

Gastroduodenal Complications with Bleeding in Severely Burned Patients

Zuvaytov Shokhrukh Gayratovich¹, Khakimov Erkin Abdukhalilovich²,
Khayitov Laziz Milionerovich^{3,*}, Abrorov Shakhboz Nematzoda⁴

¹Private Clinic "Brosmed" of the City of Karshi, Uzbekistan

²Combustology Department of the Samarkand Branch of the Republican Specialized Scientific and Practical Medical Center for Emergency Medical Care, Uzbekistan

³Samarkand State Medical University, Uzbekistan

⁴Private Clinic "Gamma med Medical", Uzbekistan

Abstract Relevance. The severity of damage to internal organs in burn disease, including the digestive organs, depends on the degree of disruption of metabolic, endocrine, and immune processes. In turn, these homeostasis disturbances are determined by the severity of the injury, the duration and severity of burn shock, and the extent of deep skin lesions. **The aim of the study was** to improve treatment outcomes for erosive and ulcerative lesions and gastrointestinal bleeding in patients with severe burns. **Material and methods.** An analysis of 85 victims with severe thermal injury (deep burn area of 20-40% of body surface area) treated from 2020 to 2024 in the Combustology Department of the Samarkand branch of the Russian Scientific Center for Emergency Medical Care was conducted. The study group included 45 victims examined retrospectively and 40 victims of the main group (prospective analysis). The course of burn disease in a number of patients was complicated by the development of bleeding from the upper gastrointestinal tract. **Results and discussion.** At any stage of burn treatment, if clinical or endoscopic signs of bleeding from an acute ulcer, the risk of its development, or negative dynamics in the state of acute ulceration are detected, especially in patients with a history of ulcers, intravenous administration of proton pump inhibitors is indicated for complete suppression of hyperchlorhydria until the threat of massive bleeding is eliminated. **Conclusions.** The pathogenetically substantiated method of choice for the development of massive bleeding in burn patients is endoscopic hemostasis combined with complex hemostatic, replacement, and angioprotective therapy. If hemostasis is impossible or ineffective, laparotomy with gastro- or duodenotomy and suturing of the bleeding vessel in the ulcer should be performed.

Keywords Burn disease, Substantiated method, Gastroduodenal bleeding

1. Relevance

The severity of damage to internal organs in burn disease, including the digestive organs, depends on the degree of disruption of metabolic, endocrine, and immune processes. In turn, these homeostasis disturbances are determined by the severity of the injury, the duration and severity of burn shock, and the extent of deep skin lesions [1,2,3]. Acute erosions and ulcers of the gastrointestinal tract (GIT) result from the development of systemic inflammatory response syndrome (SIRS) and depend on its course. For In the prevention and treatment of erosive and ulcerative lesions of the gastrointestinal tract and complicated acute ulcers in the complex treatment of burns, effective correction of SIRS is

of primary importance [4].

However, unlike all cellular structures, the upper gastrointestinal tract in SIRS is exposed to the influence of local aggressive factors – hydrochloric acid, pepsin, bile. This is caused, first of all, by prolonged stimulation of parietal cell function against the background of SIRS (histamine, gastrin, acetylcholine), as well as by a violation of the sphincter locking function with reflux of contents into the overlying sections, a decrease in the protective role of the gastric mucosal barrier. Hyperacid state of the gastric contents can contribute to the expansion and deepening of erosive and ulcerative defects of the mucous membrane with the development of complications [5,6,7]. The greater the severity of the damage and the severity of the condition in the acute period of burn disease, the more likely it is to expect complications from the gastrointestinal tract [8,9,10].

The aim of the study was to improve treatment outcomes for erosive and ulcerative lesions and gastrointestinal bleeding in patients with severe burns.

* Corresponding author:

sammi-xirurgiya@yandex.com (Khayitov Laziz Milionerovich)

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2. Material and Methods

An analysis of 85 victims with severe thermal injury (deep burn area of 20-40% of body surface area) treated from 2020 to 2024 in the Combustiology Department of the Samarkand branch of the Russian Scientific Center for Emergency Medical Care was conducted. The study group included 45 victims examined retrospectively and 40 victims of the main group (prospective analysis). The course of burn disease in a number of patients was complicated by the development of bleeding from the upper gastrointestinal tract. The victims received thermal injury as a result of exposure to an open flame in 59 (69.5%) observations, hot liquid and contact - in 23 (26.7%) and 3 (3.8%) cases, respectively. In one case, an arc flame burn was detected. In all patients, the deep burn area was more than 20% of body surface area. In 18 cases (21.9%), erosive and ulcerative gastrointestinal lesions were detected in victims with an exacerbation of chronic gastric or duodenal ulcers. In 66 patients (78.1%), erosive and ulcerative gastrointestinal lesions developed acutely. The age of the victims ranged from 20 to 80 years (mean age 57.8 ± 3.5 years). The majority of victims were men – 70 people, or 82.8% of cases.

