

Cardiovascular Imaging In-a-Month

A 70-Year-Old Woman With Cardiogenic Shock and Change in Acute Electrocardiogram Patterns

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CASE

A 70-year-old woman was emergently admitted with retrosternal chest pain. Initially her blood pressure was 90/60 mmHg with a heart rate of 60 beats/min. Soon after admission she lost consciousness. Electrocardiographic changes are shown in **Fig. 1**. Her blood pressure remained at less than 50/ - mmHg in spite of repeated intravenous administration of catecholamines.

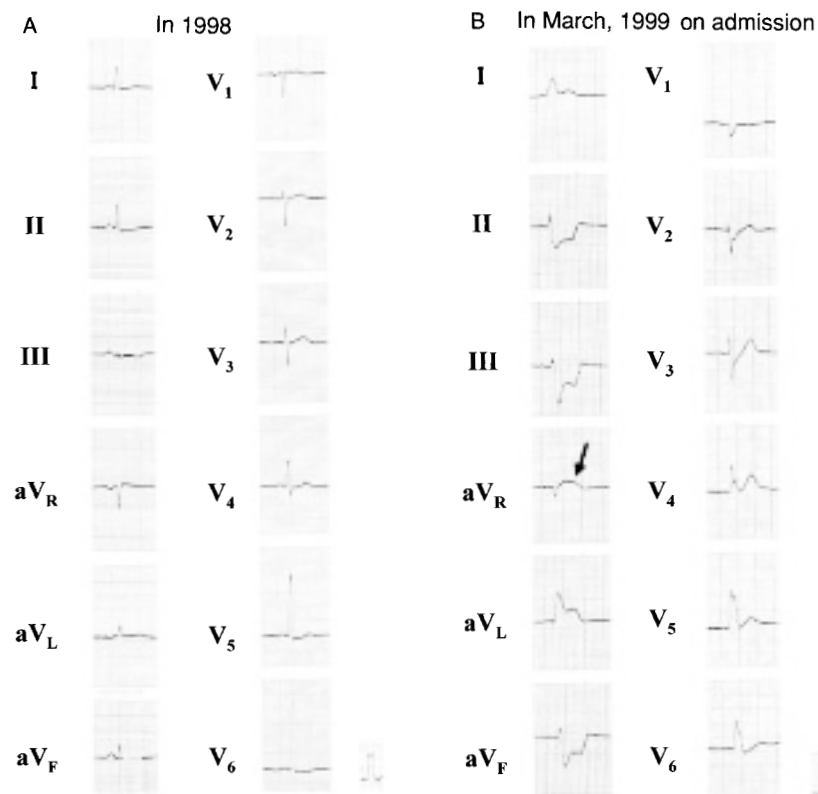


Fig. 1

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Points for Diagnosis

The patient had a history of coronary angioplasty in the left anterior descending artery(segment #6) for angina pectoris in 1995. In 1998, follow-up coronary catheterization revealed the site was still intact. In March 1999, she had intense chest symptoms, and was emergently brought to our hospital.

Fifteen minutes after admission electrocardiography(ECG) showed change to a right bundle branch block pattern coupled with mild ST elevation in the V_1 lead(Fig. 2 - A). Supporting intra-aortic balloon pumping, emergent coronary angiography was performed, which showed complete occlusion of the left main trunk(LMT) without collateral circulation(Fig. 2 - B - upper). The diagnosis was cardiogenic shock caused by acute extensive anterior myocardial infarction(Killip \leq class 3, Forrester \leq hemodynamic subset 3). As a consequence, the maximum level of creatine kinase(CK) was

14,310IU/l despite early successful coronary intervention(Fig. 2 - B - lower). Further, the right bundle branch block pattern in ECG persisted throughout her hospitalization. After 2 months she died of multiple organ failure.

