

# Severely Calcified Constrictive Pericarditis Simulating a Mediastinal Tumor and Obstructing the Right Ventricular Inflow Tract

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**We report a rare case of constrictive pericarditis that simulated a large mediastinal tumor obstructing the right ventricular inflow tract. A 58-year-old woman was referred to our hospital because of a recent increase of dyspnea and facial edema. Computed tomography revealed severely thickened calcification, including a low-density area, presenting as a mediastinal tumor, compressing the right ventricular inflow tract. A complete resection was performed, and her symptoms dramatically improved. Idiopathic constrictive pericarditis was diagnosed pathologically. (Ann Thorac Cardiovasc Surg 2007; 13: 410–412)**

**Key words:** constrictive pericarditis, mediastinal tumor

## Introduction

Constrictive pericarditis (CP) is an uncommon post-inflammatory disorder characterized by pericardial thickening, myocardial constriction, and impaired diastolic filling. Small fluid collections are commonly observed between adhesions in patients with CP; however, reports of large amounts of fluid collection, presenting as mediastinal tumor, are rare. We report idiopathic CP that stimulated a mediastinal tumor, resulting from a large hematoma formation that obstructed the right ventricular inflow tract.

## Case Study

A 58-year-old female had occasionally been treated with a diuretic for facial edema. She was referred to our hospital because of a recent increase of dyspnea on effort.

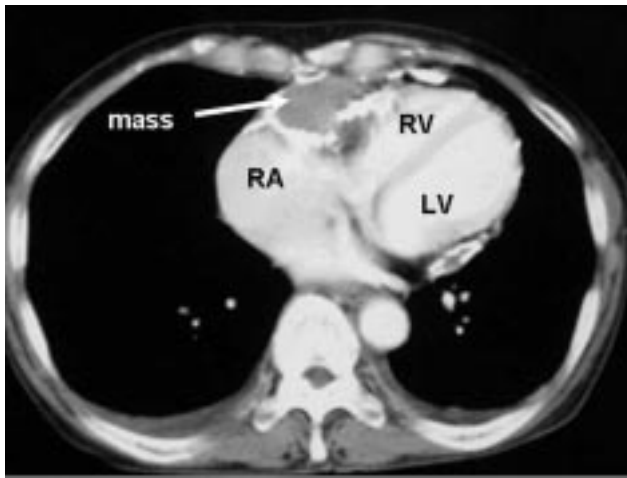
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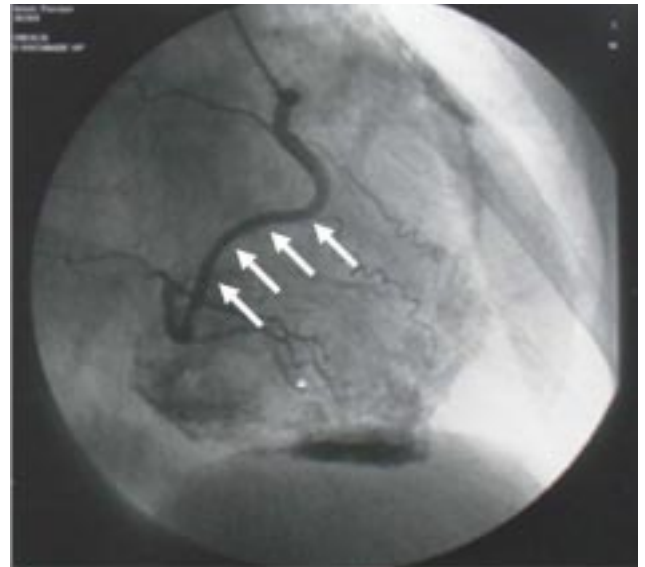
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Her New York Heart Association (NYHA) function was class III. A chest X-ray showed calcification around the heart, but without cardiomegaly and congestion in the lungs. Two-dimensional echocardiography showed normal left ventricular function, though right ventricle and atrium were compressed. Chest-computed tomography revealed the formation of a severely thickened calcified mass, presenting as a mediastinal tumor and compressing right ventricular inflow tract (Fig. 1). Cardiac catheterization was undertaken. The patient's right coronary artery was compressed while the left one was normal (Fig. 2). We tried to perform a pressure study, but the pressure-monitoring catheter could not pass the tricuspid valve, probably because of the stenosis of the right ventricular inflow tract. We considered several diseases in our preoperative diagnosis, including a mediastinal tumor such as a teratoma, and idiopathic or tuberculous CP. Several tumor markers were measured, and those levels were within normal range; the patient's tuberculous response was negative.

Under an undetermined preoperative diagnosis, surgical resection was performed. The patient was placed in a supine position under general anesthesia, and the chest was entered through a median sternotomy. Before sternotomy, her central venous pressure (CVP) was 22 mmHg. The dissection was started from the anterior surface of



**Fig. 1.** Computed tomography shows a severely calcified mass compressing the right atrium (RA), the right ventricle (RV) with its inflow narrowed, and an enlargement of the right atrium.



**Fig. 2.** Right coronary angiography showing that segments 2 and 3 are compressed and meandered (arrows).

the right ventricle toward the mass on the right atrioventricular groove. The contents of the mass appeared like old coagulated blood (Fig. 3). After a complete resection of the calcified pericardium and mass, her CVP dramatically decreased to 8 mmHg. The patient was extubated 6 h after surgery, and her postoperative course was uneventful. NYHA improved to class I, and the patient was discharged on the 14th postoperative day.

