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Investigation of the Vasculoprotective Effects of Bempedoic Acid Against Senile Aortic Damage and Atherosclerosis on Aged Rats

with the abstract titled

Cenk Anil Olsen, *Ozgur Baris, Zehra Seda Halbutogullari, Selenay Furat Rencber, Gulsen Celebi, Gozde Bugutekin, Semil Selcen Gocmez, Yusufhan Yazir, Muhip Kanko, Tijen Utkan*

24th Congress of Asian Society for Vascular Surgery & 21st Congress of the Turkish Society for Vascular and Endovascular Surgery & 18th Asian Venous Forum & 12th National Congress of Turkish Society of Phlebology held on November 30 - December 3, 2023.

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Best Abstracts -8

Investigation of the vasculoprotective effects of bempedoic acid against senile aortic damage and atherosclerosis on aged rats

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Abstract

Aim: The incidence of cardiovascular diseases increases with age, oxidative stress, and chronic inflammation. There is not enough information in the literature regarding the anti-inflammatory and vasculoprotective effects of bempedoic acid, a powerful new drug for reducing resistant LDL levels. We aimed to make a new contribute to the literature by examining the vasculoprotective effects of bempedoic acid with senescence.

Material and Methods: Once a naturally aged animal model was established, 40 rats were included in the study. They were divided into four groups of 10 each. Young (4 months) rats and young^{+}drug group; aged (12 months) rats and aged^{+}drug group. Bempedoic acid (30 mg/kg/day) was administered orally for four weeks. Thoracic aortas were removed and 4 µm-thick samples were stained with hematoxylin and eosin (H&E) to evaluate histomorphology. Quantitative-Real-Time-PCR (qRT-PCR) was performed to detect changes in inflammation and apoptosis markers using RNA isolation and cDNA synthesis. Degeneration, vacuolization, and hyperplasia in smooth muscle cells and a thicker tunica media layer were observed in the aortic sections of the elderly control group compared to the other groups. However, in the elderly group treated with bempedoic acid, the thickness of the tunica media layer decreased significantly, and aortic histomorphology improved to levels comparable those to in the young control groups.

Results: According to the results of qRT-PCR performed with the Syber Green method using cDNA samples, the levels of inflammatory markers, Monocyte Chemoattractant Protein-1 (MCP-1), tumor necrosis factor-α (TNF-α), and interleukin-1β (IL1-β) were found to be increased in the aged animals, and their levels were significantly decreased after bempedoic acid administration. On the other hand, an apoptosis marker, Caspase-3 expression also decreased in the bempedoic acid group. The levels of IL-10, an anti-inflammatory marker, increased after medication in the elderly group treated with bempedoic acid.

Conclusion: The protective effects of bempedoic acid against inflammation and senile aortic damage in the aortic tissues of aged rats was demonstrated quantitatively by gene analysis and histomorphological confirmation.

Keywords: Rats, senescence, bempedoic acid, anti-aging drugs

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