

Wound Congress 2017: The effect of pomegranate extract on survival and peritoneal bacterial load in cecal ligation and perforation model of sepsis rats_Shahryar Eghtesadi_Azad University, Iran

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Sepsis and septic shock are one of the leading causes of mortality in intensive care units (ICU). Severe sepsis results in more than 200,000 annual fatalities and the number of cases are projected to increase. Epidemiological studies of the incidence of sepsis indicate that between 11% and 27% of ICU admissions have severe sepsis, with mortality rates ranging from 20% to more than 50%.

Sepsis is a severe systemic illness caused by invasion of pathogens to normally sterile parts of body. This local infection causes a systemic response which leads to septic shock and death. It is a complex disease, which causes oxidative stress and also unbalance between pro-inflammatory and anti-inflammatory processes. Free radical production is implicated in this process, both as a mechanism for direct cellular injury and in activation of intracellular signaling cascades within inflammatory cells resulting in progression of the inflammatory responses. The clear evidence for oxidative stress in sepsis and the link with inflammatory gene expression (including cyclooxygenase-2 [COX-2], inducible nitric oxide synthase [iNOS]) and intracellular signaling pathways (including nuclear factor κ B [NF- κ B] and mitogen-activated protein kinase (MAPK) pathways), have provided a foundation for interventions to either reduce oxidative stress which could be through using antioxidant therapy or inhibit transcriptional activation. Multiple organ dysfunction syndrome (MODS), one of the major causes of death from sepsis, is also resulted from oxidative stress and hyper-inflammatory state. Some studies using antioxidants and anti-inflammatory reagents found clinical benefits and survival improvement.

Pomegranate (*Punica granatum*, Punicaceae), a fruit with high content of polyphenols, has been focus of recent studies because of its antioxidant and anti-inflammatory properties. The polyphenol content and antioxidant activity of pomegranate has been shown to be more and stronger than many potent antioxidants such as green tea. Its anti-inflammatory effects happen via inhibition of cell signaling pathways including suppression of COX-2 and iNOS expression, inhibition of activation of NF- κ B, and inhibition of phosphorylation of MAPKs proteins.

The effect of some antioxidants and polyphenols on sepsis have been studied before, and most of the studies reported beneficial effects of polyphenol administration in sepsis models. The

reported protective effects of polyphenols in sepsis includes: Improving mortality rate, and controlling inflammatory and oxidative outburst. However, there are some recent studies presenting no effect of polyphenols in similar condition. To the best of our knowledge, the effect of pomegranate on sepsis has not been investigated yet. According to high polyphenol content and anti-oxidative and anti-inflammatory effects of pomegranate, we hypothesized that pomegranate may protect against sepsis mortality, thus, the aim of the current study is to evaluate the effect of POMx, a standard pomegranate extract, on mortality and peritoneal bacterial load in cecal ligation and perforation (CLP) model of sepsis in rats.

Results:

There was no significant difference in survival rate of CLP, prevention and treatment groups, in subgroups without antibiotics. However, in subgroups with antibiotics, the prevention group had significantly lower survival rate than sham group ($P < 0.05$). Conversely, the bacterial load of prevention and treatment groups were significantly higher than sham group ($P < 0.01$).

Conclusions:

Our study demonstrates for the first time that pomegranate extract could increase mortality rate via increasing peritoneal cavity bacterial load, in CLP sepsis model. More studies to assess mechanisms of this effect are warranted.

Biography

Shahryar Eghtesadi has completed his Bachelors in Nutrition Science and Food Chemistry from Shahid Beheshti University of Medical Sciences, Tehran; MSPH degree in Nutrition from Tehran University of Medical Sciences, Tehran and also PhD from University of California at Davis (UCD), USA in Nutrition. He was the chairs of Departments of Nutrition and Biochemistry, Biochemistry & Clinical Nutrition, Public Health Nutrition and Nutrition in aforementioned Universities also served as Associate Dean and Dean of School of Public Health & Nutrition and School of Public Health of Tabriz and Iran Universities of Medical Sciences respectively.