Endoscopic Findings of Bleeding Esophageal Varices and Experimental Study

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It has been considered that the rupture of esophageal varices occurs with high incidences, and once bleeding occurs it sometimes cause fetal massive bleeding. However, from our experiences with the active application of emergency endoscopy, the incidence of bleeding from varix was unexpectedly low. From these results, we studied the rupture signs of esophageal varices in experiments on dogs and clinical cases. The actual rupture signs of varices were summarized as (1) active bleeding, (2) adhesion of fresh clot, (3) mucosal protrusion in a conical shape and white discoloration of its top area and (4) mucosal slight elevation and attachment of fibrin thrombi. Further studies, however, are required to determine whether there are any varicose bleedings which do not show the above rupture signs.

Bleeding esophageal varices may cause fetal bleeding within a short period, and hemostasis is sometimes difficult by conservative methods such as pharmacotherapy or balloon tamponade. Conventionally, bleeding esophageal varices were treated surgically by transection of esophageal varices or shunt operations. However, some surgical operations were difficult or impossible because of liver cirrhosis. In the treatment of bleeding esophageal varices with poor liver function endoscopic sclerotherapy has been generally used.

At present esophageal varices bleeding is not always adequately differentiated from the bleeding from other sources. Therefore, when bleeding esophageal varices are suspected, emergency endoscopy is considered as a contraindication, and balloon tamponade such as the Sengstaken Blackemore tube is used preferentially for emergency endoscopy. However, the balloon compression method may mechanically stimulate the varices and induce bleeding points. In one case the abrasion caused by a balloon attached to the fiberscope for the

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endoscopic sclerotherapy of an esophageal varix produced a protrusion at the site of the bleeding vessel. This protrusion, conical in shape and several mm in size, became progressively congested and soon developed severe spouting bleeding. From this experience, we discuss the endoscopic findings regarded as representing bleeding of a varix or the condition after bleeding from a varix.

**Materials and Methods**

Since 1977 we had performed emergency endoscopy in 160 cases of upper gastrointestinal (G-I) tract bleedings non selectively. Among these cases in 30 cases of overt bleeding in the presence of esophageal or gastric varices detection of the bleeding points had been attempted under its natural conditions, that is, by inserting an endoscope before gastric lavage or balloon compression. Clinical features of these 30 active bleeding cases with esophageal varices as follows; they consisted 19 males and 11 females. One patient was under 30 years of age; 2 in their thirties, 7 in their forties, 9 in their fifties and 11 over 60 years of age. All patients complicated liver cirrhosis as an underlying disease. The findings of a bleeding site of the vessel were also studied by dissecting microscopy using the models created by puncturing the mesenteric vein in dogs.

For obtaining correct information on the bleeding sites, while patients changed the posture and blood was aspirated using a suction channel of scope, topical washing was made using a teflon tube inserted through a biopsy channel as indicated. The fiberscopes used for emergency endoscopy were slim type panendoscope such as GIF-type Q of small diameter (Olympus Co., Tokyo) FGI type D (Machida Co., Tokyo).

**Results**

As shown in Table 1, the incidence of actual bleedings of esophagogastric varices was lower than that previously expected. Endoscopic findings of esophageal or gastric varices in the cases with overt bleedings are shown in Table 2. Active bleeding, adhered fresh clot, conical shaped bleeding site are acceptable for us as an actual bleeding source in the cases with esophageal or gastric varices, but in the case of no trace of bleeding, varices bleeding is not acceptable. Especially, in the cases showing no trace of bleeding site on the varices, actual bleeding lesions were seen in the other sites except esophageal or gastric varices; such as hemorrhagic erosions or ulcers in the esophagus, stomach or duodenum.

<table>
<thead>
<tr>
<th>Table 1. The incidence of bleeding esophageal varices from the result of emergency endoscopy at the Third Department of Internal Medicine, Tohoku University Hospital since 1977</th>
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<tbody>
<tr>
<td><strong>Bleeding focus</strong></td>
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<tr>
<td>Esophageal varices</td>
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<tr>
<td>Gastric varices</td>
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<td>Other source</td>
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<td><strong>Total</strong></td>
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Esophageal Varices Rupture and Rupture Signs

Endoscopic findings regarded as representing bleeding esophageal varices

Active bleeding

In cases of bleeding esophageal varices, the bleeding is initially projectile bleeding, but become persistent with reduced intensity due to decreased blood pressure and/or vessel contraction at the site of the bleeding. Then, fresh blood clot adheres, leading to hemostasis. Characteristically, the bleeding point of esophageal varices protrudes conically at all stages, and appears like a white doughnut (Fig 1). These findings of active bleeding were seen in 2 cases (7%) of overt bleeding cases with esophageal or gastric varices.

Bleeding point at the stage of hemostasis

Findings in Fig. 2 can be regarded as representing a bleeding site of esophageal varix which protrudes conically assuming slight white color on a varix.

![Endoscopic picture shows an active bleeding from esophageal varices. It is characteristic that the bleeding point of varices protrudes conically and the cut site appears like a white doughnut.](image-url)
The presence and precise location of the bleeding can be confirmed by finding such conditions before applying balloon compression therapy. These findings are seen in one (3%) of 30 overt bleeding cases with esophageal or gastric varices.

