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Case Report

Contrast-enhanced magnetic resonance imaging to detect chronic aortic dissection complicated by acute aortitis

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ABSTRACT

When chronic aortic dissection (CAD) is associated with aortic dilatation, the risk of aortic rupture increases. We report a case of CAD complicated by acute aortitis that was depicted in contrast-enhanced magnetic resonance imaging (MRI). Contrast-enhanced MRI allows early detection of subtle changes in the aortic wall as well as disease activity. Inflammation of aortic wall in the aortic dissection can be at higher risk of the dissected aortic expansion and rupture. When we recognize inflammation of unknown origin with CAD, contrast-enhanced MRI should be performed to rule out CAD complicated by acute aortitis may lead to catastrophic complications.

Introduction

Chronic aortic dissection (CAD) is followed up to evaluate aortic diameter and false lumen closure status to prevent from any progression of the condition. The prognosis of CAD depends on the presence of a thrombosed false lumen and the level of blood pressure control. It has been also suggested that inflammation in the dissected aortic wall is at higher risk of rupture [1]. We report a case of CAD complicated by acute aortitis diagnosed in contrast-enhanced magnetic resonance imaging (MRI).

Case report

A 41-year-old man presented upper abdominal pain and a fever of 38°C. He had a history of surgeries for Stanford type A acute aortic dissection and had been followed up for residual distal dissections since 10 months before. He was admitted to our hospital with expansion of false lumen in aortic dissection on computed tomography (CT). Contrast-enhanced CT revealed that the maximum short diameter of false lumen expanded from 35 mm in the point of 6 months ago to 45 mm and slightly contrast enhancement in

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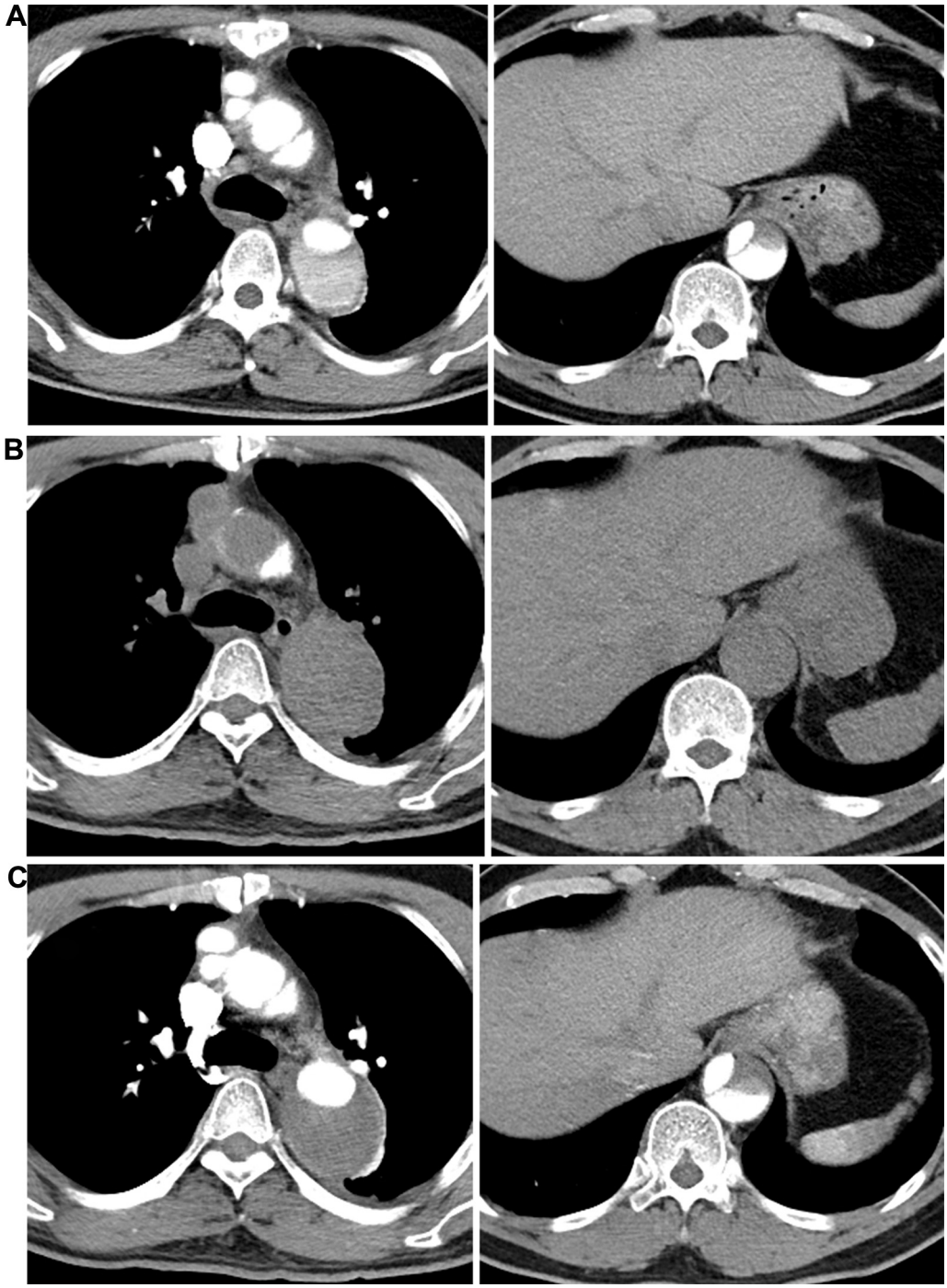

