 days prior transplant and continued post transplant.

The conditioning treatment with Melphalan with a cardiotoxic potential was well tolerated. The patient was stable during and after transplantation. We observed 2 days post-administration of the megadose of stem cell the stabilization of his cardiac status. The symptoms of left heart failure disappeared and his blood pressure elevated slowly and stabilized at values of 110/70mmHg to 120/60mmHg. During his aplasia that lasted only 5 days due to the high number of stem cells administrated he had febrile neutropenia that responded to antibiotic, antiviral and antifungal treatment but his cardiac status remained stable. He engrafted in 5 days with very good evolution with the disappearance of his bone pain, of his dyspnea and the level if IgG post-transplant lowered to 15.5g/l.

Conclusions

In this particular case we consider that the megadose of stem cells beyond the beneficial effects on myeloma had also a good effect on myocardial status. This patient needs a very through cardiac and hematologic follow-up by precise immunological, hematological and cardiological follow-up. We consider that such a young patient with a severe malignant disease associated with a life- threatening cardiac status may benefit of an autologous stem cell transplantation with mega-dose of CD34+ cells for

their double benefits effect on the myeloma and also on the myocardium. The improvement of the cardiac status of the patient arises the possible beneficial effect on the myocardial muscle but this needs further research in clinical studies.

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