



# Angiosarcoma following radiation therapy for breast cancer

## Case report



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### Angiosarcoma following radiation therapy for breast cancer. Case report

More and better accessibility to screening and increasing women's knowledge about the main symptomatic breast cancer signs result in detection of this neoplasm at an early stage, allowing a conservative surgical treatment. Breast conserving therapy (BCT) due to breast carcinoma involves the use of adjuvant radiotherapy which carries a risk the secondary radiation-induced malignancy. Angiosarcoma of the breast is an extremely rare radiation-induced malignant tumor following breast conserving therapy (BCT), first described by Schmidt in 1887.

In this article the authors presented the case of a 56-year-old woman who was admitted to the hospital because of diagnosed angiosarcoma of the right breast after breast conserving therapy (BCT) with the Sentinel Node Biopsy (SNB) and adjuvant radiotherapy of her breast carcinoma 5 years earlier. The patient had a simple mastectomy performed and on the second day after surgery was discharged home.

KEY WORDS: Angiosarcoma, Breast cancer, Radiation therapy, Surgery, Treatment

### Introduction

Breast carcinoma is the most common carcinoma among women in Poland, and the second cause of death after lung cancer among the female population. According to the National Cancer Registry, in recent years the number of new cases in Poland has exceeded 16,500 per year, while the number of deaths is around 5,500 per year. More and better accessibility to screening and increasing women's knowledge about the main symptomatic breast

cancer signs result in detection of this neoplasm at an early stage, allowing for breast conserving therapy (BCT). Such management of breast carcinoma involves the use of adjuvant radiotherapy which carries a risk of secondary radiation-induced malignancy.

Angiosarcoma of the breast is an extremely rare radiation-induced malignant tumor following breast conserving therapy (BCT), first described by Schmidt in 1887<sup>1</sup>.

### Case Report

A 56-year-old Caucasian woman was admitted to the Department of Surgical Oncology in the Ministry of Internal Affairs Hospital, Warmia and Mazury Oncology Centre in Olsztyn for a diagnosed angiosarcoma of the right breast after breast conserving therapy (BCT) with the Sentinel Node Biopsy (SNB) and adjuvant radiotherapy of breast carcinoma 5 years earlier (Fig. 1). In patient interview, the patient reported that the breast skin tumor had appeared 2 months earlier and gradually began to grow. Prior to admission to the ward, a surgical biopsy of the tumor was taken in the outpatient

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examination room. The histopathological examination confirmed the diagnosis of angiosarcoma.

In an interview, the patient reported having had breast conserving therapy (BCT) with the Sentinel Node Biopsy (SNB) of the right breast carcinoma five years earlier. In the sentinel lymph node biopsy (SNB) procedure, metastases were not found. Patient after breast conserving therapy (BCT) receive a postoperative radiotherapy dose of 50 Gy on the right breast.

The patient denied any chronic diseases. She had not lost weight in the last 6 months, did not smoke cigarettes and did not drink alcohol. In an interview regarding her family history, she denied the occurrence of carcinoma.

On palpation of the skin, the tumor was palpable in the right breast; the axillary lymph nodes and supraclavicular lymph nodes were not enlarged. The patient did not complain of other ailments.

Complete blood count with differential, as well as basic biochemical specifying inter alia the capacity of the liver and alkaline phosphatase showed no abnormalities. The patient underwent ultrasound examination of the right and left axillary lymph nodes which did not find enlarged lymph nodes. Chest X-ray and ultrasound of the abdomen and pelvis showed no pathological changes in the examined organs.

The patient was qualified for surgery. The patient had a simple right mastectomy performed. The duration of surgery was 60 minutes. After surgery, the patient felt well and did not complain of pain. The postoperative period was uncomplicated and the patient left the ward on the second day after surgery.

Histopathological examination confirmed the result - angiosarcoma - found in the previously performed surgical biopsy of the tumor (Fig. 2).

Immunohistochemistry results were CD31 (+++), CD34 (+++), Ki67 (+) in 70% of the cells, S100 (-), panCK (-) (Figs. 3, 4).



Fig. 1: Radiation-associated angiosarcoma of the right breast presents as multiple erythematous-violaceous nodules and papules.

