Exploring the Etiology and Clinical Diagnosis and Treatment of Upper Gastrointestinal Bleeding

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Abstract: Upper gastrointestinal bleeding refers to bleeding caused by the digestive tract above the flexor ligament, including diseases of the esophagus, stomach, duodenum, pancreas, biliary tract, and lesions after gastrojejunostomy. It is a common and critical condition in internal medicine. In recent years, with the continuous development of medical technology and the improvement of treatment methods, the diagnosis and treatment level of this disease has been greatly improved. However, this disease has the characteristics of fast onset, complex condition, and certain mortality rate. Therefore, exploring and analyzing the etiology, causes, and treatment plans of this disease is of great significance for improving the cure rate and prognosis of patients with this disease. Due to inflammation, mechanical injury, vascular disease, or adjacent organ lesions, the choice of treatment plan varies depending on the cause. Based on the above situation, this article, The etiology and diagnosis and treatment plan of upper gastrointestinal bleeding have been explored, which can provide reference for improving the treatment level of this disease
***Keywords*:** upper gastrointestinal bleeding, pathogeny, cause: diagnosis, treatment

1. Introduction

Upper gastrointestinal bleeding refers to bleeding in the digestive tract above the flexor ligament, including the esophagus, stomach, duodenum, pancreas, biliary tract diseases, and lesions after gastrojejunostomy. [1] It is a common and critical condition in gastroenterology, and patients may experience hemorrhagic shock or even threaten their life safety due to excessive bleeding Nowadays, upper gastrointestinal bleeding is still a serious problem that cannot be underestimated. A study abroad shows that[2] 0.1% of patients seek medical treatment for upper gastrointestinal bleeding every year, and the mortality rate of upper gastrointestinal bleeding is as high as 10% In order to further improve the cure rate of patients, enhance their prognosis, and refine the diagnosis and treatment plan for this disease, this article will focus on discussing the etiology, triggers, diagnosis, and treatment of upper gastrointestinal bleeding, and provide the following review.

2. Causes and triggers of upper gastrointestinal bleeding

There are many causes of upper gastrointestinal bleeding, including gastrointestinal diseases, portal hypertension, diseases of adjacent organs or tissues in the upper gastrointestinal tract, and systemic diseases. At present, with the massive use of non flute anti-inflammatory drugs, the incidence rate of gastric mucosal erosion is on the rise year by year, and the upper gastrointestinal bleeding caused by drugs is also on the rise [3]. In addition, domestic studies have shown that duodenal bulb ulcers are the main cause of upper gastrointestinal bleeding, accounting for 48.87%, followed by esophageal and gastric varices (16.40%), gastric ulcers (14.98%), acute erosive hemorrhagic gastritis (8.85%), gastric cancer (5.24%), and complex ulcers (3.25%) [4]. In addition, the use of non diarrheal anti-inflammatory drugs is also associated with an increasing trend of upper gastrointestinal bleeding related to stress ulcers. Among them, bleeding caused by improper diet is the most common, with an incidence rate of 86.9%. A domestic study has shown that an unreasonable diet can damage the mucosal barrier of the gastrointestinal tract, leading to the rupture of esophageal and gastric varices and causing gastrointestinal bleeding. In addition, non diarrheal anti-inflammatory drugs are also one of the causes of upper gastrointestinal bleeding, accounting for 13.04%. Long term use of non steroidal anti-inflammatory drugs can inhibit the secretion of prostaglandins, thereby damaging the gastric mucosa, affecting the secretion of bicarbonate and mucus, reducing mucosal permeability and blood supply. Additionally[5], 4.35% of cases were caused by severe coughing, straining during bowel movements, and psychological factors. In summary, the key to preventing upper gastrointestinal bleeding is to fundamentally eliminate the causes and provide patients with healthy lifestyle guidance.

