

## **Clinical Application Value of Metal Clip in the Treatment of Acute Esophageal and Gastric Variceal Bleeding in Patients with Liver Cirrhosis under Endoscopy**

**Yue-yuan Wang<sup>1</sup>, Zhiyong Wang<sup>1\*</sup>, Sen-sen Tang<sup>1</sup>, Jianliang Wu<sup>2</sup>, Liwei Sun<sup>2</sup>, Yun Guo<sup>2</sup> and Zhichao Lai<sup>2</sup>**

<sup>1</sup>Medical School of Hangzhou Normal University, China

<sup>2</sup>Department of Gastroenterology, The Affiliated Hospital of Hangzhou Normal University, China

**\*Corresponding Author:** Zhiyong Wang, Medical School of Hangzhou Normal University, China.

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### **Abstract**

**Objective:** To explore the clinical application value of metal clip in the treatment of acute esophageal and gastric variceal bleeding in patients with liver cirrhosis under endoscopy.

**Methods:** Twenty patients with acute esophageal and gastric variceal bleeding were divided into metal clip group (n = 6) and conventional sclerotherapy group (n = 14). The hemostatic methods, hemostasis time, rebleeding, hemostasis effect, complications and medical expenses between two groups were compared.

**Results:** The time of hemostasis of the metal clip group was significantly less than that of the conventional sclerotherapy group. The difference between the two groups was statistically significant (t = 16.689, P = 0.000). There was no statistically significant difference in rebleeding rate ( $\chi^2 = 0.952$ , P = 0.218). The complications of metal clip group were significantly less than that of conventional sclerotherapy group, the difference between the two groups was statistically significant ( $\chi^2 = 3.673$ , P = 0.021).

**Conclusions:** Metal clip treatment, which has less trauma, easier operation, higher success rate, less complications and lower health-care expenses, are better than simple sclerotherapy in the aspects of hemostasis time, rebleeding rate and the incidence of complications. It is effective for acute esophageal and gastric variceal bleeding treatment and can be used as a remedial measure after simple sclerotherapy which fails to prevent the occurrence of active bleeding. Therefore, the clinical value of metal clip treatment is certain, which is worthy of learning for endoscopic practitioners. However, due to our limited observational data, a large randomized controlled trial about the effectiveness and safety of metal clip treatment is necessary.

**Keywords:** Liver Cirrhosis with Acute Esophageal and Gastric Variceal Bleeding; Endoscope; Metal Clips; Sclerotherapy

### **Introduction**

Acute esophageal and gastric variceal bleeding is a common clinical emergency, while endoscopic esophageal variceal sclerotherapy (EVS) has been widely considered an effective treatment for acute esophageal and gastric variceal bleeding because of its higher emergency hemostasis success rate (about more than 90%) [1,2]. At the same time, elective repetitive sclerotherapy can effectively eradicate esophageal varices, thereby significantly reducing the rate of rebleeding. However, more and more studies report that the occurrence of complications about sclerotherapy is up to 10% -33%, resulting in re-evaluation of the role and advantages of sclerotherapy [3-5]. To date, metal clips are mainly applied to the treatment of gastrointestinal ulcers, polyp resection, cardia mucosal tear, Dieulafoy disease and so on. The mechanism is same to the surgical vascular suture or ligation, which has simple operation, good hemostatic effect and can be easily repeated [6]. But Yu Li [7] considers that it's not suitable to stop the esophageal or gastric variceal bleeding by the use of metal clip based on the medical history and endoscopic diagnosis. The aim of writing this article is to explore whether the titanium plate is also suitable for the treatment of acute esophageal and gastric variceal bleeding and the analysis is summarized as follows.

