# Synchronous Esophageal and Lung Cancer

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## KEYWORDS

• Lung cancer • Esophageal cancer • Synchronous • Metachronous

## KEY POINTS

- Patients with synchronous lung and esophageal cancers must be recognized as having separate cancers rather than metastatic disease of one or the other.
- Each cancer must be staged appropriately and if both are resectable, simultaneous resection may be considered.
- Staged surgical resection and/or surgery in combination with nonoperative therapy (including chemotherapy and/or radiation) may be appropriate.
- Radical resection for noncurative intent (eg, partial resection) should not be performed because this is associated with unacceptable mortality.

## INTRODUCTION

Although not a frequently encountered pattern in clinical practice, the care of a patient with concomitant esophageal and lung cancers is a special circumstance, but has been described in the literature.[1–5] Pulmonary and esophageal resection for cancer may carry significant morbidity. When combined, in addition to the technical challenge of the resections themselves, the morbidity of the combined procedures is increased several-fold. When performed in staged fashion in a patient with metachronous tumors, prior treatments for the first cancer (eg, radiation for locally advanced esophageal cancer) may impact the morbidity of resection for the second. The incidence and epidemiology of synchronous esophageal and lung cancer support treatment of this as a unique clinical entity. The technical challenges and the singular morbidity and possible mortality associated with managing such cases merit a discussion of combined lung and esophageal cancers as a special case.

## PERSPECTIVES: CONCOMITANT LUNG AND ESOPHAGEAL CARCINOMA IN THE LITERATURE

Most reports of lung and esophageal cancer were published in the Japanese literature. The presence of multiple synchronous primary cancers in patients diagnosed with esophageal cancer is an established pattern in the Japanese population. Many patients with esophageal squamous cell carcinoma (SCC) were found to have another primary SCC in the head and neck (most common), with lung SCC reported less commonly.[6,7] The incidence has been variously reported between 0.54% and 3.2% of patients with esophageal SCC having an associated primary lung cancer.[2,3] The mechanisms of association are not entirely clear but several studies have suggested shared risk factors as a cause insight.[8] Although shared etiologic factors, such as smoking, may predispose patients to both lung and esophageal cancer, the incidence is particularly low. Fekete and coauthors[2] suggested that this may be caused by the

poor prognosis of either cancer, leading to patient death before the second primary can manifest. Alternatively, patients diagnosed with esophageal cancer first (and found to have a lung malignancy) may be misdiagnosed as metastatic (and may be incorrectly staged and treated for either tumor). In most of the reports involving metachronous lung and esophageal cancers, the lung cancer presented first.[2,3,9–11] In most of these reports, lung cancer was treated by radiation. Patients with lung cancer treated with radiation have a relative risk of four to seven of developing a second cancer compared with age-matched normal population.[12,13] Radiation-induced esophageal carcinoma was reported to occur 2 to 19 years following irradiation for breast cancer.[13] More recent reports of metachronous lung followed by esophageal cancers after irradiation for the lung cancer documented an interval of 11 months to 13 years.[3,9] Radiation-induced esophageal cancers after other primary cancer behave differently, perhaps because of differences in risk factors compared with standard esophageal cancer.[12] As such, patients have prominent mediastinal fibrosis and the incidence of lymph node metastasis is lower in radiation-induced esophageal cancers, although survival is equivalent to that of sporadic esophageal malignancies.[2]

## SYNCHRONOUS ESOPHAGEAL AND LUNG CANCERS: SPECIAL CONSIDERATIONS
### Need for Accurate Diagnosis and Staging

As described by Fekete and coauthors,[2] differentiating between a second primary lung cancer and a lung metastasis from an esophageal cancer in the presence of a synchronous esophageal primary is challenging. Lindenmann and coworkers[14] illustrated the need for accurate staging in a case report of a patient with a midesophageal SCC accompanied by two lung masses. The lung masses were erroneously diagnosed as metastases from the esophagus, but later fortuitously discovered to be synchronous primaries, portending a better prognosis. Lung resection for each with curative intent rather than chemotherapy was the treatment of choice.[14] Although synchronous lung and esophageal cancers are rare in clinical practice, they do occur and clinicians must distinguish double cancers from metastases to determine prognosis and treatment strategies. This should be supported by tissue diagnosis, as illustrated in the report by Lindenmann and coworkers.[14] Suggested criteria that support the diagnosis of primary lung carcinoma are lung tumor with different histology, presence of lung tumor before esophageal carcinoma, solitary lung

SCC with endobronchial involvement, or a lung SCC with radiographic appearance of an irregular border/speculation.[2,3,7] Needle biopsy may be useful to obtain tissue diagnosis of the lung lesion, particularly in centers with experienced interventional radiologists and cytopathologists. There are some disadvantages, however, such as risk of pneumothorax, or more uncommonly, hemothorax, and possible nondiagnostic biopsy. Thus, surgical wedge resection is sometimes needed for biopsy. Even minimally invasive video-assisted thoracoscopic surgery (VATS) or robotic-assisted thoracoscopic surgery (RATS) resection may portend risks, including adhesion or complication for definitive esophageal and/or lung resection. These risks should be considered when determining strategy for staging and diagnosis.

### Preoperative Risk Assessment: Eligibility for Surgical Treatment of Synchronous Lung and Esophageal Cancer

Although anastomotic or conduit leak represents the most dreaded complication of esophagectomy, other causes of morbidity and mortality for esophagectomy or pulmonary resection include delayed gastric emptying, vocal cord paralysis, airway injury, atrial fibrillation, respiratory failure, pulmonary embolism, myocardial infarction, prolonged air-leak, torsion, and cerebrovascular accident.[15–19] Concomitant surgery for synchronous lung and esophageal cancer may precipitate unexpected mobility of the gastric conduit or the middle lobe (because of extensive disruption of the pulmonary ligament). Given increased risk of complication with combined surgery, meticulous preoperative assessment for suitability for surgery cannot be overemphasized.[18,19] Preoperative assessment should focus on risk-stratifying patients for complex thoracic surgery, with evaluation for inducible myocardial ischemia, ventricular and valvular function, blood gas, spirometry, and quantitative ventilation/perfusion scan as the main components as appropriate. Matsubara and coworkers[18] suggested the following criteria, which have been cited by others.[3,19] Ideal patients should have normal $P_{O_2}$, normal $P_{CO_2}$, a forced expiratory volume at 1 second ($FEV_1$) greater than 70% of vital capacity, and a predicted postoperative vital capacity greater than 50% of the standard value.[18] Shien and coworkers[5] suggested a predicted postoperative $FEV_1\%$ (ppo-$FEV_1\%$) greater than 40%. This was calculated by the standard method for pulmonary resection: ppo-$FEV_1$ = preoperative predicted $FEV_1 \times (19–S)/19$, where S represents the number of