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Original Article

The clinical effect of emergency gastroscopy on upper gastrointestinal hemorrhage patients

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Abstract: Objective: To assess the clinical effects of emergency gastroscopies on acute upper gastrointestinal hemorrhage patients. Methods: 212 patients with acute upper gastrointestinal hemorrhages were randomly divided into an experimental group (n=106) and a control group (n=106). The experimental group underwent emergency gastroscopies, and the control group underwent the traditional treatment. We measured the hemostasis effects, the treatment indexes, and the incidences of adverse reactions to assess the clinical effects. At the same time, we recorded the hemoglobin levels, the rebleeding rates, and the mortality rate to assess the hemostasis effect. Results: The hemostasis effect (the total hemostasis effective rate), the treatment index (the hemostasis time, stool occult blood turning negative time, bowel sound recovery time, and the blood transfusion volumes), the hemoglobin levels, the rebleeding rates, and the mortality were better in the EG than they were in the CG ($P<0.05$). Conclusions: Emergency gastroscopy is an effective treatment for acute upper gastrointestinal hemorrhage patients, because it improves the hemostasis effective rate and the survival rate. Clinical therapy effectively cures the hemorrhages in patients with acute upper gastrointestinal hemorrhages.

Keywords: Emergency gastroscopy, acute upper gastrointestinal hemorrhage, clinical effect

Introduction

Acute upper gastrointestinal hemorrhage is a common clinical disease, and it is a critical digestive system disease. It mainly refers to pancreaticobiliary bleeding, gastric bleeding, esophageal bleeding, and duodenal bleeding above the flexor ligament. It has a worldwide mortality rate of 2%-10% [1]. The main clinical symptoms of acute upper gastrointestinal hemorrhage include melena, hematemesis, syncope, and hemorrhagic shock. Effective hemostasis treatment is very important for patients with acute upper gastrointestinal hemorrhage, as it can reduce patient mortality [2-4]. The traditional clinical treatment for acute upper gastrointestinal hemorrhage is mainly medical treatment. Although the traditional treatment can play a hemostatic role, it has many complications, a poor prognosis, and it can even delay the best time for treatment [5, 6]. In recent years, emergency gastroscopy has been used in the diagnosis and treatment of acute upper gastrointestinal bleeding. Some studies have shown that emergency gastroscopy can improve the detection rate of hemorrhagic causes, the assess the rebleeding risk, and hemostasis. Meanwhile, it has also been reported that the early application of gastroscopy can increase the risk of rebleeding [7], but there is no systematic evidence of its clinical efficacy.

This study aimed to evaluate the clinical effect of emergency gastroscopy on acute upper gastrointestinal hemorrhage patients.

Materials and methods

Study design

The study was a randomized controlled trial and was performed at Guizhou Province Orthopaedic Hospital from September 2018 to September 2020. Inclusion criteria: 1) patients ≥18 years old; 2) patients diagnosed with acute upper gastrointestinal bleeding disease and whose clinical diagnostic criteria were in accordance with the WHO standard [7]; 3) patients who were willing to cooperate with and implement the experiment. Exclusion criteria: 1)

patients with a history of mental illness; 2) patients with a history of blood system diseases; 3) pregnant and lactating women; 4) patients with a history of chronic diseases such as hypertension, coronary heart disease, or diabetes; 5) patients with a history of malignant tumors. The researchers systematically explained the role, purpose, and process of the study to the patients and their families. The patients and their families voluntarily signed the informed consent forms and agreed to participate in this study. This study was approved and recognized by the ethics committee of our hospital.

Participants and subgroup

251 patients were treated at the Guizhou Province Orthopaedic Hospital, including 212 patients meeting the inclusion and exclusion criteria. The 212 eligible patients enrolled in this study were each randomly allocated into one of two groups: the experimental group (EG) (n=106) or the control group (CG) (n=106).