To suppress gastric secretion, we used anacid drugs in 40 patients in the main group: 12 patients received an M1-cholinergic receptor blocker (gastrocepin), 20 patients received H2-histamine receptor blockers (cimetidine, ranitidine, histodiil, zantac, quamatel), and 8 (1.8%) patients received proton pump inhibitors (omez). Patients in the control group did not receive this treatment for one reason or another.

Anacid therapy regimens were improved depending on the severity of the burn injury, anamnestic data and clinical and endoscopic manifestations. Indications for intravenous anacid therapy (H2-histamine receptor blockers or proton pump inhibitors) from the first day are severe burn injury (IF over 90 units) and a history of peptic ulcer disease, as well as signs of gastrointestinal bleeding: in the absence of these indications, anacid therapy is administered orally (H2-histamine or m1-cholinergic receptor blockers). In all patients, anacid therapy was continued until the clinical signs of SIRS syndrome disappeared. In 94% of patients, anacid therapy The drugs were effective in preventing massive bleeding. The organ-protective therapy regimen also included antacid or combined protective drugs (Almagel, Maalox, Venter).

3. Results and Discussion

At any stage of burn treatment, if clinical or endoscopic signs of bleeding from an acute ulcer, the risk of its development (thrombus-clot, columnar vessel), or negative dynamics in the state of acute ulceration (expansion or deepening of the acute ulcer) are detected, especially in patients with a history of ulcers (risk group), intravenous administration of proton pump inhibitors is indicated for complete suppression of hyperchlorhydria until the threat of

massive bleeding is eliminated (under the control of EGFD).

To stimulate angiogenesis and regeneration of the gastrointestinal mucosa, we administered solcoseryl intravenously, 5 ml twice daily, to a small group of severely injured patients (10) starting three days after injury. Clinical efficacy was demonstrated by the absence of severe destructive gastrointestinal lesions.

Morphological examination of gastric mucosal biopsy specimens after a 7-10-day course of treatment revealed a trend toward normalization of microcirculatory blood flow, with focal dystrophic changes not leading to destructive lesions. Early erosions and ulcers are caused by increased acid-peptic aggression; they are small and located against a background of inflamed mucosa. Late ulcers appear with the development of infectious complications; they are larger, and the mucosa is atrophic due to a decrease in its protective factors. An analysis of the nature of bleeding sources yielded the following data. Acute erosions accounted for 61.8% of cases, acute ulcers accounted for 28.4%, chronic ulcers accounted for 3.7%, and a combination of various sources was observed in another 6.8%. The most common source of gastrointestinal bleeding is localized in the stomach (64.2%) and much less often in the duodenum (13.5%); a combination of bleeding sources in the stomach and duodenum occurred in 15% of cases.

Thus, acute erosions and ulcers of the upper gastrointestinal tract, including those that are a source of gastrointestinal bleeding, in burn patients with deep burns of more than 20% of the b.t. are characterized by the following features: - firstly, acute erosions of the stomach are observed most often; - secondly, acute ulcers occur approximately three times less often; - thirdly, the maximum frequency of bleeding occurs in the first seven days (stages of burn shock and acute burn toxemia). In the main group (50 patients), the developed program of advanced treatment of this complication was carried out, which included: ensuring adequate motility of the gastrointestinal tract; improving microcirculation in the submucosal layer of the stomach and duodenum; improving tissue respiration in the organs of the gastrointestinal tract; local inhibition of excessive lipid peroxidation; normalization of the functioning of the parietal cells of the stomach to eliminate hyperacidity; diagnostic fibrogastroduodenoscopy in dynamics (2, 4, 6, 9 and 14 days).

Complex therapy of erosive and ulcerative lesions of the gastrointestinal tract in burn disease included the following principles:

- I. Infusion-transfusion therapy:
- II. Hemostatic therapy:
- III. Anti-Helicobacter therapy.

It is known that ulcer bleeding stops spontaneously or with the help of treatment in 85-95% of patients. The use of systemic hemostatic therapy, effective antisecretory agents, the widespread introduction of endoscopic hemostasis methods into clinical practice, and the recently actively promoted eradication *H. pylori* infection allows most physicians and many surgeons to rely solely on conservative

hemostasis and the transfer of this category of patients to internal medicine clinics for treatment. However, a second well-known fact—namely, the occurrence of recurrent ulcer bleeding in 12-35% of patients with duodenal ulcers and in more than 40% of patients with gastric ulcers—makes such hopes, at least for now, quite illusory. Conservative hemostatic and antiulcer therapy, taking into account the presence of *H. pylori* in the gastric mucosa, is crucial in preventing recurrent bleeding.

According to the results of our research, which is consistent with the literature data, early eradication *H.pylori* in patients with ulcerative bleeding prevents the development of recurrent bleeding in all patients without exception, while in patients who have not received anti-*Helicobacter* therapy, recurrent ulcerative bleeding occurs in 30% or more cases.

