Service Priorities and Programmes

Electronic Presentations

Convention ID: 1027
Submitting author: Mr Ka Ho TSE
Post title: Radiation Therapist I, Pamela Youde Nethersole Eastern Hospital

A Comparison of Contralateral Breast Dose from Primary Breast Radiotherapy using Different Treatment Techniques

Tse KH (1), Cheng CYH (2), Chow MKA (3)
(1) Department of Clinical Oncology, Pamela Youde Nethersole Eastern Hospital, (2) Oncology Centre, St. Teresa's Hospital, (3) Department of Clinical Oncology, Queen Mary Hospital

Keywords:
Contralateral breast dose
Radiotherapy

Introduction

Because of the proof of equivalent efficacy between breast-conserving therapy (BCT) plus radiotherapy and mastectomy, more patients received breast irradiation during the past three decades. Radiotherapy treatment techniques also advanced from conventional wedged technique to intensity modulated radiotherapy (IMRT). Regardless of the treatment techniques, peripheral dose to the contralateral breast is inevitable.

Objectives

To compare the contralateral breast dose from the primary breast irradiation using various radiotherapy treatment techniques and types of shielding.

Methodology

Six treatment plans by different treatment techniques, including paired physical wedges (PW-P), a lateral physical wedge only (PW-L), paired enhanced dynamic wedges (EDW-P), a lateral enhanced dynamic wedge only (EDW-L), field-in-field tangential opposing (TO-FiF), and inverse-planned intensity modulated radiotherapy (IMRT-IP), were generated using a female Rando phantom. The phantom was treated by all plans, and 15 metal oxide semiconductor field effect transistor (MOSFET) detectors on the surface and inside the contralateral breast were utilized for measuring the contralateral breast dose for each plan. Measurement was repeated with the application of 0.2, 0.3 and 0.5 cm lead sheets or 0.5 and 1 cm superflab (SF) on the TO-FiF to demonstrate the effect of shielding on the contralateral breast dose.

Result

The measured contralateral breast doses were: 2.05 Gy for PW-P, 1.44 Gy for PW-L,

1.51 Gy for EDW-P, 1.52 Gy for EDW-L, 1.25 Gy for TO-FiF, and 1.17 Gy for IMRT-IP, corresponding to 2.35% to 4.11% of total dose. For the addition of shielding, the doses were: 1.25 Gy for no shielding, 0.65 Gy for 0.2 cm lead, 0.61 Gy for 0.3 cm lead, 0.49 Gy for 0.5cm lead, 0.76 Gy for 0.5 cm SF, and 0.72 Gy for 1 cm SF. All techniques showed that the surface dose was much higher than the dose at depth, and the dose dropped exponentially from the surface to the internal. To conclude, contralateral breast dose can be lowered by using TO-FiF or IMRT-IP, as well as by adding either lead or SF shielding. Thus it is recommended that TO-FiF or IMRT-IP with lead or SF shielding is applied for clinical practice to achieve a better treatment outcome.