

An unusual case of Radiotherapy-Induced Angiosarcoma with Splenic Metastases

Mark Miruzzi, Ayman Mostafa

Background: Radiation-Induced Angiosarcoma (RIAS) is a recognised clinical entity relating to a malignant vascular process affecting the skin and soft tissues in patients who have received radiotherapy. This case report presents a Maltese case of RIAS in a breast cancer patient who developed a rare site of metastasis: the spleen.

Methods: The patient's medical file, online notes and imaging reports were reviewed in order to examine the details of the case.

Other papers on the topic of RIAS were reviewed after this process to assess the pathophysiology of the condition as well as usual sites of metastasis.

Results and Conclusion: Consider radiotherapy side effects in the differential diagnosis of a patient presenting with a lump post breast cancer surgery.

- Radiation-induced angiosarcoma can cause metastases to distant atypical sites including the spleen.
- Radiation-induced angiosarcoma can present with lesions away from the breast, in this case a fungating lesion in the left axilla.
- Holistic management of the breast oncological patient requires emphasis on inter-disciplinary liaison.

Dr Mark Miruzzi, MD, MRCP
Department of Medicine,
Mater Dei Hospital,
Msida, Malta

Mr Ayman Mostafa, MD, PhD
Department of Surgery,
Mater Dei Hospital,
Msida, Malta

Radiation-Induced Angiosarcoma (RIAS) is a recognised clinical entity relating to a malignant vascular process affecting the skin and soft tissues in patients who have received radiotherapy as part of the management of oncological conditions such as breast carcinoma. It is a rare tumour however is being reported in the literature with increased frequency.¹ This case report presents a Maltese case of RIAS in a breast cancer patient: besides highlighting the different steps in the diagnostic and management plans, this case was of interest in view of the atypical site of metastasis: the spleen.

CASE PRESENTATION

Ms MF is a 73-year-old woman who developed an angiosarcoma with splenic and pulmonary metastases following radiotherapy administered for breast carcinoma. The patient was diagnosed with breast carcinoma in 2010 after she initially presented with a breast lump. Fine needle aspiration (FNA) cytology revealed numerous carcinoma cells, singly and in discohesive clusters, showing hyperchromatic nuclei and high nuclear-cytoplasmic ratio.

As part of triple assessment of this breast lump, mammography and ultrasound of both breasts was performed: these revealed a small spiculated lesion in the upper outer quadrant of the left breast, suspicious for malignancy. Following adequate preoperative assessment, the patient underwent Wide Local Excision (WLE) with Sentinel Lymph Node

Biopsy (SLNB) and Axillary Clearance. Histology of the surgical specimen revealed a Grade 1 infiltrative ductal carcinoma consisting of scattered small neoplastic acini set in desmoplastic stroma.

The patient was referred to Oncology: as part of adjuvant treatment, the patient underwent radiotherapy following her surgical procedure. The patient went on to develop a rare complication of radiotherapy: high-grade angiosarcoma. A fungating lesion was identified in the left axilla. Diagnosis was confirmed via a shave biopsy of a vascular nodule below the left nipple, which revealed a well-differentiated angiosarcoma. In 2021, the patient underwent left mastectomy. Ms MF passed away in October 2022 due to sepsis on the background of metastatic breast angiosarcoma.

One of the crucial investigative modalities in this case was mammography of both breasts. The patient underwent mammography prior to her wide local excision and underwent periodic mammography in the following months to monitor for any signs of recurrence. **Figure 1** shows a mammogram revealing a spiculated lesion in the left breast, suspicious for malignancy.

Another important investigation in the diagnostic workup of this patient was lymphoscintigraphy, which allowed intra-operative identification of the sentinel lymph node in order to enable resection, histological evaluation and assessment for metastases of the infiltrative ductal carcinoma.

