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TLR4 Expression is Associated with Left Ventricular Dysfunction in Patients Undergoing CABG Surgery

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Introduction

Toll-like receptors pattern-recognition receptors in the innate immune response to micro-bialpathogens, are expressed in immune cells and cardiac muscle. We have found that cardiac Toll-like receptor 4 (TLR4) is involved in the acute myocardial dysfunction caused by septic shock and myocardial ischemia (MI). Cardiac function of TLR4-ko mice revealed resistance to lipopolysaccharide (LPS)-septic shock-like and reduced cardiac depression following MI. Widespread activation of inflammatory cells at the systemic level and in the heart causes the release of pro-inflammatory cytokine mediators, such as TNFα, IL-1β, and others. These cytokines negatively influence heart function. The mechanism that leads to the release of pro-inflammatory cytokines also includes the activation of TLR4. TLR4protein can be activated by LPS and endogenous proteins released after cardiac ischemia to secrete different cytokines. Brain natriuretic peptide (BNP) levels can facilitate diagnosis and are strictly related with heart failure (HF) severity. We aimed to study the correlation between the levels of TLR4 and BNP found in the blood taken from patients during coronary artery bypass graft surgery with varying levels of heart functions.

Results

The control group was composed of patients with coronary disease with moderate heart function, with an ejection fraction (EF) greater than 50%. The test group included patients with poor myocardial performance and with EF lower than 50%. Leukocytes extracted from 50 patients were checked for TLR4 in the population of monocytes. Inpatients with LOW EF, TLR4 values were higher ($p<0.03$). This result reflects sits involvement in the development of HF in patients. The levels of BNP correlated negatively with EF ($p<0.005$).

Conclusion

Increased expression and signaling by TLR4 may contribute to the activation of innate immunity in the injured myocardium leading to the depression of cardiac function. Moreover TLR4 can be used as additional biomarkers for HF.