Interventions

EG: The patients underwent emergency gastroscopies. Meanwhile, the indications for gastroscopy were confirmed according to their conditions. The bleeding points were screened using gastroscopy. High frequency electrocoagulation and peptide clips were used in the patients with blood vessel ejections. Norepinephrine solution was sprayed in the patients with diffuse bleeding, sclerotherapy was used in the patients with esophageal varices, and tissue glue injections were given to the patients with gastric varices.

CG: The patients received the traditional treatment. They underwent omeprazole treatment and acid suppression treatment. Moreover, the patients were required to absolutely ensure that bedrest and oxygen therapy were carried out when necessary to ensure a smooth airway.

Primary outcome measures

The primary outcome measures were the hemostasis effect, the treatment index, and the incidences of adverse reactions. The hemostatic effect can be divided into three outcomes: markedly effective, effective, and ineffective. Markedly effective: the clinical symptoms disappeared after the treatment, including black stools, dizziness, hematemesis, blood pressure drop, etc., and the bleeding stopped, the stool occult blood test results were negative for 3 days, the drainage fluid had no bloody substances, and the bleeding focus was healed. Effective: the patients reached the significant effective standard after 72 hours of treatment. Ineffective: the treatment did not reach the effective standard after 72 hours of treatment, of if there was still bleeding or titanium clips or surgical treatment were needed to stop the bleeding, or death. Total effective rate = significant efficiency + effective rate. The treatment indexes included the blood transfusion volume, the hemostasis time, the stool occult blood turning negative time, and the bowel sound recovery time. At the same time, we recorded the hemoglobin levels, the rebleeding rates, and the patient mortality.

Statistical analysis

All the data were analyzed using SPSS 22.0. Among the data (n, %) refers to the calculated data. The comparisons of the relevant data between groups and within groups were performed using chi square tests, and the measurement data was expressed as (± s). The comparisons between groups were conducted using t tests. $P<0.05$ indicated a statistically significant difference.

Results

Clinical characteristics

Table 1 shows the characteristics of the participants. The study included 181 patients after the follow-up, and it involved 93 patients in the experimental group, with a mean age of (49±3.01) years old, and in the control group, the patients had a mean age (47±3.83) years old. The BMI in the experimental group was (22.5±3.06) kg/m^2, and in the control group it was (23.35±2.33) kg/m^2, and there was no significant difference between the two groups (P=0.34, >0.05). The number of patients whose alcohol intake exceeded more than 14 alcohol units in the experimental group was 65 (69.9%), and in the control group it was 59 (67%). Some of the participants took analgesics occasionally, 19 (20.4%) in the experimental group, and in the control group 21 (23.9%) patients took

Table 1. Comparison of the clinical characteristics of acute upper gastrointestinal hemorrhage patients between the two groups

	Experimental group (n=93)	Control group (n=88)	t/x^2	*P*
Age (years)	49±3.01	47±3.83	0.25	0.06
Sex				
Male (n%)	54 (58.1%)	47 (53.4%)	1.68	0.78
Female (n%)	39 (41.9%)	41 (46.6%)	2.49	0.63
BMI	22.5±3.06	23.35±2.33	0.39	0.34
Alcohol intake				
More than 14 alcohol units	65 (69.9%)	59 (67%)	0.96	0.48
Less than 14 alcohol units	28 (30.1%)	29 (33%)	3.18	0.37
Duodenal ulcer	14 (15.1%)	49 (55.7%)	0.79	0.84
Gastric ulcer	38 (40.8%)	39 (44.3%)	3.29	0.24
Take Medicine				
Analgesics	19 (20.4%)	21 (23.9%)	0.32	0.22
Aspirin	14 (15.1%)	17 (19.3%)	6.38	0.76
Glucocorticoids	8 (8.6%)	11 (12.5%)	4.63	0.59

Note: A significant difference was set at P<0.05.

