



Risk factors for chylothorax after esophagectomy

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Chylothorax commonly occurs after esophagectomy for esophageal cancer and sometimes becomes refractory. When it cannot be cured by conservative treatments, surgery is usually considered (1). It can be associated with significant postoperative mortality, long hospital stay, and high economic burden (2,3). Thus, preventing postoperative chylothorax is one of the important clinical issues during esophagectomy.

At this time, only a few studies of the risk factors for chylothorax after esophagectomy have been conducted (2,4). Shah *et al.* suggested that certain histological types (squamous cell carcinoma) may be at increased risk for chylothorax. Miao *et al.* documented that a body mass index <25 kg/m² was a significant risk. However, Shah *et al.*'s study included several types of surgery that could affect the incidence of postoperative chylothorax. Miao *et al.* performed open Ivor Lewis esophagectomy, which is not a standard surgery for esophageal carcinoma in Japan. Thus, in the current study, Ohkura *et al.* investigated the risk factors for post-esophagectomy chylothorax using comparatively homogenous patients regarding surgery: subtotal esophagectomy with two- or three-field lymphadenectomy, which is the standard surgery in Japan.

This study is considerably important because the investigation of risk factors for chylothorax after subtotal esophagectomy has never been conducted. In this study, the authors documented that preoperative chemoradiotherapy (CRT) and high intraoperative fluid balance were significant risk factors for postoperative chylothorax. Moreover,

resection of the thoracic duct (TD) might be a risk.

The reasons for the association between preoperative CRT and postoperative chylothorax that the authors claimed are reasonable and acceptable. Preoperative CRT can induce damage to the lymphatic system and edema in an irradiated field (5). In addition, fibrotic changes after CRT complicates distinguishing the dissection plane in a surgical field and may cause frequent lymphorrhea by inducing microinjuries of the TD and lymphatic network surrounding the TD. In addition, preoperative CRT is usually performed in patients with more advanced esophageal cancer. Advanced cancer with lymph node metastasis often requires extensive lymphadenectomy and concurrent TD resection, which can also be a cause of chylothorax.

The association between intraoperative fluid balance and postoperative chylothorax in this report is a novel and interesting result that has never been reported. Importantly, the authors performed both a retrospective study for risk factors seeking and prospective validation study. They finally confirmed that high intraoperative fluid balances ≥ 6.55 mL/kg/h were correlated with a frequent incidence of postoperative chylothorax. However, the authentic mechanism of frequent chylothorax in patients with high intraoperative fluid balance remains uncertain. The authors suggested that high fluid balance increases the pressure within the lymphatic vessels, and their slight damage during esophagectomy can result in chylothorax. However, it is difficult to verify whether a high intraoperative fluid

balance is truly a cause or result of chylothorax. This is because intraoperative lymphorrhea commonly requires more fluid infusion during surgery. In fact, the authors noted that some patients in a prospective validation study did not meet the target value (6.55 mL/kg/h) of fluid infusion unintentionally. We cannot conclude whether high intraoperative fluid infusion in the study caused chylothorax or was unavoidably administered due to large intraoperative lymphorrhea.

It is also difficult to conclude that TD resection may be associated with frequent chylothorax after esophagectomy. Several previous studies have demonstrated that prophylactic TD ligation can prevent chylothorax after esophagectomy (6,7). As the authors mentioned, differences in patients' backgrounds can affect the incidence of chylothorax. More advanced cancers in the TD resection group may have contributed to the increasing incidence of chylothorax. In addition, TD resection for complete lymphadenectomy surrounding the TD and prophylactic TD ligation for chylothorax may have different values with regard to chylothorax in esophagectomy. Based on the current results, it is difficult to elucidate the reasons for chylothorax after esophagectomy via a retrospective study.

In addition to the limitations mentioned in the discussion, differences in surgical approaches (open *vs.* video-assisted thoracoscopic surgery) may affect the current results. Because open esophagectomy is generally correlated with higher blood loss and insensible water loss than those of minimally invasive esophagectomy, it would be better to test the cutoff value of intraoperative fluid balance separately.

In conclusion, this study retrospectively elucidated the risk factors for postoperative chylothorax after esophagectomy. Preoperative CRT confers a reasonable risk of postoperative chylothorax. With regard to the influence of intraoperative fluid balance, a definitive conclusion remains unclear despite a discreet prospective validation

study. As the authors mentioned, a further multicenter study with a larger cohort is necessary to reconfirm and strengthen the current results.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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