Fig. 1 – Contrast- and non–contrast-enhanced computed tomography (CT; 6 months ago [A], on admission [B], [C]) showed expansion of false lumen in aortic dissection.

a part of the lateral margin of aorta which was not enough clear to refer to as significant lesion on admission (Fig. 1). Laboratory data on admission showed slight elevations in serum levels of C-reactive protein (CRP) to 1.82 mg/dL and fibrinogen to 409 mg/dL. The D-dimer levels also showed elevation to 10.0 μg/mL.

On admission, although the need for surgical or endovascular intervention was considered, we had to search for the source of fever and inflammation to prevent serious postoperative complication before surgical treatment. His upper abdominal pain and fever remained, and CRP levels showed marked elevation to 18.28 mg/dL on the 5th day of admission. Although we suspected infection and performed contrast-enhanced CT on the 15th day and gallium-67 (67Ga) scanning on the 22nd day to search for the source, there was no finding of infection and inflammation (Fig. 2). Contrast-enhanced MRI was performed on the 26th day because CRP levels remained high. Gadolinium-enhanced fat-suppressed

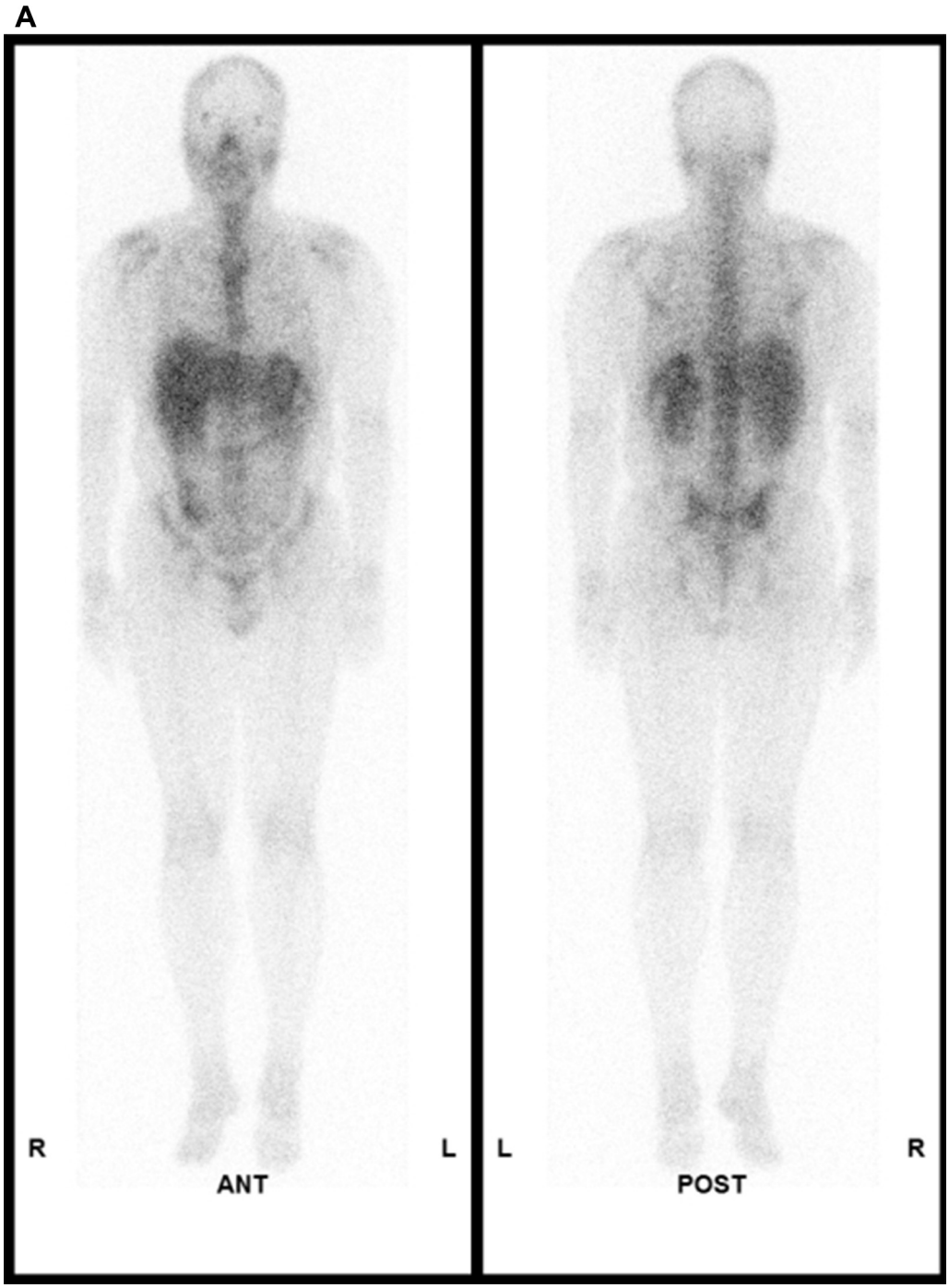

Fig. 2 – (A-C) Gallium-67 showed no finding of infection and inflammation.

T1-weighted image showed enhancing of tunica adventitia of the descending dissected aortic wall and diffusion weighted image with a low b value show edema of surrounding the lesion (Fig. 3). We diagnosed CAD complicated by acute aortitis. We could exclude rheumatic diseases based on serologic tests and his medical history. Although there was no evidence of systemic infection including negative results on blood and urine cultures, we initiated antibiotic therapy according to suspected infectious aortitis. His upper abdominal pain improved, the CRP level decreased, and CT revealed reduction of the expanded false lumen over time after treatment (Fig. 4). He was discharged without other complications.

Discussion

When CAD is associated with aortic dilatation, the risk of aortic rupture increases. In this case, it was found that aortitis

