Introduction: Aging is defined as a progressively decreasing ability to maintain homeostasis and increasing risk to many cardiovascular system diseases. At an older age, accumulation of altered macromolecules and membranes may impair cell functioning and accumulation of damaged organelles may increase the yield of reactive oxygen species and accelerate aging. It is known that exercise delays the aging processes and protects the cardiovascular system. Due to aging body mass index increases and adipose tissue amount increases in the body.

Aim: The aim of the study was observed the protective effects of exercise and caloric restriction on cardiovascular system in aged rats.

Materials and Methods: Sprague Dawley rats were used in the study. Five experimental groups (n= 8 each group), were formed as: 1-control (3 month old, standard diet), 2-aged (15 months old, standard diet), 3-aged + caloric restriction (15 months old, caloric restriction), 4-aged + exercise (15 months old, standard diet, swimming exercise for 3 months) and 5-aged + caloric restriction + exercise groups. At the end of the study aorta and heart tissues were taken from the animals for morphological and biochemical studies. The tissue samples were fixed with 10% neutral buffered formaldehyde and processed for routine paraffin embedding. Hematoxylin and Eosin stained sections were evaluated semiquantitatively. In order to examine oxidative tissue injury, 8-hydroxy-2-deoxyguanosine (8-OHdG), malondialdehyde (MDA) and glutathione (GSH) levels, and superoxide dismutase (SOD), nitric oxide synthase (NOS) and caspase 3 activities were analyzed biochemically. Data were analyzed statistically.

Results: Aging altered the histological appearance of the tissues and caused oxidative damage assessed by increased MDA and 8-OHdG levels and decreased GSH levels and SOD activity. Furthermore, due to aging, the heart and aorta tissue caspase-3 activity is increased, while NOS activity is decreased. When aged rats were exposed to exercise, caloric restriction, or both procedures, histopathological and biochemical changes were reversed in varying amounts.

Conclusion: In conclusion, exercise and caloric restriction may protect the cell and tissues in the cardiovascular system via balancing oxidant-antioxidant status, nitric oxide metabolism and inhibiting apoptosis.