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Short-Term versus Long-Term Effect of Waterpipe Smoking Exposure on Cardiovascular Biomarkers in Mice

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Abstract : Introduction: Tobacco use is one of the main risk factors to cardiovascular diseases (CVD) and atherosclerosis in particular. WPS contains several toxic materials such as: nicotine, carcinogens, tar, carbon monoxide and heavy metals. Thus, WPS is considered to be as one of the toxic environmental factors that should be investigated intensively. Therefore, the aim of this study is to investigate the effect of WPS on several cardiovascular biological markers that may cause atherosclerosis in mice. The study also conducted to study the temporal effects of WPS on the atherosclerotic biomarkers upon short (2 weeks) and long-term (8 weeks) exposures. Methods: mice were exposed to WPS and heart homogenates were analyzed to elucidate the effects of WPS on matrix metalloproteinase (MMPs), endothelin-1 (ET-1) and, myeloperoxidase (MPO). Following protein estimation, enzyme-linked immunosorbent assays were done to measure the levels of MMPs (isoforms 1, 3, and 9), MPO, and ET-1 protein expressions. Results: our data showed that acute exposure to WPS significantly enhances the levels of MMP-3, MMP- 9, and MPO expressions ($p < 0.05$) compared to their corresponding control. However, the body was capable to normalize the level of expressions for such parameters following continuous exposure for 8 weeks ($p > 0.05$). Additionally, we showed that the level of ET-1 expression was significantly higher upon chronic exposure to WPS compared to both control and acute exposure groups ($p < 0.05$). Conclusion: Waterpipe exposure has a significant negative effect on atherosclerosis and the enhancement of the atherosclerotic biomarkers expression (MMP-3 and 9, MPO, and ET-1) might represent an early scavenger of compensatory efforts to maintain cardiac function after WP exposure.

Keywords : atherosclerotic biomarkers, cardiovascular disease, matrix metalloproteinase, waterpipe
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