3. Clinical manifestations of upper gastrointestinal bleeding

Upper gastrointestinal bleeding is a common and critical emergency, which can present with symptoms and signs of shock. A single episode of bleeding can exceed 20% to 25% of the body's blood volume (1000ml to 2000ml). Clinically, the severity of a patient's condition can be determined based on clinical manifestations such as vomiting blood, black stool, anemia, fever, changes in blood count, peripheral circulation failure, and laboratory test results. Within 24 hours of upper gastrointestinal bleeding, an increase in reticulocytes can be seen. When the patient has a large amount of blood for 2-5 hours, the white blood cell count increases slightly to moderately. At 24-48 hours, the blood urea nitrogen level can reach its peak. If the patient's urea nitrogen level is below 14.3 mmol/L, it can gradually return to normal after 3-4 days; if it is above 35.7 mmol/L, it indicates that the patient's condition is very serious. In addition, it is worth noting that elderly patients have special physical conditions due to their older age, while pediatric patients are younger. The main clinical manifestations of elderly patients with upper gastrointestinal bleeding are hemorrhagic peripheral circulation failure such as dizziness, palpitations, and fatigue. If there is no vomiting of blood or black stool, it is necessary to inquire about the patient's and their family's medical history in detail, and combine laboratory examination results to assist in diagnosis. When young children experience upper gastrointestinal bleeding, the main manifestations are gastrointestinal reactions, such as abdominal pain, bloating, belching, acid reflux, poor appetite, vomiting, etc. Hematemesis or nasogastric tube can suck out coffee colored bloody liquid, excrete tarry stool or bright red bloody stool, and the fecal occult blood test will be positive.

4. Diagnosis and differential diagnosis of upper gastrointestinal bleeding

4.1 Diagnosis of upper gastrointestinal bleeding

To diagnose upper gastrointestinal bleeding, the first step is to exclude bleeding outside the digestive tract such as the mouth, throat, nose, and bronchi. It is also necessary to distinguish between vomiting blood and hemoptysis. At the same time, attention should be paid to whether the mouth, throat, nose, and other parts have ruptured, and whether the patient has taken certain drugs or toxic substances that can stimulate or damage the gastrointestinal mucosa and cause bleeding. In addition, a detailed understanding of the patient's medical history and family history is also necessary in order to make accurate judgments about the patient's condition and provide a basis for treatment.

In the process of diagnosing upper gastrointestinal bleeding, in addition to routine physical and laboratory examinations, gastroscopy can also be used to more intuitively observe the location and degree of gastrointestinal bleeding, thereby more accurately guiding us to treat patients.

Regarding the differential diagnosis of hemoptysis and hemoptysis, detailed medical history and clinical symptoms should be inquired about, and the color, quantity, shape, and other characteristics of hemoptysis and hemoptysis should be observed. Combined with relevant examination results, a comprehensive judgment should be made. In addition, we should also raise awareness of rare diseases such as esophageal and gastric variceal bleeding and gastrointestinal stromal tumors.

For upper gastrointestinal bleeding, we need to take measures such as hemostasis, fluid replacement, and blood transfusion according to the specific situation of the patient. At the same time, we should closely monitor the patient's condition changes and adjust the treatment plan in a timely manner. At the same time, it is necessary to strengthen health education for patients, encourage them to have a reasonable diet, avoid overwork, and prevent recurrent gastrointestinal bleeding. The diagnosis and treatment of upper gastrointestinal bleeding should be based on medical history, symptoms, signs, and relevant examination results to develop personalized treatment plans and actively prevent recurrence of gastrointestinal bleeding.

4.2 Estimated bleeding volume

The assessment of the severity of upper gastrointestinal bleeding cannot be separated from the estimation of the patient's bleeding volume. The determination of the treatment plan for upper gastrointestinal bleeding is closely related to the estimated bleeding volume When the patient's bleeding volume is between 5-10 milliliters, the patient's fecal occult blood test will indicate a positive (+) result. When the patient has obvious black stool, the bleeding volume is considered to be 50-100 milliliters. If the patient vomits blood, the bleeding volume is estimated to be between 250-300 milliliters. If there are also symptoms such as fatigue, dizziness, palpitations, etc., it indicates that the patient's bleeding volume is greater than 400 milliliters. In addition to the above symptoms, if the patient is accompanied by a decrease in blood pressure, blurred consciousness, cold limbs, or shock, the bleeding volume is above 1000 milliliters In addition, the patient's pulse, shock index, systolic blood pressure, laboratory tests such as red blood cells, hemoglobin, reticulocytes, white blood cells, platelets, blood urea nitrogen, prothrombin time, activated partial thromboplastin time, etc. can also help us estimate the amount of upper gastrointestinal bleeding [6] When the patient's systolic blood pressure is 70-80mmHg, it indicates a bleeding volume of 800-1600ml and a pulse rate of 100-120 beats per minute If the systolic blood pressure drops to 50-70mmHg, inform us