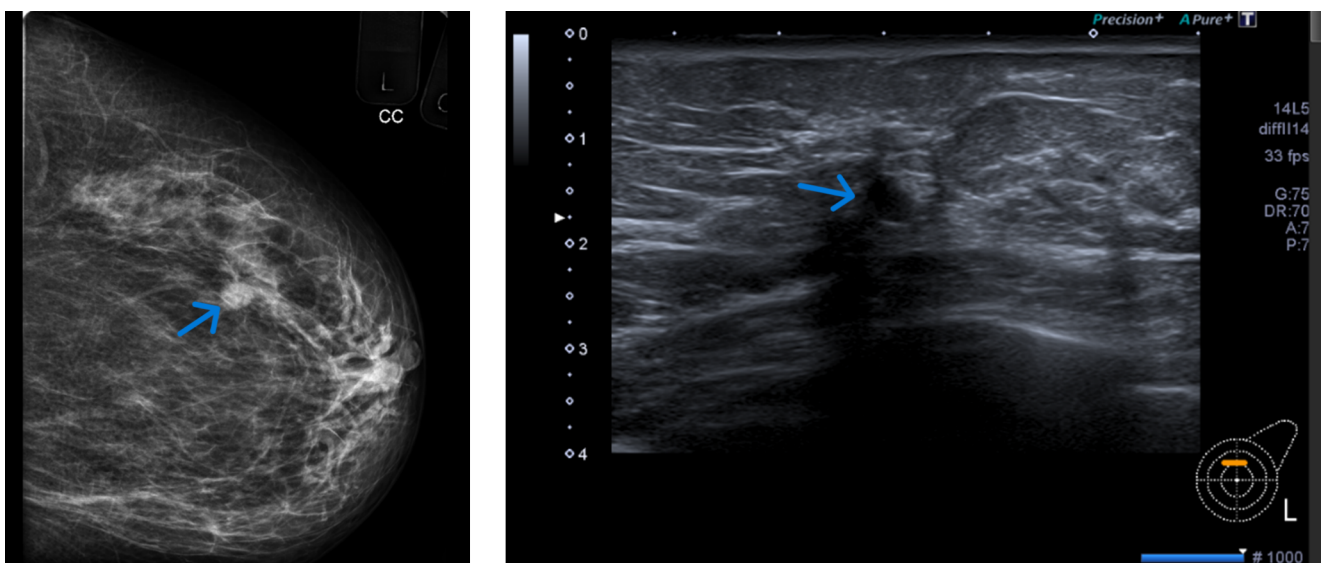


Figure 1 Imaging investigations of the left breast. Left image: Mammogram of the left breast taken in 2010 with arrow indicating lesion. Right image: ultrasound imaging showing scarring of the left areolar region secondary to angiosarcoma

CT PET Oncology served as a useful diagnostic tool in staging of the disease, to identify any metastases from the primary infiltrative ductal carcinoma of the left breast, and also to identify angiosarcoma and its possible metastases. **Figure 2** shows a PET CT Oncology performed in 2021 which showed subtle FDG uptake in the left breast tumour without evidence of FDG avid distant sites of disease.

Following diagnosis of angiosarcoma, CTPA showed multiple small nodules in both lungs suggestive of metastases. CT AP showed multiple hyperdense lesions in the liver, suggestive of metastatic deposits.

Figure 3 shows an image from a CT thorax-abdomen-pelvis: this revealed multiple new splenic lesions which appeared malignant in nature, representing splenic metastases. The spleen is enlarged and contains multiple lesions which demonstrate peripheral enhancement with central necrosis; the largest of these lesions measured 9cm.

DISCUSSION

Radiation-induced angiosarcoma (RIA) is a rare, malignant vascular neoplasm affecting skin and superficial soft tissues. Angiosarcoma accounts for less than 1% of breast malignancies, and only 307 cases have been reported in literature.² It is associated with a poor prognosis.¹ This is due to both

SUMMARY BOX

- Consider radiotherapy side effects in the differential diagnosis of a patient presenting with a lump post breast cancer surgery.
- Radiation-induced angiosarcoma can cause metastases to distant atypical sites including the spleen.
- Radiation-induced angiosarcoma can present with lesions away from the breast, in this case a fungating lesion in the left axilla.
- Holistic management of the breast oncological patient requires interdisciplinary liaison and communication between the breast surgical team, the oncologist, the histopathologist, radiologist, breast care nurses, and nuclear medicine specialists.

the locally-aggressive nature of the disease and also its tendency to metastasize to distant sites. Abraham et al's study in 2007 found that 76% of angiosarcomas investigated were either intermediate or high grade on histological analysis.³

Epidemiologically, Radiation-Induced Angiosarcoma more commonly affects women older than 70 years,

