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A pectin-honey hydrogel prevents postoperative intraperitoneal adhesions in a rat model

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Postoperative intra-abdominal adhesion formation has long been considered an inevitable consequence of laparotomy, and the incidence in abdominal surgery is ranging between 67 and 93% [1-3]. Liquid honey has been used intraperitoneally to reduce the incidence of these adhesions [4-6]. However, solid barriers are considered more effective than liquids in decreasing postoperative intra-abdominal adhesion formation; therefore, a new pectin-honey hydrogel (PHH) was produced and its effectiveness was evaluated in a rat cecal abrasion model.

Standardized cecal/peritoneal abrasion was performed through laparotomy in 48 adult Sprague-Dawley rats to induce peritoneal adhesion formation. Rats were randomly assigned to a control (C) and treatment (T) group. In group T, PHHs were placed between the injured peritoneum and cecum. Animals were euthanized on day 15 after surgery. Adhesions were evaluated macroscopically and adhesion scores were recorded and compared between the two groups. Inflammation, fibrosis, and neovascularization were histologically graded and compared between the groups.

In group C, 17 of 24 (70.8%) animals developed adhesions between the cecum and peritoneum, while in group T only 5 of 24 (20.8%) did ($p = 0.0012$). In group C, one rat had an adhesion score of 3, sixteen had scores of 2, and seven rats had scores of 0. In group T, four rats had adhesion scores of 2 and one rat had an adhesion score of 1. Significantly lower grades of inflammation, fibrosis, and neovascularization were seen in group T ($p = 0.007$, $p = 0.001$, $p = 0.002$, respectively).

PHH is a novel absorbable barrier that is effective in preventing intra-abdominal adhesions in a cecal abrasion model in rats.

References:

- [1] Yildiz T, Ilce Z, Yildirim M, Akdogan M, Yurumez Y, Varlikli O, Dilek FH. Antienflamatuar and antiadhesive effect of clioquinol. *Int J Surg* 2015; 15:17-22.
- [2] Cassidy MR, Sheldon HK, Gainsbury ML, Gillespie E, Kosaka H, Heydrick S, Stucchi AF. The neurokinin 1 receptor regulates peritoneal fibrinolytic activity and postoperative adhesion formation. *J Surg Res* 2014; 191:12-18.
- [3] Chaturvedi AA, Lomme RMLM, Hendriks T, van Goor H. Prevention of postsurgical adhesions using an ultrapure alginate-based gel. *Br J Surg* 2013; 100:904-910.
- [4] Emre A, Akin M, Isikgonul I, Yuksel O, Anadol AZ, Cifter C. Comparison of intraperitoneal honey and sodium hyaluronate-carboxymethylcellulose (Seprafilm™) for the prevention of postoperative intra-abdominal adhesions. *Clinics (Sao Paulo)* 2009; 64:363-368.
- [5] Aysan E, Ayar E, Aren A, Cifter C. The role of intra-peritoneal honey administration in preventing post-operative peritoneal adhesions. *Eur J Obst Gyn Repr Biol* 2002; 104:152-155.
- [6] Cooke J, Dryden M, Patton T, Brennan J, Barrett J. The antimicrobial activity of prototype modified honeys that generate reactive oxygen species (ROS) hydrogen peroxide. *BMC Vet Res* 2015; 8:20-25.