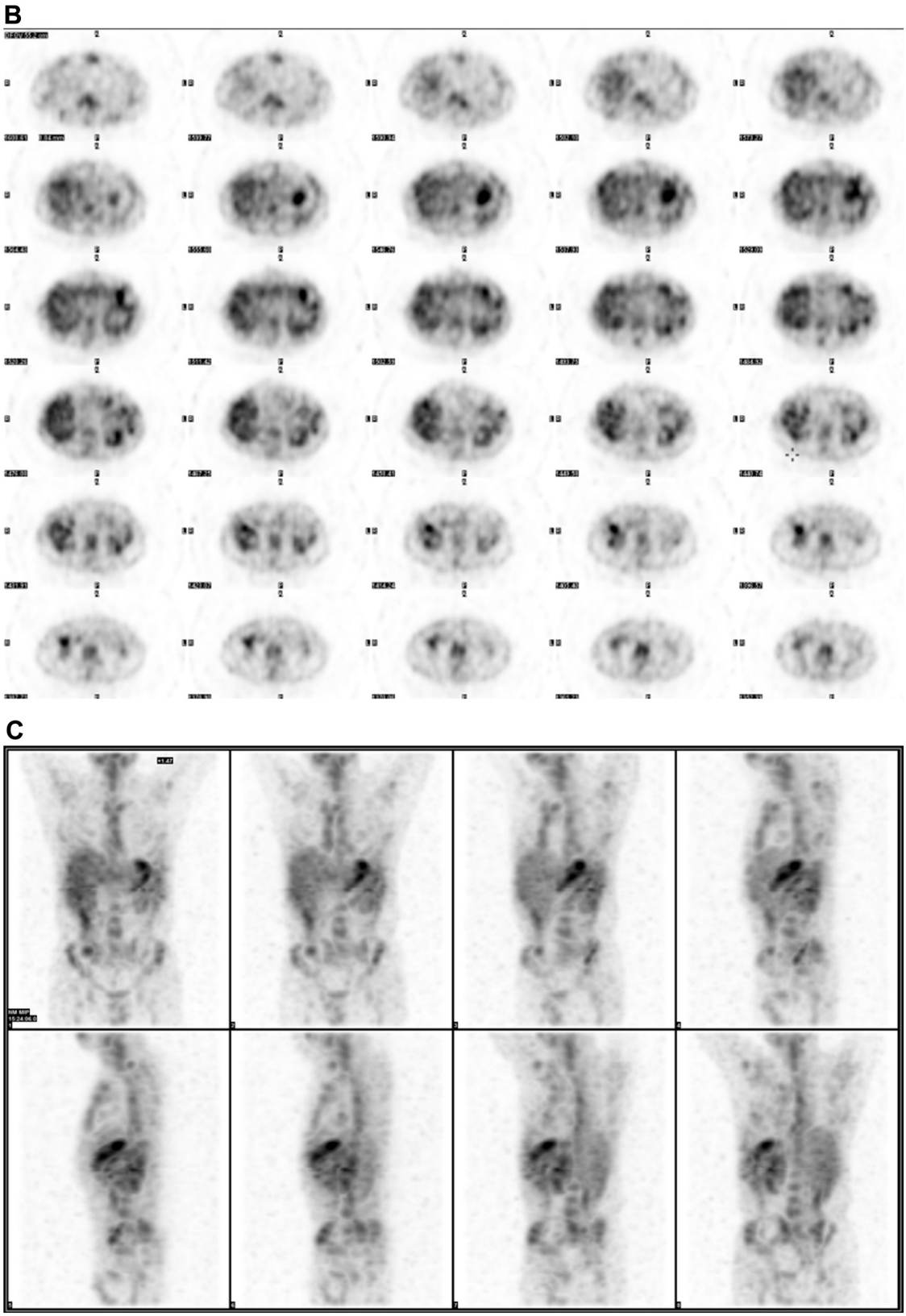

Fig. 2 – (*continued*).

was developed in CAD and contrast-enhanced MRI was useful to detect inflammation of dissected aortic wall. To our knowledge, this is the first case report to describe CAD complicated by acute aortitis.

A recent study showed that the aortic expansion and rupture were associated with massive neutrophil accumulation in the tunica adventitia of the dissected aorta [2]. The severely damaged aortic wall may more easily expand, may be