that the patient's bleeding volume is greater than 1600 milliliters

4.3 Determination of bleeding site in upper gastrointestinal bleeding

In upper gastrointestinal bleeding, different parts of the bleeding have different characteristics, and we should develop effective treatment plans for different parts of the bleeding When the patient's bleeding volume is small and there is no concurrent shock, it is generally considered to be bleeding from the stomach and duodenal bulb. When the bleeding volume is 500-1000 milliliters and there are complications such as shock, it indicates bleeding from the esophagus and gastric fundus. When the patient's clinical presentation is mainly rectal bleeding and the bleeding volume is 200-300 milliliters, biliary bleeding can be considered

4.4 Determination of active upper gastrointestinal bleeding

Active bleeding in upper gastrointestinal bleeding includes persistent bleeding and rebleeding, and determining whether a patient has active bleeding is of great significance for the patient's treatment and prognosis. The patient's symptoms of vomiting blood and black stool remain unchanged after clinical treatment, and there is no improvement. The continuous increase in reticulocytes has no downward trend, which has certain clinical significance for diagnosing active bleeding. In a study [7], it was found that measuring central venous pressure is one of the simplest methods and is more sensitive for diagnosing active bleeding systolic blood pressure and pulse rate.

5. Treatment of upper gastrointestinal bleeding

When treating patients with upper gastrointestinal bleeding, we should follow the principle of specific problem analysis, actively seek the cause of the patient, and adopt different treatment plans for different causes of the patient to improve the cure rate, prevent a series of complications, and ensure the patient's prognosis to the greatest extent possible.

In the process of treating upper gastrointestinal bleeding, we also need to pay attention to the patient's general condition, such as nutritional status, psychological state, etc. Malnutrition and excessive psychological stress can greatly affect the treatment effectiveness and prognosis of patients. Therefore, we need to provide nutritional support to patients, ensuring that they consume sufficient nutrients, while also paying attention to their psychological needs and providing them with necessary psychological support and comfort.

In addition to treating the cause, we also need to pay attention to the patient's bleeding situation. For patients with severe bleeding, we need to take timely hemostatic measures, such as using hemostatic drugs and performing endoscopic hemostasis. At the same time, we also need to closely monitor the patient's vital signs, such as heart rate, blood pressure, respiration, etc., to ensure that the patient's vital signs are stable.

During the treatment process, we also need to have sufficient communication with the patient and their family, explaining the treatment plan, treatment process, and possible risks and complications. This can help patients and their families better understand and cooperate with treatment, improve treatment effectiveness and patient satisfaction.

5.1 General Treatment

Once a patient is diagnosed with upper gastrointestinal bleeding, anti shock treatment and rapid blood volume supplementation should be given top priority in all treatment plans. Effective hemostasis strategies should be selected according to different causes and specific conditions, and surgery should be considered when there are indications for surgery. For patients with upper gastrointestinal bleeding, they should pay attention to bed rest. If the patient vomits blood, they need to fast and take intravenous fluid replacement to quickly replenish the patient's blood volume and prevent hemorrhagic shock. Closely monitor the patient's vital signs such as blood pressure, heart rate, respiratory rate, etc., observe whether the patient experiences symptoms such as dizziness, palpitations, fatigue, as well as signs such as pale complexion and wet and cold limbs. Closely observe whether the patient experiences recurrent vomiting and rectal bleeding, regularly check blood routine, etc., and promptly take effective treatment for the patient.

5.2 Drug therapy

With the continuous improvement of medical technology, nowadays more patients with upper gastrointestinal bleeding are treated with endoscopic hemostasis or interventional therapy, but drug therapy is still the preferred treatment for upper gastrointestinal bleeding. In the drug treatment of upper gastrointestinal bleeding, acid suppressants are usually the main drugs. The main function of these drugs is to inhibit the secretion of gastric acid, raise the pH value in the patient's stomach, inactivate proteases, promote the formation of fibrin clots, stabilize fibrin clots, and promote platelet aggregation, thereby preventing premature dissolution of blood clots. They have good effects on hemostasis and preventing patients from rebleeding. Currently, the commonly used acid suppressants in our clinical practice are proton pump inhibitors and histamine

