

Misdiagnosed Recurrent Pericardial Effusion in Chronic Type A Aortic Dissection

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We report an unusual case of recurrent pericardial effusion complicating type A aortic dissection in a 65-year-old woman. The patient was referred to our hospital due to progressive dyspnea. Her medical history showed hypertension, which was controlled with several oral antihypertensive medications. Furthermore, a melanoma had been removed from her right arm 7 years prior, with no recurrence. Cardiac risk factors included hypertension, family history of heart disease, and past smoking.

PATIENT DESCRIPTION

One month before presenting to the emergency department, she was admitted to a coronary care unit with severe chest pain. Electrocardiogram showed a sinus rhythm with T wave inversion in the infero-lateral leads. Blood analysis ruled out elevated cardiac enzymes and echocardiography showed no signs of pericardial effusion or regional wall motion abnormalities. However, it did show a hypertrophic left ventricle. The patient was discharged the next day, after an inconclusive exercise test due to lack of exercise capacity.

One month after she was discharged from the cardiac care unit dyspnea, which seemed to increase in severity in

time, appeared. Eventually, her functional capacity was very low (New York Heart Association Functional Classification 3) and was interfering with her normal daily activity. Other concomitant symptoms appeared, including occasional mild chest pain, a chronic cough, dizziness, and severe fatigue. Antibiotics were started due to suspected pneumonia, which had no effect on her symptoms. She complained of feverish sensation, but high fever was not documented at any time. Progressive heart failure was suspected; however, there were no specific provoking moments and symptoms were not postural.

Physical examination showed a dyspneic woman with a respiratory rate of 25 breaths per minute and an oxygen saturation of 96% with oxygen mask. Blood analysis showed a moderate anemia (7.1 g/dl) that was not present one month earlier. It also revealed elevated inflammatory parameters (C-reactive protein 133 mg/L, leukocytes $14.6 \times 10^9/L$) and an elevated NT-pro BNP (1383). A chest X-ray showed severe cardiomegaly and straightening of the heart contour [Figure 1A]. Subsequently, an echocardiography was performed. It revealed a pericardial effusion of approximately 3–4 cm in the pericardial sac. A non-complicated pericardiocentesis was performed, draining a total of 1700 ml of serosanguinous fluid from the pericard. Her symptoms immediately subsided with the drainage of the pericardial fluid, establishing the diagnosis of a tamponade. However, one week

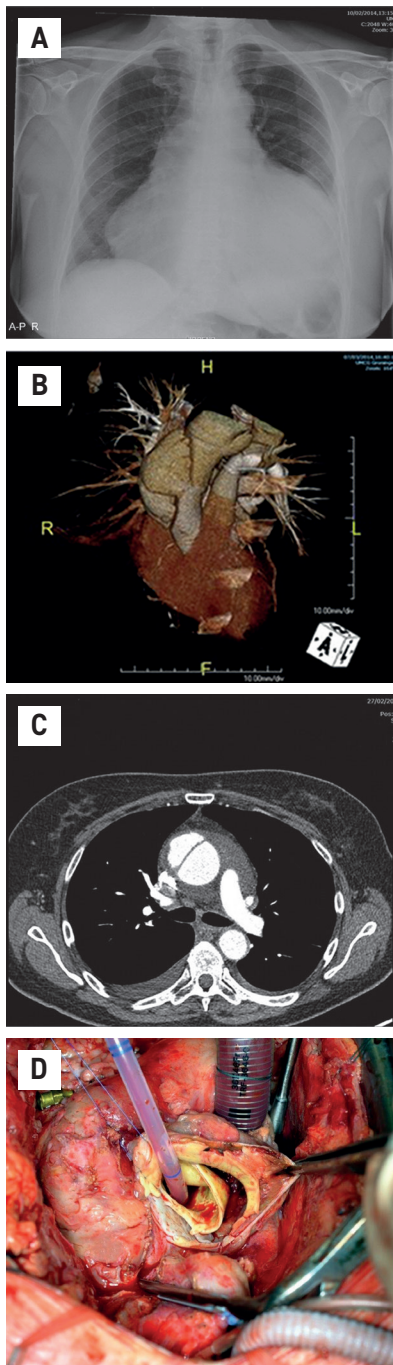
later, the patient presented with recurring pericardial fluid associated with dyspnea. Several weeks later, approximately 3 cm of pericardial fluid had built up in the pericardial sac again.

Positron-emission tomography/computed tomography (PET/CT) scan was performed to exclude recurrent melanoma. Type A aortic dissection was detected as an incidental finding at the level of the ascending aorta requiring a surgical intervention [Figure 1B]. Figures 1C and 1D clearly demonstrate the dissected ascending aorta with the true lumen, the false lumen, and the intramural hematoma. The patient underwent surgery the following day and the dissected ascending aorta was replaced with a prosthetic graft. She recovered in the intensive care unit for one day and was discharged home after an uneventful postoperative stay. Pathological examination revealed degenerative aortic tissue with no signs of connective tissue disorders. Retrospectively, the episode of severe chest pain one month earlier had probably been the moment of the aortic dissection.

COMMENT

Cardiac tamponade is a serious and possibly life threatening condition. It gradually increases the intra-pericardial pressure and decrease preload. This mechanism may mimic progressive heart failure and eventually, misdiagnosis may occur. A large amount of pericardial fluid is often a sign of an underlying disease.

