

AbstractID: 3569 Title: Observer Evaluation of Semi-Automated Mesothelioma Measurements

Purpose: Accurate quantification of malignant pleural mesothelioma tumor burden is essential for proper patient management and for the conduct of clinical trials. Although manual measurement of tumor thickness on computed tomography (CT) scans is the current clinical standard for assessing response to therapy, this approach is tedious and time-consuming. We have developed semi-automated methods to quantify the extent of mesothelioma on CT scans, and we have assessed the performance of these methods through an observer evaluation study.

Method and Materials: Given a user-specified point along the outer margin of the tumor in a CT section, the computer automatically identifies a corresponding point along the inner margin of the tumor and displays a line segment between the user-specified outer tumor margin point and the computer-identified inner tumor margin point. The length of this line segment represents tumor thickness. Three observers independently reviewed semi-automated measurements (i.e., line segments and their corresponding lengths) generated by three different algorithms at a fixed set of 134 measurement sites in the CT scans of 22 mesothelioma patients. These algorithms are based on morphological characteristics of the automatically segmented lung regions. Observers had the opportunity to accept a measurement or to modify it through a computer interface. Differences between the initial semi-automated measurements and the measurements as modified by the observers were analyzed.

Results: The frequency with which observers accepted the semi-automated measurements without modification was as high as 86%. Of all measurements across all observers and methods (1206 measurements), 89% were changed by less than 2 mm.

Conclusion: We expect these promising computerized methods to become important components of clinical protocols for mesothelioma by making the quantification of tumor extent more efficient and consistent.

Conflict of Interest (only if applicable): SGA and HM hold warrants to shares of R2 Technology, Inc. (Sunnyvale, CA).