

Incidental Dose to Ipsilateral and Contralateral Internal Mammary Chain by Partial Tangential Arc Technique: A Single Institutional Analysis in Breast Cancer Patients



Madam — Internal mammary irradiation has been a much-debated aspect of breast cancer radiotherapy [1–5]. Between January 2013 and December 2016, 46 consecutive breast cancer patients were treated using partial volumetric modulated arc therapy (VMAT) tangential arcs for whole breast/chest wall [6]. The internal mammary vessels (with 0.5 cm radial margin) were contoured from the superior aspect of the medial first rib to the cranial aspect of the fourth rib, on both the ipsilateral and the contralateral side to generate the internal mammary volume [7]. Typically, 30 degree bitangential arcs were used. The incidental dose received by the internal mammary volume was calculated both on the ipsilateral as well as the contralateral side. The mean \pm standard deviation dose for the ipsilateral internal mammary chain (IMC) was 1374.63 ± 1062.59 cGy, whereas the mean \pm standard deviation dose for the contralateral IMC was 220.36 ± 301.87 cGy. There was no significant dose difference between left-sided and right-sided treatments for the ipsilateral IMC dose (1429.22 ± 965.88 cGy versus 1315.08 ± 1155.99 cGy, respectively, $P = 0.396$). Also, there was no statistical difference between patients of left- or right-sided treatments for contralateral IMC dose (284.79 ± 383.16 cGy versus 150.08 ± 144.59 cGy, respectively, $P = 0.084$).

A study of 112 patients delivered over 5 weeks with tangential fields reported mean doses to IMC after modified radical mastectomy, modified radical mastectomy with immediate reconstruction and breast conservative surgery as 30.34, 30.26 and 18.67 Gy, respectively [8]. Another study using two- and three-dimensional techniques reported the mean dose to the ipsilateral IMC as 7.93 Gy in the two-dimensional cohort, compared with 20.64 Gy in the three-dimensional cohort [9]. In a more recent study, computed tomography-based three-dimensional conformal treatment plans of 25 left and 25 right breast patients were included [10]. The mean IMC dose for all patients was 30.49 Gy (range 2.18–52.22 Gy, standard deviation 16.55).

Our study has found that lower doses of radiotherapy were being received by patients as compared with other series in the literature, probably because of VMAT arc planning [9,10]. This will probably have implications in planned IMC radiotherapy in breast cancer cases. Also, the low doses received by the IMC will probably be of significance for future internal mammary vessel use in ischaemic heart disease patients.

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