World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-26, September 2023
ISSN: 2749-3644

DEVELOPMENT OF AN ORIGINAL METHOD AND TECHNICAL ASPECTS OF ENDOSCOPIC HEMOSTASIS IN EXPERIMENTAL GASTRODUODENAL BLEEDING.

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Article history:

Received: July 24th 2023
Accepted: August 26th 2023
Published: September 28th 2023

Abstract:

Despite many years of research into this pathology, against the background of pharmacological and endoscopic methods of correction that were discovered by the beginning of the 21st century, the treatment of complications of ulcerative lesions of the gastric mucosa and duodenum still remains a complex problem in modern gastroenterology [1,4,5,8,9].

Keywords:

RELEVANCE. According to modern literature, annually erosive and ulcerative lesions of the gastrointestinal tract are diagnosed in 5 million people worldwide, while, despite the general trend of decreasing incidence, peptic ulcer of the stomach and duodenum remains a common pathology of the gastrointestinal tract, accompanied by dire consequences [3, 6,11,12].

Despite many years of research into this pathology, against the background of pharmacological and endoscopic methods of correction that were discovered by the beginning of the 21st century, the treatment of complications of ulcerative lesions of the gastric mucosa and duodenum still remains a complex problem in modern gastroenterology [1,4,5,8,9].

The most common complication of GU and DU is acute bleeding, the frequency of which varies within 5-10% of cases. In men, especially over the age of 40, this complication occurs 5-6 times more often than in women. In the elderly, the probability of bleeding already reaches 70-90%. On average, during the first six months from the moment of bleeding, 12-33% of patients experience relapses of this complication [2,5,7,10].

Despite the continuing discussion about therapeutic tactics, the choice of method and hemostatic agent for acute gastroduodenal bleeding, namely, regarding the preference for conservative treatment with a combination of endoscopic methods of hemostasis (physical, chemical methods) or active-watchful tactics in combination with open surgical intervention for recurrent course of the process, on the one hand, most surgeons dealing with this problem are often skeptical about the emergence of new hemostasis technologies and reserve the right to use proven techniques that have long existed in these clinical units.

Moreover, there is no clear evidence base regarding the prevention of the next recurrence of bleeding with the preference of any method. On the contrary, according to studies of both foreign and domestic clinicians, recurrent bleeding, strictly associated with the area of the primary source, is observed in 2-12% of patients, and during the first three months in 15% of patients.

In this regard, to date, methods of endoscopic hemostasis or its combined intervention are being developed. In this chapter, an original method for processing endoscopic hemostasis using the domestic innovative drug "Geprocel", an assessment of its effectiveness in an experimental model of acute ulcerative bleeding and technical aspects during endoscopic hemostasis are presented.

BIOLOGICAL PROPERTIES OF "GEPROCEL" AND ITS EFFECTIVENESS ON THE MODEL OF BLEEDING GASTRIC ULCER.

To create an experimental model of acute gastroduodenal bleeding, male rats weighing from 170 to 190 g were used. Animals were left without food for 12 hours before the operation. Under general anesthesia with halothane vapor under an anesthetic "bell", followed by mask anesthesia using a special mask and a gauze ball moistened with halothane, the rat was anesthetized. Under the control of the level of spontaneous breathing and corneal reflexes, the surgical stage of anesthesia was reached (Fig. 1).

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Figure 1. Animal in a state of surgical anesthesia, treatment of the surgical field with an antiseptic.

The skin incision and opening of the abdominal cavity was carried out along the midline in / 3 of the abdominal wall. The stomach is brought out into the wound, attention is drawn to the fact that the stomach should be empty of food masses (Fig. 2).

Figure 2. Rat stomach exposed to the surgical wound.

At the level c/3 of the body of the stomach, a soft vascular clamp is applied, thereby creating an artificial sealant for the pyloroanthral part of the stomach. Using a thin insulin needle, a puncture is made along the greater curvature of the stomach and air is introduced to form an air cavity in a volume of up to 0.5 ml (Fig. 3).

Figure 3. The body of the stomach in the distal third is clamped to achieve the sealant by the instrument. Needle in the lumen of the antrum of the stomach.

Through the same needle, 0.1 ml of a 60% solution of acetic acid is injected into the stomach cavity (Fig. 4).

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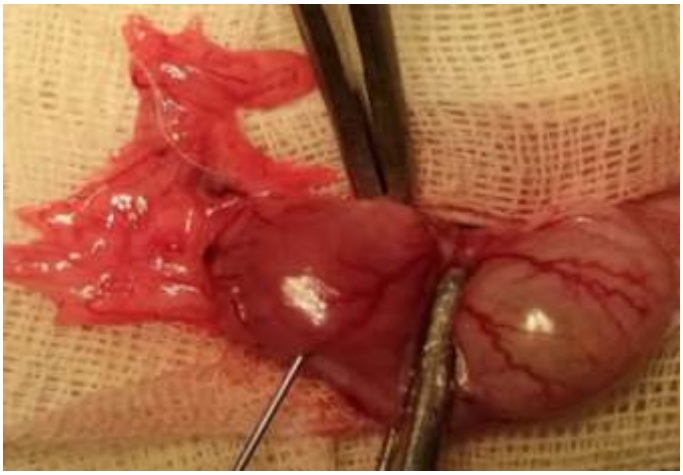

Figure 4. Introduction of 0.1 ml of 60% acetic acid solution into the stomach cavity.

