

Thesis Title:

Evaluation of the Effect of Intraperitoneal Administration of Bromelain on Colon Anastomosis Healing in Rats

Abstract:

Proper healing of colon anastomosis after colorectal surgery plays a critical role in preventing serious complications such as anastomotic leakage and severe adhesions. The use of biological agents with anti-inflammatory and tissue-regenerative properties, including bromelain, has been considered as a novel approach to enhancing the quality of tissue repair. The aim of the present study was to evaluate the effect of intraperitoneal bromelain administration on the healing process of colon anastomosis in an animal model. In this study, twenty adult male rats with similar age and weight were randomly assigned to two groups of ten animals each. Following intraperitoneal anesthesia with ketamine and xylazine, 1 cm segment of the descending colon was resected, and the two ends were anastomosed using Dexon 4-0 sutures with simple interrupted pattern. After surgery, the control group received 1 ml of normal saline intraperitoneally once a day, whereas the treatment group received the same volume containing bromelain (10 mg/kg) dissolved in normal saline for five consecutive days. On the sixth day, the rats were euthanized, and the adhesion score was evaluated. In each group, five colon samples were subjected to the burst pressure test and histopathological examination using Hematoxylin and Eosin staining for infiltration of inflammatory cells, fibroblast count, and angiogenesis, while the remaining five samples underwent biomechanical tensile testing. Results showed that in the bromelain treated group, adhesion scores were significantly lower, with only mild and limited adhesions, whereas the control group exhibited severe and multiple adhesions to abdominal organs. Microscopic evaluation revealed reduced infiltration of polymorphonuclear inflammatory cells in the treatment group, along with a marked increase in angiogenesis and fibroblast density—indicating stimulation of collagen synthesis and efficient extracellular matrix remodeling. From a mechanical perspective, maximum tolerable force, yield point force, and stress values were significantly higher in the bromelain group, suggesting greater strength and mechanical resistance of the anastomotic site. The resistance measured by the burst pressure test in the treatment group was more than three times that of the control group. These findings showed that intraperitoneal administration of bromelain, by reducing inflammation and improving the quality of tissue regeneration, enhanced the function of the colon wall and can be used as an adjunct therapy in colorectal surgeries..

Keywords: Anastomosis, Bromelain , Healing, Pineapple, Rat