Deep Inspiration Breath Hold (DIBH) is currently a standard practice to protect the heart during left breast radiotherapy. The increased lung volume pushes the heart in the opposite direction of the breast. This mechanical effect drives the heart away from the irradiated volume. Different systems are used to manage this breathing maneuver which are based on surrogates. The spirometric method offers a guaranty of inspired air volume reproducibility. However, a question remains about the heart position reproducibility.

Purpose and Objective

Material and Methods

The breast radiotherapy is driven with the help of the SDX/DYN'R spirometer and video feed back assisting the patient to provide a deep inspiration breath hold during each imaging and delivery phase.

Results

The measurements were obtained with the graphic rule on a stretched image area over the entire screen. The manual use of the graphic rule was evaluated with a potential error of less than 2mm due to the mouse tool and the blurred edge of each anatomy image.

The mean / maximum heart position variation in the middle heart head-feet image was 0.36 / 0.51 cm. At the inferior breast gland limit we measured 0.32 / 0.52 cm and on the third position feet direction 0.30 / 0.58 cm.

CONCLUSION

The heart position reproducibility during spirometric DIBH radiotherapy is fully acceptable. These results can be used to take into account the dosimetric effect in the dose gradient area on the heart edge. However, only the maximum dose can be evaluated as the mean dose would need a CB-CT and a deformable heart image process.