

An Autopsy Case of Esophageal Rupture Caused by Cardiopulmonary Resuscitation with the Insertion of a Sengstaken-Blakemore Tube

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Abstract : We encountered a case of an esophageal rupture, revealed by autopsy, that had possibly been caused by cardiac massage after a Sengstaken-Blakemore tube (SBT) insertion for gastric varicose vein rupture-induced cardiopulmonary arrest. [Patient] A 54-year-old female with a gastric varicose vein rupture was brought to our facility, and received compression hemostasis using a SBT. Cardiopulmonary arrest occurred and cardiopulmonary resuscitation (CPR) was performed with the SBT in place. The patient died and an autopsy was performed about 13 hours after death. A full-thickness lacerated wound 7 cm in length was noted in the esophagus, and a lacerated wound 5.5 cm in length was noted in the gastric mucosa. [Discussion] Esophageal injury occurs in many cases as a complication of improper use of SBT, such as a misplacement of a gastric balloon in the esophagus. In this patient, mucosal injuries were noted at the sites at which the gastric and esophageal balloons should have been placed, thus suggesting that the cause of esophageal injury was not due to improper placement, but was due to compression injury caused by cardiac massage with the balloon inflated. As a result, the balloons should be deflated when CPR is applied in patients with a SBT in place.

Key words : Esophageal rupture, CPR, Sengstaken-Blakemore tube, Gastric varicose vein rupture

Introduction

Sengstaken-Blakemore tube (SBT) placement remains an important hemostasis method for esophago-gastric hemorrhage despite the development of endoscopic therapy.¹⁾⁻⁶⁾ In this patient, cardiopulmonary arrest occurred due to a gastric varicose vein rupture, and CPR was performed with a SBT in place. An esophageal rupture occurred despite the SBT being accurately inserted as specified, and the patient died. We herein report the autopsy findings of this case.

Case report

The patient was a 54-year-old female who had

been admitted to a psychiatry department for atypical psychosis. A gastric varix had been found, but was not treated. Hematemesis occurred suddenly, and the patient was transferred to an internal medical ward. The patient's systemic condition deteriorated during upper gastrointestinal endoscopy, and she was thus brought to our facility.

When the patient was brought to our facility, her blood pressure was 46/29 mmHg, and heart rate was 96 bpm, thus indicating a profound shock state, and compression hemostasis was performed with a SBT concurrent with emergency blood transfusion. However, the condition became aggravated, cardiopulmonary arrest occurred, and the patient died despite the fact that resuscitation was performed with the SBT in place. The SBT

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Fig. 1. Autopsy findings arrow : Mediastinal hematoma
A mediastinal hematoma had formed around the esophagus.

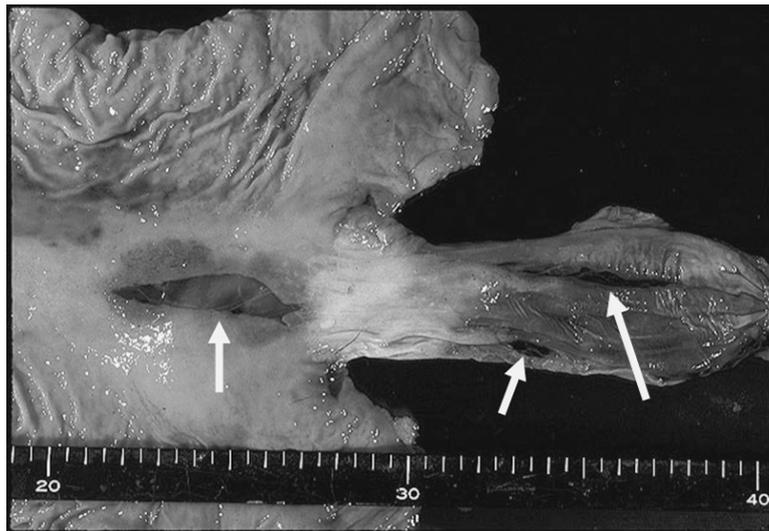


Fig. 2. Excised specimen arrows : Lacerated wounds
In the excised specimen, a full-thickness lacerated wound measuring 7 cm in length was noted in the esophageal mucosa, and a 5.5 cm lacerated wound, partially reaching the muscular layer and starting from the esophagogastric junction, was noted on the lesser curvature of the gastric mucosa.

had been inserted using the normal procedures without any resistance, and the specified balloon infusion volume was followed (esophageal balloon pressure : 30 mmHg). An autopsy was performed about 13 hours after death.

