Effect of fibrin glue in liver regeneration after laparoscopic surgery.

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Abstract:

Background: Fibrin glue (FG) is a natural chemical - adhesive system with an important role in blood coagulation and wound healing. It consists of two basic components - fibrinogen and thrombin, where activation of fibrinogen and its transformation into fibrin under the action of thrombin is the third phase of blood coagulation. It is known that the use of FG in laparoscopic cholecystectomy reduces the complication rate in terms of stopping diffuse bleeding in the liver parenchyma, preventing extravasation of bile and the reduction of abdominal adhesions. The main objective of this study was to determine whether the use of FG in laparoscopic surgery has an effect on the speed of healing and regeneration of liver tissue. Material and methods: The study included a total of 40 experimental pigs in which was performed laparoscopic cholecystectomy and intraoperative standardized artificially damage of gallbladder boxes, which was repaired using FG in animals of experimental group (EG) or using standard means in animals of the control group (CG). FG was homemade (Blood Transfusion Institute Nis), prepared from two components, of which the first one was prepared from the cryoprecipitate with the addition of antifibrinolytic agents (aprotinin). The second component was a commercial bovine thrombin with calcium chloride. Animals were monitored for 30 days, 4 animals were sacrificed on the fifth, seventh, tenth, fourteenth and thirtieth day of follow- up. During autopsy we have taken liver tissue and prepared for pathological research on which basis is calculated the histopathologic regeneration score (HRS: 0-3), which shows the level of liver regeneration. Results: HRS was statistically significantly higher in EG on the fifth and seventh day ($P > 0.05$) and extremely higher on the tenth and fourteenth day ($P > 0.0001$). On the thirtieth postoperative day HSR in EG was 3.75 which is verified as a high level of regeneration and

indicates the completion of liver regeneration after thirty days from the application of FG. In the course of liver regeneration, necrosis and hemorrhage fields were lower in EG compared to CG (P = 0.03, respectively). Verified cytoplasmic vacuolization was significantly higher in CG compared CG. Conclusions: Application of fibrin glue in laparoscopic surgery affects the optimal and rapid flow of the process of healing and regeneration of the liver. Its application is recommended especially in the occurrence of diffuse intraoperative liver bleeding or in the bile duct injury, in patients who are on anticoagulant therapy, with liver cirrhosis and severe coagulation disorders.