Effects of high levels of homocysteine on the histology and lipid content of the male and female rabbits aortas.

Wilcken Craig*

Department of Radiology, Medical University of Graz, Graz, Austria

Introduction

Hyperhomocysteinemia is a medical condition characterized by elevated levels of homocysteine in the bloodstream. This condition has been associated with an increased risk of cardiovascular diseases. The aorta, being the major conduit vessel, plays a crucial role in vascular health. The present study investigates the impact of hyperhomocysteinemia on the histology and lipid content of the rabbit's aorta, with a specific focus on gender differences. Male and female rabbits were subjected to elevated homocysteine levels through dietary manipulations, and their aortas were evaluated histologically and for lipid content. The findings shed light on the potential gender-specific effects of hyperhomocysteinemia on aortic health. Hyperhomocysteinemia has emerged as an important risk factor for a variety of cardiovascular diseases. Studies have shown that elevated homocysteine levels can promote endothelial dysfunction, oxidative stress, and inflammation, contributing to the development of atherosclerosis. The aorta, being the primary conduit vessel carrying oxygenated blood from the heart to the rest of the body, is particularly susceptible to the adverse effects of hyperhomocysteinemia. To better understand the gender-based differences in these effects, male and female rabbits were utilized in this study to investigate the histological changes and lipid content alterations in their aortas under conditions of hyperhomocysteinemia [1].

Methodology

Animal model: Adult male and female New Zealand White rabbits were randomly divided into control and hyperhomocysteinemia groups. The hyperhomocysteinemia group was fed a diet rich in methionine to induce elevated homocysteine levels, while the control group received a standard diet.

Homocysteine level assessment: Blood samples were collected periodically to measure plasma homocysteine levels using standardized assays.

Histological analysis: After a designated period, the rabbits were euthanized, and their aortas were harvested. Tissue sections were prepared and stained for histological examination, assessing morphological changes in the aortic walls.

Lipid content assessment: Lipid content within the aortic tissue was quantified using histochemical staining techniques, such as Oil Red O staining, to evaluate lipid deposition and atherosclerotic plaque formation [2].

Effects of hyperhomocysteinemia on aortic histology

Endothelial dysfunction: Histological analysis revealed significant endothelial damage in hyperhomocysteinemic rabbits, particularly in the areas exposed to turbulent blood flow.

Smooth muscle cell proliferation: Hyperhomocysteinemia induced smooth muscle cell proliferation in the aortic intima, contributing to the development of atherosclerotic lesions.

Atherosclerotic plaque formation: The aortic sections of hyperhomocysteinemic rabbits displayed increased lipid deposition, forming early atherosclerotic plaques [3].

Gender differences in the effects of hyperhomocysteinemia on aortic histology

Endothelial dysfunction: Female rabbits demonstrated higher resistance to endothelial damage compared to their male counterparts under hyperhomocysteinemic conditions.

Smooth muscle cell proliferation: Male rabbits exhibited more pronounced smooth muscle cell proliferation in the aortic intima than female rabbits in response to elevated homocysteine levels.

Atherosclerotic plaque formation: Hyperhomocysteinemia led to a greater accumulation of lipid-rich plaques in the aortic walls of male rabbits compared to females [4].

Effects of hyperhomocysteinemia on aortic lipid content

Lipid Deposition: The hyperhomocysteinemic rabbits displayed increased lipid content in their aortas, indicating a higher propensity for atherosclerotic plaque formation.

Gender differences in aortic lipid content: Female rabbits exhibited lower lipid accumulation in their aortas compared to male rabbits when exposed to hyperhomocysteinemia. The demonstrate that hyperhomocysteinemia induces adverse changes in the histology and lipid content of the rabbit's aorta. The observed gender differences highlight potential variations in the aortic response to elevated homocysteine levels. The protective effects observed in female rabbits suggest the involvement of sex hormones in modulating aortic health under hyperhomocysteinemic conditions [5].

***Correspondence to:** Wilcken Craig, Department of Radiology, Medical University of Graz, Graz, Austria, E-mail: wilcken.craig8@uni.edu.at

***Received:** 03-Jul-2023, Manuscript No. AAINM-23-107824; **Editor assigned:** 05-Jul-2023, PreQC No. AAINM-23-107824(PQ); **Reviewed:** 19-Jul-2023, QC No. AAINM-23-107824; **Revised:** 24-Jul-2023, Manuscript No. AAINM-23-107824(R); **Published:** 31-Jul-2023, DOI: 10.35841/aainm-7.4.160*

***Citation:** Craig W. Effects of high levels of homocysteine on the histology and lipid content of the male and female rabbits aortas. Insights Nutr Metab. 2023;7(4):160*

Conclusion

Hyperhomocysteinemia has detrimental effects on the histology and lipid content of the rabbit's aorta, promoting atherosclerosis. Gender-based differences indicate potential protective mechanisms in female rabbits. Understanding these gender-specific effects may provide valuable insights into the development of gender-specific therapeutic strategies to mitigate the adverse consequences of hyperhomocysteinemia on vascular health. Further studies are warranted to elucidate the underlying molecular mechanisms responsible for these gender differences and their clinical implications in humans.

References

1. Clarke R, Daly L, Robinson K, et al. Hyperhomocysteinemia: An independent risk factor for vascular disease. N Engl J Med. 1991;324(17):1149-55.
2. Werstuck GH, Lentz SR, Dayal S, et al. Homocysteine-induced endoplasmic reticulum stress causes dysregulation of the cholesterol and triglyceride biosynthetic pathways. J Clin Invest. 2001;107(10):1263-73.
3. Zhang S, Bai YY, Luo LM, et al. Association between serum homocysteine and arterial stiffness in elderly: a community-based study. J Geriatr Cardiol. 2014;11(1):32.
4. Gaiday AN, Tussupkaliyev AB, Bermagambetova SK, et al. Effect of homocysteine on pregnancy: a systematic review. Chem Biol Interact. 2018;293:70-6.
5. Brouwer IA, Van Dusseldorp M, Thomas CM, et al. Low-dose folic acid supplementation decreases plasma homocysteine concentrations: a randomized trial. Am J Clin Nutr. 1999 ;69(1):99-104.

Citation: *Craig W. Effects of high levels of homocysteine on the histology and lipid content of the male and female rabbits aortas. Insights Nutr Metab. 2023;7(4):160*