H_2 receptor antagonists. Among them, esomeprazole is the fastest acting proton pump inhibitor and can be used as the first choice for treating patients with massive upper gastrointestinal bleeding. H2 receptor antagonist injections include ranitidine and famotidine. In addition, we can also use somatostatin, which can reduce visceral blood flow, lower portal vein pressure, decrease the secretion of peptide hormones in the gastrointestinal tract and pancreas, and reduce the risk of rebleeding in patients. Vasopressin and its analogues such as posterior pituitary hormone and terlipressin are also indispensable in the drug treatment of the upper gastrointestinal tract. It can greatly control the bleeding caused by varicose vein rupture, but there are many adverse reactions. Therefore, when using clinical medication, we should pay attention to whether patients have symptoms such as elevated blood pressure and arrhythmia, adjust or stop medication in a timely manner, and ensure the safety of patients' lives.

5.3 Endoscopic treatment

Usually, when treating patients with upper gastrointestinal tract problems, in addition to general treatment and medication, if there is a large amount of bleeding, it is necessary to replenish the patient's blood volume in a timely manner to complete hemostasis in a short period of time [8]. For patients with upper gastrointestinal bleeding who have poor drug treatment results and no significant improvement in symptoms, endoscopic hemostasis treatment can be adopted. Endoscopic treatment is a minimally invasive, accurately located, rapidly hemostatic, and highly effective treatment option, which is safer for some patients and can greatly improve their symptoms and prognosis.

(1) The drug spraying method is suitable for patients with bleeding at the edge of ulcers, bleeding after polypectomy, and hemorrhagic erosive gastritis, with an effective rate of 95% [9]. It is commonly used for patients with small but large bleeding areas and can be combined with other treatment methods in endoscopic treatment of upper gastrointestinal bleeding [10]. Common spray drugs include norepinephrine, adrenaline, Montessori solution, thrombin, etc. The treatment method is to insert a plastic catheter or spray catheter into the biopsy tube during endoscopic examination of the patient, and spray hemostatic drugs at a distance of 1-2cm from the lesion[11]. If the lesion is blurry or the field of view is unclear, physiological saline can be used to rinse it before spraying hemostatic drugs. Stop spraying after the bleeding from the lesion stops.

(2) Local drug injection method mainly involves injecting drugs into the submucosal layer of the lesion, constricting the blood vessels at the lesion site to achieve hemostasis. It is commonly used in clinical practice and has significant therapeutic effects. The commonly used injectable drugs include 15% to 20% high tension saline solution, anhydrous alcohol, 1% ethoxysclerosant, 5% sodium cod liver oil, 1:10000 adrenaline injection, etc. According to a foreign literature report, when thrombin is used for local injection, the hemostasis rate is 94.4% [12]. Common methods include endoscopic injection of sclerosing agents and endoscopic injection of tissue glue. Endoscopic injection of sclerosant: Puncture needle is inserted into the gastric fundus vein, and immediately after blood is drawn out, sclerosant injection is performed, usually 5-10 ml, which can be injected at 2-6 locations. The total amount of injection at a time is generally within 40 mL. The hardening agent is mainly poly (cinnamyl alcohol). This method can effectively block the risk of gastric variceal bleeding. Endoscopic tissue gel injection method: When the blood flow of varicose veins is large and the sclerosing agent is difficult to fix in the varicose veins, tissue gel can quickly seal the blood vessels and prevent further bleeding, so it is often used for the treatment of varicose bleeding. Adjust the dosage of tissue gel according to the thickness of the vein, inject 1-3 ml each time, and then determine whether it is sufficient based on the hardness of the vein. When treated with tissue gel injection, it can effectively reduce the recurrence rate and mortality rate of variceal bleeding.

(3) Thermal probe coagulation hemostasis method is to insert a thermal probe into the lesion in the patient's stomach through endoscopy, and use heat, electricity and other effects to cause tissue degeneration and necrosis, accelerate vasospastic coagulation and thrombus formation. It has good hemostatic effect, strong penetration, and few complications. Suitable for observing ruptured blood vessels and bleeding points under endoscopy, but cannot be applied to diffuse bleeding, tumors, and variceal bleeding. The commonly used methods in clinical practice include contact and non-contact thermal probe coagulation hemostasis. The contact thermal probe coagulation hemostasis method includes: high fever probe, unipolar electrocoagulation, multi-stage electrocoagulation, etc. The non-contact thermal probe coagulation hemostasis method includes endoscopic radiofrequency ablation and argon ion coagulation. The hot probe coagulation hemostasis method is safe, convenient, cost-effective, and highly effective.

