Austin Journal of Medical Oncology

Open Access

Austin Publishing Group

Case Report

Massive Dystrophic Calcification after Radiofrequency Ablation for Breast Cancer

Oura S* and Makimoto S
Department of Surgery, Kishiwada Tokushukai Hospital, Kamori-cho, Kishiwada-city OSAKA, Japan
***Corresponding author:** Shoji Oura, Department of Surgery, Kishiwada Tokushukai Hospital, Kamori-cho, Kishiwada-city OSAKA, Japan

Received: November 13, 2020; **Accepted:** November 27, 2020; **Published:** December 04, 2020

Abstract

A 40-year-old woman underwent Radio Frequency Ablation (RFA) to her localized small breast cancer followed by radi-otherapy to the breast. Ablated tumor became smaller with a gradual increase in depth/width ratio over time and was gradually covered by dystrophic calcification, leading to the formation of a visible mass. Although the patient termi-nated the follow-up in ten years without any recurrence and major complications, the patient consulted us to evaluated the persistent visible mass 14 years after RFA. The patient requested us to resect the protruding and annoying mass with massive dystrophic calcifications on mammography. Pathological examination of the resected mass showed an oval mass, 23 mm in size, with fat necrosis and calcifications in the center encompassed by hyalinization with calcifica-tions and mild infiltration of lymphocytes. Physicians should pay much attention to the emersion of dystrophic calcifi-cations, leading to cosmetic deterioration on long-term follow-up. Exploration of measures to prevent dystrophic calci-fications should be warranted.

Keywords: Breast cancer; Dystrophic calcification; Radiofrequency ablation

Introduction

Non-surgical ablation, e.g. Radio Frequency Ablation (RFA) [1], has become a feasible alternative to surgery especial-ly in the treatment of hepatocellular carcinoma and attracts both the physicians and patients in the treatment of breast cancer. It is well known that RFA can bring about complete cell death including cancer to a certain extent according to the ablation procedures and the devices used for RFA. Insufficient tumor heating, however, is often observed when the tumor locates close to the major vessels, i.e. heat-sink effect. Due to the lack of major vessels in the breast parenchy-ma, RFA can deliver sufficient heat to the breast cancer presumably comparable to partial resection.

RFA without resection of the breast parenchyma including breast cancer strongly makes the patients imagine perfect cosmetic outcome. It, however, has gradually becoming apparent that, with the accumulation of RFA cases, cosmesis after RFA is not always excellent due to various factors. We herein report a case of breast cancer treated by RFA with a gradual emersion of massive dystrophic calcifications, leading to cosmetic deterioration with the long-term follow-up periods.

Case Report

A 40-year-old woman with a small breast tumor in the inner and lower quadrant of her right breast was referred to a university hospital in March 2006. Core needle biopsy showed the tumor to be luminal invasive ductal carcinoma. Due to the absence of extensive intraductal spread and daughter nodules on Magnetic Resonance Imaging (MRI), the pa-tient underwent RFA to the breast cancer using Cool-tip radiofrequency system with negative sentinel node biopsy. The patient further received radiotherapy to the breast and adjuvant tamoxifen for five years. The patient received semi-annual follow-up after the completion of adjuvant tamoxifen for five years. Ultrasound showed us that the ablated tumor, as the time passed, became better-demarcated, became smaller with gradual increase in depth/width ratios, had more cystic part, and bore more calcifications (Figure 1). On inspection, we could gradually confirm a visible and elastic solid mass, i.e. ablated tumor, especially in a spine position. She terminated the regular follow-up without any recur-rence in 2016. In 2020, the patient with the persistent visible breast mass (Figure 2a) consulted us due to the abnormal calcifications on screening mammography (Figure 2b). Although neither recurrence nor new primary breast cancer was detected, the patient requested us to remove the annoying persistent RFA-induced mass, leading to the tumorectomy under local anesthesia. Pathological examination showed an oval mass, 23 mm in size, with fat necrosis and calcifica-tions in the center encompassed by thick hyalinization with calcifications and mild infiltration of lymphocytes (Figure 3). The patient recovered uneventfully and returned to routine mammography screening.