Thus, eradication therapy for *H.pylori* infection should be considered one of the leading principles of the modern pathogenetic strategy for conservative treatment of patients with bleeding from gastric and duodenal ulcers in burn victims. Burn disease complicated by bleeding is an absolute indication for anti-*Helicobacter* therapy after successful drug hemostasis. Pathogenetically justified treatment of gastric and duodenal ulcers complicated by bleeding, using anti-acid secretory and adequate anti-*Helicobacter* agents in case of successful eradication *H.pylori* infection leads to rapid ulcer scarring within 8-14 days. Lack of eradication *H.pylori* infection slows down the rate of scarring and delays the epithelialization of the defect by an average of 7-10 days.

I. We have found that the earlier eradication therapy is administered, the lower the recurrence rate. Therefore, a follow-up EGD should be performed 12-24 hours after bleeding has stopped to determine whether there is an indication for prescribing medications. os. The indication for which is the application of fibrin at the bottom of the ulcer defect (Forrest III). The decision of the Maastricht Consensus Conference of the European *Helicobacter Pylori* Study Group (2005) for eradication therapy recommended first-line regimens, each of which necessarily includes the administration of one of the proton pump inhibitors in standard doses 2 times a day. The clinical significance of bleeding from the upper gastrointestinal tract is determined by high mortality rates, which have remained steadily at the level of 60-70% over the past few years [2]. The widespread use of drugs for the prevention of erosive and ulcerative lesions of the mucosa of the upper gastrointestinal tract has led to a decrease in the incidence of severe bleeding to 5-10%, however, the mortality rate when they occur 3.5%-22% remains high in severely burned patients [7]. Currently, there are three main methods of endoscopic hemostasis:

Medicinal, physical, and mechanical. When considering the medicinal method of stopping bleeding, its diversity can be emphasized: irrigation with medicinal solutions (hemostatic, vasoconstrictive, coagulating), application of film-forming agents, infiltration hemostasis (adrenaline solution, adhesive compositions, oil solutions, alcohol-novocaine mixtures, isotonic, sclerosing, and coagulating solutions). At the same time, the search for new drugs continues, each of which

differs in its characteristics from previously known ones. Combined treatment of erosive and ulcerative lesions includes the endoscopic method and drug therapy. Endoscopic imaging is used to predict rebleeding based on the Forrest classification (1976). Patients with ongoing bleeding should undergo endoscopic hemostasis, which would eliminate the need for emergency surgical intervention. Of the 85 victims with deep burns of more than 20% of the b.t., 68 (80.9%) patients had acute erosive and ulcerative gastrointestinal bleeding clinically manifested by melena; no significant hemodynamic disturbances were noted. EGFD did not reveal active bleeding. Hemostatic and antiulcer therapy led to ulcer scarring. In our observations, massive gastrointestinal bleeding, requiring endoscopic arrest (in 16–19%), developed in 16 patients and in one patient transferred from the subbranch on the 8th day (control group), without the use of anacid drugs, and in 3 patients (main group) who received complex therapy. To stop ongoing arterial bleeding in 17 patients and to prevent recurrence of bleeding, endoscopic infiltration with 70% alcohol (2.5-5 ml) and 0.1% adrenaline solution 1-2 ml from 3-5 points around the acute ulcer or under the clot was performed in 3 patients. Hemostasis was effective in 15 of 17 patients with ongoing bleeding and in 3 cases of threatened recurrence. Two patients underwent surgery due to the ineffectiveness of endoscopic hemostasis and ongoing bleeding; the bleeding vessel was sutured at the bottom of the acute gastric ulcer (1) and duodenal ulcer (1). In one patient, after stopping the bleeding, perforation of the acute duodenal ulcer occurred, which also required surgical treatment. Thus, 16 of 85 patients (14 in the control group and 2 in the study group) developed massive bleeding from an acute ulcer, requiring endoscopic hemostasis, prophylactic injection of a vessel at the ulcer base due to the risk of recurrent bleeding, or surgical intervention. Fatal outcomes occurred in 6 cases (7.6%), including 3 (4.0%) in the study group and 9 (10.9%) in the control group. Until recently, bleeding from acute ulcers in burn patients was considered a surgical problem, whereas our data indicate that the problem of bleeding in burn disease should be addressed by burn specialists in collaboration with endoscopists and surgeons, while the role of surgical interventions should be minimized by the use of preventive and therapeutic measures. Taking into account the developed pathogenesis, which is based on systemic microcirculation disorders, and the acid-peptic factor plays a secondary role, it becomes obvious that such surgical interventions as gastric resection and/or vagotomy in burn disease are not pathogenetically justified.

4. Conclusions

The pathogenetically substantiated method of choice for the development of massive bleeding in burn patients is endoscopic hemostasis combined with complex hemostatic, replacement, and angioprotective therapy. If hemostasis is impossible or ineffective, laparotomy with gastro- or duodenotomy and suturing of the bleeding vessel in the ulcer should be performed. In case of perforation of an acute ulcer,

its suturing should be performed, since ulcers in burn patients are acute and do not lead to the development of peptic ulcer disease, and hyperchlorhydria is temporary and stimulated, and after the acute period of burn disease, gastric secretion returns to its original state. It should be noted that endoscopic hemostasis has currently taken a leading place in the provision of care to other categories of patients with gastroduodenal bleeding.

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