

Various Explanations for the Phenomenon of Low Voltage in Patients with Hypothyroidism

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We read with interest the study by Yamanaka et al. [1], which demonstrated that in patients with hypothyroidism, attenuated QRS voltage is related to the presence of pericardial effusion and the severity of hypothyroidism. Additionally, there was a non-significant trend toward lower albumin levels in patients with low voltage.

Attenuation of voltage can have various reasons and different pathophysiologic explanations. According to Ohm's law, voltage is inversely proportional to resistance. Pericardial effusion clearly increases resistance and can explain low voltage although little is known to what extent the volume and composition of the effusion affects

voltage. Another reason for increased resistance could be oedema in the tissues between the myocardium and the ECG electrode. It is well known that severe hypothyroidism is associated with pretibial myxoedema, but massive lymphoedema has been described in different body parts in the past [2]. We recently demonstrated temporary loss of voltage after defibrillation or cardioversion [3] and believe that temporary skin oedema in the precordial region could have explained this phenomenon.

In patients with isolated (or predominant) precordial low voltage anatomical factors should also be taken into consid-

eration. We assessed the phenomenon of low voltage in patients with ascites and demonstrated that attenuated voltage could be partially corrected if the precordial electrodes were placed one or two intercostal spaces cranially [4]. Having in mind that severe hypothyroidism is associated with ascites [5] and that there was a trend toward lower albumin values in the study by Yamanaka et al. [1], we believe that the presence of ascites should be actively assessed when severely hypothyroid patients are diagnosed with low voltage. As demonstrated in our study, drainage of ascites normalizes the ECG in these patients.

References

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