

Effects of Injectable Thermosensitive Hydrogel Containing Chitosan as a Barrier for Prevention of Post-operative Peritoneal Adhesion in Rats

Authors : Sara Javanmardi, Sepehr Aziziz, Baharak Divband, Masoumeh Firouzamandi

Abstract : Post-operative adhesions are the most common cause of intestinal obstruction, female infertility and chronic abdominal pain. We developed a novel approach for preventing post-operative peritoneal adhesions using a biodegradable and thermosensitive curcumin hydrogel in rats. Thirteen male Sprague-Dawley rats were assigned randomly into five groups of six animals each: In SHAM group, the cecum was exteriorized, gently manipulated and sent back into the abdomen. In CONTROL group, the surgical abrasion was performed with no further treatment. In Hydrogel group, surgical abrasion was performed with local application of blank hydrogel (1 mL). In Curcumin group, surgical abrasion was performed with local application of curcumin (1 mL). In CUR/HGEL group, surgical abrasion was performed with local application of curcumin hydrogel (1 mL). On day 10, adhesions were assessed using a standardized scale (Evans model), and samples were collected for the Real-time PCR. Real-time PCR was performed to determine mRNA levels of VCAM-1, ICAM-1 and GAPDH. The macroscopic adhesion intensity showed statistically significant differences between the CUR/HGEL and other groups ($P=0.0005$). The findings of the present study revealed there were statistically significant differences between the groups regarding adhesion band length and numbers ($P<0.0001$). The protein and mRNA expression of VCAM-1 and ICAM-1 in secal tissues were significantly down regulated due to curcumin-hydrogel application in CUR/HGEL compared to other groups ($p<0.05$). The thermosensitive hydrogel could reduce the severity and even prevent formation of intra-abdominal adhesion. Curcumin hydrogel could serve as a potential barrier agent to prevent post-operative peritoneal adhesion in rats.

Keywords : peritoneal adhesion, hydrogel, curcumijn, ICAM-1, VCAM-1

Conference Title : ICASO 2023 : International Conference on Animal Surgery and Operations

Conference Location : Paris, France

Conference Dates : September 18-19, 2023