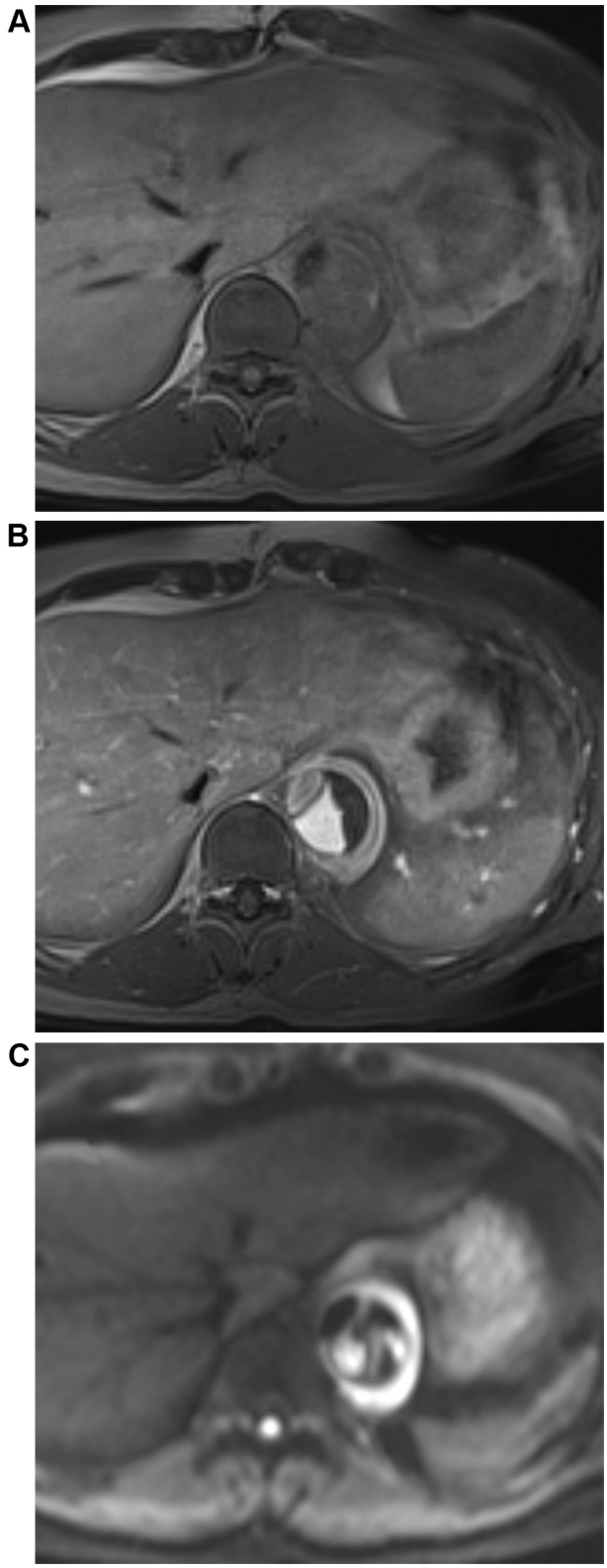

Fig. 3 – Gadolinium-enhanced fat-suppressed T1-weighted image showed enhancing of tunica adventitia of the descending dissected aortic wall (B) compared with pre-enhanced fat-suppressed T1-weighted image (A), and diffusion-weighted image using a low b value show edema of surrounding the lesion (C).

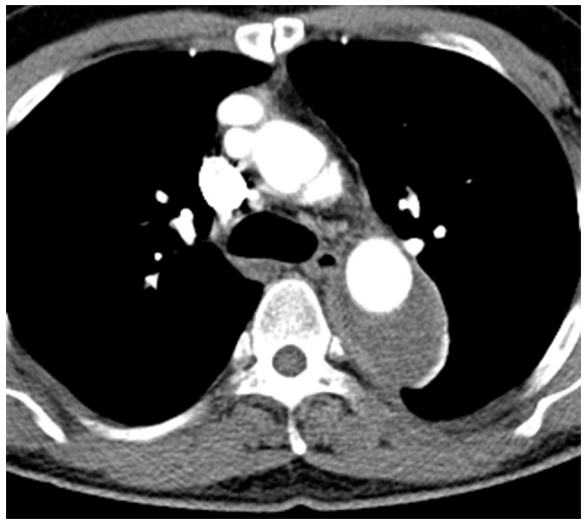

Fig. 4 – Contrast-enhanced CT on the 40th day of admission showed reduction of false lumen in aortic dissection after treatment.

more prone to redissect, and may be at higher risk of rupture during the chronic phase [2]. Although it is unknown that this mechanism has relevance to our case, inflammation of aortic wall in the aortic dissection is an important response to predict prognosis.

Aortitis is often overlooked during the initial work-up because of nonspecific clinical features. An imaging approach is often required for diagnosis and assessment of the aortic wall and lumen. Noninvasive imaging modalities such as CT, MRI and nuclear medicine studies, such as positron emission tomography using 18-fluorine fluorodeoxyglucose and 67Ga scanning, are useful in the diagnosis, assessing disease activity of inflammatory for aortitis [3]. CT is excellent imaging modality to evaluate cause of the inflammation including aortitis rapidly and should be commonly the initial imaging study. However, in this case, we could not identify in initial contrast-enhanced CT or 67Ga inflammation of aortic wall that was depicted clearly in contrast-enhanced MRI as inflammation in the tunica adventitia of the dissected aorta which may reflect adventitial mononuclear infiltration and perivascular cuffing of the vasa vasorum in early stages of aortitis. Contrast-enhanced MRI allows early detection of subtle changes in the aortic wall as well as disease activity [3].