Fig. 2. Endoscopic picture shows a trace of the bleeding point of the varices. White colored conical protrusion is characteristic.

Fig. 3. Endoscopic picture shows a previously ruptured point of varices. Fibrin thrombi is characteristic.
Finding confirmed as representing a trace of bleeding

The finding of fibrin thrombi in Fig. 3 indicates the previously ruptured point of an esophageal varix. Such white fibrin clot is produced from the blood clot by the washing by saliva or gastric juice. These findings were seen in one (3%) of 30 overt bleeding cases with esophageal or gastric varices.

Fig. 4. Endoscopic picture shows usual non-bled esophageal varices with signs of varices on varices.

Fig. 5. Mechanisms and findings of bleeding from the varices.
Bleeding esophageal varices not leaving traces

Many investigators believe that in overt gastrointestinal bleeding associated with esophageal varices, the presence of redness, so called varices on varices (Fig. 4), sometimes changes to a varicose bleeding point (Fig. 5), and then heals without leaving any adhesion of fibrin clot. This finding was seen in 26 (87%) of 30 overt bleeding cases with esophageal or gastric varices. However, all these cases not leaving traces showed active bleeding lesions such as hemorrhagic erosions or ulcers in another sites.

Fig. 6. The upper half of the picture shows a normal mesentric vein in dog by dissecting microscopic observation and lower punctured vein by the use of a round needle.
Findings of experimentally induced bleeding site of mesenteric vein

Observation by dissecting microscopy

In mongrel dogs, laparotomy was performed under general anesthesia and the mesenteric vein was punctured by a round needle to make a bleeding point. Then, the bleeding site was washed locally with tap water until spontaneous hemostasis was obtained. Findings obtained by dissecting microscopic observation of the control are shown in the upper half of Fig. 6 and those of the punctured vein in the lower half. The punctured area protruded slightly with adhesion of fibrin thrombi on the surface of adventitia of the mesenteric vein.
Observation by conventional microscope

The puncture site of the blood vessel showed the tissue defect through all layers of the vessel filled with thrombi consisting chiefly of fibrin. Within the cavity of the blood vessel, thrombi continuing from inside to outside at the puncture were noted (Fig. 7).

The above experiments demonstrated that fibrin thrombi were easily formed at bleeding site of veins, and that the veins slightly white. These findings resemble those of the bleeding site of varix in clinical cases.

Discussion

In the past, since conventional endoscopy was regarded as contraindication of emergency endoscopy for such severe esophageal varicose bleeding with varix on varix only a few cases of esophageal varix showing active bleeding received emergency endoscopy. In addition, the slim type fiberscope was not generally used before 1979. Accordingly many questions remain concerning whether such bleedings from varices actually occur or not, or how such bleedings occur without leaving traces.

In overt bleeding cases with esophageal varices where the intraesophageal cavity is destended by air supply and is covered with fresh clot, blood with high viscosity adheres to one point on the esophageal varix and it appears like actual bleeding. This gives us the impression that massive bleeding is present. Therefore, endoscopy should be performed with caution. In such cases local lavage under direct observation using a teflon tube inserted through the channel of a fiberscope is required. If the upper half of the patient’s body is kept high during this local lavage, the clot is easily removed and makes it easy to judge the real bleeding source.

Therefore, for detection of bleeding site in bleeding esophageal varices we have made it a rule to insert an endoscope while maintaining the upper half of the patient’s body elevated and to do local lavage under direct observation.

Conventionally, it has been reported that the rupture of esophageal varices occurs with high incidences (67% by Novis et al. 1976; 72% by Terblanche et al. 1979), and once bleeding occurs it sometimes causes fatal massive bleeding. However, according to the experiences of our active application of emergency endoscopy since 1977, the incidence of bleeding from varix was unexpectedly low even in the cases with severe esophageal varices, and that the bleeding source was often the esophageal and/or gastric erosions, gastric or duodenal ulcers. These results were classified by the emergency endoscopy without the use of balloon tamponade nor gastric lavage as a pretreatment. Similar results have been reported by other investigator (Nakada et al. 1983).

In the treatment of esophageal varices, endoscopic sclerosing therapy has become popular. In the years, there is a tendency to use this therapy as a prophylactic treatment for cases without history of gastrointestinal bleeding.
Although it has been pointed out that endoscopic sclerosing therapy of esophageal varices may aggravate liver functions transiently, such effects are reversible and will fully recover within several days. We recommend esophageal varices with high surgical risks for endoscopic treatment. It is essential to diagnose the bleeding from esophageal varices to correctly elucidate the pathophysiology of this disease, to select the suitable treatment and to discuss the prognosis.

Today emergent endoscopic sclerosing therapy is possible as the treatment for esophageal varices bleeding and we believe that therapeutic emergent endoscopy for hemostasis will also become widespread.

To correctly elucidate the disease entity, it is essential to select an adequate therapeutic method and to evaluate the clinical significance of the treatment.

References

