The convergence on extremes

Gaetano Rocco, MD, FRCSEd

From the Division of Thoracic Surgery, Thoracic Department, Istituto Nazionale Tumori, IRCCS, Fondazione Pascale, Naples, Italy.

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Address for reprints: Gaetano Rocco, MD, FRCSEd, Division of Thoracic Surgery, Thoracic Department, Istituto Nazionale Tumori, IRCCS, Fondazione Pascale, Naples, Italy (E-mail: g.rocco@istitutotumori.na.it).

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Gaetano Rocco, MD, FRCSEd

Central Message

A well-performed wedge resection is still a valuable option in selected patients with lung cancer.

See Article page 380.

In statistics, the study of the extremes of a Gaussian curve may be of interest to understand the characteristics of a population not from the most common values but from the maximal or minimal values recurring in time.¹ The so-called Gumbel distribution is used in epidemiology and, in particular, in geography to cluster phenomena (ie, floods) where maximal precipitations are examined to predict the occurrence of such phenomena.² This method also is used in oncology to understand specific cancer epidemiology within a certain region in an attempt at connecting disease episodes that may otherwise appear unrelated and occasional.^{1,2} The Gumbel distribution is a clear example of how the investigators may draw sensible information by converging on extremes.

In the last 20 years, with the advent of thoracoscopic surgery and the refinements of the lung cancer TNM staging system, wedge resection and pneumonectomy have become the extremes of a thoracic surgical practice. The latter is infrequently performed for those extents of disease when saving of the parenchyma is not technically feasible or recommendable but completeness of resection is desired. Currently, surgeons report their primary pneumonectomy figures almost with reluctance, feeling somewhat entitled to use this procedure only after complex neoadjuvant treatments. In fact, recent series on pneumonectomy after induction treatment demonstrate acceptable mortality and morbidity rates that cannot go unnoticed.³ On the other end of the spectrum, wedge resections have long represented a compromise solution for primary lung cancers, fraught with recurrence rates that have attracted the interest of stereotactic body radiation therapy (SBRT) advocates.^{4,5} Along the line of recent evidence emerging from the literature,⁶ the article by Ajmani and colleagues⁷ analyzes the National Cancer Data Base in an attempt at revisiting the oncological value of wedge resection by focusing on the quality of the procedure.⁷ Indeed, tumor-free margins associated with the removal of at least 5 lymph nodes were favorable prognosticators compared by propensity matching to patients treated with SBRT after adjustment

for demographic and clinical variables.⁷ Far from delineating a sort of surgical counter-offense against the trendy new treatment modality (ie, SBRT), this contribution raises several issues to be addressed to better define our current practice. First, in a fashion similar to SBRT, we can actively modulate our surgical choice to fit the needs of the individual patient. However, thoracic surgeons *must know* that by performing a wedge resection for primary lung cancer—without the certainty of clear margins and adequate nodal sampling—the quality of the procedure will be impaired.^{6,7} In addition, for early-stage lung cancers, the survival outcomes obtained after carefully scheduled and performed wedge resections (associated with lymphadenectomy) may not differ from the ones observed with segmentectomies.⁶ In fact, the presence of a solid component and the tumor spread through air spaces phenomenon may play a significant role in determining the recurrence rate after wedge resection for lesions measuring less than 2 cm in diameter.⁹⁻¹¹ Whether the lack of compliance with tumor-free margins and extent of lymphadenectomy as new quality metrics may translate into a survival disadvantage of wedge resection compared with SBRT needs to be assessed by the much-awaited randomized trials.¹² Second, patients and colleagues *must know* that, like pneumonectomies, well-planned wedge resections may still serve a viable oncological purpose. In addition, these procedures can be done by video-assisted thoracoscopic surgery, more often than in the past via a single small incision, in awake or nonintubated selected patients and without placing a chest tube at the end.¹³ In this setting, the addition of an adequate nodal dissection should not affect the procedure-related morbidity

and hospital stay.⁸ Accordingly, in selected patients, a well-performed wedge resection may represent an excellent operative step of an advanced Enhanced Recovery After Surgery protocol aimed at configuring a 1-day lung cancer surgery pathway according to a fast-track model that may become the surgical benchmark against which any other local treatment modality must be compared.¹⁴

More than a mathematical and philosophical model, the convergence on extremes of our thoracic surgical armamentarium may represent the key for a treatment planning characterized by a more granular distinction of the type of procedure according to the patients' characteristics, stage of disease, and nodule size and density, as well as the level of expertise in minimally invasive surgery.

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