Pathological findings from autopsy

A mediastinal hematoma had formed around the

esophagus, thus suggesting esophageal injury (Fig. 1).

In the excised specimen, a full-thickness lacerated wound measuring 7 cm in length was noted in the esophageal mucosa, and a 5.5 cm lacerated wound, partially reaching the muscular layer and starting from the esophagogastric junction, was noted on the lesser curvature of the gastric mucosa. These injuries were consistent with the

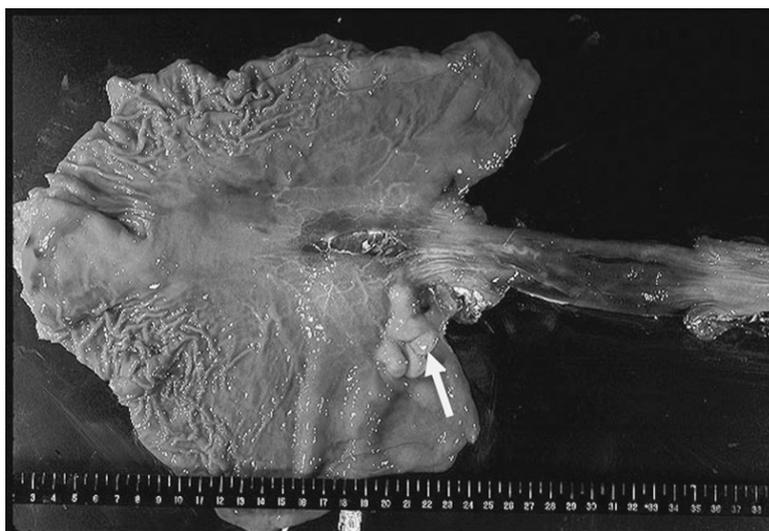


Fig. 3. Macroscopic findings of the specimen after the injection of a barium-gelatin mixture.
 arrow : Bleeding point
 A tumor-like varix was present in the gastric fornix, and a mucosal defect, which may have been the bleeding point, was noted immediately above the varix. The esophageal varices were mild, and no varices were evident at the injured site.

placement sites of the esophageal and gastric balloons of the SBT (Fig. 2).

A barium-gelatin mixture was infused into the varicose blood vessel in the excised specimen to reproduce a varicose vein morphology. A tumor-like varix was present in the gastric fornix, and a mucosal defect, which may have been the bleeding point, was noted immediately above the varix. The esophageal varices was mild, and no varices were evident at the injured site. It is therefore unlikely that the esophageal wall was fragile due to the esophageal varices (Fig. 3).

Discussion

Esophageal injury has long been reported to be a dire complication of SBT. In many cases, this type of injury can be due to the improper insertion and misplacement of the gastric balloon in the esophagus.⁷⁾⁻¹³⁾ However, neither of these types of injuries occurred in this patient, nor was there any esophageal wall fragility associated with the esophageal varix. Since the injuries were located at the sites at which the gastric and esophageal balloons should have been placed, the esophageal rup-

ture and gastric mucosal injury in this case may have been caused by compression injuries during the cardiac massage with the balloon inflated. These findings suggest that cardiac massage with an inflated balloon in the esophagus can contribute to the risk of esophageal injury. We consider that the balloon should be deflated before CPR be performed when it is absolutely necessary that it be performed with a SBT in place.

Conclusion

We reported an autopsy case of an esophageal rupture caused by CPR with a SBT in place. Based on the findings of this case, we conclude that the balloon should be deflated before initiating cardiac massage when it is necessary to perform CPR with a SBT in place.

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