(4) Mechanical hemostasis methods include endoscopic ligation hemostasis, endoscopic hemostatic clip hemostasis, and endoscopic suture hemostasis. Endoscopic ligation hemostasis: Under endoscopy, elastic ligation rings are used to ligate the base of varicose veins, causing ischemic necrosis of the bleeding site and achieving hemostasis. Compared with endoscopic injection of sclerosing agents, it has fewer complications. In emergency situations, after stopping bleeding, frequent and repeated ligation should be performed to achieve complete closure and prevent further bleeding. However, when the degree of varicose veins is severe or the diameter is greater than 15 cm, the ligature ring is prone to fall off, making its hemostatic

effect unsatisfactory. Endoscopic hemostatic clip for hemostasis: A metal clip is inserted through the endoscopic channel to directly clamp the affected blood vessel. This method causes minimal damage to the patient, is efficient in hemostasis, and has a good prognosis. We can adjust the angle of the hemostatic clip to accurately clamp the bleeding vessels and small wounds, quickly stop bleeding, reduce the risk of rebleeding, minimize damage to the lesion, and hardly affect wound healing. The traditional endoscopic clamp is the transendoscopic forceps clamp (TTSC), which is generally used to close gastrointestinal tissue defects with a length less than 1 centimeter. In clinical practice, when closing larger defects, multiple hemostatic clamps need to be used simultaneously. When the surrounding tissues of the defect become swollen or hardened, the effectiveness of endoscopic clamping through the forceps channel deteriorates. For bleeding with large volume, unclear observation of bleeding site, diffuse bleeding, and large wound area. For larger ulcers, metal forceps are generally difficult to stop bleeding. Super Range Clamp (OTSC) can be used for hemostasis, which can clamp larger wounds such as ulcers, perforations, fistulas, etc. The super range clamp is made of memory alloy material, which can achieve full layer closure; The closed defect area is relatively large and can be used for the closure of 2cm defects. In the same closure surgery, it is used in fewer quantities and has a shorter surgical time; The closing force is stronger, which will not cause secondary bleeding of the tissue, nor will it loosen due to the disappearance of tissue edema. Compared with endoscopic forceps, the super range clamp has outstanding performance advantages. Clinical trials have shown that its success rate in hemostasis can reach over 80%, while the incidence of rebleeding does not exceed 1%. Endoscopic suturing hemostasis: suitable for gastrointestinal perforation and fistula. According to a foreign literature report, 10 patients with gastrointestinal bleeding achieved hemostasis through endoscopic suturing without recurrent bleeding. [13] The purse string suture method can not only quickly achieve hemostasis under mechanical pressure, but also quickly close the wound, reduce the contact between gastric substances and lesions, and accelerate wound healing. The surgical method is mature, the operation is simple, the hemostatic effect is good, and there is less rebleeding.

(5) Endoscopic ultrasound: Varicose bleeding can easily affect our field of view of the lesion, and endoscopic ultrasound can provide us with accurate positioning when the bleeding range is blurred, thereby improving the hemostatic effect and safety. The safety and feasibility of composite therapy guided by endoscopic ultrasound have been validated. However, this technology requires a high level of proficiency from doctors, which limits its clinical application.

6. Summary

As a common critical illness in gastroenterology, although the clinical cure rate of patients with upper gastrointestinal bleeding has significantly increased, the mortality rate is still high. This phenomenon is worthy of our vigilance. In recent years, with the continuous improvement of medical technology, endoscopic hemostasis treatment has made great breakthroughs. Although the diagnosis and treatment plans and prognosis of patients with different types of upper gastrointestinal bleeding vary greatly, endoscopic hemostasis has an irreplaceable position among many treatment methods. Accurately grasping the timing of using endoscopic hemostasis treatment and selecting different treatment plans according to the cause is the key to treatment. I believe that with the continuous advancement of medical technology in our country, the consensus and guidelines for upper gastrointestinal bleeding will continue to improve, and the prognosis of patients with upper gastrointestinal bleeding will be greatly improved.

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