



EXPERIMENTAL STUDIES TO EVALUATE THE HEMOSTATIC EFFECTIVENESS OF HEMOBEN GEL IN RUPTURES OF THE GASTRIC MUCOSA

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Abstract:

Mallory-Weiss syndrome is a linear rupture of the mucous membrane in the area of the gastrointestinal junction. The main objective of this study was an experimental assessment of the hemostatic effect of submucosal administration of Hemoben gel. Taking into account the main task of the dissertation, the primary study was aimed at assessing the effect of Hemoben gel on the gastric mucosa in experimental animals. In the second series of experiments, a wound of the mucous membrane of the esophageal-gastric junction was formed by gastrotomic access. In this part of the experiment, the possibility of stopping bleeding using a gel from the drug Hemoben was tested. The advantage of introducing Hemoben gel is to achieve closure of the edges of the mucosal defect, which lasts for a long time.

Keywords: Mallory-Weiss syndrome; Hemoben Gel; hemostatic effect; mucosal defect.

The main objective of this study was an experimental assessment of the hemostatic effect of submucosal administration of Hemoben gel. Taking into account the main task of the dissertation, the primary study was aimed at assessing the effect of Hemoben gel on the gastric mucosa in experimental animals. It was found that for injection using needle injectors, it is sufficient to prepare 2% gel by diluting Hemoben powder in saline solution. At the beginning of the studies, Hemoben was injected through a puncture of the serous wall of the stomach into the submucosal layer in an amount of up to 0.2-0.3 ml with the formation of a protruding roller. Observation for 7 days revealed no signs of necrosis or inflammation of the mucous membrane.

In the second series of experiments, a wound of the mucous membrane of the esophageal-gastric junction was formed by gastrotomic access. In the control group of animals, bleeding from a mucosal tear was stopped by injecting an epinephrine solution into the submucosal layer, and in the experimental group by injecting Hemoben gel. During the morphological examination of the control group on the 1st day of the experiment, various alternative inflammatory processes prevailed. At the same time, there were "micro-tears" of histological layers of different sizes, tissue edema, and areas of moderate necrosis. In the experimental group of animals, the mucosa in the area of previously performed damage is closed, there are no signs of ischemia and necrosis, histologically, the exudative-proliferative process of inflammation prevailed more, edema and lymphocytic focal infiltration were detected in the area where the gel was injected.

On day 3, in the control group, the wound in the form of a narrow line decreased in size by 2 times, was covered with fibrin, exudative-proliferative inflammatory process prevailed in the mucous and submucosal membranes. In the experimental group, the mucous membrane in the area of the tear almost completely healed in the form of an elastic scar. Histologically, the fibers of the mucous layer are organized, fibrosis is found in the affected areas. Remnants of a homogeneous mass are found in the area of gel administration.

In the control group, hemostasis in the vessels of the affected layers was mainly achieved due to vascular spasm. Subsequently, microhematomas appeared in submucosal areas as a result of diapedetic accumulation of erythrocytes and sludge in the injection area. Their complete resorption was observed after 5-7 days of the experiment. Wound healing, mainly in an exudative form, began from 5 days. In the experimental group: hemostasis in the vessels in the area of experimental trauma occurred due to Hemoben gel with hardening of damaged vessels. In contrast to the control group, extravascular diapedesis was almost not observed. As for wound healing, due to its adhesiveness, the gel glued the damaged areas and enhanced their regeneration.

On day 7, in the control group of animals, macroscopically, the wound of the gastric mucosa completely healed by forming a scar. However, microscopically, a layer of fibroblasts continued to form in the area of damage, especially in the area of damaged histological layers. In the experimental group, the regeneration of the histological layers of the lesion



zone was completed within these terms. A small number of soft-fibrous connective tissue elements are observed in the affected layers, while all layers have recovered to their morphophysiological state.

Thus, in this part of the experiment, the possibility of stopping bleeding using a gel from the drug Hemoben was tested. The dynamics of resorption of gel injected into the submucosal layer of the stomach and the ability to stop bleeding were investigated. This made it possible to conduct the next part of experimental studies that are close to the clinical situation. For this purpose, a model of the formation of a longitudinal rupture of the gastric mucosa by the endoscopic method in mini-pigs was used. In the control group, bleeding was stopped by injecting up to 20 ml of epinephrine solution. In the experimental group, Hemoben gel was injected in an amount of up to 10 ml.

10 minutes after the bleeding stopped, there was almost complete resorption of the injected epinephrine solution with a gaping lumen of the wound. The resumption of bleeding occurred only in one case, which was stopped by repeated administration of an epinephrine solution.

In the experimental group, in addition to achieving complete hemostasis, the introduction of the gel contributed to closing the edges of the rupture of the mucosa due to the formed mucosal roller. 10 minutes after the procedure, the edges of the wound remained closed, no blood leakage was observed.

According to endoscopic studies performed at various times after surgery, it was found that in the control group of animals, by the 6th day, the wound of the mucosa remained almost the same size and was covered with fibrin. The edges of the wound were gaping. Partial healing of the mucosal wound was observed by 10-18 days. In the experimental group of animals, on day 6, the wound of the gastric mucosa practically healed, while it shrank by 3 times and had the character of a linear wound. Stable hemostasis occurred in the affected histomorphological layers due to the homogeneous distribution of the gel. Unlike the control group, extravascular diapedesis was practically absent in this group.

Thus, 2% Hemoben gel can be injected into the submucosal layer of the stomach. The advantage of introducing Hemoben gel is to achieve closure of the edges of the mucosal defect, which lasts for a long time. This contributes to a more favorable course of the postoperative period and wound healing on 6-10 days after surgery, which is 2-3 times faster than when using an adrenaline solution (14-18 days).

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