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Barrier polymer implants in prophylaxis of postoperative peritoneal adhesions

Viacheslav A Lipatov
Kursk State Medical University, Russia

Background: Associated with intra-abdominal adhesions, there are post-operative peritoneal adhesions, abdominal adhesive disease, and adhesive intestinal obstruction. Regarding abdominal adhesions, 1% of patients that underwent through surgery are re-admitted with the mentioned condition, and in 50 to 75% of these patients, there is development of adhesive intestinal obstruction. Conservative treatment has proved to be ineffective. Moreover, there is relapse in 32-71% in abdominal adhesions operations. Much of the etiology, pathogenesis, morphology, classification, prevention and treatment of peritoneal adhesion are still under discussion. A promising direction in prevention of adhesions and its complications is the use of implants with a barrier effect.

Objective: 1) Stressing the current theoretical assumptions of etiology, pathogenesis and morphology of abdominal adhesion. 2) Evaluation of the advantages and disadvantages of approaches to determine the morphology and severity of abdominal adhesions. 3) Display of the effectiveness of the barrier anti-adhesive findings, based on polymers, according to the results of practical experiments.

Study design: The studies were conducted by comparing the analysis of the literature and the results of their own research. Through simulation of surgical trauma in animals, on a laboratory environment, there were studied the characteristics of development of adhesions. As the object of study, adult Wistar rats were used, all males weighing 250±12 grams. Histological examination of tissues was carried out by examining the paraffin sections stained with hematoxylin-eosin and Picro - Sirius Red. The morphometric parameters of their digital values were processed by methods of variation statistics using the Mann-Whitney test.

Results: A system was developed to assess the severity of peritoneal adhesion, by the method of semantic differential. Designed resorbable polymer barrier means have been studied experimentally and proved their safety and efficacy for the prevention of primary and recurrent adhesions. Investigation of immunological aspects was performed and it was shown efficiency of immunomodulators in the postoperative period. The experiment assessed pro-adhesive properties of certain drugs administered parenterally and intra-peritoneally, regarding its properties of suppression of undesirable body reactions in response to the implant.

Conclusions: 1) In order to carry out fundamental research into the etiology and pathogenesis of adhesions there should be used diffuse adhesions modeling techniques to study the efficiency of applied anti-adhesive means the most appropriate model is a local Cecal model. 2) The method of semantic differential was the best form in assessment of the severity of adhesions in the experiment. 3) The use of barrier significantly reduces the severity of primary and recurrent adhesions in the abdominal cavity (and including on a background of drug use) in the postoperative period.

drli@yandex.ru

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