Considering that the rat lies on its back, the acid is collected in the projection of the posterior wall of the stomach closer to the pyloroanthral region. We wait for the time required for the formation of the necrotic zone of the mucosa - from about 30 to 50 seconds, depending on the volume of the stomach of the rat. Subsequently, air with sanious fluid is sucked out through the same needle (Fig. 5).

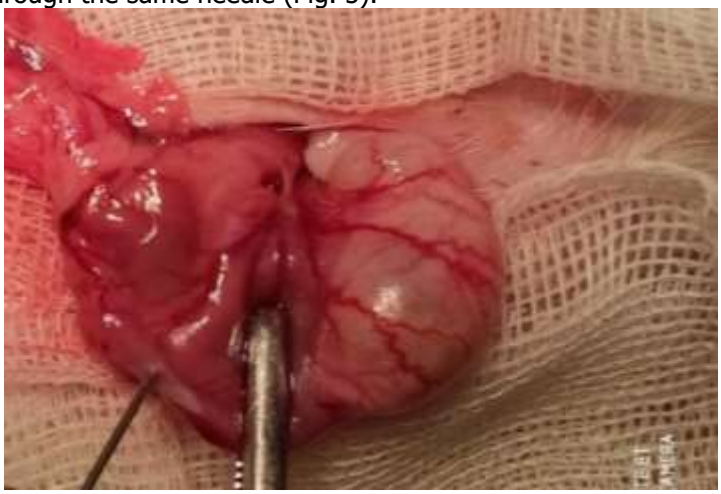

Figure 5. Stage of suction of air with sanious fluid from the stomach.

The stomach cavity is additionally washed with saline in a volume of 2 ml. The clamp is removed. The injection site was not sutured. The abdominal cavity is sutured tightly (Fig. 6).

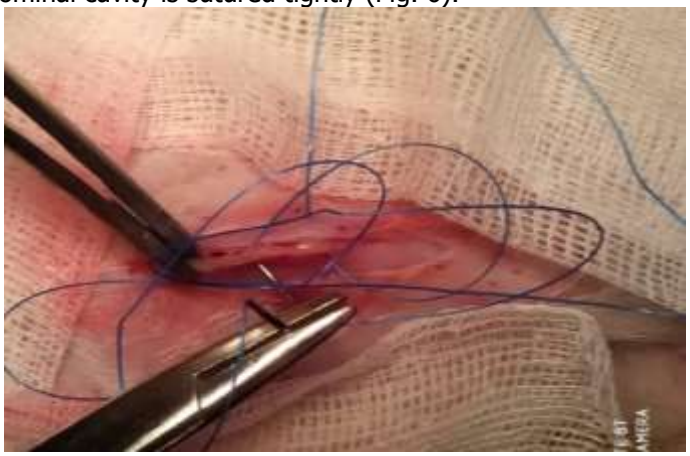

Figure 6. The process of suturing the surgical wound.

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After the operation, animals are not given food for 3 hours, only drinking water. For postoperative analgesia, 0.1 ml of ketonal is injected intramuscularly for 2 days, 2 times a day. Complete food ration from the next day.

Results of experimental creation of the model.

Out of 12 rats, death occurred in 3 individuals within 1-2 days. Autopsy showed the presence of an ulcer with perforation of the stomach wall, acute intoxication. After the experiment, 9 individuals remained alive. Assessment of the state of the ulcer and the experiment was carried out on the 3rd day after the formation of the ulcer (Fig. 7 and Fig. 8).

Figure 7. The state of the abdominal cavity on the 3rd day after the formation of a chronic acetate ulcer.

3 days after the operation, a deep round ulcer is clearly defined (Fig. 8), consistently developing in the body of the stomach only on the posterior wall, the anterior mucosa remains essentially unchanged in each animal.

Figure 3.8. Formation of a bleeding ulcer in the pyloroduodenal zone.

A bleeding ulcer was modeled using an abrasive material (Figure 9).

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Figure 9. Formation of a bleeding ulcer by treating the bottom of the ulcer with abrasive material.

The control group included laboratory animals in which hemostasis was achieved by fixing a sterile gauze pad to the ulcer.

In the control group, complete (4 rats) hemostasis from the ulcer was achieved in 123–230 sec, and when observed for 10 min, rebleeding was noted in 28.2 ± 4.3% of cases.

In the experimental group of animals (5 individuals), hemostasis after applying the hemostatic powder occurred within 5.3 ± 2.1 sec. adhesion and strength. After 10 minutes of observation, no rebleeding was observed (Figure 10).

Figure 10. Hemorrhage arrest after Geprocel application.

Subsequently, activation of blood coagulation factors led to the formation of a fibrin film on the surface of the ulcer (Fig. 11).

Figure 11. Formation of a fibrin film on the surface of the ulcer.

Subsequent observations of the animals showed that 1 and 3 hours after the operation, the implant remained on the surface of the erosive and ulcerative defect in the form of a white coating and did not separate from the wound surface. There were no signs of bleeding.

Thus, the conducted studies have shown that Geprocel powder exhibits the ability to enhance hemostatic properties in an acidic environment, adheres tightly to the ulcer, and actively stops bleeding.

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