Introduction

Since Bayle et al. reported organizing pneumonia (OP) after radiotherapy for breast conservation surgery in 1995 [1], many cases have been reported both domestically and in the international literature. However, there have been only three reports on OP after bilateral breast irradiation including the present patient [2, 3]. Although prednisolone is usually effective for OP after irradiation and good outcomes can be expected, attention is warranted since one case requiring mechanical ventilation management was also reported [4]. The authors herein report a patient with bilateral OP occurring after simultaneous bilateral breast irradiation.

Case Report

The patient was a 45-year-old woman with a history of right ovarian cyst surgery and a family history of breast cancer (her mother). Breast cancer screening revealed an abnormality and she was diagnosed with bilateral breast cancers based on extensive testing. The clinical stage of the right breast cancer was cT1aN0M0, Stage IA, and the histopathology was luminal A type. The clinical stage of the left breast cancer was cTisN0M0, Stage 0. Bilateral breast conservation surgery was conducted for these breast tumors. The right breast cancer was diagnosed as an infiltrating ductal carcinoma (pT2N1aM0, Stage IIb), the left as lobular carcinoma in situ (pTisN0M0, Stage 0) postoperatively. A metastasis was detected in a sentinel lymph-node during surgery, and dissection of axillary lymph nodes was thus additionally performed. There were no other metastases. Postoperative chemotherapy was not administered as the patient refused this option. The authors thus opted for radiotherapy and decided to irradiate both breasts to prevent postoperative recurrence, as microinvasion was preoperatively suspected in the left breast. Irradiation was started approximately two months after surgery, and tangential irradiation to both breasts (Figure 1) was performed at 2 Gy per fraction for a total of 50 Gy. Radiotherapy was administered using a 4-MV X-ray two parallel opposing tangential beams using field-in-field techniques. The patient received standard conformal radiotherapy. Concomitant hormone therapy was not given during the irradiation period. Only grade 1 NCI-CTC (National Cancer Institute-Common Terminology Criteria, Version 4.0) [5] dermatitis was observed as an acute-phase adverse event during the irradiation period. At the follow-up examination one month after irradiation, the patient exhibited no particular changes in physical condition, and the dermatitis had nearly resolved. However, 2.5 months after irradiation, she visited the hospital due to having become febrile with temperatures of 38°C or higher and having a dry cough 2.5 months after irradiation. CT revealed infiltrative changes with air bronchograms that corresponded to the irradiated field on the ventral sides of both lungs, as well as infiltration and ground-glass opacities that did not correspond to the irradiated field, and appeared to be spreading into areas adjacent to the infiltration in the irradiation fields. Conclusions: Meticulous follow-up appears to be necessary for patients receiving simultaneous bilateral breast irradiation because there is a possibility that irradiation-induced lesions will temporarily spread extensively.

Key words: Organizing pneumonia; Radiotherapy; Adverse events; Breast cancer.
dry cough. Chest radiography revealed infiltrative changes in the middle and lower lobes of both lungs. CT performed on the same day showed infiltrative changes with air bronchograms that corresponded to the irradiated fields on the ventral sides of both lungs, as well as infiltration and ground-glass opacities that did not correspond to the irradiated fields and appeared to be contiguous parts of the infiltration observed in the irradiated fields (Figure 2). The authors diagnosed post-radiotherapy OP since influenza and mycoplasma test results were negative; radiation pneumonitis was suspected considering the time that had elapsed since radiotherapy, and the lesions showed involvement outside of the irradiated fields as well. These lesions were bilateral and thus observed in a wide area. Administration of prednisolone (20 mg/day) was initiated because the patient suffered from respiratory discomfort. Respiratory symptoms showed rapid improvement after administration of prednisolone, as did the infiltration, leading to a gradual tapering of the prednisolone dose (Figure 3). No recurrence due to dose reduction was observed, and exacerbation of respiratory syndromes was not observed after discontinuation of prednisolone. Although limited evidence of a new occurrence of pneumonia was seen on the CT images obtained after prednisolone discontinuation, the patient was followed up instead of restarting drug administration, as the existing pneumonia had resolved. Respiratory symptoms showed no exacerbation and resolution of the pneumonia was subsequently seen on CT images. She is currently receiving follow-up care.

All clinical procedures were performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from the patient for publication of this original article and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal. All data generated or analyzed during this study are included in this published article.

Discussion

Radiation pneumonitis quite often develops after breast radiotherapy, including minute changes on CT images, but pneumonitis with respiratory symptoms is rare. The incidence of symptomatic pneumonia after breast-conserving therapy is reportedly 2 to 5.5% [6-8]. For tangential breast irradiation, there is no problem if the radiation pneumonitis is confined to changes in the irradiated field, while occurrence outside of the irradiated field is a matter of clinical concern.

This phenomenon is reported as radiation-induced OP similar to bronchiolitis obliterans organizing pneumonia, as well as cryptogenic organizing pneumonia and incidence rates are 1.8-2.5% [9-11]. In the present case, infiltrative changes emerged mainly in the irradiated field after both breasts had been simultaneously irradiated following breast conservation surgery. The bilateral infiltrative changes manifested during the same period and the CT images showed both to be spreading beyond the irradiated fields in a similar way in the right and left lungs. The times of occurrence range from during irradiation to 12 months after completing irradiation, which is a long post-treatment period, but these changes generally occur in three to six months [9-12]. The present case experienced a course largely similar to that of patients described in past reports. OP development after radiotherapy is considered to be associated with immunological responses, but the mechanisms are still not fully understood [13]. There is also a report describing occurrence as being associated with age, concomitant hormone therapy, and smoking [14]. The present patient’s history included none of these possibly associated factors.

With regards to the treatment of OP developing after breast radiotherapy, spontaneous resolution without pred-
Simultaneous irradiation is necessary if, for compelling clinical reasons, bilateral breast irradiation is performed in one session. In conclusion, OP patients generally have good outcomes after breast radiotherapy. However, close follow-up is necessary for patients receiving simultaneous bilateral breast irradiation because there is a possibility of pulmonary lesions temporarily undergoing extensive spreading.

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**References**


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