IMAGES IN CARDIOLOGY

Eggshell Calcification of the Heart

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Abstract

A case of a patient with extensive egg-shell calcification of the pericardium is presented without signs of constriction. This was imaged by fluoroscopy during an ablation procedure performed for persistent atrial fibrillation. ***Rhythmos 2022; 17(1):105-106.***

Key Words: atrial fibrillation; electrical cardioversion; pericardial calcification; egg-shell calcification; fluoroscopy; constrictive pericarditis; catheter ablation; pericardiectomy

Abbreviations: AF = atrial fibrillation; HR = hazard ratio; NYHA = New York Heart Association

A 59-year-old gentleman with history of hypertension was referred for ablation of persistent atrial fibrillation (AF). He had a history of surgical pericardiectomy performed 24 years earlier for constrictive pericarditis. The patient denied history of tuberculosis or bouts of acute pericarditis; he had no prior history of other thoracic surgery, chest irradiation or connective tissue disorder.

The patient had multiple recurrences of AF managed with amiodarone and a vitamin K antagonist oral anticoagulant, while he required electrical cardioversion several times in the past. However, this last recurrence had lasted for 3 months. This time he opted for pulmonary vein isolation which was performed with use of cryoballoon ablation. During fluoroscopy, an eggshell calcification of the heart was imaged (**Fig**. 1). He denied symptoms of constrictive pericarditis, such as dyspnea on exertion, fatiguability or peripheral edema.

The procedure was uncomplicated and he was discharged home in sinus rhythm. This lasted only for 4 months with ensuing recurrence of the arrhythmia. He underwent a second ablation procedure, where 2 pulmonary veins which showed reconnection were re-isolated. However, the arrhythmia did not respond to cardioversion, while a multifocal atrial rhythm was subsequently noted and the patient remained on drug therapy for rate control. Anticoagulation therapy was continued indefinitely. Echocardiography showed a left ventricular ejection fraction of 60% and no signs of pericardial constriction.

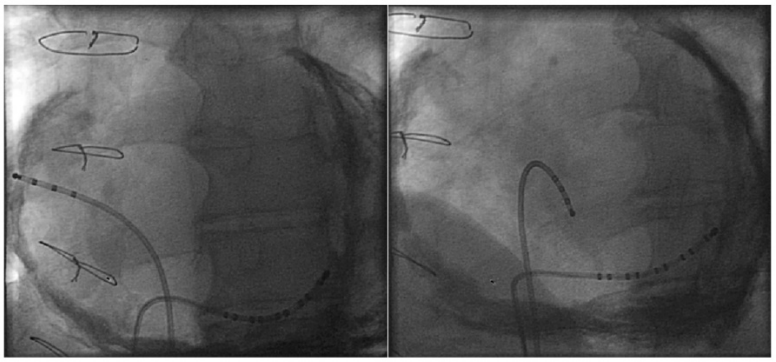

Figure 1. Left anterior oblique (LAO) fluoroscopic views of the heart are shown, a shallow and a steeper view, illustrating the circumferential heavy egg-shell calcification of the pericardium. The images were taken during the ablation procedure (two multipolar intracardiac electrode catheters are also shown)

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Extensive eggshell calcification of the pericardium, as seen in this case, is rare.[1] Even rarer is the lack of symptoms and signs of constrictive pericarditis despite the presence of diffuse pericardial calcification. Of course, the initial presentation of constrictive pericarditis 24 years earlier was symptomatic with right heart failure symptoms and signs of constriction that led to pericardial surgery. Apparently, there was incomplete resection of the pericardium during initial surgery; however, this did not lead to recurrence of symptomatology. Reasons for incomplete resection remain unknown in this case, but resection is not feasible when part of the pericardial calcification is adherent to the myocardium.[2] Due to current lack of symptoms and signs, the patient did not undergo hemodynamic assessment via cardiac catheterization.

Historically, tuberculosis pericarditis is a main cause of constrictive pericarditis and pericardial calcification, while other causes may include recurrent bouts of idiopathic viral pericarditis, trauma, cardiac surgery, radiation, connective tissue diseases and malignancy.[3,4] In a consecutive series of 135 patients (age 56±16 years) with constrictive pericarditis confirmed surgically (n=133) or by autopsy (n=2), pericardial calcification was seen in 36 patients (27%). The cause of constrictive pericardial disease was indeterminate in 67% of patients with pericardial calcification and in 21% of patients without.[5] Patients with pericardial calcification had had symptoms for a longer period and more perioperative deaths, while late survival was similar in both groups.

Although extensive pericardial calcification did not produce clinical symptoms of right heart failure in our patient, one may still consider the development of AF in this patient as a consequence of his calcific pericardial disease. Indeed, according to a study of 44 patients with constrictive pericarditis, of whom 13 (29.5%) had AF, calcification was seen in 11 (25%) of the whole group; AF was much more common in those with calcification than those without (odds ratio, 7.87, P=0.008), while the chance of developing AF increased by 27% by each year of disease duration (P=0.025).[6] The authors concluded that in patients with constrictive pericarditis, the presence of pericardial calcification and the increasing disease duration are associated with a higher chance of developing AF.

Asymptomatic pericardial calcifications can be assessed via cardiac computed tomography;[7,8] such calcifications have been detected in 17 (1%) individuals in a study of 1812 consecutive patients without signs of pericardial constriction on the echocardiogram who underwent electron-beam tomography for coronary artery calcium scoring.[9] Interestingly, only about one third of patients with calcified pericardium may have signs and symptoms of constrictive pericarditis. On the other hand, not all patients with constrictive pericarditis have pericardial calcification, with only ~50% of them showing pericardial calcification on plain chest radiographs, indicating that the absence of calcification does not exclude constrictive pericarditis.[7,10] Searching the literature did not reveal any previous case imaged via plain fluoroscopy as in the current case.

Long-term clinical outcomes after pericardiectomy relate to the underlying etiology and the patient's preoperative clinical condition, according to the results of a retrospective study of 45 patients (age, 59±14 years) who underwent pericardiectomy for constrictive pericarditis.[11] The 5-year event-free survival was 65%. Patients with idiopathic disease and tuberculosis-related constrictive pericarditis had favorable outcomes compared with post-cardiac surgery constrictive pericarditis; 5-year event-free survival: idiopathic, 80%; tuberculosis, 100%; post-cardiac surgery, 52%. Higher age (hazard ratio-HR 2.51), preoperative AF (HR 3.25), advanced NYHA class (HR 3.92), and increased pulmonary artery pressure (HR 1.06) were predictors of cardiac events.

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