

Abstract

Peritoneal adhesion is the attachment of peritoneal viscera including omentum, intestine loops and abdominal walls. Peritoneal adhesions are commonly observed about one third of abdominal or pelvic surgeries. Previous studies have indicated that the incidence of adhesions following the surgical operations is about 20% in the first year. Following the peritoneal adhesion formation, various complications are occurred including intestinal obstruction, infertility and chronic pain, even additional surgery is also required. There are several causes for peritoneal adhesions' formation consisting of mechanical trauma, thermal injury, tissue ischemia, exposing to exogenous materials, and peritonitis due to infection.

It is expressed that various mediators of inflammation including arachidonic acid, cytokines, nitric oxide (NO), and oxygen-derived free radicals are involved in peritoneal adhesions. In many studies the role of inflammation in adhesion is well exhibited. Injured mesothelial cells due to surgery provoke inflammatory and proliferative responses mediated by various cytokines such as: interleukin (IL-1 β) and interleukin (IL-6), tumor necrosis factor (TNF- α), and growth factors such as tumor growth factor- β (TGF- β), insulin growth factor-1 (IGF-1) and platelet-derived growth factor (PDGF) by which acute phase cells and growth stimulation of mesothelial cells is stimulated. Inflammatory cytokines play important roles in fibrinolytic pathways and remodeling of extracellular matrix. IL-1 and TNF- α have been expressed as reliable biomarkers of peritoneal adhesion. Overproduction of TGF- β is involved in peritoneal adhesion formation too. Nowadays nanoparticles are drawing attention more and more in modern medicine specially in the field of drug and gene delivery. So far this is the first try to show the effect of selenium nanoparticles in the peritoneal adhesion. The selenium nanoparticles have shown potential anti-inflammatory properties in irradiated rats. The selenium nanoparticles are involved in arthritis treatment partly due to their anti-inflammatory effect. In this study, 64 male Wistar rats were randomly divided into groups. Each group is then assigned to one of the concentrations of 0.01%, 0.1% and 1% selenium or selenium nanoparticles.

Selenium nanoparticles are widely used in various studies confirmed its anticancer, antioxidant, anti-inflammatory and anti-diabetic action. Regarding to the valuable pharmacologic properties of selenium nanoparticles and the role of oxidation and inflammation in peritoneal adhesion we hypothesized selenium as a sufficient and beneficial treatment for peritoneal adhesion.

Keywords: peritoneal, adhesion, selenium, nanoparticle, anti-inflammatory, rat



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