Table 2. Comparison of the hemostasis effects between two groups

Group	Number of cases	Markedly effective	Effective	Ineffective	Total effective rate
Experimental group	93	67	22	4	89 (95.7%)
Control group	88	30	22	36	52 (59.1%)
t	-	-	-	-	7.537
P	-	-	-	-	0.000

Note: A significant difference was set at P<0.05.

analgesics occasionally. Some patients took aspirin: 14 (15.1%) in the experimental group, and in the control group 17 (19.3%) took aspirin. Eight (8.6%) participants took glucocorticoids in the experimental group, and in the control group 11 (12.5%) patients took glucocorticoids. 14 (15.1%), of the patients were found to have duodenal ulcers in the experimental group, and in the control group 49 (55.7%) patients were found to have duodenal ulcers. 38 (40.8%) of the patients were found to have gastric ulcers in the experimental group, and in the control group 39 (44.3%) patients were found to have gastric ulcers. The two groups were similar in their demographics and clinical characteristics, and there were no statistically significant differences between the two groups.

Hemostasis effect in the two groups

As shown in **Table 2**, in the experimental group, the number of markedly effective hemostasis cases was 67, and that effective hemostasis was up to 22, and the number of ineffective patients was only 4, so the total hemostasis effective rate was 89 (95.7%). The number of markedly effective hemostasis patients in the control group was 30, and the number of effective hemostasis patients was 22, and that ineffective patients was up to 36, so the total hemostasis effective rate was 52 (59.1%). Meanwhile, there was a significant improvement compared between the two group (95.7% vs. 59.1%, P=0.000).

The treatment indexes in the two groups

The hemostasis time in the experimental group was (1.06±0.89) days, and in the control group it was approximately (4.55±1.12) days. The stool occult blood turning negative times were improved in the EG, and the time in the EG was (1.76±0.34) days, and in the control group it was (3.28±0.28) days. The bowel sound recovery times also showed a rapid recovery in the experimental group: the time in the experimental group was (1.83±0.52) days, and the time in the control group was (4.43±0.58) days. The blood transfusion volume was significantly reduced in the EG. The mean of the volumes in the experimental group was (213.9±21.23) ml, and that the mean of the volumes in the control group was up to (471.08±25.19) ml. As the results show, there was a significant difference between the two groups in terms of their hemostasis times, stool occult blood turning negative times, bowel sound recovery times, and blood transfusion volumes (P<0.05) (**Table 3** and **Figure 1**).

The hemoglobin levels in the two groups

The hemoglobin levels before treatment showed no significant difference between the two

Table 3. Comparison of the treatment indexes between the two groups

Group	Number of cases	Hemostasis time (d)	Stool occult blood turning negative time (d)	Bowel sounds sound recovery time (d)	Blood transfusion volume (mL)
Experimental group	93	1.06±0.89	1.76±0.34	1.83±0.52	213.9±21.23
Control group	88	4.55±1.12	3.28±0.28	4.43±0.58	471.08±25.19
t	-	15.374	13.24	14.937	21.384
P	-	0.000	0.000	0.000	0.000

Note: A significant difference was set at P<0.05.

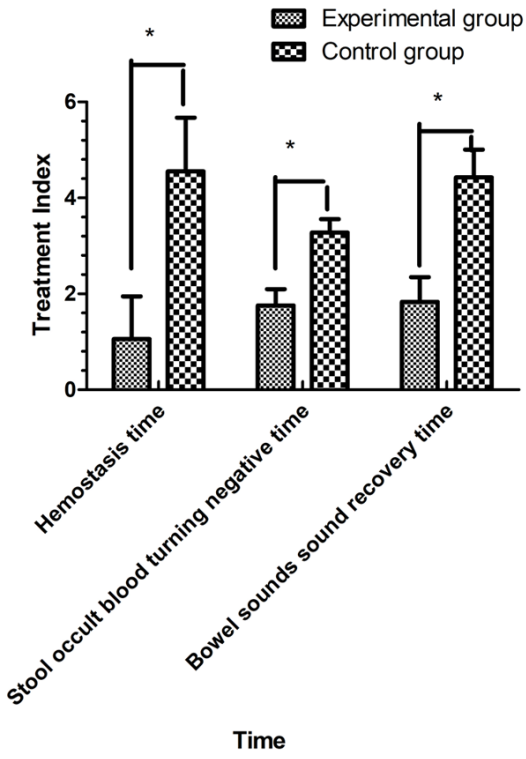

Figure 1. Comparison of the treatment indexes between the two groups after the intervention. *P<*0.05.*

