Narodowy Instytut Onkologii
im. Marii Skłodowskiej–Curie
Państwowy Instytut Badawczy
Oddział w Gliwicach

E.Telka[1], B.Jochymek[1], J.Huszno[1], K.Szczepanik[1], D.Krok[2]

1.National Institute of Oncology, National Institute of Research, branch Gliwice, Department of Radiotherapy, Poland
2. Opole University, Institute of Psychology, Poland

Comparison of dose distribution in the postoperative breast cancer patients irradiated with the technique of Deep Inspiratory Breath Hold and dynamic techniques

Breast cancer is the most common cancer in women in Poland. In patients with cancer located on the left side, breast radiotherapy is associated with the irradiation of part of the heart. It was calculated that for every 1 Gy dose of radiation deposited in the heart, the risk of heart complications increases by 7.4%.

Material and method

The subject of analysis was a group of 50 patients treated in the National Institute of Oncology, Department of Radiotherapy, Gliwice from June 2018 to December 2019. The age of patients ranged from 30 to 70 (median 63 years). All patients were after surgeries (38 patients after BCT with SNB and 12 patients after left breast amputation). All patients were additionally irradiated using Deep Inspiratory Breath Hold technique. Dose distributions per heart and lungs were compared in IMRT, Rapid Arc, and DIBH techniques. Radiation complications from the skin were assessed according to WHO scale.

Results

In all irradiated patients the dose distribution in the technique on suspended inhalation was better compared to the dynamic IMRT and Rapid Arc techniques, with dose reduction per heart by about 10-15% and per lung from 5 to 10%. No higher than II degree of acute and late skin reaction in the DIBH technique was observed in comparison with dynamic techniques.
(Figure 1).

Conclusions

1) Deep Inspiratory Breath Hold technique is a simple non-invasive method which effectively reduces the dose of radiation absorbed by the heart muscle.
2) Irradiation of patients with deep inspiratory allows a reduction of the lungs dose by about 5-10 %.
3) The technique of irradiation of patients during deep inspiratory is a simple, non-invasive method of treatment of patients reducing the risk of radiation complications from the heart and the lungs in comparison with dynamic, IMRT, and Rapid Arc techniques.\

Figure 1. Comparison two technics od radiotherapy-DIBH (purple line) and dynamic IMRT(blu line) – reduction of the lung dose with DIBH about 7%