

**Summary of the DVM thesis No , Faculty of Veterinary Medicine of Urmia University.**

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Title of thesis: **The effect of zinc on the stability of colon anastomosis in the presence and absence of experimental peritonitis in rats**

**Summary:**

In surgeries performed on the colon, the occurrence of leakage from the anastomosis site increases the mortality rate. The occurrence of leakage is due to the decrease in tissue resistance due to the increased activity of collagenases (some matrix metalloproteinases, MMPs and serine proteases) at the site of anastomosis, especially in the first days after surgery (the first three days); This causes the destruction of old collagen fibers. In fact, this phenomenon is the reason for weakening the anastomosis again. Zinc is the second known element, which plays a significant role in all secretions of organs and glands of the body. Zinc deficiency causes significant problems for the patient, including the patient's greater sensitivity to infection, delay in wound healing, etc. MMPs play an essential role in wound healing due to their balancing function in collagen degradation and synthesis. Most MMPs are zinc-binding multipartite endopeptidases. Based on the evidence, due to the pivotal role of zinc in the formation of endopeptidase and finally MMP and procollagen C-Proteinase, the timely presence of this element seems to be of great help in the healing process of colon anastomosis wounds. Based on the above explanations, the aim of this study is to investigate the effect of zinc on the stability of the colon anastomosis in the presence and absence of experimental peritonitis in rats. 32 adult male Wistar rats were randomly divided into four groups of 8 each. The first group underwent anastomotic surgery without intraperitoneal zinc injection, the second group with intraperitoneal zinc injection under anastomotic surgery, the third group without intraperitoneal zinc injection in peritonitis, under anastomotic surgery and the fourth group with intraperitoneal zinc injection in peritonitis. , underwent anastomosis surgery. Experimental peritonitis was induced by ligation of the cecum. The day after the development of peritonitis, the cecum was removed and the descending colon was anastomosed. 5 days after the surgery, the mice were euthanized and 1cc of blood was taken from each mouse to evaluate their serum levels. The amount of leakage, adhesion and rupture pressure were evaluated. Histopathological evaluations were done with hemotoxin eosin and Wenginson staining to check the amount of tissue collagen and healing and inflammatory cells. Semi-quantitative assessment of tissue MMPs was done by Western blot method. The amount of leakage and adhesion in the groups treated with zinc sulfate was lower compared to the groups that did not receive zinc. In the histopathology evaluations, the treatment groups had less inflammatory cells (neutrophils, lymphocytes and macrophages) compared to the groups that were not treated. Also, in evaluating the amount of collagen fibers, the treated groups had a higher density in the same conditions. Considering the amount of tissue collagens as well as the amount of leakage and adhesion, the rupture pressure was higher in the treatment groups. The amount of zinc in the serum was higher in the recipient groups under similar conditions. In

examining the amount of MMPs as an important factor in all stages of the wound, in the groups under peritonitis, in the group receiving zinc, their amount decreased, and in the groups that were not subjected to the conditions of induced peritonitis, in the group Zinc receiver, their amount increased. Intraperitoneal injection of zinc sulfate increases tissue resistance, increases wound healing speed in colon anastomosis in inflammatory phases and peritonitis conditions in rats.

**Keywords:** anastomosis, peritonitis, colon, zinc, rat