Commentary

Impact of whole tumor size in part-solid non-small cell lung cancer

Tomoyoshi Takenaka, Naoko Miura, Koji Yamazaki, Sadanori Takeo

Department of Thoracic Surgery, Clinical Research Institute, National Hospital Organization, Kyushu Medical Center, Fukuoka, Japan

Correspondence to: Tomoyoshi Takenaka, MD, PhD. Department of Thoracic Surgery, Clinical Research Institute, National Hospital Organization, Kyushu Medical Center, Jigyohama 1-chome, 8-1, Chuo-ku, Fukuoka city 810-8563, Japan. Email: ttake@surg2.med.kyushu-u.ac.jp.

Comment on: Hattori A, Matsunaga T, Takamochi K, et al. Neither Maximum Tumor Size nor Solid Component Size Is Prognostic in Part-Solid Lung Cancer: Impact of Tumor Size Should Be Applied Exclusively to Solid Lung Cancer. Ann Thorac Surg 2016;102:407-15.

Received: 26 August 2016; Accepted: 13 September 2016; Published: 23 September 2016.

doi: 10.21037/vats.2016.08.08

View this article at: http://dx.doi.org/10.21037/vats.2016.08.08

In the recent issue of Annals of Thoracic Surgery, Hattori *et al*. reported the impact of the maximum tumor size and solid component size on the prognosis of patients with non-small cell lung cancer (NSCLC) (1). They evaluated 1,181 surgically resected cases of clinical N0 M0 NSCLC. The patients were divided into three groups according to the radiologically determined consolidation tumor ratio (CTR): the pure ground-glass opacity (GGO) group (CTR =0; n=168), the part-solid (0<CTR<1; n=448) group and the solid (CTR =1; n=565) group. The authors reported that the tumor size had a significantly impact on the 5-year overall survival (OS) of patients with radiologically solid tumors (≤20 mm, 83%; 21–30 mm, 75.4%; 31–50 mm, 56.2%; ≥51 mm, 45.3%; P<0.0001). In contrast, the tumor size did not influence the 5-year OS of patients with radiologically pure GGOs (100%, regardless of the tumor size) or part-solid tumors (≤20 mm, 97.7%; 21–30 mm, 94.6%; 31–50 mm, 93.4%; P=0.1028). In addition, the size of the solid component and CTR were not associated with OS in patients with part-solid tumor. They therefore concluded that the impact of maximum tumor size should only be applied to radiologically solid lung cancer (1).

It has been demonstrated that lung adenocarcinomas that exhibit part-solid nodules with a proportion of GGOs tend to be less invasive than solid tumors of the same size (2,3). Several authors have also demonstrated that the solid-area diameter without GGOs on HRCT is a more effective measurement of tumor nodules for predicting the prognosis of patients with NSCLC (4-8). Tsutani *et al*. reported that the solid tumor size on high-resolution CT had greater value for predicting high-grade malignancy and the prognosis in clinical stage IA lung adenocarcinoma (6,7). Kudo *et al*. reported that the CTR and consolidation size were important for predicting the pathological invasion factor and for diagnosing invasive adenocarcinoma in part-solid tumors (8). Recently, Takenaka *et al*. reported a retrospective study that drew attention to the tumor volume in NSCLC (9). According to the report, the whole tumor volume and the solid part volume were correlated with DFS in patients with surgically resected clinical stage IA NSCLC. In addition, the solid part volume was much better for predicting the prognosis than the tumor size, the whole tumor size and CTR. As mentioned above, many previous reports have suggested the adverse impact of the solid part of tumors on the prognosis in solid or part solid lung cancer (2-9). On the other hand, most previous studies evaluated the impact of the whole tumor size, consolidation size and CTR on the prognosis together with all types of CT findings (2-7,9).

In this study, the authors divided the patients into three groups based on the radiological findings and then calculated the OS separately for each of the groups. This was the strong point of the study. In addition, the number of enrolled patients was relatively larger and analyses were more detailed in comparison to previous studies. On the other hand, the surprising conclusions that were drawn in this study raise some concerns. First, while there were no statistically significant correlations among the CTR, tumor size and OS in part-solid tumors, the 5-year OS were decreased with an increase in the tumor size (≤20 mm, 97.7%; 21–30 mm, 94.6%; 31–50 mm, 93.4%) or CTR (0<CTR≤0.50, 98.4%; 0.50<CTR<1.0, 95.0%), respectively.

Furthermore, lymphatic or vascular invasion was observed significantly more frequently in solid-dominant tumors (0.50<CTR<1.0) which were more frequently pathologically up-staged than the GGO-dominant tumors (0<CTR≤0.50). Only 7 (3.7%) patients in the GGO-dominant groups were pathologically up-staged. In contrast, 87 patients (31.4%) in the solid-dominant group were up-staged. In addition, postoperative chemotherapy was administered to 12.8% of the GGO-dominant patients and 24.5% of the solid-dominant patients. Based on these results, there were significant correlations between recurrence-free survival and whole tumor size or CTR (1). According to the results, the authors should not easily conclude that neither maximum tumor size nor the solid component size is prognostic in patients with part-solid lung cancer.

