Radionecrosis 30 Years After Breast Cancer

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Abstract This report describes the case of a 70-year-old woman presenting to outpatient with a several-week history of a painful mass in her right breast, 30 years after her treatment for primary breast cancer. At first, this was suspected to have been a recurrence of her malignancy; however, repeated biopsies ultimately proved this to be negative. Her injury was actually a case of radiotherapy-induced necrosis (radionecrosis) and was subsequently treated with surgical debridement.

Keywords Radionecrosis · Breast cancer · Surgical debridement · HBOT · Hypoechoic lymph node · Pseudotumoural necrosis

Advancements in treatment options for breast cancer have meant that many patients are living longer with an increased quality of life. However, it is important to consider that in a subset of patients who have undergone breast conserving therapies, we need to be aware of long-term complications that may affect them other than the recurrence of cancer. This particular report is also of interest as no other case in the literature describes a presentation of radionecrosis as long as 30 years after the initial radiotherapy course.

Radionecrosis 30 Years After Breast Cancer

A 70-year-old Caucasian woman presented to the breast outpatient clinic with a 3-week history of pain and redness over her right breast. She described a feeling of firmness on the inner aspect of her right breast, which had gone on to ulcerate and discharge pus. The patient had a previous history of right-sided breast cancer in 1983 which was treated with a combination of a lumpectomy and radiotherapy. Her other past medical history included hypertension and hypercholesterolaemia. There was no family history of breast or ovarian cancer.

On examination, her left breast and axilla were normal. There was a large ulcerated mass approximately 7 cm occupying the lower inner quadrant of her right breast, with areas of slough present and visible discharge from the site. The mass was also fixed to underlying muscles (Fig. 1).

The patient's last mammogram taken 3 years ago as part of the NHS breast screening programme was unremarkable. A repeat mammogram taken after this presentation displayed an excessive density within the lower inner aspect of the right breast. Following this, an ultrasound scan demonstrated findings consistent with a malignant right breast cancer as well as a hypoechoic lymph node suggesting potential metastatic disease. For a more accurate diagnosis, a core biopsy was obtained (and later repeated), which showed in fact no evidence of malignancy but rather necrotic breast tissue with areas of infarction. An open biopsy was repeated which confirmed infarction and that the lesion was a result of delayed radiotherapy effect.

The patient received regular dressings for her lesion until she underwent primary wound debridement aiming to remove as much of necrotic tissue as possible.

The initial debridement was successful in removing a large extent of slough. The patient was then followed up in clinic on

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Fig. 1 Right breast lesion at initial presentation

a regular basis, to review the progress of her wound healing and assess whether or not she needed any further therapeutic intervention. Two further debridements were deemed necessary (Fig. 2).

However, on the third occasion (4 months after her initial presentation), fragmented rib cartilage was discovered during the operation which again showed radionecrosis on histology. As the injury had progressed to the bone, we have referred her to plastic surgeons for an opinion over repair, currently which we are awaiting.

Discussion

For the purpose of putting this case into context, it is vital to gauge the incidence of breast radionecrosis. A systematic review (Frassica et al.) analysing studies of breast cancer patients over two decades found that complications such as radionecrosis are relatively uncommon affecting <5 % of

Fig. 2 Wound 1 week prior to third debridement

patients [1]. Koppert et al. conducted a 25-year retrospective study of 68 patients who underwent surgery for complications after breast cancer. Of the 7 patients who did experience radiation-induced necrosis, it was found that the average median time to develop it was 13.5 years [2]. The most comparable case in the literature is a 2009 case report by Gerullis et al., which discusses the presentation of a 65-year-old Caucasian lady with a pseudotumoral necrosis 23 years after her primary adenocarcinoma had been resected. However in this case, the mass had gradually increased in size over a period of 10 years—unlike our patient where the presentation was much more of an acute nature. Ultimately, this patient (Gerullis et al.) was treated successfully with radical surgery—a thoracic wall resection followed by a latissimus dorsi flap [3].

Traditionally, conservative management for radiation injuries of the breast and chest wall has been unsuccessful in providing complete resolution. Therefore, generally more aggressive measures have been taken, ranging from wound debridement to chest wall resection and reconstruction with various flaps [1, 3]. Reconstruction of the chest wall usually involves transfer of an area of tissue (muscle or omentum) to the area of injured tissue in order to provide a healthy vascular supply to ensure protection of all vital structures as well as promoting wound healing.

There is a growing body of evidence for the application of hyperbaric oxygen therapy (HBOT) as an alternative to treat radiation injuries (including radionecrosis of the chest wall) [2, 4]. It is thought to work by stimulating angiogenesis and neovascularisation in irradiated tissue which has become hypoxic. HBOT is even available in the patient's locality under a specialised commissioning group policy [5]. Unfortunately the policy states that HBOT will only be funded for emergency indications such as decompression sickness, so it is not a viable option in this case.

Conclusions

Radionecrosis can occur over two decades after radiotherapy, particularly in patients who received the treatment 20 to 30 years ago. However, advancements in technology have meant that radiotherapy is a lot more focused today, and as a consequence, the incidence of radiation-induced injuries will decrease. Current treatment options for radionecrosis include wound debridement, surgical reconstruction and hyperbaric oxygen therapy. Finally, from a clinical perspective, one should bear in mind alternative diagnoses when patients present with hard breast lumps, other than malignancy.

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