Cardiogenic shock or sudden cardiac death frequently occurs in patients with acute LMT occlusion. Recently, this state has been described as left main shock syndrome¹⁾. Clinicians should appreciate the lethal nature of this state and consider invasive therapies without delay. Patients with acute LMT occlusion may show various cardiac rhythms including ventricular fibrillation, atrio-ventricular conduction block, idioventricular rhythm or cardiac arrest. Subsequent acute ECG changes include ST changes in various leads. ST elevation in both precordial and lateral leads reflects the extensive spread of anterolateral transmural ischemia. ST

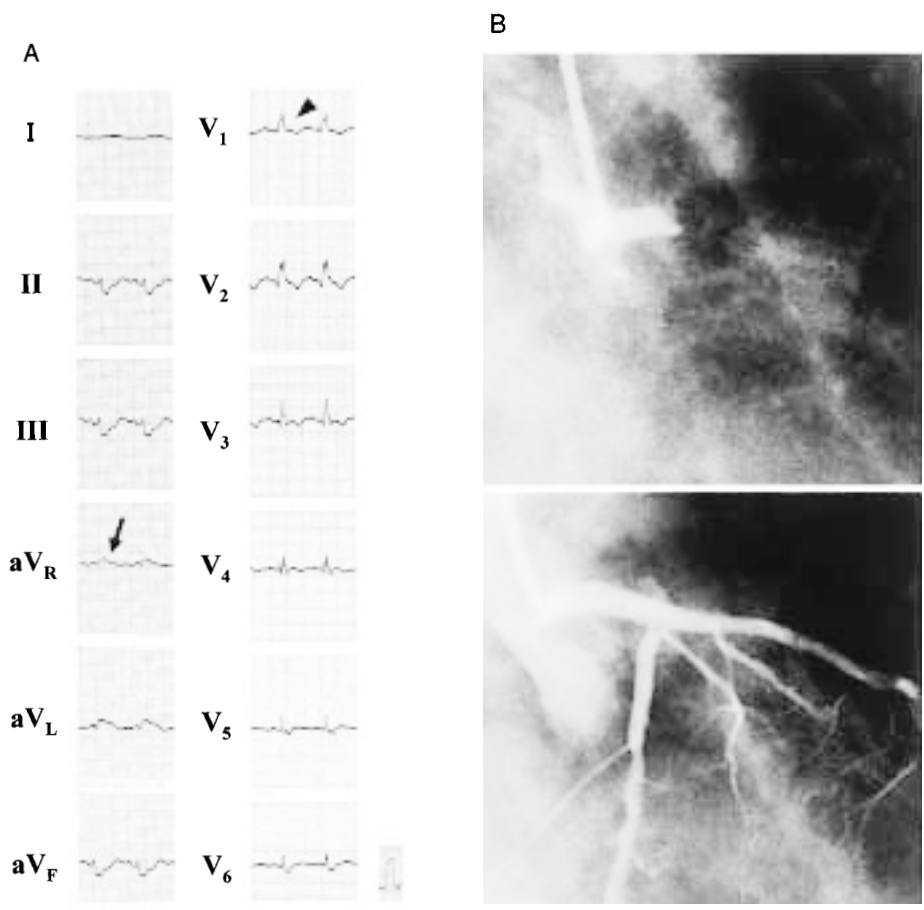


Fig. 2

depression in both precordial and lateral leads indicates severe damage to the anterolateral myocardial area. Significant ST depression in the inferior leads represents reciprocal change against a severe anterior myocardial lesion. In addition to such ST changes, complete right bundle branch block changes are frequently observed, which suggest an intracardiac conduction disturbance. ST elevation in lead V_1 (Figs. 2 - A, 3 - A, B; arrowheads) is associated with left anterior descending artery occlusion proximal to the first septal branch artery²). More importantly, ECG patterns indicating acute LMT occlusion include ST elevation in lead aVR (Figs. 1 - B, 2 - A, 3; arrows). This change suggests probable transmural ischemia of the basal region of the septum³). The aVR sign is often overlooked, but may be a powerful predictor of LMT occlusion^{2,4}). Other patients who presented with left main shock syndrome had similar signs and changes (Fig. 3).

Left main shock syndrome should always be included in the differential diagnosis of cardiac accidents. These ECG findings can provide simple,

swift and valuable information in an emergency.