Discussion

RFA naturally lacks surgical margins, suggesting impossible intra-operative and/or post-operative additive RFA or sur-gical resection. Under the careful selection of the patients with applicable images including MRI, local control has been generally speculated by postoperative MRI and ultrasonography instead of intra-operative and/or post-operative pathological margin check. Limited data [2,3] are available concerning local control of RFA cases without surgical re-section but show promising outcome despite relatively short follow-up periods.

Seki, et al. [4] reported that RFA damage well correlated with pyknotic streaming nuclei, ill-defined intercellular bounda-ry, unclearness of nuclear and cytoplasmic texture details, and dense

Citation: Oura S and Makimoto S. Massive Dystrophic Calcification after Radiofrequency Ablation for Breast Cancer. Austin J Med Oncol. 2020; 7(2): 1053.

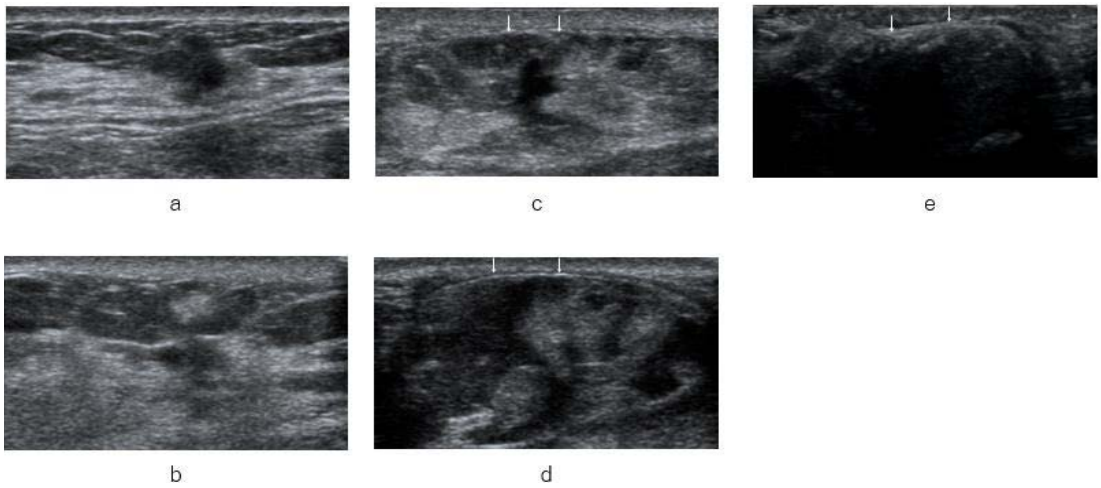

Figure 1: Ultrasonographic findings; a (before Radiofrequency Ablation; RFA): An ill-defined small tumor was observed in the mammary gland; b (two weeks after RFA): The ablated tumor in the obscured mammary gland textures was still visible on ultrasonogra-phy; c (12 months after RFA): Presumed cystic parts appeared in the tumor. Ablated margins were well demarcated with contiguous calcifications (arrows); d (31 months after RFA): Anterior margins (arrows) of the ablated tumor with more cystic parts got brighter than be-fore; e (14 years after RFA): The ablated tumor became smaller and oval with much calcifications (arrows).

Figure 2: Local findings and mammography; a: A mass was visible in the inner and lower quadrant of the breast; b: Oval and massive calcifications with a slight notch were observed.

homogenous and highly eosinophilic fibrous connective tissue on H.E.-staining. However, functional evaluation is much easier than morphological evaluation to evaluate thermal damage to the cancer cells. Therefore, nicotine amide adenine diaphorase staining has often been applied to evaluate the cancer cell viability through judging the mitochondrial function [5,6]. In this case, thermal damage to the cancer cells was easily recognized with the routine H.E.-staining due to complete disappearance of can-cer cells with a long-term follow-up period.

