Non-small cell lung cancer, if detected at early stage, is a disease with high probability for cure. However, the treatment in clinical practice is highly dependent on the co-morbidities of the patient, the performance status and age. A relevant proportion especially of the elderly patient population remains untreated despite the dismal prognosis of untreated stage I NSCLC with 5 year cancer specific survival (CSS) of only 16% (1,2). Conventionally fractionated radiotherapy has been the treatment of choice for medically inoperable patients: however, outcome is suboptimal with 5 year CSS ranging between 13% and 39% (3); most importantly, local disease recurrence is the most frequent site of failure, not systemic metastases (4). CSS is excellent after lobectomy ranging between 100% and 57.6% depending on the size of the primary tumor (5). Despite a randomized trial demonstrated inferior outcome of sublobar resection compared to lobectomy (6), sublobar resection is practiced especially in high-risk patients aiming at preservation of pulmonary function (7). Wedge resection seems to be insufficient even for small tumors whereas segmentectomy results in promising CSS if the tumor size is below 3cm (5,8).

Stereotactic body radiotherapy (SBRT) – or stereotactic ablative radiotherapy, which are different names for identical treatment methodologies – has gained much attention as a novel and promising treatment option for early stage NSCLC. The rational for the practice of SBRT is the finding that very high radiation doses are required to locally control NSCLC, higher than achievable with conventional radiation techniques (9): SBRT allows treatment with these escalated irradiation doses to the site of the primary tumor by optimal lung sparing using modern radiotherapy technologies e.g. breathing motion compensation and image-guidance. As a consequence, local tumor control after SBRT is substantially better compared to conventionally fractionated radiotherapy: in a large number of prospective phase II trials, local tumor control ranged consistently between 84 – 98% (10-14) compared to only 60% after conventional radiotherapy (3). This translates into CSS rates between 72.5% and 88% after 3 years (10,11,13).

The review in this issue of the *Journal of Thoracic Disease* summarizes the current status of SBRT (15). No randomized controlled trial tested SBRT in comparison with any other treatment modality: best-supportive care, conventionally fractionated radiotherapy, sublobar resection or lobectomy. However, there is a growing body of evidence based on prospective phase II trials and well performed retrospective analyses, which define the current status of SBRT in this wide spectrum of patients with early stage NSCLC.

A recent population based analysis demonstrated that the introduction of SBRT significantly
decreased the proportion of untreated patients older than 75 years, which resulted in significantly improved overall survival (2): a non-invasive treatment practiced in an out-patient fashion with only 1–8 treatment fractions is a low barrier for patients and referring doctors to choose a curative treatment approach. Even very poor pulmonary function in the context of severe COPD should not be considered as contraindication for SBRT (16,17).

The difference in both local tumor control and CSS between SBRT and conventional radiotherapy is highly consistent in the literature and is considered as so large, that SBRT is widely accepted as the treatment of choice for patients who are no candidates for surgical resection. Overall survival now seems to be influenced mainly by the comorbidities of the patients (18). As stated clearly in the review, strict and comprehensive quality assurance covering indication for SBRT, staging, treatment planning, radiotherapy delivery and follow-up – the whole chain of SBRT treatment – are mandatory for the practice of this sophisticated treatment. Such quality assurance protocols are published and broadly available, which will be the basis for a broader clinical implementation of SBRT outside of highly specialist academical centres.

There is limited data comparing SBRT and surgical treatments. A retrospective study reported improved local tumor control and regional control with no difference in CSS for SBRT compared to wedge resection (19). Japanese patients, who were operable but refused surgery, experienced excellent 5 year overall survival of 72% and 62% for stage IA and IB after SBRT, respectively; these results are approaching overall survival after lobectomy, which is also indicated by a Markov-Model analysis (20). In the absence of randomized trials for both SBRT and sublobar resection, both SBRT and sublobar resection should be offered to high-risk patient as viable treatment options. For patient suitable for lobectomy, SBRT offers a curative treatment option if surgery is refused.

References


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