The usefulness of intraoperative transesophageal echocardiography (TEE) has been established in cardiac surgery\(^1\)–\(^3\) and recently its usefulness in transluminal endovascular stent-graft repair for thoracic aortic aneurysm was reported.\(^4\) Although complications associated with diagnostic TEE are rare, with a reported incidence of only 0.18% in 10,218 TEE examinations,\(^5\) blind positioning and manipulation of the echoprobe in the esophagus and stomach pose special risks to the surgical patient who has been anticoagulated for cardiopulmonary bypass (CPB). We present a rare case of a Mallory–Weiss tear complicating intraoperative TEE in a patient undergoing coronary artery bypass grafting (CABG).

**Case Report**

A 62-year-old man underwent elective CABG for angina pectoris. His past medical history was remarkable for hypercholesterolemia, hyperuricemia and a history of smoking, but there was neither a personal nor family history of coagulopathy. Because the patient did not have abdominal symptoms and had not been diagnosed with active gastrointestinal disease, preoperative gastrointestinal endoscopy was not performed. He had undergone angioplasty and stenting of the right coronary artery 6 months before the CABG. Preoperative coronary angiography revealed 75% stenosis of the left main trunk and 75% stenosis of the left anterior descending coronary artery.

After premedication with ranitidine, morphine, and scopolamine, anesthesia with fentanyl, propofol, and vecuronium was induced without complication. After induction, an esophageal echoprobe (Toshiba Model PEF-510MA, 5.0 MHz; tip dimensions: diameter, 16 mm and length, 38.5 mm) was inserted easily and uneventfully. The left ventricle was imaged without difficulty (Toshiba Model PowerVision 8000 Ultrasound Imaging System) in the transgastric short-axis view. Postoperative esophagogastroscopy revealed a Mallory–Weiss tear at the gastroesophageal junction and erosions in the cardia, presumably secondary to contact pressure by the echoprobe and ultrasonic thermal injury. When not actively imaging, the echoprobe should be left free in the esophagus with the acoustic power off.\(^\) (Circ J 2003; 67: 357–358)

**Key Words:** Complication; Intraoperative transesophageal echocardiography; Mallory–Weiss tear

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**Fig 1.** Esophagogastroscopy shows the Mallory–Weiss tear at the gastroesophageal junction (arrow).
Discussion

TEE is used increasingly in cardiology and during cardiac surgery because it can be performed quickly, with minimal invasiveness and with few complications. However, intraoperative TEE monitoring in anesthetized patients increases the risk of serious complications, such as injury, because the period of monitoring is prolonged, there is no endoscopic guidance and the patient cannot provide feedback during manipulation of the echoprobe.

Bleeding from diagnostic endoscopy is rare, with an incidence of 0.03%. Although a Mallory–Weiss tear resulting from active gastrointestinal disease has been reported because the present patient did not have evidence of active gastrointestinal disease before the surgery, we conclude that the tear in this case must have been caused by the instrumentation left in the esophagus and stomach. Of the 2 other reported cases of a Mallory–Weiss tear as a complication of intraoperative TEE, one lost 9 liters of blood and eventually died. The consequences of even a small injury will be magnified by the systemic anticoagulation and post-CPB coagulopathy.

We suspect the echoprobe caused the Mallory–Weiss tear by the following mechanism. According to Urbanowicz et al., the pressure on the esophagus exerted by the TEE probe usually does not exceed 17 mm Hg, although pressures as great as 60 mm Hg have been recorded. In the present patient, the left ventricle was imaged in the transgastric view and to obtain this view, the echoprobe must be flexed, which puts tension on the G-E junction and thus may produce a high contact pressure on the junction because the distal end of esophagus is not straight. Ultrasonic thermal injury may also contribute. Heat is generated by 2 mechanisms: vibration of the crystal can heat the echoprobe and another mechanism is the absorption of the ultrasonic energy by the tissue, which can cause heating at a distance from the echoprobe. The ultrasonic power is shut down automatically when the temperature exceeds 42°C, but in this case the automatic shut-down system did not operate and the ultrasonic power was not turned off manually during CPB, so a thermal injury may have occurred in this case.

In conclusion, a Mallory–Weiss tear at the G-E junction and erosions in the cardia occurred when the TEE echoprobe was left with the power on in a locked and flexed position during CPB. To prevent this injury, the echoprobe can be left in the esophagus, but the power must be shut off when not actively monitoring the patient.

References