

Two Sub-obstructive Left Atrium Myxomas induce Cardiac Failure after Breast Cancer Treatment

Nicolas LEDUC¹, Vincent MOLINIE², Vincent VINH-HUNG^{1,*}

¹Radiation Oncology, University Hospital of Martinique, France

²Anatomic pathology, University Hospital of Martinique, France

*Corresponding author: nicolas.leduc.mail@gmail.com

Received August 02, 2015; Revised August 14, 2015; Accepted August 20, 2015

Abstract Atrial myxoma is a rare condition. Cardiac failure after left breast cancer treatment is not usually attributed to such pathology. We describe the case of a 69 year-old female who presented two sub-obstructive left atrium myxomas one year after the end of left breast cancer treatment. Acute cardiac failure, without history of prior cardiovascular disease, could have resolved from the combination of various factors involving myxomas and complications of radiotherapy and chemotherapy. The absence of atrial images on the computerised tomography and ultrasonography performed before cancer treatment question the accuracy of diagnosis imaging as well as the actual rate of growth of cardiac myxoma.

Keywords: left breast cancer, atrial myxoma, radiation therapy

Cite This Article: Nicolas LEDUC, Vincent MOLINIE, and Vincent VINH-HUNG, "Two Sub-obstructive Left Atrium Myxomas induce Cardiac Failure after Breast Cancer Treatment." *American Journal of Medical Case Reports*, vol. 3, no. 9 (2015): 288-290. doi: 10.12691/ajmcr-3-9-7.

1. Introduction

Atrial myxoma is a rare condition. Cardiac failure after left breast cancer treatment is not usually attributed to such pathology. It is clear, however, that previous chemotherapy and radiotherapy may aggravate the clinical symptoms of cardiac failure.

2. Case Presentation

A 69 year-old, african-caribbean female was diagnosed with a tumour of the left breast in early 2012, after discovery of a suspicious mass on a routine mass screening mammography. Biopsy, echography and clinical exam identified a cT2N2, SBR grade III, estrogen and progesterone receptors positive, HER2Neu negative invasive carcinoma. The patient was treated with left mastectomy and axillar lymph node dissection. Post-operative histological stage was pT3N3 (with 12/18 positive nodes). In accordance to the French guidelines, she received adjuvant chemotherapy and radiotherapy until early 2013. She was prescribed afterwards a 5 years hormone therapy. Chemotherapy included three cycles of fluorouracil, epirubicin, and cyclophosphamide (FEC) followed by three cycles of docetaxel [1]. External radiotherapy planning included irradiation of the internal mammary lymph nodes (50 Gy). Two pre-treatment cross-sectional transthoracic echocardiographies were performed and did not show functional or morphological abnormalities.

The pre-radiotherapy unenhanced computed tomography (CT) was normal.

In January 2014, the patient consulted at her local hospital for shortness of breath, orthopnoea and dizziness. She had no history of cardiovascular disease and was first diagnosed with an obstructive pulmonary syndrome, then discharged. Her symptoms worsened, and she was admitted in July with a diagnosis of acute left cardiac failure and atrial fibrillation.

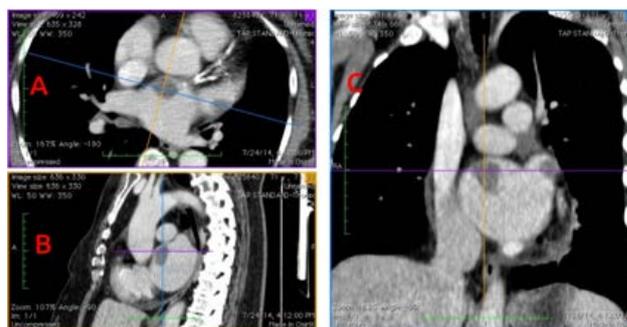


Figure 1. Pre-surgery thoracic contrast tomography showing an left intra-atrial defect revealing two masses of tissular density. Axial (A) slice and oblique sagittal (B) and coronal (C) reconstructions

On the 15th of July, initial emergency transthoracic echocardiography showed a dilated, fibrillating left atrial cavity and moderate pericardial effusion, without providing valid etiology for the severe symptoms.

On the 17th, injected thoracic scanner (Figure 1) found a left atrium mass (38mmX20mm) pending to the cranial wall of the atrium. This mass was associated to a smaller mass of the left auricle. It was confirmed by a transoesophageal echocardiography and heart MRI (Figure 2,

Figure 3) after clinical stabilization on the 22th. Both were assumed to be of cancerous or thrombotic nature and likely responsible for the clinical symptoms.

A pre-surgery coronarography identified a severe stenosis of distal right dominant coronary artery.

The possible causes for cardiac failure in that case were numerous. Neoplastic or paraneoplastic thrombus in the breast cancer context was the most probable. Myocardial metastasis was also an option. Myocardial, valvular or pericardial complication of radiotherapy or chemotherapy could lead to cardiac failure. Lastly, left atrium primary tumor of the heart (myxoma), albeit unusual, had to be considered as a valid etiology.