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## Materials and Methods

### General Information

This study examined the records of 20 hospital patients (16 males and 4 females) from January 1, 2015 to August 31, 2016 with a mean age of 53.4 years (range, 33 - 74 years) who underwent acute esophageal and gastric variceal bleeding. All patients showed the symptoms like hematemesis, melena or both, and the emergency gastroscopy can find the bleeding problem. Simultaneously, they got stable vital signs (blood pressure  $\geq 90/60$  mmHg, Hb  $\geq 70$ g/L) after the treatment of blood and fluid transfusion or drugs such as H<sub>2</sub> receptor blockers or proton pump inhibitors and thrombin after 24 hours. All patients were diagnosed with decompensated liver cirrhosis, excluding the presence of peptic ulcer, gastric cancer, gastrointestinal polyps, Dieulafoy disease and so on. They were divided into metal clip group and conventional sclerotherapy group hemostasis group. The former included 6 cases with a mean age of 51.2 years old (5 males and 1 females) and five of them got the titanium clip supplement measure for active bleeding in the treatment of sclerotherapy and 1 case was the simple treatment using metal clip for hemorrhage. The latter included 14 cases of conventional sclerotherapy with a mean age of 54.4 years old (11 males and 3 females). There was no significant difference between two groups in gender, age, clinical manifestation, bleeding site and other general data ( $P > 0.05$ ).

### Instruments and Methods

#### Instrument

Olympus HIF-H260 electronic endoscopy, Olympus HX-5LR-1 endoscopic hemostatic clip placement, Olympus MD-850 metal titanium clip, polyglycol, endoscopic needle, norepinephrine Ice and so on.

#### Handling Methods

Routine preoperative preparation matters. In the meantime, it's vital for patients to maintain airway patency and open venous access. When the patients got shock, take the treatment for anti-shock immediately, including the treatment of blood and fluid transfusion, to maintain vital signs [8,9]. Patients with cardiovascular disease were examined in the ECG monitoring and prepared to rescue drugs. They should complete the emergency endoscopy examination as soon as possible in the case of stable conditions. The norepinephrine ice salt water was used to wash the lesion repeatedly through the endoscopic biopsy hole in order to understand the situation like bleeding site, cause and activity with a clear vision.

**Metal Clip Group:** Patients who got active bleeding in the treatment of sclerotherapy or the acute esophageal variceal bleeding can use metal clips for hemorrhage. The release of the titanium clip was inserted through the endoscopic biopsy tract, and it's time to place the clip vertically to the target vessels when the distance between clip and lesion is about 3 cm. The number of clips depend on the size and length of the lesion. The pliers were broken off from the release device and the second titanium clip was prepared to put in until the bleeding stops [10,11].

**Conventional Sclerotherapy Group:** After finding the varicose veins and determining the bleeding veins or possible ones, it's feasible to conduct the intravascular injection of varicose veins. 2 - 3 veins per time, 1 - 2 points per veins, 4 - 10 ml per injection point and the total amount of each injection does not exceed 40 ml [12,13].

All cases were given symptomatic support like acid suppression, hemostasis or other treatment when they finished the operation.

#### Observe indicators and efficacy judgments

##### Hemostasis time

Using the saline to rinse the surface of lesion repeatedly in order to confirm the location of metal clips and the injection site correctly. No blood bleeds from the lesion means the success in hemostasis after conservation about one minutes.

### Rebleeding

① The occurrence of fresh hematemesis or the frequency of melena (bloody) and bowel sounds gradually increased. ② Peripheral circulation have no significant improvement after the full rehydration and transfusion or deteriorates after improvement. ③ Hemoglobin concentration continued to decline more than 30 g/L or reticulocyte count continued to rise in the absence of blood transfusion. The occurrence of one of the three items above in one week is considered to be rebleeding, which should be given the second endoscopic examination [14,15].

### Adverse reactions or complications

**Sclerotherapy group:** ① Esophageal erosion, ulcers and rebleeding. ② Fever, posterior sternal pain, swallowing pain. ③ Esophageal perforation, esophageal stenosis, portal hypertension, mediastinal inflammation, hemolytic reaction, ectopic embolization, etc. The occurrence of any of the three items above is considered to be a complication [16].

**Metal clip group:** Generally, no obvious complications. The following two situations may exist: ① Fall off before its time to cause rebleeding. ② Digestion tract perforation.

### Comparison of medical expenses

**Sclerotherapy group:** one-time varicose veins injection needle: 767 yuan/month; polyglycol: 471.6 yuan/support.

**Metal clip group:** one-time use of the digestive tract soft tissue clip: 152 yuan/month (small); 1029/month yuan (large).

