Circulating Markers of Oxidative Stress in Metabolic Diseases: An update of clinical relevance ?

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Metabolic disease is often marked with dyslipidemia and increased cardiovascular risk markers. These markers include conventional risk factors, such as increased LDL cholesterol, decreased HDL levels, increased liver enzymes, and elevated HBA1c, inflammatory and oxidative stress markers. Oxidative stress is the hallmark of atherosclerosis. Oxidation markers in metabolic disease are not routinely utilized as diagnostic tools or therapeutic targets due to their instability, oxidizability, intracellular abundance and low serum levels. Also, findings regarding these oxidation marker measures are inconsistent and subject to large variations.

Importantly, considerable evidence shows significant associations between conventional serum metabolic markers and oxidative stress. However, knowledge regarding the role of these metabolic risk factors in enhancing oxidative stress is limited, and often overlooked.

Formation of protein carbonyls and lipid oxidation products are fairly stable and may overcome the shortcomings of oxidative modifications. Notably, proteins and lipids constitute the major components of circulating proteins and lipoproteins that significantly increase, or are altered, in the dyslipidemic state of metabolic disease. Therefore, measuring oxidatively modified serum markers of the dyslipidemic state and metabolic disease may be useful for the early detection of predisposing atherosclerosis risk factors, and provides new perspectives regarding their clinical relevance to cardiovascular disease progression.

Here we present updates and new perspectives considering circulating metabolic risk markers as potential triggers of oxidative stress, their possible mechanisms of action and prospective diagnostic and clinical applications.

Key words: Dyslipidemia, Oxidative Stress, Systemic markers, Cardiovascular Disease, Diagnostic markers.