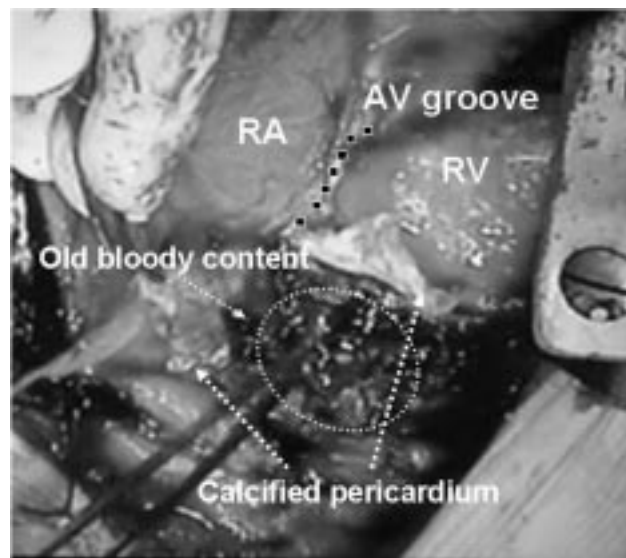
A pathological examination of the resected specimen demonstrated noncellular fibrosis with nonspecific inflammatory change. The pathological diagnosis was compatible with idiopathic CP. Polymerase chain reaction (PCR) culture of the specimen of pericardium and pericardial fluid revealed no tubercle bacilli. The final diagnosis was idiopathic CP.

## Discussion

Thoracic surgeons are frequently faced with having to evaluate and treat anterior mediastinal masses. Several differential diagnoses are considered for masses with calcification in the anterior mediastinum; a mediastinal tumor such as a teratoma, hemopericardium after blunt trauma,<sup>1,2)</sup> and idiopathic or tuberculous CP. A computed tomography scan is generally performed to assist in making a diagnosis and to evaluate how widely and invasively the mass extends. Teratomas are germ-cell tumors that often have well-defined smooth or lobulated margins, and they have heterogeneous attenuation with soft tissue fluid,

fat, and calcium components.<sup>3)</sup> CP is an uncommon postinflammatory disorder characterized by pericardial thickening, myocardial constriction, and impaired diastolic filling. The most common etiologies of this disorder are viral infection, renal failure, tuberculosis, radiation therapy, collagen vascular disease, prior pericardiotomy, and idiopathic CP.<sup>4)</sup> Blunt chest trauma is also one of the causes of CP, occasionally accompanied with localized mass.<sup>1,2)</sup> However, in the present case the patient had no history of blunt trauma in the chest. Tuberculous pericarditis often results in severe calcification of the pericardium and in anterior mediastinal granulomatous mass formation. In the present case, idiopathic CP was considered, but tuberculous pericarditis could not completely be ruled out. It was possible that chronic constrictive tuberculous pericarditis had healed and therefore showed no tubercle bacilli in culture or by PCR.

Clinicians sometimes encounter small collections of fluid entrapped between adhesions in patients with CP. However, reports of a large fluid collection are extremely rare. The giant mass observed in the case presented here consisted of a thick layer of calcified tissue within the pericardial cavity. In the cavity was old, partially coagulated bloody fluid. The patient's previous disease history, clinical course, pathological examinations of the resected pericardium, and the content of the mass showed no specific etiology for its formation or calcification of the pericardium. The mechanism by which such a large amount of fluid was entrapped within the mass was unclear. One



**Fig. 3.** Old bloody contents surrounded by severely calcified pericardium are observed on the atrial-ventricular (AV) groove. RA, right atrium; RV, right ventricle.

mechanism speculated was that inflammatory change in pericardium leads to neovascular, which is often fragile, easily ruptured, and results in a large amount of blood in the cavity. Indeed, blood was confined in the cavity.

Pericarditis is a common cause of obstruction of cardiac structures. Several cases of right ventricular outflow tract obstruction<sup>5)</sup> or narrowing of the mitral orifice resulting from circumferential calcification by annular CP<sup>6)</sup> have been reported. However, there is only one report<sup>7)</sup> of a case in which the right ventricular inflow tract was obstructed because of chronic CP. It needs to be remembered that CP can form a large mass, which is difficult to preoperatively distinguish from a mediastinal tumor, and it might obstruct the cardiac chamber, including the right ventricular inflow tract.

## References

1. Isaacs D, Stark P, Nichols C, et al. Post-traumatic pericardial calcification. *J Thorac Imaging* 2003; **18**: 250-3.
2. Lin HS, Liu HC, Huang WC, et al. Delayed hemopericardium with constrictive pericarditis after blunt trauma: a report of a surgical case. *Ann Thorac Cardiovasc Surg* 2006; **12**: 428-31.
3. Yang SC, Cameron DE. Anterior mediastinal masses. In: Jones DR ed.; *Current Therapy in Thoracic and Cardiovascular Surgery*. Philadelphia: Mosby, 2004; pp 327.
4. Cohn LH, Edmunds LH Jr. Cardiac surgery in the adult. In: Mangi AA, Torchiana DF eds.; *Pericardial Disease*, 2nd ed. New York: McGraw-Hill, 2003; pp 1359-71.
5. Nishimura RA, Kazmier FJ, Smith HC, et al. Right ventricular outflow obstruction caused by constrictive pericardial disease. *Am J Cardiol* 1985; **55**: 1447-8.
6. Mounsey P. Annular constrictive pericarditis. With an account of a patient with functional pulmonary, mitral, and aortic stenosis. *Br Heart J* 1959; **21**: 325-34.
7. Isobe M, Yamaoki K, Sugiyama T, et al. Right ventricular inflow obstruction due to giant hematoma formed by chronic constrictive pericarditis. *Intern Med* 1993; **32**: 346-9.