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Hypocholesterolemia and Statins in Multiple Myeloma

Irfan Yavaşoğlu[1*] and Atakan Turgutkaya[1]

[1]Hematologist, Aydin Adnan Menderes University Medical Faculty, Division of Hematology, Aydin, Turkey.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Short Communication

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ABSTRACT

Statins are lipid-lowering agents. They also have immunomodulatory, anti-inflammatory, anti-angiogenic, and anti-proliferative functions. In this context, they are demonstrated to have beneficial effects on mortality in several malignancies including esophageal, breast, lung, liver, pancreatic, endometrial, and colorectal cancers. Multiple myeloma is considered as an incurable plasma cell disorder with current therapy; however due to the current knowledge about the correlation between cholesterol-lowering agents and myeloma; it's suggested to have lower mortality rates for patients using statins. Patients with multiple myeloma usually have a low cholesterol level which is often underestimated by clinicians. Hereby we aimed to summarize the myeloma-hypocholesterolemia relationship and emphasize the importance of statins as an inexpensive and beneficial approach for these patients.

Keywords: Cell line; cholesterol; LDL; multiple myeloma; proteasome; statins.

1. INTRODUCTION

Hypocholesterolemia is seen in solid tumors and some hematological malignancies such as multiple myeloma (MM) and chronic lymphocytic leukemia. The antineoplastic effects of statins are progressively illustrated [1]. Herein, we would like to summarize the relationship between MM, cholesterol, and statins.

**Corresponding author: E-mail: atakanturgutkaya@yahoo.com.tr;*

2. DISCUSSION

Statins are usually used to lower lipid levels. On the other hand, they have apoptosis-triggering effects with immunomodulatory, anti-inflammatory, anti-angiogenic, and anti-proliferative roles [1,2]. Statins have mitochondria-damaging features; with the possible mechanisms of creating the deficiency of coenzyme Q10 (an important electron carrier of mitochondrial respiratory chain), inhibition of respiratory chain complexes, inhibition of protein prenylation, and induction of mitochondrial apoptosis pathway [3]. Indeed, statins have demonstrated beneficial effects on mortality among several solid malignancies including esophageal, breast, lung, liver, pancreatic, endometrial, and colorectal cancer [1].

The effects of cholesterol and statins in MM first started with cell line studies. Myeloma cells were reported to need cholesterol for growth and proliferation in mouse cell lines. In addition, drugs such as simvastatin, atorvastatin, and lovastatin were shown to cause the death of MM cell lines [4,5]. Failure to fully evaluate microenvironment effects was one of the limitations of these studies. Secondly, it was reported that low cholesterol levels accompanied MM and this became more evident with the disease progression. We previously noted the presence of limited clinical studies on MM and hypocholesterolemia. In our study, we reported that total cholesterol (C) and LDL-cholesterol levels were higher in stage I patients compared to stage II and III ($p<0.001$ and $p<0.005$, respectively). In addition, total cholesterol and LDL-C levels were not higher in the control group, compared to stage-1; and HDL-C levels were lower in patients with stage 3 than patients in the control group ($p<0.001$) [6]. In these studies, it seemed difficult to achieve homogeneity (such as IgG, A, and light chain differences). Thirdly, cholesterol-lowering treatments have been on the agenda in MM due to both the data obtained from the cell lines and clinical studies. Van der Spek E and colleagues reported that high-dose simvastatin (15 mg/kg/day) could be used in MM. Then, the same group reported that the use of simvastatin would not affect VAD (vincristine, doxorubicin, and dexamethasone) resistance [7,8]. In MM, a large number of drugs such as IMIDs, proteasome inhibitors, etc. have been included in our practical use in the last 10 years. The interaction of statin use with these drugs remains unknown. In in-vitro studies, it was reported that the dose of bortezomib could be affected by statins [6]. Studies conducted with large numbers of patients and investigating statin and cholesterol effects have started to take place in the literature [9]. Statin therapy has been suggested to be associated with a reduced risk of both all-cause and MM-specific mortality [10,11].

3. CONCLUSION

In conclusion, it is clear that hypocholesterolemia accompanies MM and statins may be included in MM as an inexpensive option.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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