An unusual cause of T-wave inversion

M.B. Nienhuis, J.P. Ottervanger, W.P. Beukema

Figure 1.

A 22-year-old female was referred for dyspnoea and chest pain. There was no previous medical history and she was not taking any medication or drugs, but she was a smoker. There was no family history of is-

chaemic heart disease. She complained of dyspnoea and right thoracic chest pain for several hours which had started at rest. Physical examination showed a tachypnoeic, agitated woman. Physical examination was otherwise normal. The electrocardiogram (ECG) revealed sinus rhythm with symmetrical T-wave inversion in the precordial leads V_4 to V_6 , III and aVF (figure 1). Blood samples showed normal values, including total cholesterol, except a low potassium (3.2 mmol/l). Arterial blood gas analysis was abnormal with pH 7.68, pCO_2 1.7 kPa, pO_2 16.5 kPa, HCO_3^- 15.4 mmol/l, BE -5.4 mmol/l and O_2 saturation 99%. Chest X-ray and echocardiogram were normal. She refused to breathe into 'the plastic bag'. Instead, oxazepam 10 mg orally was administered. After two hours she had re-

M.B. Nienhuis
J.P. Ottervanger
W.P. Beukema

Department of Cardiology, Isala Clinics, Zwolle,
the Netherlands

Correspondence to: W.P. Beukema
Department of Cardiology, Isala Clinics, PO Box 10500,
8000 GM Zwolle, the Netherlands
E-mail: v.r.c.derks@isala.nl

Figure 2.

covered completely. The repeated ECG normalised almost completely (figure 2) as did the arterial blood gas analysis: pH 7.42, pCO₂ 4.5 kPa, pO₂ 13.3 kPa, HCO₃⁻ 21.4 mmol/l, BE -2.4 mmol/l and O₂ saturation 98%. A diagnosis of hyperventilation was made and the patient was discharged.

Discussion

Alterations of the repolarisation on ECG caused by hyperventilation have been described.^{1,2} Usually T-wave inversion due to hyperventilation occurs in one lead.^{3,4} More rarely, ST-segment depression (diffuse and not according to coronary anatomy) is seen. These changes invariably occur during the overbreathing phase and subside immediately on discontinuing hyperventilation. Possibly, the changes are induced by alkalosis. Although our patient also had a mild hypokalaemia, this cannot explain the electrocardiographic signs.

Our patient had a very low risk profile for coronary artery disease. In patients with a low risk of coronary artery disease, presenting with dyspnoea and atypical chest pain and an abnormal ECG, arterial blood gas analysis should be considered to exclude hyperventilation and alkalosis. ■

References

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- 4 Savonitto S, Ardissino D. Different significance of hyperventilation-induced electrocardiographic changes in healthy subjects and patients with coronary artery disease. *Eur Heart J* 1996;17:1302-4.

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