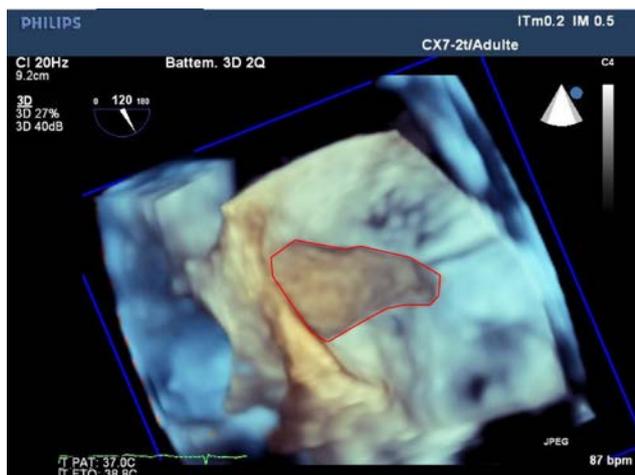


Figure 2. Pre-surgery 3D reconstruction of trans-oesophageal echocardiography. A mass of maximal dimensions 3,8mmx20mmx20mm was found pending to the cranial left atrium wall. The free end did not obstruct the mitral valvula

Curative surgery was performed 6 days after image diagnosis of the intra-atrial masses. The masses were resected during an open-heart surgery and sent to a pathologist. Histological analysis identified two benign primary tumor of the heart of the myxoma type (Figure 4). They were macroscopically and microscopically separated.

Recovery was uneventful. The patient was discharged 15 days later after complete resolution of her symptoms, with specific medical treatment including oral anticoagulation.

After a 6 months follow-up, she has shown no further signs of cardiac failure. However, cancer treatment left her with upper limb lymphoedema and peripheral neuropathy. She is closely followed by her cardiologist as well as oncologists.

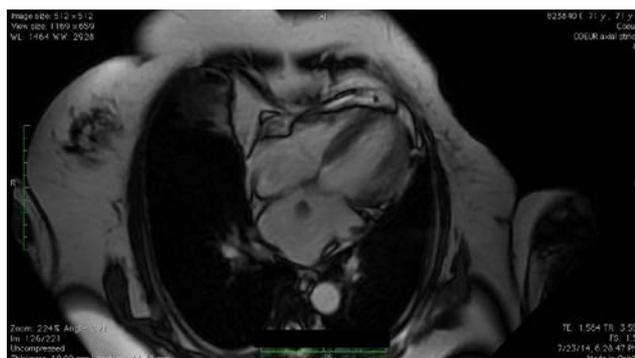


Figure 3. Pre-surgery heart MRI (contrast T2 axial slice).

3. Discussion

Atrial myxomas are rare primary tumours of the heart. For this patient, two successive transthoracic echocardiographies and a non-contrast thoracic scanner did not detect any intra-atrial mass in 2012. Therefore, the time span for the growth of this tumour is unclear. As such, two hypotheses can be discussed:

First hypothesis: **The myxomas were already present in 2012 but were not detected by standard exams.** Since the emergency conventional transthoracic echocardiography in 2014 did not show the myxomas either, it is reasonable to assume that the same exam could have failed finding a smaller mass in 2012. Besides, we reviewed the non-contrast thoracic tomographies performed in 2014 (Figure 1) and 2012 (Figure 5). Mean attenuation of the myxomas in 2014 was 32HU (standard deviation 16HU). Attenuation at the same location in 2012 was 29HU (Std deviation 15HU), while mean blood attenuation in the left atrium was 36HU (Std deviation 14HU). Low attenuation values could indicate the location of a tumor. But with such close values, it is difficult to be affirmative about the presence of a myxoma in 2012 in the left atrium. Indeed, after a thorough review of the images, none of us was able to conclusively find it.

Second hypothesis: **This is a de novo occurrence of myxoma developed after breast cancer treatment.** There is neither study nor evidence correlating irradiation of the heart to the development of myxoma. The occurrence of the pathology in this case is probably entirely coincidental, despite of the short time span between cancer treatment and the growth of the heart tumor. We found a sole other case describing irradiation of internal mammary lymph nodes and later finding of an atrial myxoma[2]. Besides, rate of growth of atrial myxoma is a matter of controversy, as most are surgically resected immediately after diagnosis. It was commonly thought to be a slow-growing tumour but recent case reports suggest that it could be much faster [3,4,5]. Our case may support this latter opinion. Whether cancer treatment could accelerate the development of myxoma is not known.