One reason for the difference between recurrence-free survival and OS may be derived from the follow-up in this study. According to the report, the study population included patients who were treated from January 2008 to April 2013; the median follow up time was 43 months. Less than 3 years have passed since the last patient was followed in this study. Advances in chemotherapy have great improved post-recurrent survival. The median duration of post-recurrence survival has been reported to be 22.5–43.6 months (10-12). In particular, the median duration of post-recurrence survival in *EGFR*-mutation positive patients who receive EGFR-TKI therapy is reported to be 49 months (10). Moreover, more than 25% of the patients with part-solid GGO can receive the benefits of EGFR-TKI therapy after recurrence (13). Thus, when considering the OS among patients with surgically resected NSCLC, a much longer follow-up period may be necessary to clarify the actual relationships.

Another concern is how to handle tumors that cannot easily be classified according to the CT findings (such as consolidation and GGO) due to inflammation of the background lung or a scattered distribution, or other reasons. Actually, the authors previously reported that it was difficult to measure GGOs due to a scattered distribution in 12.4% of lung cancer patients (14). The authors evaluated scattered consolidation tumors as a new category of lung cancer according to the thin-section CT findings and reported outcome of those tumors was favorable (14). On the other hand, the authors did not mention such tumors in the present study (1).

In conclusion, Hattori *et al*. offered new insight into the diagnosis and prognosis of lung cancer. Further clinical studies using large cohorts, such as a national database are warranted to establish a new T category of lung cancer that more accurately reflects the prognosis than the whole tumor size.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned and reviewed by the Section Editor Chengwu Liu (Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China).

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/vats.2016.08.08). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Hattori A, Matsunaga T, Takamochi K, et al. Neither Maximum Tumor Size nor Solid Component Size Is Prognostic in Part-Solid Lung Cancer: Impact of Tumor Size Should Be Applied Exclusively to Solid Lung Cancer. Ann Thorac Surg 2016;102:407-15.
2. Matsuguma H, Oki I, Nakahara R, et al. Comparison of three measurements on computed tomography for the prediction of less invasiveness in patients with clinical stage I non-small cell lung cancer. Ann Thorac Surg 2013;95:1878-84.
3. Tsutani Y, Miyata Y, Yamanaka T, et al. Solid tumors versus

mixed tumors with a ground-glass opacity component in patients with clinical stage IA lung adenocarcinoma: prognostic comparison using high-resolution computed tomography findings. J Thorac Cardiovasc Surg 2013;146:17-23.
4. Maeyashiki T, Suzuki K, Hattori A, et al. The size of consolidation on thin-section computed tomography is a better predictor of survival than the maximum tumour dimension in resectable lung cancer. Eur J Cardiothorac Surg 2013;43:915-8.
5. Nakamura S, Fukui T, Taniguchi T, et al. Prognostic impact of tumor size eliminating the ground glass opacity component: modified clinical T descriptors of the tumor, node, metastasis classification of lung cancer. J Thorac Oncol 2013;8:1551-7.
6. Tsutani Y, Miyata Y, Nakayama H, et al. Prognostic significance of using solid versus whole tumor size on high-resolution computed tomography for predicting pathologic malignant grade of tumors in clinical stage IA lung adenocarcinoma: a multicenter study. J Thorac Cardiovasc Surg 2012;143:607-12.
7. Tsutani Y, Miyata Y, Nakayama H, et al. Solid tumor size on high-resolution computed tomography and maximum standardized uptake on positron emission tomography for new clinical T descriptors with T1 lung adenocarcinoma. Ann Oncol 2013;24:2376-81.
8. Kudo Y, Matsubayashi J, Saji H, et al. Association between high-resolution computed tomography findings and the IASLC/ATS/ERS classification of small lung adenocarcinomas in Japanese patients. Lung Cancer 2015;90:47-54.
9. Takenaka T, Yamazaki K, Miura N, et al. The Prognostic Impact of Tumor Volume in Patients with Clinical Stage IA Non-Small Cell Lung Cancer. J Thorac Oncol 2016;11:1074-80.
10. Takenaka T, Takenoyama M, Yamaguchi M, et al. Impact of the epidermal growth factor receptor mutation status on the post-recurrence survival of patients with surgically resected non-small-cell lung cancer. Eur J Cardiothorac Surg 2015;47:550-5.
11. Takahashi Y, Horio H, Hato T, et al. Predictors of post-recurrence survival in patients with non-small-cell lung cancer initially completely resected. Interact Cardiovasc Thorac Surg 2015;21:14-20.
12. Song IH, Yeom SW, Heo S, et al. Prognostic factors for post-recurrence survival in patients with completely resected Stage I non-small-cell lung cancer. Eur J Cardiothorac Surg 2014;45:262-7.
13. Hsu KH, Chen KC, Yang TY, et al. Epidermal growth factor receptor mutation status in stage I lung adenocarcinoma with different image patterns. J Thorac Oncol 2011;6:1066-72.
14. Matsunaga T, Suzuki K, Hattori A, et al. Lung cancer with scattered consolidation: detection of new independent radiological category of peripheral lung cancer on thin-section computed tomography. Interact Cardiovasc Thorac Surg 2013;16:445-9.

doi: 10.21037/vats.2016.08.08
Cite this article as: Takenaka T, Miura T, Yamazaki K, Takeo S. Impact of whole tumor size in part-solid non-small cell lung cancer. Video-assist Thorac Surg 2016;1:21.