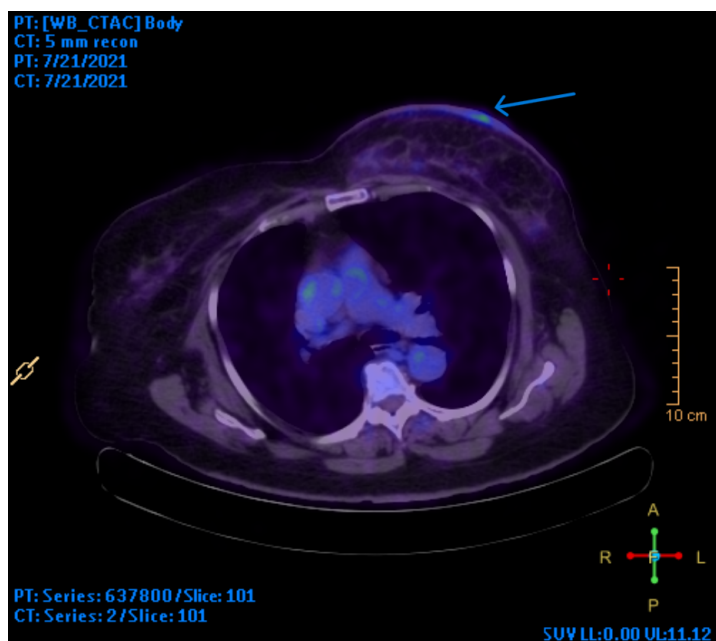


Figure 2 CT PET Oncology in 2021 showed subtle increased FDG uptake in the dermis of the left breast in proximity to the nipple where thickening was appreciated, corresponding to the known tumour, without evidence of FDG avid distant sites of disease

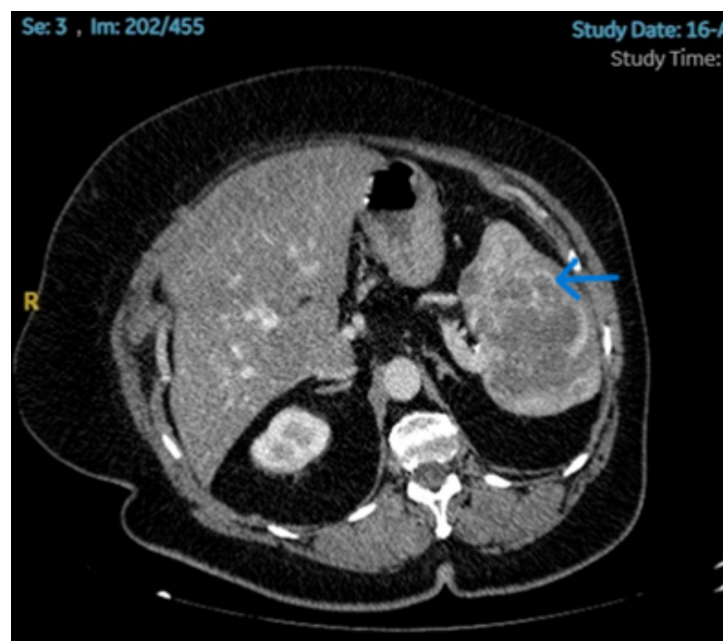


Figure 3 Splenic lesions on CT thorax-abdomen-pelvis. Arrow highlights area of multiple metastases

and it is typically a late complication of radiotherapy, with a mean latency period of 6 years after breast cancer diagnosis.

As described in the case report by Desira and Buhagiar in 2022, breast angiosarcoma tends to metastasise to areas such as the bone, lungs, liver, and the contralateral breast.⁴ The splenic metastases described in this case therefore represent an unusual finding.

Angiosarcoma of the breast can present a diagnostic challenge since it manifests as a skin lesion that can be a nodule, plaque or patch, and can resemble telangiectasia. MRI is the most appropriate imaging modality. As with most breast malignancies, biopsy of

the lesion is the means for definitive diagnosis. Immunohistochemical analysis of angiosarcomas shows that these tumours are positive for antigens related to CD31, CD34.

Current treatment of angiosarcoma is mainly aggressive surgical resection, typically wide local resection or mastectomy, however surgery should be combined with other oncological treatments such as adjuvant chemotherapy or radiotherapy in order to improve prognosis. The study by Depla et al in 2014 showed enhanced local recurrence-free survival (57%) when combining surgery with re-irradiation as opposed to surgery alone (34%) ($p = 0.008$).⁵

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