

Antioxidant Status in Synovial Fluid from Osteoarthritis Patients: A Pilot Study in Indian Demography

Authors : S. Koppikar, P. Kulkarni, D. Ingale , N. Wagh, S. Deshpande, A. Mahajan, A. Harsulkar

Abstract : Crucial role of reactive oxygen species (ROS) in the progression Osteoarthritis (OA) pathogenesis has been endorsed several times though its exact mechanism remains unclear. Oxidative stress is known to instigate classical stress factors such as cytokines, chemokines and ROS, which hampers cartilage remodelling process and ultimately results in worsening the disease. Synovial fluid (SF) is a biological communicator between cartilage and synovium that accumulates redox and biochemical signalling mediators. The present work attempts to measure several oxidative stress markers in the synovial fluid obtained from knee OA patients with varying degree of disease severity. Thirty OA and five Meniscal-tear (MT) patients were graded using Kellgren-Lawrence scale and assessed for Nitric oxide (NO), Nitrate-Nitrite (NN), 2,2-diphenyl-1-picrylhydrazyl (DPPH), Ferric Reducing Antioxidant Potential (FRAP), Catalase (CAT), Superoxide dismutase (SOD) and Malondialdehyde (MDA) levels for comparison. Out of various oxidative markers studied, NO and SOD showed significant difference between moderate and severe OA ($p= 0.007$ and $p= 0.08$, respectively), whereas CAT demonstrated significant difference between MT and mild group ($p= 0.07$). Interestingly, NN revealed statistically positive correlation with OA severity ($p= 0.001$ and $p= 0.003$). MDA, a lipid peroxidation by-product was estimated maximum in early OA when compared to MT ($p= 0.06$). However, FRAP did not show any correlation with OA severity or MT control. NO is an essential bio-regulatory molecule essential for several physiological processes, and inflammatory conditions. However, due to its short life, exact estimation of NO becomes difficult. NO and its measurable stable products are still it is considered as one of the important biomarker of oxidative damage. Levels of NO and nitrite-nitrate in SF of patients with OA indicated its involvement in the disease progression. When SF groups were compared, a significant correlation among moderate, mild and MT groups was established. To summarize, present data illustrated higher levels of NO, SOD, CAT, DPPH and MDA in early OA in comparison with MT, as a control group. NN had emerged as a prognostic bio marker in knee OA patients, which may act as futuristic targets in OA treatment.

Keywords : antioxidant, knee osteoarthritis, oxidative stress, synovial fluid

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