

# Factors influencing conformity index in radiotherapy for non-small cell lung cancer

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Corrected Proof

## Abstract

The radiotherapy conformity index (CI) is a useful tool to quantitatively assess the quality of radiotherapy treatment plans, and represents the relationship between isodose distributions and target volume. A conformity index of unity implies high planning target volume (PTV) coverage and minimal unnecessary irradiation of surrounding tissues. We performed this analysis to describe the CI for lung cancer 3-dimensional conformal radiotherapy (3DCRT) and to identify clinical and technical determinants of CI, as it is not known which factors are associated with good quality 3D conformal radiotherapy treatment planning. Radiotherapy treatment plans from a database of 52 patients with inoperable Stage 1 to 3b lung cancer, on a hypofractionated 3DCRT trial were evaluated. A CI was calculated for all plans using the definition of the ICRU 62:  $CI = (TV/PTV)$ , which is the quotient of the treated volume (TV) and the PTV. Data on patient, tumor, and planning variables, which could influence CI, were recorded and analyzed. Mean CI was 2.01 (range = 1.06-3.8). On univariate analysis, PTV ( $p = 0.023$ ), number of beams ( $p = 0.036$ ), medial vs. lateral tumor location ( $p = 0.016$ ), and increasing tumor stage ( $p = 0.041$ ) were associated with improved conformity. On multiple regression analysis, factors found to be associated with CI included central vs. peripheral tumor location ( $p = 0.041$ ) and PTV size ( $p = 0.058$ ). The term 3DCRT is used routinely in the literature, without any indication of the degree of conformality. We recommend routine reporting of conformity indices. Conformity indices may be affected by both planning variables and tumor factors.

**Key Words:** [Lung cancer](#), [Radiotherapy](#), [Conformity index](#)

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