Figure 1. [A] X-ray showing severe cardiomegaly. [B] 3D reconstructed chest CT scan showing 2 saccular aneurisms in the ascending aorta. [C] Chest CT scan slide at the level of the carina showing the dissected ascending aorta with the true lumen, the false lumen and the intra-mural hematoma. [D] Intra-operative photography showing the dissected ascending aorta (superior view), the true lumen and the false lumen



Most often, the pericardial effusion will return if the cause remains untreated.

Aortic dissection is a rare, but serious condition. The mortality of an untreated type A aortic dissection is approximately 90% after one month. In the acute phase (during the first 48 hours), it increases up to 1–2% per hour compared to a milder mortality rate in type B dissection, where it reaches approximately 20% in 2 months [1]. Complications of aortic dissection vary in their severity and presentation. They include myocardial ischemia, aortic regurgitation, severe stroke, and an aortic rupture. Another severe complication of type A aortic dissection is pericardial effusion and consequently cardiac tamponade. For that reason, an immediate surgical intervention is indicated in type A dissection; whereas, in type B dissection, surgery is indicated only in case of a rupture, peripheral ischemia, or other complications [2]. Aortic dissections are most often associated with hypertension (72%) and atherosclerosis (31%) [1].

Pericardial effusion can be the leading cause of death in almost 40% of all type A dissections. According to the European guidelines, in case of suspected pericardial effusion, both echocardiography and chest X-ray are class I recommendations while CT scan or cardiac magnetic resonance are class IIa recommendations. However, CT scan provides a wider topographical view allowing better diagnosis and further detection of associated pathologies.

As previously mentioned, our patient had a history of surgically treated melanoma on her arm. Although there was no recurrence of the disease, a PET/CT scan was preformed because malignancies are a known cause of pericardial effusion. Among all malignancies, melanoma has the highest percentage of cardiac metastases according to Glancy and Roberts [3]. They reported a prevalence of 64% in a study where 70 autopsies were performed in 1968.

Our case describes a chronic aortic dissection. A dissection is defined as

chronic if it is present for more than 14 days. Some authors even suggest 21 days [4]. Because of the emergent surgical intervention indicated in case of type A dissection and the poor prognosis associated with misdiagnosis or treatment-delay, aortic dissections are rarely seen with an unknown incidence.

Not many reports describe chronic type A aortic dissections. In 2014, Erkut et al. [4] published their experience with a patient who had an acute type A aortic dissection and refused an emergent surgical treatment. He survived the acute episode but eventually underwent surgery 3 years later to disable an aortic aneurysm. Another case was reported describing three patients who initially presented with chest pain [5]. The pain was initially thought to be related to myocardial infarction in the first patient, endocarditis in the second patient, and pericarditis in the third. After 54, 16, and 20 days, respectively, they all developed dyspnea because of a cardiac tamponade. Just like in this case report, there was a delay between the initial presentation of pain and the cardiac tamponade symptoms. The diagnosis of chronic type A aortic dissection for each of the three patients was made 10, 39, and 16 days, respectively, after the tamponade was relieved.

CONCLUSIONS

Large amounts of recurrent pericardial effusion can, in rare cases, be attributed to a chronic aortic dissection. Chronic aortic dissection should be considered as a cause of recurrent pericardial effusion, especially if a recent episode of severe chest or back pain has been present or other symptoms that could indicate an aortic dissection.

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Capsule

Three strikes to knock cancer out

BRCA1 and *BRCA2* are tumor-suppressor genes and patients with mutations in these genes are predisposed to breast, ovarian, and other cancers. Because *BRCA1* and *BRCA2* mutations affect pathways involved in DNA break repair, the tumors in these patient are usually vulnerable to treatments that further damage DNA repair, such as poly (ADP-ribose) polymerase (PARP) inhibitors, but they can acquire resistance to therapy. Using a genome-wide screening approach, **Fugger**

and co-authors identified a protein called DNPH1 as a “nucleotide sanitizer” that prevents the incorporation of abnormal nucleotides into. The authors examined its mechanism of action and demonstrated how it can be targeted to expedite the killing of *BRCA1*-mutant cancer cells in combination with PARP inhibitor treatment.

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Eitan Israeli

Capsule

Bacteriotherapy for the skin

Atopic dermatitis, a form of eczema, can be exacerbated by colonization of the affected skin with *Staphylococcus aureus*. **Nakatsuji** et al. reported a phase 1 clinical trial of *Staphylococcus hominis* A9 (*ShA9*) as a topical treatment for atopic dermatitis. *ShA9* is found on the skin of healthy people and selectively inhibits strains of *S. aureus* that have been associated with atopic dermatitis. It also improves atopic dermatitis in mice. The

authors report that *ShA9* treatment did not cause serious adverse events, and *S. aureus* abundance was reduced, even during a short 7-day trial. In addition, application of *ShA9* altered the microbial composition on affected skin, suggesting that the treatment induces a more beneficial skin microbiota.

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Capsule

Symptomless transmission of COVID-19

Both asymptomatic infections and a relatively long pre-symptomatic phase present substantial challenges to tackling severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) transmission and ending the COVID-19 pandemic. Being infectious without symptoms means that people are unaware that they could be spreading SARS-CoV-2, and tracing such cases is challenging. Because of the lack of surveillance testing, much is unknown about

symptomless transmission. In a perspective, **Rasmussen** and **Popescu** discussed what researchers know about the prevalence and infectiousness of asymptomatic and pre-symptomatic SARS-CoV-2 infections. They also discuss what researchers need to understand better to be able to mitigate transmission more effectively.

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