### Statistical Methods

The data were quantified by Microsoft Excel software. The results were analyzed by SPSS 18.0 statistical software. The quantitative data were compared with t test and the qualitative data group was compared with  $\chi^2$  test,  $\alpha = 0.05$ .

### Results

There is no rebleeding patients in metal clip group within 72 hours. One of them had conducted Sclerotherapy for 9 times and the gastroscopy results showed that esophageal varices disappeared but the gastric veins still exist. Afterwards, this patient was in hospital because of the acute gastric variceal bleeding (Figure 1). We used 2 clips to close the lesion on both sides and the bleeding stopped immediately (Figure 2 and 3). The review of endoscopy showed gastric varices disappeared. Another patient who had esophageal varicose veins found three moderate varicose veins (RC+++), two of veins got the sclerotherapy and the other had 3 metal clips closed to treat the varicose veins (Figure 4). The review showed that the metal clip did not fall off but the severity of varicose veins was significantly better than the treatment of sclerotherapy.

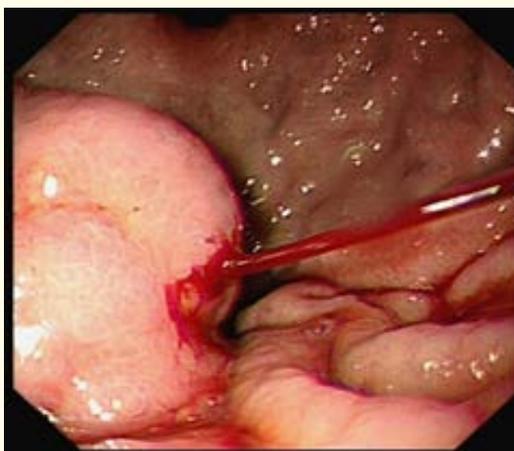
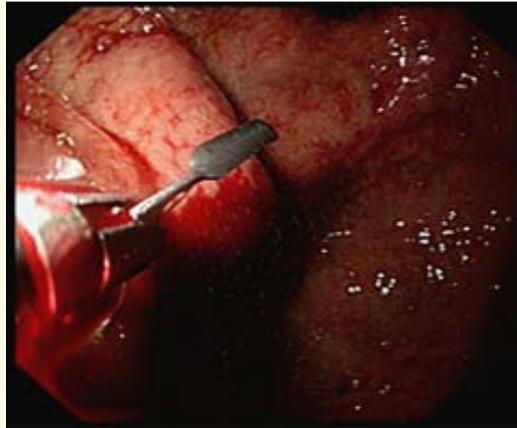
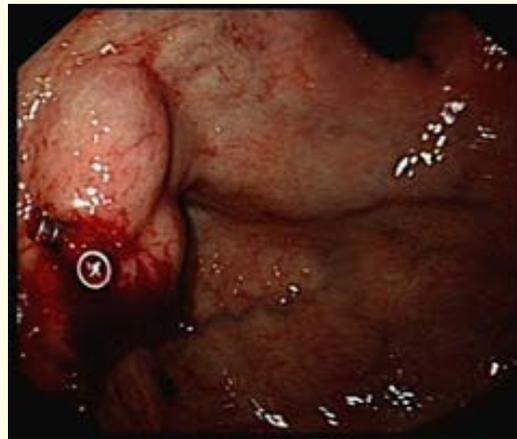


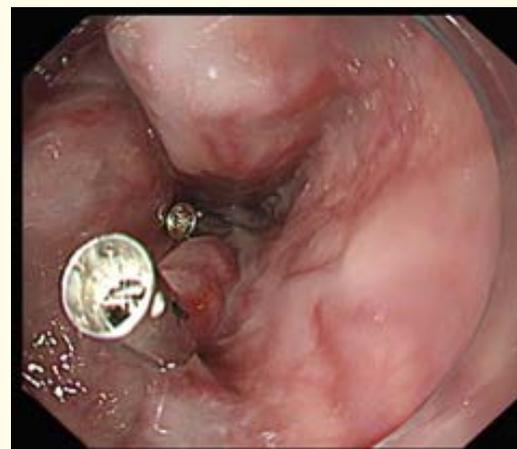
Figure 1: Acute gastric variceal bleeding.