Diagnosis: Left main shock syndrome/Acute LMT occlusion

References

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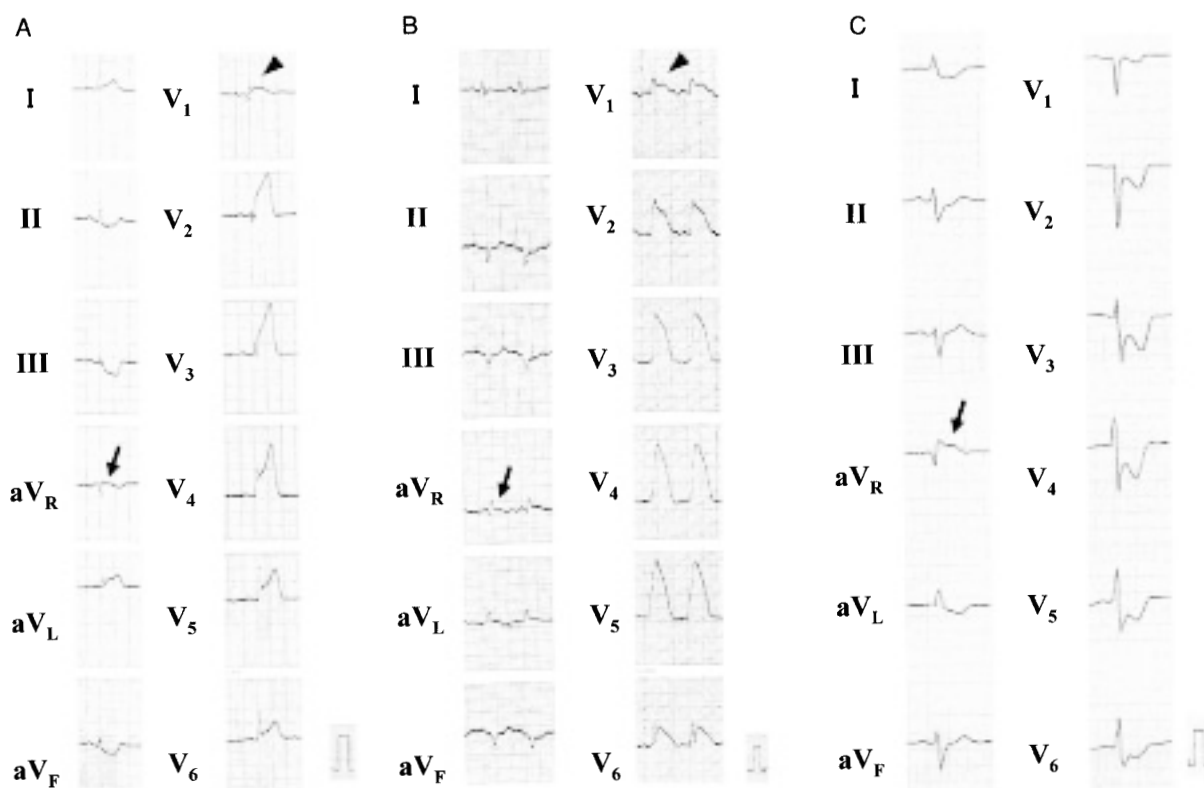


Fig. 3

Fig. 1 Electrocardiograms taken in 1998 (A) and on admission (B)

ST elevation in the lateral and a_R leads, and depression in the inferior leads were seen on admission.

Fig. 2 Electrocardiogram recorded 15 min after admission (A) and emergency coronary angiograms (B)

Right bundle branch block pattern coupled with ST elevation in lead of ₁ appeared. Coronary intervention (B - lower) recanalized a complete occlusion (B - upper) of the left main trunk.

Fig. 3 Electrocardiograms showing the characteristics of

left main shock syndrome

A: A 79-year-old man. Electrocardiogram showing ST elevation in the precordial and lateral leads, and ST depression in the inferior leads (maximum level of creatine kinase, 16,500 IU/l).

B: An 82-year-old woman. Electrocardiogram showing significant ST elevation in the precordial and a_R lead (maximum level of creatine kinase, 20,320 IU/l).

C: A 55-year-old man. Electrocardiogram showing ST depression in the precordial and lateral leads (maximum level of creatine kinase, 14,400 IU/l).

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