groups (39.79±5.58) VS. (42.32±5.64), P= 0.53). Interestingly, the hemoglobin level had a significant improvement with the emergency gastroscopy therapy. The hemoglobin levels in the experimental group after treatment rose to (79.02±10.92) g/L, and in the control group after treatment the levels rose to (70.22± 0.9.62) g/L, and there was a significant difference between the two group (P<0.05) (**Table 4** and **Figure 2**).

The two groups' rebleeding and mortality rates

The rebleeding rate in the experimental group decreased to 9.6% (9/93) after the emergency gastroscopy therapy, and the rebleeding rate in the control group after the traditional treatment was 20.5% (18/88). Moreover, the decline in the experimental group was significantly different compared with the control group (P<0.05). The mortality rate in the experimental group was 3.2% (3/93), and the mortality rate in the control group was 11.4% (10/88). There was significant improvement after the emergency gastroscopy therapy and there was a significant difference in the mortality rates between the two groups (3.2%) VS. (11.4%), P<0.05) (**Table 5**).

Discussion

As shown in our research, emergency gastroscopy can significantly improve the hemostasis effect, the treatment indexes (the hemostasis times, the stool occult blood turning negative times, the bowel sound recovery times, and the blood transfusion volumes), the hemoglobin levels, and the rebleeding and mortality rates in patients with acute upper gastrointestinal hemorrhages. The total hemostasis effective rates, the hemostasis times, the stool occult blood turning negative times, the bowel sound recovery times, the hemoglobin levels, and the blood transfusion volumes in the EG were improved compared with the corresponding values in the CG. Furthermore, the rebleeding and mortality rates indicated a significant difference the between the two groups (P<0.05), as they were decreased in the EG compared with the CG.

Acute upper gastrointestinal bleeding is a common gastrointestinal acute disease around the world. The incidence rate is (50~150)/10 million in China [8]. With the changes in people's lifestyles and eating habits, most people have had gastrointestinal disorders, such as gastritis, digestive ulcers, and even gastrointestinal hemorrhages. Repeated attacks or excessive bleeding can lead to anemia. For acute or

Table 4. Comparison of the hemoglobin levels between the two groups

Group	Number of cases	Baseline	After treatment
Experimental group	93	39.79±5.58	79.02±10.92
Control group	88	42.32±5.64	70.22±0.9.62
t	-	3.198	14.824
P	-	0.53	0.000

Note: A significant difference was set at P<0.05.

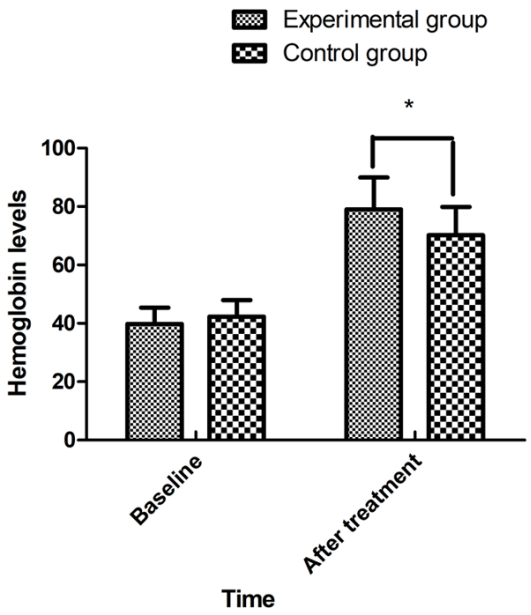

Figure 2. Comparison of the hemoglobin levels between the two groups before and after the intervention. *P<*0.05.*

