Commentary: Carinal pneumonectomy: Not for the faint of heart

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Central Message

Carinal resections are complex, rarely performed operations. A recent series found acceptable outcomes in the current surgical era but supports limiting carinal pneumonectomy to high-volume centers.

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Thoracic surgeons face few operations that are more complex than carinal resection and in particular carinal pneumonectomy. In less-experienced hands, procedural mortality greater than 25% is not uncommon.¹ Training and proficiency in the procedure are hard to achieve because of the rarity of central airway lesions. Earlier detection of lung cancer and advanced imaging may further reduce need for carinal resection. Even experienced centers seldom see more than 2 patients a year who require a carinal resection.

Arguably, the pioneer in performing complex airway surgery and training residents in the procedure was Dr Hermes Grillo. His landmark book, *Surgery of the Trachea and Bronchi*, is a mandatory read for any thoracic surgeon with interest in airway surgery.² In 1999, Grillo and colleagues from the Massachusetts General Hospital (MGH) published their experience spanning almost 4 decades of carinal surgery with a very respectable mortality of 12.7% including patients who underwent carinal pneumonectomy.³

In this issue of the *Journal*, Costantino and colleagues⁴ updated the MGH experience with carinal resection, reporting on 45 patients operated on during a 20-year period, from 1997 to 2017, a more modern era of surgery and anesthesia. Combined carinal and lung resection was performed in 24 patients (53%); the majority were carinal pneumonectomies (23 patients, 51%). Most commonly, these surgeries were approached by right thoracotomy or median sternotomy. Circulatory support was used in 4 patients; cardiopulmonary bypass was electively used in 3, and venoarterial extracorporeal membrane oxygenation was used in 1. There were 5 anastomotic complications, but only 1 patient required surgical therapy, an improvement over Grillo and colleague's 1962 to 1996 MGH series. Three patients (6.7%) died within 30 days of carinal resection; all had undergone carinal pneumonectomy. The mortality in patients who underwent carinal pneumonectomy was 13% (3/23), and there was no mortality (0%) in patients who underwent

carinal resection without pneumonectomy. Even at the Massachusetts General Hospital, a high-volume center, carinal resection was performed only twice a year on average.

The series of Costantino and colleagues is an important report that stresses the difficulty of carinal surgery, in particular, the difficulty of carinal pneumonectomy. The 4 lessons learned and detailed by the authors will serve all surgeons well: (1) Patients should be carefully selected for carinal resection, taking medical fitness, lymph node status, and technical planning into account; (2) the surgeon should aim for an R0 resection but not at the expense of anastomotic tension; (3) circulatory support should be used when warranted; and (4) patients who are likely candidates for carinal resection should be referred to a high-volume center. Even in the experienced hands at MGH, carinal pneumonectomy carried a mortality of 13%. Although minimally invasive techniques may assist in reducing the morbidity and mortality of carinal resection and could allow more surgeons to perform carinal resections safely, carinal pneumonectomy should be performed at a high-volume center because of the rarity of these cases.

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