INTERNAL MEDICINE

□ PICTURES IN CLINICAL MEDICINE □

Low Electrocardiogram Voltage due to Anasarca

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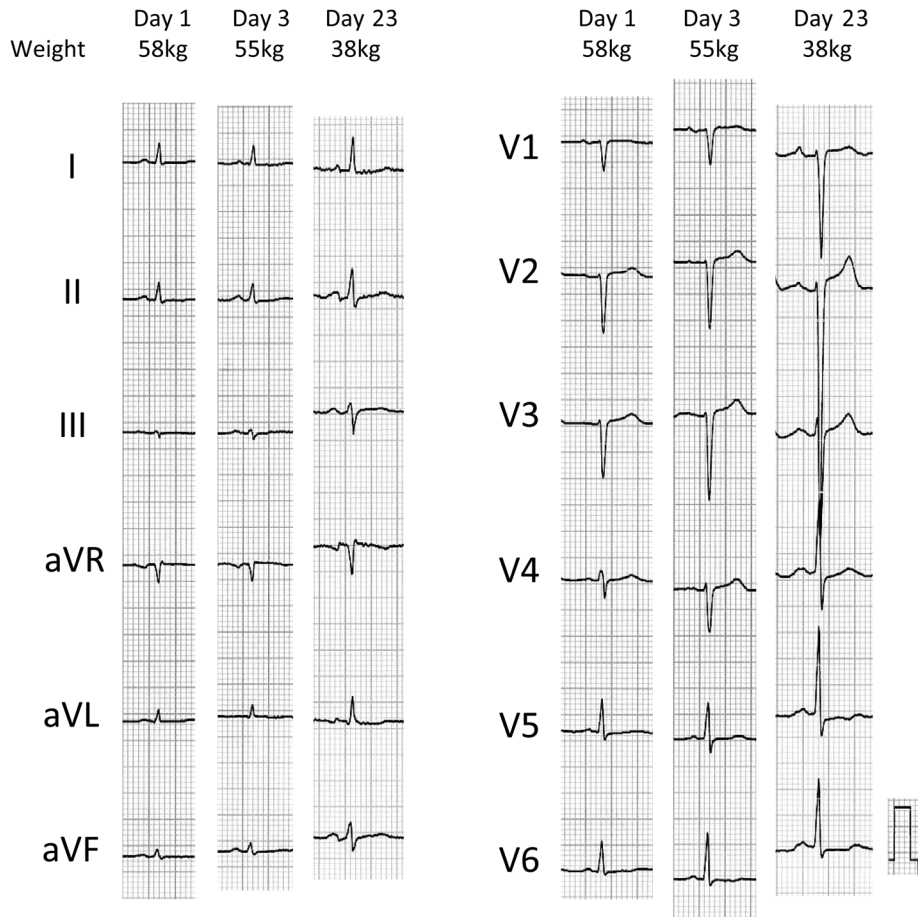

Picture 1. **Electrocardiogram on admission showed low voltage which gradually disappeared.**

A 66-year-old woman was admitted to our hospital because of exertional dyspnea and weight gain. On admission, her height was 145 cm, body weight was 58 kg, blood pressure was 224/139 mmHg, pulse rate was 120 per minute, and anasarca was observed on physical examination. Chest X-ray showed cardiomegaly and bilateral pleural effusion. Electrocardiogram (ECG) showed low voltage and flat T waves (Picture 1). Echocardiography showed reduced ejection fraction (28%) of the left ventricle with mild hypertrophy and mild pericardial effusion. Laboratory data indicated a low serum albumin level (2.4 g/dL), and elevated plasma B-type natriuretic peptide level (>2,000 pg/mL). Chest computed tomography (CT) showed bilateral pleural effusion and increased subcutaneous fluid. The patient was diagnosed as heart failure and treated by diuretics and antihypertensive agents. Anasarca was gradually diminished and her body

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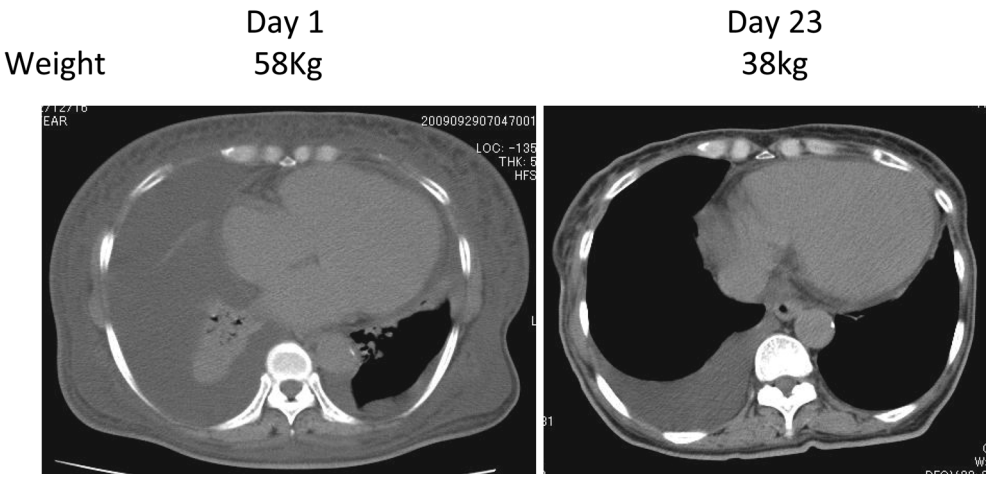

Picture 2. **Chest computed tomography on admission showed an increase in subcutaneous fluid which decreased on day 23.**

weight decreased to 38 kg on day 23. Follow-up ECG revealed gradually increased voltage of QRS complexes and ST-T changes (Picture 1), and chest CT showed decreased subcutaneous fluid (Picture 2). Madias et al reported that attenuation of ECG voltage in patients with anasarca is correlated with weight gain, and it could be attributed to a shunting of the cardiac potentials due to the low resistance of the anasarca fluid (1). Though the patient was suspected of cardiac amyloidosis on the basis of ventricular hypertrophy and low ECG voltage on admission, follow-up ECG recordings lead to the correct diagnosis of hypertensive heart failure.

Reference

1. Madias JE, Bazaz R, Agarwal H, Win M, Medepalli L. Anasarca-mediated attenuation of the amplitude of electrocardiogram complexes: A description of a heretofore unrecognized phenomenon. J Am Coll Cardiol **38**: 756-764, 2001.