*Figure 2: Using clips to stop the bleeding.*



*Figure 3: The clips are closed and the bleeding stops.*



*Figure 4: Using clips to close gastric varicose veins.*

### Hemostasis time

The difference between the two groups was statistically significant ( $t = 16.689, P = 0.000$ ) (Table 1).

	n	Hemostasis time (min)
Clip group	6	5.83 ± 0.75
Nonclip group	14	17.36 ± 1.60

**Table 1:** Comparison of hemostasis time in both groups.

### Rebleeding

There was no statistically significant difference between the two groups ( $\chi^2 = 0.952, P = 0.218$ ) (Table 2).

	Rebleeding	No rebleeding	Total
Clip group	0	6	6
Nonclip group	2	12	14
Total	2	18	20

**Table 2:** Comparison of rebleeding in both groups.

### Adverse reactions or complications

There were no death cases in both groups. 6 patients in metal clip group were no obvious adverse reactions or complications, no routine surgery. The review of endoscopy after 3 - 4 weeks showed that the clip were shed and the lesion healed. As to 14 patients in the sclerotherapy group, the review of endoscopy after 2 weeks showed that 6 patients had complications (esophageal ulcers). There was significant difference between the two groups ( $\chi^2 = 3.673, P = 0.021$ ) (Table 3).

	Complications	No complications	Total
Clip group	0	6	6
Nonclip group	6	8	14
Total	6	14	20

**Table 3:** Comparison of complications in both groups.

### Comparison of medical expenses

**Sclerotherapy group:** using a one-time varicose veins injection needle, the average use of polyglycol is 3.2, the average cost is 2276.1 yuan.

**Metal clip group:** using disposable gastrointestinal soft tissue clip. total titanium clip 14, an average of 2.3, the average cost is 349.6 yuan.

### Discussion

Treatments for acute esophagogastric variceal bleeding include medication, endoscopic treatment includes endoscopic sclerotherapy (EST) and endoscopic band ligation (EBL), compression hemostasis by the Sengstaken-Blakemore tube, transjugular intrahepatic porto-systemic shunt (TIPS), and surgery [17-19]. In recent years, metal clips and esophageal metal stents have been reported for the treatment of esophageal variceal bleeding [20].

The results of this study show that metal clip treatment are better than simple sclerotherapy in the aspects of hemostasis time, re-bleeding rate and the incidence of complications, which has less trauma, easier operation, higher success rate, fewer complications and

medical expenses. It's effective for acute esophageal and gastric variceal bleeding treatment and can be used as a remedial measure after simple sclerotherapy which cannot prevent the occurrence of active bleeding. It has a certain clinical application value. The mechanical force generated by clip after the closure of the lesion can tighten the blood vessels and the surrounding tissue together to cut off the blood flow and close the wound with the purpose of immediate hemostasis. It only causes so minimal damage to the wound that the bleeding can quickly stop and don't need special treatment. Usually the metal clip will fall off and excreted by the digestive tract after 1 - 3 weeks because of the formation of granulomatous tissue generated by inflammation. Therefore, it will not cause intestinal damage and have generally no complications.

The success of this matter are closely related to the operator's proficiency and the cooperation between operator and assistant [21]. In the course of treatment, the lesion should be washed by saline and attracted by negative pressure suction device, try to keep the vision clear and the surface is fully exposed. Then try to adjust the angle between titanium clip and hemorrhage lesion after careful observation, place the clip vertically with moderate strength and clamp quickly, the clip will be tightened on both sides of the lesion to block the blood flow, otherwise, clips will fall off prematurely and easily lead to rebleeding.

In this study, the reason why there was no statistically significant difference between two groups in rebleeding rate may be related to our limited numbers of cases. It is precisely because the sample is very limited, and the follow-up work is not perfect, the evaluation of the application value of the clip still needs a large sample and randomized controlled study. The follow-up also need to be improved.

### **Acknowledgement**

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