Deletion of CD28 molecule increases cardiac rupture after myocardial infarction through reduction of collagen fiber in the infarct scars.

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Background: It is known that inflammatory responses are important in the pathophysiology of cardiac repair after myocardial infarction (MI). Although costimulatory signals such as CD80/86 and CD28 signals are required for T cell activation and survival, the roles of these signals in the wound healing after MI are still unclear.

Methods and Results: C57BL/6 (Control) mice and CD28 knockout (CD28KO) mice were subjected to left coronary artery permanent ligation. The mortality and the rate of cardiac rupture were significantly higher in CD28KO group than in Control group. Although there were no significant differences in the infarct size between two groups, the extent of extracellular collagen in the infarct area was significantly decreased in CD28KO group compared with Control group. The number of α-smooth muscle actin positive myofibroblasts was significantly decreased, and MMP-9 activity was significantly increased in CD28KO group compared with Control group. The mRNA expression of TNF-α, IL-1β, and IFN-γ were significantly higher in CD28KO group than in Control group. The percentage of infiltrating neutrophils and M1 macrophages were significantly higher, and the percentage of infiltrating M2 macrophages and regulatory T cells were significantly lower in the myocardium in CD28KO group than in Control group.

Conclusions: Deletion of CD28 molecule increases cardiac rupture after myocardial infarction through reduction of collagen fiber in the infarct scars.

Keywords: myocardial infarction, wound healing