Radiotherapy-induced acute myopericarditis

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ABSTRACT

Introduction: A case of acute myopericarditis related to radiotherapy is presented. Incidence is difficult to affirm but chronic presentation is much more common. Diagnosis is challenging and a high suspicion level is important to establish it. Case Report: A 43-year-old woman with left breast carcinoma completed adjuvant chemotherapy and after initiation of adjuvant radiotherapy presented with acute myopericarditis. Literature was reviewed upon the theme. Conclusion: We raise awareness to the importance of recognizing rare but known etiologic factors of myopericardial disease and emphasize the rising role of cardio-oncology.

Keywords: Cardio-oncology, Myocarditis, Myopericarditis, Pericarditis

INTRODUCTION

Cardiotoxicity is a relatively common complication of oncologic treatments for breast cancer, such as anti-HER2 (Human Epidermal growth factor Receptor 2) therapy, anthracycline-based chemotherapy (CT), and radiotherapy (RT), which are frequently used, as monotherapy or in combinations of all of the above. Pericardial disease is a common manifestation of such toxicity, mostly in the form of chronic disease but in rare circumstances with acute worrisome manifestations [1].

Here, we describe a rare case of acute radio-induced myopericarditis, which combined myocardial and pericardial damage. Incidence of RT-induced myopericarditis is not well established, although it is known that myocardial perfusion abnormalities can reach a 42% incidence, two years after RT [2].

CASE REPORT

A 43-year-old woman with an unremarkable medical history besides the present oncologic disease noticed a left breast lump on breast self-examination. She was diagnosed with left breast carcinoma, submitted to lumpectomy and staged IA (pT1cN0M0 with positive expression of estrogen receptors, HER2+). She underwent treatment with intravenous chemotherapy (Doxorubicin + cyclophosphamide for 4 cycles, total doses of 384 mg and 3840 mg, respectively), and began endocrine therapy with oral tamoxifen 20 mg/day.

She started external thoracic RT and presented in the emergency department, on day 13 of RT, complaining of low-grade fever, dry cough, and a pleuritic retrosternal pain, worsening for five days, irradiating to the jaw and left arm. On examination, she was borderline tachycardic (101 bpm), but otherwise hemodynamically stable, with a normal electrocardiogram (ECG) and a slight analytic elevation of myocardial necrosis markers, which did not rise upon serial analysis. A thoracic computerized tomography revealed a low volume pericardial effusion (Figure 1). Echocardiogram showed slight pericardial thickening with preserved left ventricular ejection fraction (LVEF). It was assumed an acute pericarditis with a viral etiology and she was discharged with ibuprofen and...
colchicine. Symptom relief was obtained in the next few days and RT treatment restarted.

Twelve days later, she was readmitted to the emergency department with clinical relapse. On cardiac auscultation a pericardial friction rub was present. Echocardiogram showed nonspecific ventricular repolarization findings. It revealed septal bounce and a 45% LVEF was estimated. Both diastolic and systolic functions were compromised. Reactive C-protein (RCP) was elevated (103 mg/L). On the basis of an acute pericarditis and the presence of global systolic dysfunction, a final diagnosis of radio-induced myopericarditis was made. High-dose corticosteroids and beta-blocker were started, associated with ibuprofen and colchicine. Radiotherapy was promptly and definitely suspended. She experienced gradual clinical improvement, with resolution of thoracic pain and progressive declining of inflammatory markers. She was discharged after 10 days, having completed steroid tapering after about three weeks and continued ibuprofen for five months (mid-treatment ibuprofen tapering was tried with pain relapse and RCP elevation). Delayed cardiovascular magnetic resonance evaluation after steroid suspension showed pericardial disease with no myocardial inflammatory involvement nor myocardial infarction necrosis. One year colchicine treatment was completed.

The patient maintains cardiologic follow-up, with biannual echocardiographic evaluation. She is asymptomatic, having no stigmas of heart failure, with a LVEF of 52% on two and a half years follow-up. Surveillance reveals no evidence of oncologic disease to date, even though, planned and recommended oncologic treatment for this case was not completed, namely RT and anti-HER2 therapy.

**DISCUSSION**

Radiotherapy not only has a damaging effect on tumor cells, but also on normal tissue cells of the irradiated areas. Thoracic RT has the potential to damage the heart, lungs, esophagus, and other intrathoracic organs and structures.

Radiation damage to the heart can involve the pericardium, myocardium, valves, and coronary vessels with the pericardium being most frequently involved. Radiation damages the vascular endothelium, and hence radiation-induced vascular injury occurs in the field of radiation exposure [2].

Pericardial disease is a common manifestation of RT-induced cardiotoxicity and can present as pericarditis, pericardial effusion (the most common form of presentation) with or without constrictive pericarditis [1]. Pericarditis might be classified as *acute*, which is a rare entity, and occurs during or after radiation exposure, or *delayed*, which may develop over a period ranging from few months to few years, with a mean latency time for development of approximately one year [3, 4], comprising most commonly reported cases, with a rising trend due to cancer survivorship [5].

The signs and symptoms of acute pericarditis are those of nonspecific pericarditis with chest pain, fever, and sometimes nonspecific ECG abnormalities, and it commonly responds to bed rest and nonsteroidal anti-inflammatory drugs (NSAIDs) [1, 3].

Clinically significant myocardial changes after RT usually manifest five years after the treatment [6]. Acute myocarditis is a rare manifestation that presents similar to any other myocarditis, often with features of severe, acute heart failure, and often occurs alongside acute pericarditis [7].

Diagnosis of RT-induced heart disease is often challenging and usually is a diagnosis of exclusion. A good clinical examination, as well as a high degree of clinical suspicion is very important for diagnosis [3].

Subclinical cardiac damage occurs in >50% of breast cancer survivors treated with radiation therapy [8]. Thus, it should be mandatory to approach aggressively the underlying modifiable risk factors, such as arterial hypertension, smoking, and dyslipidemia, in an attempt to halt the impact and improve the outcome of RT-induced cardiopathy.

**CONCLUSIONS**

Cardiotoxicity is a relatively common adverse event of RT. The acute presentation of such toxicity is rarely seen, thus the importance of maintaining a high level of suspicion for this challenging diagnosis, when known causes are present. We enhance the role of cardio-oncology as a new and developing sector of research and therapy.
LEARNING POINTS

We highlight the following aspects:

- The importance of recognizing rare but known etiologic factors;
- The importance of balance between risks and benefits of maintaining oncologic treatment, particularly in the present scenario of adjuvant/curative intent;
- Instructive errors, namely errors of initial clinical impression.

REFERENCES


Author Contributions

Fernando Gonçalves – Conception of the work, Design of the work, Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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