

Keith M. Increased oxidative stress in patients with congestive heart failure. *J Am Coll Cardiol* 1998;31(6):1352-1356.

OBJECTIVES: We sought to study the markers of lipid peroxidation and defenses against oxidative stress in patients with varying degrees of heart failure. **BACKGROUND:** Despite advances in other areas of cardiovascular disease, the morbidity and mortality from congestive heart failure (CHF) are increasing. Data mainly from animal models suggest that free radical injury may promote myocardial decompensation. However, there are no studies in humans correlating the severity of heart failure with increased free radical injury and antioxidants. **METHODS:** Fifty-eight patients with CHF and 19 control subjects were studied. In addition to complete clinical and echocardiographic evaluations, the prognosis of these patients was established by measuring the levels of soluble tumor necrosis factor-alpha receptors 1 and 2 (sTNF-R1 and sTNF-R2). Oxidative stress was evaluated by measuring plasma lipid peroxides (LPO), malondialdehyde (MDA), glutathione peroxidase (GSHPx) and vitamin E and C levels. **RESULTS:** The patients' age range, cause of heart failure and drug intake were comparable across the different classes of heart failure. Heart failure resulted in a significant increase in LPO ($p < 0.005$), MDA ($p < 0.005$), sTNF-R1 ($p < 0.005$) and sTNF-R2 ($p < 0.005$). There was a significant positive correlation between the clinical class of heart failure and LPO, MDA, sTNF-R1 and sTNF-R2 levels. There was an inverse correlation between GSHPx and LPO. With increased lipid peroxidation in patients with CHF, the levels of vitamin C decreased, but vitamin E levels were maintained. **CONCLUSIONS:** These data demonstrate a progressive increase in free radical injury and encroachment on antioxidant reserves with the evolution of heart failure; they also suggest that oxidative stress may be an important determinant of prognosis. The therapeutic benefit of administering antioxidant supplements to patients with CHF should be evaluated.