Colchicine reduced pericardial effusion due to postcardiac injury syndrome following cardiac resynchronization therapy implantation

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Background
Postcardiac injury syndrome is an inflammatory process involving pericardium [1]. Cevik et al. reported that postcardiac injury syndrome can develop following implantation of cardiac implantable electrophysiological devices (CIED) implantation [1]. NSAID therapy and steroid therapy have been shown to be effective treatments [1, 2]. We report a case of the disease following cardiac resynchronization therapy (CRT) implantation which was treated by only colchicine intake.

Case Report
An 87-year-old man was referred to our hospital with dyspnea. Based on the NYHA classification, his dyspnea exacerbated from class II to IV during 1 week. Although coarse crackle was not observed, pitting edema in the lower limbs was observed on physical examination. A 12-lead surface ECG showed bradycardia and revealed atrial fibrillation rhythm with left bundle branch block, and the width of QRS duration was 144 msec. Echocardiography demonstrated an ejection fraction of 30–40%. Despite medical therapy and cardioversion to sinus rhythm, his dyspnea still showed class III on the NYHA classification. After denying ischemic heart disease by coronary angiogram, we concluded the patient was a candidate for CRT. CRT implantation was performed without any complications (Fig. 1A). The patient’s left ventricular dysfunction improved clinically. One week after CRT implantation, he was discharged with no significant laboratory data, chest X-ray, and echocardiography data.

However, at 1-month follow-up, he complained of fatigue on exertion. Physical examination revealed no specific findings. Although the QRS morphology was not different from that at 1 week after CRT implantation, 12-lead surface ECG showed atrial fibrillation. In addition, heart enlargement was observed by chest X-ray. From the parameters of echocardiography, heart failure was negative. However, moderate pericardial effusion which was not observed at 1 week after CRT implantation was observed (Fig. 1B). Therefore, we suspected the fatigue...
must be caused by the increased pericardial effusion. Although computed tomography suggested atrial lead perforation (Fig. 2), anemia was not observed from the laboratory data and the value of the atrial lead impedance and sensing threshold were not different from those at 1 week after CRT implantation. The pericardial effusion which was observed by computed tomography was located not at the ipsilateral side of the atrial lead, but at the opposite side. From above findings, we concluded that the pericardial effusion was not due to lead perforation. Signs of cardiac tamponade were absent by echocardiography. In addition, despite the 2-week observation period, pericardial effusion did not increase. Therefore, we decided to continue observation with no treatment. However, at 3-month follow-up, his pericardial effusion gradually increased (Fig. 3A and B) with low-grade fever. Laboratory data showed elevation of inflammatory marker (CRP 7.51 mg/dL) with absence of anemia. Although he had a fever, it was a low-grade fever of 37.3°C. The WBC from the laboratory data was within normal of 7900/μL with normal fraction. In addition, the atrial lead impedance and sensing threshold were not different from those at 1 month after CRT implantation. Therefore, pericardial effusion due to infection or lead perforation was not suspected. From the above findings, postcardiac injury syndrome was suspected as the cause of effusion. Although treatment using colchicine is not as common as NSAIDs or steroids [1, 2] for the syndrome, colchicine is able to produces an anti-inflammatory effect with less side effects [3]. Treatment using colchicine was deemed preferable, to drainage of the effusion. Therefore, colchicine intake (1.0 mg/day) was started. After 3 days, inflammation marker started to decrease. Furthermore, the effusion was diminished at 1 month after the start of colchicine therapy (Fig. 3C).

**Discussion**

Although relatively uncommon, pericardial effusion was observed after implantation of CIED. The rate of occurrence is reported to range from 1.7% to 10.0% [4, 5]. Holmes et al. reported that the effusion is usually the result of lead perforation [6]. Ellenbogen et al. reported that lead perforation provokes increased lead pacing threshold and sensing threshold [7]. Ohlow et al. reported that pericardial effusion was observed in 10% of patients after CIED implantation. In addition, 1.5% of these patients progressed to cardiac tamponade requiring pericardiocentesis or surgical treatment [5]. In 70% of these patients, a bloody effusion suggested lead perforation.

![Figure 2. Computed tomography at 1 month after CRT implantation. Lead perforation was suspected. However, the atrial lead sensing threshold was not changed. In addition, the pericardial effusion was not observed ipsilateral side but opposite side.](image)
However, in the remaining 30%, pericardial effusion was suspected due to pericarditis [5]. The other patients whose increased pericardial effusion did not require drainage were managed conservatively or with anti-inflammatory therapy [5]. These pericardial effusion cases were observed during the perioperative period [4–6]. In our patient, pericardial effusion was observed after the perioperative period. In addition, the atrial lead impedance and sensing threshold had not changed. This is not consistent with past reports.

On the other hand, postcardiac injury syndrome following CIED implantation is rare. Gatzoulis et al. reported that the incidence was 0.1% [8]. In addition, the pericardial effusion was observed not during the perioperative period but after [1, 8]. Postcardiac injury syndrome is an inflammatory process involving pericardium [1]. This syndrome can develop after CIED implantation without obvious cardiac perforation [1]. Cevik et al. reported that this syndrome can develop at 7–56 days after implantation of CIED with pericardial effusion and low-grade fever in elderly patients1. These findings are consistent with this case.

Colchicine is able to inhibit various leukocyte functions and this effect leads to an anti-inflammatory action [3]. Although treatment using colchicine is not as common as NSAIDs or steroids for postcardiac injury syndrome, colchicine also produces an anti-inflammatory effect with less side effects. Therefore, colchicine seems to be an effective and safe treatment option for the syndrome. Actually, increasing pericardial effusion following CRT implantation diminished after colchicine intake was started in this case with no side effect.

**Conclusion**

Although treatment using colchicine is not as common as NSAIDs or steroids for postcardiac injury syndrome, colchicine also produces an anti-inflammatory effect with less side effects. Therefore, colchicine seems to be an effective and safe treatment option for the syndrome.

**Authorship**

TH: wrote and revised the manuscript and contributed to treating the patient. KA and YS: contributed to treating the patient and assisted in the preparation of the manuscript. KT: gave final approval of the manuscript. All authors have read and approved the final manuscript.

**Conflict of Interest**

The authors declare that they have no conflict of interest.

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