chronic complications such as peripheral circulation failure, the mortality rate ranges from 8%-13.7%, which seriously affects patients' physical and mental health and quality of life [9]. Emergency gastroscopy not only quickly locates the bleeding focus and determines the cause of the bleeding, but it also provides electrocoagulation, vascular embolization, and the spraying or injection of hemostatic drugs for hemostasis. It is a simple, rapid, safe and reliable method, and it can effectively shorten the treatment time and improve patient prognosis [10, 11]. Our results showed that total hemostasis effective rate had a significant improvement in the experimental group (95.7% VS. 59.1%, P=0.002), which indicated that emergency gastroscopy can result in effective hemostasis.

Under the emergency gastroscope exploration, taking corresponding hemostasis treatment according to different bleeding situations can achieve the early control of bleeding and reduce blood transfusions [12, 13]. The results of this study show that there was no significant difference in the hemoglobin levels between the two groups before the treatment; the hemoglobin levels of the experimental group were higher than they were in the control group after the intervention, and the difference was statistically significant (P<0.05). The emergency gastroscopy treatment can quickly find the bleeding location, and, combined with the corresponding hemostatic treatment, can greatly improve the clinical efficacy and reduce the risk of rebleeding and death. Our study demonstrated that the rebleeding rate was significantly decreased in the experimental group (9.6%) vs. (20.5%), P<0.05, and the mortality was significantly improved with the emergency gastroscopy therapy in the experimental group (3.2%) vs. (11.4%), P<0.05.

At present, emergency gastroscopy has become an important technology for diagnosis and clinical rescue. Emergency gastroscopy within 24-48 hours of acute upper gastrointestinal bleeding can promptly detect active bleeding lesions, so it is of great significance for the subsequent clinical examination and treatment [14-17]. Most patients received gastroscope hemostasis treatment and had an effective hemostasis. It is not only treats upper gastrointestinal bleeding, but it can also improve the detection rate of early gastric cancer and esophageal cancer [18-20].

The therapeutic mechanism of emergency gastroscopy in treating acute upper gastrointestinal hemorrhages is unclear. As we reported, we deduced that it may be related to its direct healing. There are currently several different treatment modalities available to the endoscopist, including injection therapy, hemoclips, thermal coagulation, fibrin sealant, and hemostatic powder. The most commonly-used forms of endoscopic intervention are thermal coagulation and hemostatic clips [21, 22]. Certain drugs can direct hemostasis. Moreover, emergency gastroscopy can promote thrombus formation and decrease the coagulation time by spraying endoscopically onto the lesion and

Table 5. Comparison of the rebleeding and mortality rates between the two groups

Group	Number of cases	The rebleeding rate	Mortality
Experimental group	93	9 (9.6%)	3 (3.2%)
Control group	88	18 (20.5%)	10 (11.4%)
t	-	13.476	16.318
P	-	0.000	0.000

Note: A significant difference was set at P<0.05.

forming a barrier. Lastly, endoscopic hemoclips can clip vessels using emergency gastroscopy [23]. However, a more in-depth investigation of the mechanism underlying the therapy for emergency gastroscopy for acute upper gastrointestinal hemorrhage patients is necessary.

There are limitations in our study. First, it was a single-center study. Second, the risk factors for acute upper gastrointestinal hemorrhage could not be given because the case number was small. Finally, the therapeutic mechanism wasn't a deep study, so a larger, placebo-controlled, perspective study is needed to evaluate the efficacy and mechanism of emergency gastroscopy on acute upper gastrointestinal hemorrhages.

In summary, this study provides preliminary evidence that emergency gastroscopy results in greater improvements in the hemostasis of the digestive tract in patients with acute upper gastrointestinal hemorrhages. Further studies are needed to assess the long-term efficacy and safety of emergency gastroscopy in patients with acute upper gastrointestinal hemorrhages.

Disclosure of conflict of interest

None.

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