Constrictive Pericarditis With Intrapericardial Abscess
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Figure 1. (A) Axial planes of chest computed tomography scanning show the widespread pericardial calcification. (B) Frontal view of 3-dimensional reconstitution of chest computed tomography (3D-CT). (C) Frontal view of 3D-CT without ribs or spine. (D) Right lateral view of 3D-CT without ribs. 3D-CT shows the broad, pericardial calcification especially on the visceral, caudal and sinister sides.
A 67-year-old man presenting with persistent high fever (>38°C) was admitted to hospital. He had a medical history of unoperated constrictive pericarditis, and several other complications such as previously surgery for Budd-Chiari syndrome, chronic hepatitis C infection and previous esophageal transection because of bleeding from esophageal varices. Laboratory data showed leukocytosis (22,000/μl) and elevated C-reactive protein (32 mg/dl). He immediately underwent whole-body computed tomography, which revealed only the known pericardial calcification (Figure 1). Furthermore, transthoracic echocardiography revealed no remarkable findings except for rapid atrial fibrillation and the known constrictive pericarditis. No obvious focus of infection was found.

Multiple blood cultures were positive for methicillin-resistant *Staphylococcus aureus* (MRSA) and intensive intravenous antibiotic therapy was initiated to the unknown focus of the MRSA infection; however, his general condition gradually worsened and he died on hospital day 31 from uncontrolled MRSA infection and multi-organ dysfunction. We performed only a partial autopsy of his heart according to the wishes of his family.

The cardiac autopsy study revealed remarkable abscess formation between the heavily calcified pericardium and myocardium (Figure 2). There was no evidence of infectious endocarditis. Culture of pus from the abscess proved the existence of MRSA. No other major complication was detected. Retrospective study of echocardiography and computed tomography images failed to detect the abscess cavities.

Constrictive pericarditis is the result of scarring and consequent loss of the normal elasticity of the pericardium. Intrapericardial abscess is a rare complication of constrictive pericarditis; there is only one reported case of intrapericardial abscess formation, so its pathological and clinical demographics are unknown. In the previously reported case, the causative microorganism was *Mycobacterium tuberculosis*. We are

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**Figure 2.** Cardiac autopsy study revealed intrapericardial abscess formation. There was remarkable pus and granulation tissue between the adhesive, thick pericardium and myocardium. (A) Focused view of the left ventricle to the heavily calcified, thick pericardium. (B) A creamy pus-filled abscess cavity occupies the space from just inside the thick pericardium to the subepicardial myocardium. (C, D) Microscopically, the thick pericardium shows heavy calcification. Numerous neutrophils, lymphocytes and macrophages corresponding to abscess are located inside the calcified pericardium. Inflammation has expanded into the cardiac muscle tissue and replaced muscle with granulation tissue. Small number of neutrophils can be seen in the cardiac muscular tissue around the left ventricular exit zone. (Magnification C: x100, D: x400.) Ao, ascending aorta (sectioned); LV, left ventricle; RA, right atrium. *Calcified pericardium (edge).*
reporting the first case of a constrictive pericarditis with MRSA intrapericardial abscess, which seems to be the result from hematogenous spread.

Constrictive pericarditis can occur after practically any pericardial disease process, including infectious pericarditis. In a recently reported case series, idiopathic or viral pericarditis accounted for 42–49%, and tuberculous or purulent pericarditis accounted for 3–6% of patients with constrictive pericarditis.5,6 On the other hand, there is insufficient knowledge of the infectious complications in patients with chronic constrictive pericarditis.

Myocardial abscess without infective endocarditis was a differential diagnosis of this case, and it also is rare and potentially fatal. Common organisms for myocardial abscess include Staphylococcus aureus, anaerobes and Gram-negative bacilli, and immunocompromised patients are at increased risk.4 Localized purulent pericarditis (also known as pericardial abscess) was an alternative differential diagnosis, and it is pathologically similar to myocardial abscess.5,6 These conditions are assumed to result from hematogenous spread or direct spread from an adjacent infectious focus, trauma or surgery. The symptoms and physical findings in patients with intrapericardial abscess might be similar in these pathologically similar conditions. Echocardiography and computed tomography are useful for diagnosis of localized purulent pericarditis. Ultimately, however, the diagnosis of localized purulent pericarditis is established by obtaining pericardial fluid for culture and microscopy. However, in patients with constrictive pericarditis, such as in the present case, the pericardial cavity is typically obliterated and less likely to form a localized purulent pericarditis. The myocardial abscess is usually concomitant with endocarditis and is very rare without endocarditis.7 Because no signs of endocarditis were found, we thought myocardial abscess was less likely in this case.

In computed tomography or echocardiography images, heavily calcified tissues create surrounding image artifacts,8,9 making it difficult to distinguish true tissue changes from these artifacts. In the present case, the artifacts might have obscured the true diagnosis of intrapericardial abscess.

In general, implanted artificial materials or hypovascular tissues are vulnerable to infection because of poor tissue migration of leukocytes or antibiotic agents. It is reported that unresected and chronically calcified residual pericardium can serve as a nidus for bacterial infection 10 years after pericardiectomy.10 In the present case, the heavily calcified pericardium may have been vulnerable to infection, such as from implanted artificial materials.

In conclusion, we present a rare case of constrictive pericarditis with MRSA intrapericardial abscess. Antemortem diagnosis and treatment were very difficult. In septic patients with constrictive pericarditis, intrapericardial abscess should be high on the list of differential diagnoses.

References