



Wedge resection—finding its place in early-stage non-small cell lung cancer?

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The advent of high-resolution computed tomography (HRCT) and low-dose computer tomography (LDCT) screening has led to an increase in the number of patients diagnosed with early-stage lung cancer (1-3). Lobectomy has been the standard of care for the treatment of stage I non-small cell lung cancer (NSCLC) since the Lung Cancer Study Group's randomized phase III trial reported a 3-fold increase in local recurrence and a 50% increase in cancer related deaths after sublobar resection (4). More recent, retrospective studies have suggested comparable survival with a priori sublobar resections—which include segmentectomy and wedge resection—for early-stage NSCLC (5-7). Wedge resections have traditionally been considered oncologically inferior to segmentectomy, and the efficacy of wedge resection for small, peripheral, stage IA NSCLC remains controversial (8,9).

In a recent issue of *Journal of Thoracic Disease*, Bian and colleagues (10) present their experience performing wedge resection for stage IA lung adenocarcinoma (IA-LUAD). They retrospectively analyzed 186 patients who underwent wedge resection by video-assisted thoracoscopic surgery (VATS) from 2014 to 2017. Their data suggests that wedge resection can be performed with acceptable recurrence rates of 0.54%, 3.76%, and 4.84% at 1-, 3-, and 5-year in a cohort of highly selected patients—those with a single, peripheral nodule with a resection margin distance at least

equal to the nodule size, or 20 mm of margin. Additionally, they identified maximum dimension of consolidation component (MCD), consolidation-to-tumor ratio (CTR), and computed tomography value of tumor (CTVt) as predictors for recurrence, and suggest optimal cutoffs of 10 mm, 60%, and -220 Hounsfield units (HU), respectively, as radiologic criteria for wedge resection. Other features seen on HRCT, specifically spicules of margin, lobulated shape, and vascular passage were also associated with greater rates of recurrence. Together, these data support the benefit of wedge resection for stage IA NSCLC in this cohort. Perhaps more important is how we are to interpret these data amidst the ever-evolving landscape of thoracic surgery. Within the past year, two landmark, prospective, randomized trials have been performed demonstrating the non-inferiority of sublobar resection for NSCLC with nodule size of 2 cm or less. The Japan Clinical Oncology Group (JCOG) 0802 demonstrated segmentectomy as non-inferior to lobectomy, with outstanding recurrence-free survival and overall survival (6). This was followed by Cancer and Leukemia Group B (CALGB) 140503 which corroborated the results of non-inferiority in a western population, in this case grouping both wedge resections and segmentectomies together in a sublobar cohort (11).

Theoretic advantages of sublobar resections include preservation of lung parenchyma and lower perioperative

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morbidity, specifically in patients with compromised pulmonary function. Interestingly, among the 21 patients in the Bian study who underwent wedge resection owing to their inability to tolerate an anatomic resection, the incidence of recurrence within a 5-year timeframe was 14.29%, a figure substantially higher than the 3.64% recurrence rate recorded among patients who underwent planned wedge resections. This bears significance as the former group of patients may be more prone to being recommended wedge resection in clinical practice to preserve pulmonary function. An additional observation was the absence of discernible variance in recurrence rate based on pathological subtype or the presence of driver-gene mutations. As the authors point out, this finding contradicts previously published studies (12,13), however, this may be attributed to their relatively low rates of recurrence overall. A final, crucial point of the study, as well as JCOG0802 and CALBG140503, is the importance of implementing meticulous surgical technique in oncologic resections. Opponents of sublobar resection cite greater frequency of inadequate lymphadenectomy associated with sublobar resections compared to lobectomies (4,8,9). Notably, Bain *et al.* (10) excluded patients without lymph node sampling from this study, and the JCOG and CALBG studies required a comprehensive nodal sampling or dissection for inclusion.

Bian and colleagues demonstrate excellent results performing wedge resections in a highly selective cohort of patients with IA-NSCLC while also exploring radiographic benchmarks to prognosticate disease recurrence. This study substantiates the concept that sublobar resection is not invariably oncologically inferior and can be performed with minimal risks and excellent cancer-specific outcomes.

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