Lung Cancer Growth Curves Based on CT Imaging

To the Editor:

We read with interest the recent article in CHEST (December 2009) by Lindell et al 1 in which the authors state that this “study is the only one to have evaluated growth curves of lung cancers using multiple CT scans.” We would like to point out our previously published article one to have evaluated growth curves of lung cancers using multiple measurement using automatic segmentation and direct volume determination. 2 Their article’s focus was on volume determination methods, whereas our article in a recent issue of CHEST (December 2009) 3 was on the lack of exponential growth of a subset of lung cancers as shown by growth curves and the implications that this could have on prior studies that advocated using two volume measurements to determine volume doubling time. While their study did include growth curves for 20 lesions, only 13 of those were lung cancers, and although it is difficult to be sure from their growth curves, it appears that most, if not all, of their lung cancers were followed with only three CT scan exams. An early criticism of our manuscript during peer review was that it would be difficult to prove or exclude exponential growth based on only three data points, and it was recommended that we include only cases with at least four CT scan exams. Therefore, although Quint and colleagues did generate growth curves, it is our position that based on peer review feedback they did not plot their study to have undergone resection and were therefore not included.

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References


Response

To the Editor:

I would like to thank Quint et al and Kakinuma et al for their letters and making us aware of the article by Quint et al titled “Lung Lesion Doubling Times: Values and Variability Based on Method of Volume Determination.” 2 Their article’s focus was on volume determination methods, whereas our article in a recent issue of CHEST (December 2009) 3 was on the lack of exponential growth of a subset of lung cancers as shown by growth curves and the implications that this could have on prior studies that advocated using two volume measurements to determine volume doubling time. While their study did include growth curves for 20 lesions, only 13 of those were lung cancers, and although it is difficult to be sure from their growth curves, it appears that most, if not all, of their lung cancers were followed with only three CT scan exams. An early criticism of our manuscript during peer review was that it would be difficult to prove or exclude exponential growth based on only three data points, and it was recommended that we include only cases with at least four CT scan exams. Therefore, although Quint and colleagues did generate growth curves, it is our position that based on peer review feedback they did not plot their study to have undergone resection and were therefore not included.

The differing results regarding exponential growth are interesting but perhaps somewhat explainable by our prospective screening method and different inclusion criteria. Compared with our study, our study’s criteria resulted in a population of lung cancers with a smaller initial size (none > 8 mm vs a mean of 11-17 mm) and slower growth (volume doubling time mean of 771 days vs a mean range of 58-128 days) that were followed on more CT scan exams for a longer period of time (mean 1,025 days, median 1,051 days, range 404-1,666 days, or 55.5 months if assuming 30 day mo, vs a mean of 227 days, median 154 days, range 6 days-34.5 months). Since their study was retrospective and only included lesions with a histologic diagnosis, they selected for a different set of cancers. Cancers with a slower growth rate may not have changed sufficiently during the course of their study to have undergone resection and were therefore not included.

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