

## Estimation of Lungs Physiological Motion for Patient Undergoing External Lung Irradiation

**Authors :** Yousif Mohamed Y. Abdallah

**Abstract :** This is an experimental study deals with detection, measurement and analysis of the periodic physiological organ motion during external beam radiotherapy; to improve the accuracy of the radiation field placement, and to reduce the exposure of healthy tissue during radiation treatments. The importance of this study is to detect the maximum path of the mobile structures during radiotherapy delivery, to define the planning target volume (PTV) and irradiated volume during both inspiration and expiration period and to verify the target volume. In addition to its role to highlight the importance of the application of Intense Guided Radiotherapy (IGRT) methods in the field of radiotherapy. The results showed (body contour was equally  $(3.17 + 0.23 \text{ mm})$ , for left lung displacement reading  $(2.56 + 0.99 \text{ mm})$  and right lung is  $(2.42 + 0.77 \text{ mm})$  which the radiation oncologist to take suitable countermeasures in case of significant errors. In addition, the use of the image registration technique for automatic position control is predicted potential motion. The motion ranged between 2.13 mm and 12.2 mm (low and high). In conclusion, individualized assessment of tumor mobility can improve the accuracy of target areas definition in patients undergo Sterostatic RT for stage I, II and III lung cancer (NSCLC). Definition of the target volume based on a single CT scan with a margin of 10 mm is clearly inappropriate.

**Keywords :** respiratory motion, external beam radiotherapy, image processing, lung

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