Ultrasound, in this case, showed that the ablated tumor became smaller with gradual increase in depth/width ratio over time. The higher depth/width ratios are often observed in breast reconstruction using silicone. Every living organism including a human being has a characteristic to minimize the contact area between the host and the foreign body. Sili-cone implant, therefore, is generally compressed in order to minimize the contact area between the silicone and host tissue, forming a possible spherical transformation and rippling, i.e. capsular contracture [7]. Ablated tumor itself is not a foreign body but should be gradually recognized as such. In addition, thermally damaged tumors have come to turn partially into fat necrosis, making the spherical transformation of the ablated tumor easier.

Breast surgeons should take the probability of emersion of dystrophic calcifications, a possible determinant for cos-metic deterioration, into consideration on applying RFA to breast cancer. In this case, cosmetic outcome was excel-lent at least for one year after RFA though the ablated invisible mass could be detected as a discrete mass on palpa-tion. BCT without any application of oncoplastic techniques can hardly offer excellent cosmesis to the patients with a breast cancer located in the inner and lower quadrant of the breast like this case. Non-surgical ablation seemed to be a feasible and ideal

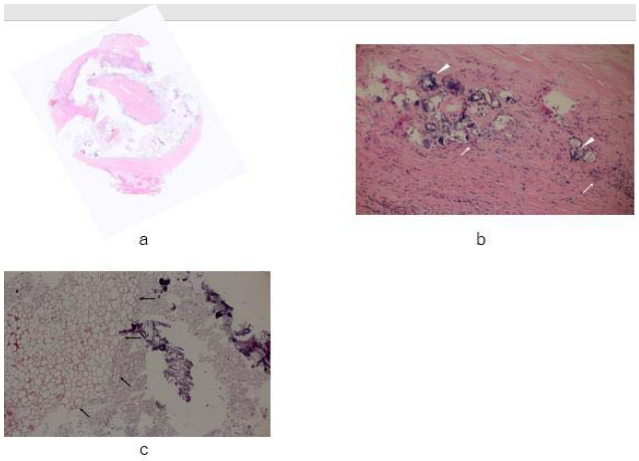

Figure 3: Pathological findings; a: Low magnified view well correlated to the ultrasonographic findings such as round shape and large cystic parts; b: Calcifications (arrow heads) and lymphocytic infiltrates (arrows) were observed in the hyalinized tissue; c: Massive fat necrosis (arrows) was also observed in the center of the ablated tumor.

approach to control such breast cancers. It, however, should be noted that the emersion of massive dystrophic calcifications could affect the long-term cosmesis of the breast after RFA.

In conclusion, RFA should become an important alternative to partial resection, at least for limited cases, in the treat-ment of breast cancer. Breast surgeons should note that RFA-induced massive dystrophic calcifications could affect the long-term cosmesis. It is necessary for breast surgeons to clarify which factors cause massive dystrophic calcifica-tions and how to prevent it.

References

1. Shiina S, Tateishi R, Arano T. Radiofrequency ablation for hepatocellular carcinoma: 10-year outcome and prognostic factors. Am J Gastroenterol. 2012; 107: 569-577.
2. Ito T, Oura S, Nagamine S. Radiofrequency Ablation of Breast Cancer: A Retrospective Study. Clin Breast Cancer. 2018; 18: e495-e500.
3. Oura S, Tamaki T, Hirai I. Radiofrequency ablation therapy in patients with breast cancers two centi-meters or less in size. Breast Cancer. 2007; 14: 48-54.
4. Seki K, Tsuda H, Iwamoto E. Histopathological effect of radio-frequency ablation therapy for primary breast cancer, with special reference to changes in cancer cells and stromal structure and a comparison with enzyme histochemistry. Breast Cancer. 2011; 18: 18-23.
5. Jeffrey SS, Birdwell RL, Ikeda DM. Radiofrequency Ablation of Breast Cancer. Arch Surg. 1999; 134: 1064-1068.
6. Tsuda H, Seki K, Hasebe T. A histopathological study for evaluation of therapeutic effects of radiof-requency ablation in patients with breast cancer. Breast Cancer. 2011; 18: 24-32.
7. Araco A, Caruso R, Araco F. Capsular contractures: a systematic review. Plast Reconstr Surg. 2009; 124: 1808-1819.