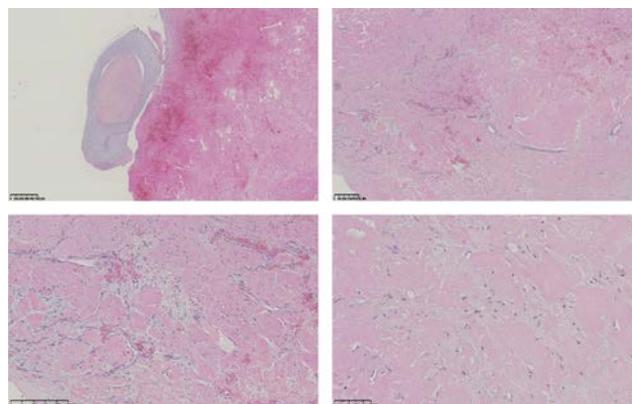


Figure 4. Microscopy: histological cuts show typical proliferation of cells including large eosinophilic cytoplasm, round nuclei. Tissue is organized in small cords, with a myxoid, hypocellular background. There is no sign of malignancy: no pleomorphism nor atypical mitoses

Breast cancer patients can be at high risk of cardiac complications because of: anthracycline-based chemotherapy [6], heart irradiation [7], immunotherapy (Trastuzumab)

[8], pre-existing risks factors (Age, former cardiovascular disease...) [7],

Out of these 4 factors, this patient had 3: - She was treated with chemotherapy including epirubicin.- Analysis of dose-volume histograms for this patient shows high levels of heart irradiation: mean irradiation of the heart is 6,8 Gy with 28% of the volume receiving more than 10Gy. Highest levels of irradiation are reached during internal mammary lymph nodes irradiation. - Age superior to 60 years-old, Hypertension and probable chronic ischemia due to a severe stenosis of distal right dominant coronary (as seen on pre-surgery coronarography). Stenosis could be pre-existent or subsequent to the irradiation [9]



Figure 5. Pre-radiotherapy planning non -contrast tomography showing dose localisation after vector fusion. Pinnacle system (Philips Group) and Inkscape. Internal mammary lymph nodes boost irradiates left atrium with a dose higher than 10Gy

Lastly, the concomitant occurrence of two well-separated myxomas in the same atrium is odd, and we have not found any reference in literature for this phenomenon. The patient does not possess any of the cutaneous or endocrine characteristics that could be found in the Carney's complex (multiple myxomas syndrome).

To sum it up, we presented the case of two concomitant, possibly fast-growing atrial mixoma leading to acute

cardiac failure in a context of cardiac toxicity after breast cancer treatment. Although failure of early diagnosis imaging is the most probable hypothesis and there is no conclusive evidence as to whether atrial myxoma could actually grow faster than previously expected, it might be interesting to assert the association between heart irradiation and subsequent atrial myxomas.

References

- [1] Roché, H., Fumoleau, P., Spielmann, M., Canon, J. L., Delozier, T., Serin, D., ... & Asselain, B. (2006). Sequential adjuvant epirubicin-based and docetaxel chemotherapy for node-positive breast cancer patients: the FNCLCC PACS 01 Trial. *Journal of Clinical Oncology*, 24(36), 5664-5671.
- [2] García-Quintana, A., Martín-Lorenzo, P., Suárez de Lezo, J., Díaz-Escofet, M., Llorens, R., & Medina, A. (2005). Infected left atrial myxoma. *Revista Española de Cardiología (English Edition)*, 58(11), 1358-1360.
- [3] Walpot, J., Shivalkar, B., Rodrigus, I., Pasteuning, W. H., & Hokken, R. (2010). Atrial myxomas grow faster than we think. *Echocardiography*, 27(10), E128-E131.
- [4] Roudaut, R., Gosse, P., & Dallochio, M.. (1987). Rapid growth of a left atrial myxoma shown by echocardiography. *British heart journal*, 58(4), 413-416.
- [5] Malekzadeh, S., & Roberts, W. C. (1989). Growth rate of left atrial myxoma. *The American journal of cardiology*, 64(16), 1075-1076.
- [6] Olson, R. D., & Mushlin, P. S. (1990). Doxorubicin cardiotoxicity: analysis of prevailing hypotheses. *The FASEB journal*, 4(13), 3076-3086.
- [7] Darby, S. C., Ewertz, M., McGale, P., Bennet, A. M., Blom-Goldman, U., Brønnum, D., .. & Hall, P. (2013). Risk of ischemic heart disease in women after radiotherapy for breast cancer. *New England Journal of Medicine*, 368(11), 987-998.
- [8] Sengupta, P. P., Northfelt, D. W., Gentile, F., Zamorano, J. L., & Khandheria, B. K. (2008, February). Trastuzumab-induced cardiotoxicity: heart failure at the crossroads. In *Mayo Clinic Proceedings* (Vol. 83, No. 2, pp. 197-203). Elsevier.
- [9] Senkus-Konefka, E., & Jassem, J. (2007). Cardiovascular effects of breast cancer radiotherapy. *Cancer treatment reviews*, 33(6), 578-593.