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Detection of biological nanoparticles in Egyptian patients with coronary artery disease

Reda Bastawesy², Hala Badawi¹, Mrvat EL Damarawy¹, Aly Atteya², M anal ELSaid¹, Amira Hlmy¹, Omar Helmy¹ and Ehab Esmail¹ ¹Theodor Bilharz Research Institute, Egypt ²Benha University, Egypt

Introduction: Cardiovascular diseases account for more deaths than any other cause of death worldwide. Biological Nanoparticles (BNP) are novel bacteria with the smallest cellular dimension known on earth (50-300 nm). BNP are recently accused to play the role in the process of endothelial injury and hence atherosclerosis facilitating Coronary Artery Disease (CAD).

Objective: The aim of this study was to detect BNP in serum and urine samples of CAD in Egyptian patients.

Methods: The study was conducted on 38 patients and was divided into two groups. Group (1) included 28 patients with confirmed CAD by coronary angiography. Group (2) included 10 patients with excluded CAD with coronary angiography as control groups. Both groups were subdivided into two subgroups sample types, urine and serum. Patients were subjected to clinical examination, chest x-ray, ECG recording, echocardiography, coronary angiography and laboratory investigations. BNP were detected in human blood and urine by Scanning Electron Microscope (SEM).

Results: BNP were detected by SEM in 78.57% CAD patients, in serum and urine 53.57% and in serum only 25%, showing a strong association between BNP detection and CAD (P<0.01). No statistical significance was shown between serum and urine negative and positive groups regarding age, gender, hypotension, diabetes, smoking and lipid profile. coronary angiography results in serum and urine positive patients emphasized same significant LAD lesion in 19 (86.36) and 17 (100%) of patients (p<0.01) followed by LCX in 16 (72.73%) and 13 (76.47%) of patients (p<0.01) then RCA in 16 (72.73%) and 12 (70.59%) of patients (p<0.05) and the LMCA was the least to be affected showing 3 (13.64%) and 14 (82.35%) of patients with a same significant statistical reverse correlation (p<0.01), respectively. Nine (9) (52.94%) BNP urine positive versus 1 (9.1%) BNP urine negative patients showed significant statistical finding between BNP detection in urine and RWMA as a component of estimating the cardiac muscle condition.

Conclusion: BNP was detected by SEM in (78.59%) of the total patients with known CAD with variables grades and sites of coronary lesions. These data may help to understand the medical importance of already demonstrated effects of BNP on atherosclerosis and pathologic calcification in the human bodies especially coronary arteries. Screening of the body fluids for BNP on a large scale could be necessary for the assessment of co-infections with BNP especially in susceptible persons with risk of developing CAD.

profreda59@yahoo.com

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