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Radiation-Induced Right Pectoralis Muscle Sarcoma after Breast Cancer: Case Report and Review of the Literature

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Abstract | **Case Report**

Radiation-induced sarcoma of the breast is a rare but serious complication of radiation therapy for breast cancer. Although the risk of this complication is low, patients who have undergone radiation therapy for breast cancer should have regular follow-up to detect any signs of new tumor or recurrence. Imaging tests such as CT or MRI can be used to screen for radiation-induced sarcoma. If radiation-induced sarcoma is detected, the recommended treatment includes complete surgical removal followed by postoperative radiation therapy.

Keywords: Radiation-induced sarcoma, breast cancer, women, mastectomy.

INTRODUCTION

Breast cancer is the most common cancer in women worldwide. Treatments such as radiation therapy are commonly used to eliminate cancer cells. However, there are risks associated with these treatments, including the development of radiation-induced sarcoma [1]. In this article, we report a case of radiation-induced sarcoma of the right pectoral muscle in a 55-year-old female patient who had undergone surgery for right breast cancer.

CASE REPORT

A 55-year-old woman was diagnosed with stage II right breast cancer. She underwent a modified radical mastectomy followed by adjuvant radiation therapy. The total radiation dose was 50 Gy administered in 25 fractions over five weeks. After seven years of follow-up without recurrence, the patient developed chest pain and a palpable mass in the right upper chest wall. A thoracic CT scan was performed and revealed a well-limited nodular formation of roughly oval shape at the right pectoralis minor muscle with spontaneous contrast isodense homogeneously enhanced after PDC injection measuring 34 x 14 mm (Fig 1).

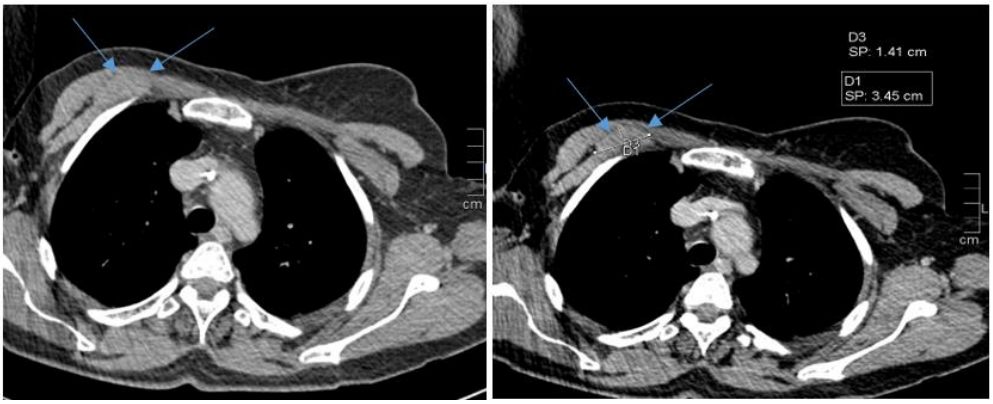

Figure 1: Spiral acquisition in axial sections at portal time showing a well-limited nodular formation of roughly oval shape at the right pectoralis minor muscle (blue arrow), homogeneously enhanced after PDC injection measuring 34 x 14 mm

Excision was performed (Fig 2) with study of the specimen which revealed a radiation-induced sarcoma. Radiation-induced sarcoma is a malignant tumor that occurs in irradiated tissue after a long period of time following exposure to ionizing radiation [2]. It is known to be rare, but is considered a serious complication of radiation therapy. Radiation-induced sarcoma can occur in different tissues, including bone tissue, connective tissue, and muscle tissue. In our patient's case, the radiation-induced sarcoma developed in the right pectoral muscle.

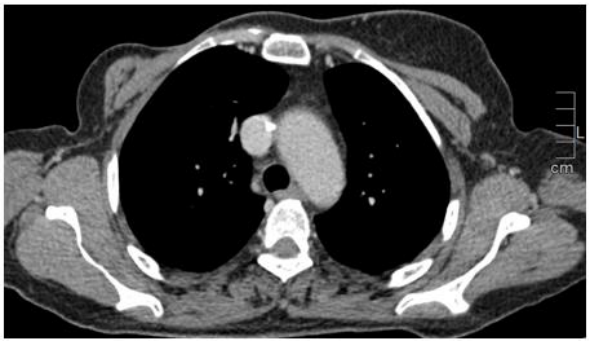

Figure 2: monitoring after surgical exeresis: absence of recurrence of the right intermuscular nodular formation

DISCUSSION

Radiation therapy is an important modality in the treatment of breast cancer [3]. However, the risk of developing a radiation-induced tumor is one of the most serious and rare side effects of this therapy [1]. Radiation-induced sarcoma of the breast is a rare but serious complication that can occur several years after the initial radiation therapy [4, 5]. According to a long-term follow-up study of 2,000 breast cancer patients treated with radiation therapy, the risk of developing radiation-induced sarcoma is 0.5% to 1% after 10 years of follow-up [6]. 6] However, the risk seems to increase with the dose of radiation therapy and the length of follow-up. The recommendations for adjuvant therapy of breast cancer, published in 2000 by the Consensus Development Conference Statement, emphasize the importance of long-term follow-up of patients after radiation therapy [3]. Patients should be informed of the risks associated with this therapy and should be monitored regularly for signs of new tumor or recurrence [6].

The literature review by Seinen et al. emphasized that although the risk of radiation-induced sarcoma is low, it is important to monitor patients who have undergone radiation therapy for signs of this complication [6]. Imaging studies, such as computed tomography (CT) or MRI, can be used to screen for radiation-induced sarcoma. However, there are no specific imaging criteria [7, 8].

The lesions found after irradiation are often non-specific and require a comparison between the location of the images found and the volumes irradiated. An anatomic and clinical comparison is essential. On the other hand, the appearance of lesions suggestive of a sarcoma must always be confirmed histologically [9]. CT exploration of a tumor mass is indicated in the extension assessment (thoracic CT). The limitations of this technique are related to the poor delineation of the tumor in relation to muscle and fascia structures, the poor ability to differentiate the different intratumoral components and the density artifacts at the bone-soft tissue interfaces [10]. CT is necessary in case of suspicion of sarcoma developed in irradiated territory

Treatment of radiation-induced sarcoma depends on several factors, including tumor location, tumor size, and extent of disease. Recommendations for the treatment of radiation-induced sarcoma include complete surgical excision with adequate safety margins, followed by postoperative radiation therapy when the quality of excision is not satisfactory [1]. Radiotherapy is used in 10% to 20% of cases [11, 12], with highly variable doses, taking into account the history of irradiation, the site and the organs at risk in the vicinity.

In our patient's case, surgical resection of the tumor was performed followed by adjuvant radiotherapy. Chemotherapy was not given because the tumor was small and had been completely excised. The patient is currently in remission with no evidence of recurrence.

CONCLUSION

Radiation-induced sarcoma is a rare but potentially serious complication of radiation therapy. Patients with breast cancer who have been treated with radiotherapy should be informed of the associated risks and monitored regularly. Treatments should be tailored to the individual case. Close monitoring is necessary to detect any signs of new tumor or recurrence.

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