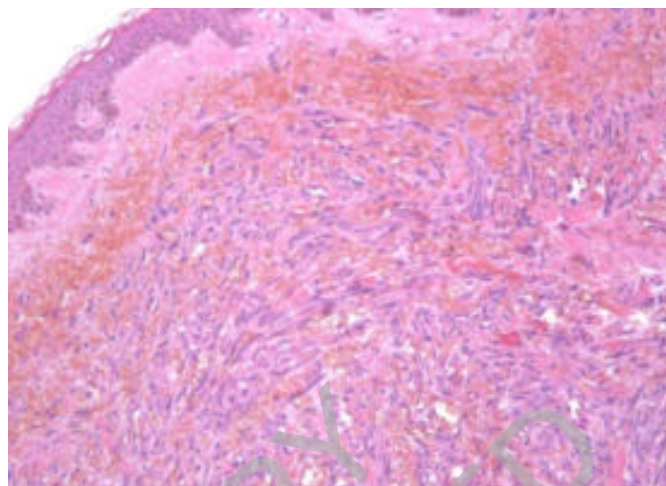


Fig. 2: Angiosarcoma cell proliferation affecting the entire dermis. (hematoxylin and eosin [H&E], original magnification x100).

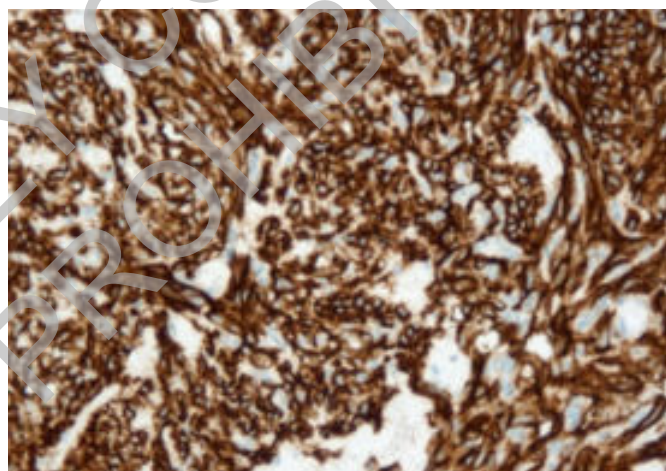


Fig. 3: In most cases the most sensitive and specific marker of angiosarcoma - CD31 - shows strong diffuse and strong staining often accentuating the cytoplasmic membrane (original magnification x200).

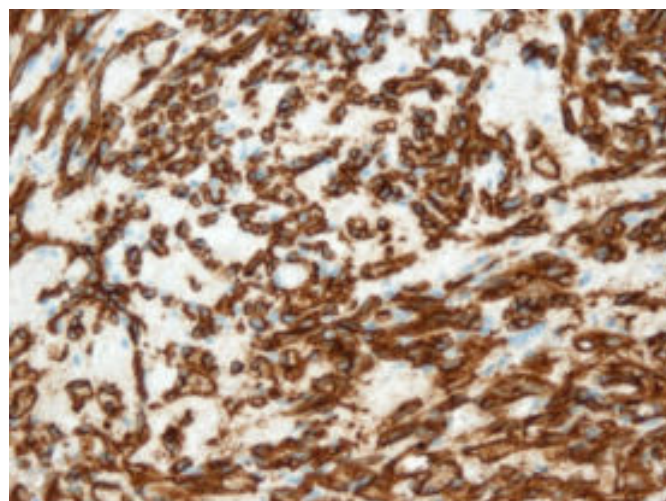


Fig. 4: In most cases CD34 shows strong diffuse often accentuating the cytoplasmic membrane (original magnification x200).

Currently the patient is under the care of the Surgical Oncology Outpatient Clinic in the Ministry of Internal Affairs Hospital, Warmia and Mazury Oncology Centre in Olsztyn. Within 16 months of the simple mastectomy, there was no recurrence of the cancer.