Aortitis can be classified into infectious and noninfectious aortitis. Noninfectious aortitis may develop secondary to a wide spectrum of rheumatic diseases including Takayasu arteritis and giant cell arteritis, idiopathic conditions, and as a result of radiation exposure [4]. Suspected infectious aortitis requires rapid antibiotic therapy based on the results of culture. On the other hand, immunosuppressive therapy is the primary treatment of noninfectious aortitis such as rheumatic diseases. The optimal treatment of isolated idiopathic arteritis remains controversial [4]. The application of steroid therapy for isolated idiopathic arteritis should be

considered on a case-by-case basis, depending on the clinical presentation of the patient and the location and extent of inflammation [4]. Although there was no evidence of systemic infection including negative results on blood and urine cultures in this case, we initiated antibiotic therapy according to suspected infectious aortitis. We could exclude rheumatic diseases based on serologic tests and history of the patient. Although CRP level was decreased over time, etiology of this aortitis was not known for certain. CT also revealed that the expanded false lumen reduced over time with conservative therapy in this case. Therefore, conservative therapy such as antibiotics or steroids for CAD complicated by acute aortitis could obviate the need for surgical and endovascular intervention.

In conclusion, when we recognize inflammation of unknown origin with CAD, contrast-enhanced MRI should be performed to rule out aortitis of the dissected aorta which may lead to catastrophic complications. The expanded false lumen with aortitis could reduce with conservative therapy to obviate the need for surgical and endovascular intervention.

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