## Discussion

Angiosarcoma is an incompletely understood, heterogeneous and aggressive malignancy which accounts for about 1% of soft tissue sarcomas<sup>2,3</sup>. Among the most common histologic subtypes of sarcomas are malignant fibrous histiocytoma, fibrosarcoma, liposarcoma and angiosarcoma. Primary angiosarcoma tumors are categorized as cutaneous and non-cutaneous<sup>4</sup>. Cutaneous angiosarcoma can be divided into 3 main types: the classic or idiopathic type, the chronic lymphedema-associated type and the radiation-induced type. The classic type of angiosarcoma is the most frequent in elderly patients with location on the skin of the head and neck<sup>5</sup>. The chronic lymphedema-associated type of angiosarcoma affects a limb with chronic lymphedema post radical mastectomy with axillary lymph node dissection<sup>5</sup>. The radiation-induced type is observed in an irradiated area after a latency period<sup>5</sup>. Postoperative radiotherapy in breast carcinoma includes the area of the chest wall and nodal field. The area of the chest wall - a dose of 50 Gy in 2 Gy fractionated day by electrons of suitable energy (typically 6-9 MeV) or photon energy of 4-6 MV technology (tangential field). In elderly patients without pre chemotherapy without irradiation nodal areas, a good dose distribution, it is possible to more irradiation dose fractional, for example 42.5 Gy/16 fractions or 40 Gy/15 fractions. When planning treatment should be reduce the dose of radiotherapy, which receives heart. Nodal irradiation fields - a total dose of 50 Gy in 2 Gy fractionated after a day using photons with an energy of 4-6 MV. In Poland, indications for nodal irradiation area in patients treated-saving are the same as in patients after amputation. The latency period after radiotherapy is 3 to 5 years in most cases<sup>2,3,5</sup>. Angiosarcoma tumors are observed more frequently in Caucasians than African-Americans or Asians<sup>4</sup>. The incidence of this malignancy increases rapidly after the age of 40 years in both the male and female population<sup>6</sup>. Some research indicates that breast angiosarcomas were bilateral, especially in younger patients after radiotherapy<sup>7,8</sup>. Angiosarcoma has a tendency to develop in areas with chronic inflammation and lymphedema<sup>9</sup>.

Clinically, angiosarcoma presents as painless, erythematous-violaceous nodules or plaques with or without ulceration, and occasional bleeding<sup>10,11</sup>. Median size is 7.5 cm and multifocality is common (12,13). Pathologically, angiosarcomas express endothelial markers such as von Willebrand factor, CD31, CD34 and

VEGF (vascular endothelial growth factor)<sup>2</sup>. CD31 is the best single marker which presents a high sensitivity and specificity<sup>2</sup>. Marker CD34 and factor VIII are present in most angiosarcomas, but are less current in poorly differentiated tumors<sup>2</sup>. What is very important, most of carcinomas are CD31 negative<sup>2</sup>.

Treatment breast angiosarcoma involves simple mastectomy<sup>5</sup>. Some research suggest that radiation-induced angiosarcoma has a poorer prognosis than sporadic angiosarcoma<sup>14</sup>. Prognosis is poor with high recurrence incidence rates and a high tendency to metastasize<sup>2,5</sup>. Metastases from mammary angiosarcomas have been reported in lung, skin, liver, bone, spleen and lymph nodes<sup>2,5,14</sup>. The 5-years survival rate is 12% to 20% and mean survival is 18 to 28 months<sup>15</sup>.

## Conclusion

Because of the rarity of angiosarcoma of the breast, treatment should be reserved only for highly specialized cancer centers. Because of an increasing frequency of breast-preserving therapy that typically involves breast conserving therapy (BCT) and radiation, the incidence of angiosarcoma will be increasing. Clinically, most angiosarcomas are aggressive and most patients die because of disseminated disease. Regular follow-up in patients after radical breast angiosarcoma treatment with gadolinium-enhanced MRI may be useful in the diagnosis of recurrence.

## Riassunto

La migliorata disponibilità agli screening preventive e la maggiore consapevolezza delle donne riguardo I principali segni sintomatici del cancro della mammilla hanno determinate la scoperta di questa neoplasia in stadi più precoci, consentendo l'adozione del trattamento chirurgico conservativo. Il trattamento conservativo della mammella (BCT) prevede il trattamento radioterapico adiuvante, che comporta il rischio di indurre tumori secondari indotti dalla radiazione.

L'angiosarcoma della mammella è un tumore maligno estremamente raro indotto dall'energia radiante dopo trattamento conservativo della mammella (BCT) descritto per la prima volta nel 1887 da Schmidt.

In questo articolo viene illustrato il caso di una donna di 56 anni ricoverata con diagnosi di angiosarcoma della mammella destra insorta successivamente a trattamento chirurgico conservativo (BCT) con procedura del nodo sentinella (SNB) e trattamento radioterapico adiuvante 5 anni prima. La paziente è stata trattata con mastectomia semplice e dimessa dall'ospedale due giorni dopo.

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