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Case Report

Slow ventricular tachycardia in a 91-year-old man with implantable cardioverter-defibrillator and acute respiratory failure

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ABSTRACT

Slow ventricular tachycardia (VT) in patients with devices such as an implantable cardioverter - defibrillator (ICD) is more common than in the rest of the population. The incidence in elderly patients with an ICD remains largely unknown. In younger patients, slow VT is generally asymptomatic or associated with limited clinical relevance. It may be efficiently and safely terminated by anti-tachycardia pacing. We present a case of slow VT in a 91-year-old man with ICD with type 1 acute respiratory failure and drowsiness. Very elderly patients who have poor cardiac reserve and minor deterioration in cardiac function can face serious consequences such as ventricular fibrillation, cardiac arrest, and sudden cardiac death. The persistent ventricular rhythm may have a deleterious effect on their haemodynamic status, with potential aggravation of symptoms of heart failure and further impairment of ventricular function.

1. Background

Slow VT incidence varies from 6% to 30% in ICD recipients without a history of slow VT. However, this evidence generally refers to patients with a mean age of 65 years old and no current data is available in regards to the elderly population. In general, slow VT in patients with an ICD may be asymptomatic or associated with limited clinical relevance [1-2]. It has been reported to be safely terminated by anti-tachycardia pacing (ATP) with a success rate of 85–90% [3].

1.1. Case presentation and discussion

A 91-year-old man presented to the emergency department with severe respiratory distress and drowsiness. The caregiver reported a history of coronary artery bypass grafting, heart failure, tachyarrhythmia, and implantable cardioverter-defibrillator (ICD) insertion in 2010. His medical history also included a diagnosis of Stage 3A chronic kidney disease according to Kidgo guidelines in 2007, a Benign Prostatic Hypertrophy in 2007, and depression in 2013. The patient was diaphoretic and in obvious respiratory distress. His vital signs were notable for a respiratory rate of 32/min, pulse oximetry of 60% on room air, heart rate 120/min, blood pressure 100/70 mm Hg, afebrile, and Glasgow Coma Scale (GCS) 10/15. Blood gas analysis showed type 1 respiratory failure (pH 7.24, pCO_2: 42 mmHg, pO_2: 31 mmHg, HCO_3: 24 m Eq/lit, lactate 2.9 mmol/L). An electrocardiogram (ECG) was obtained (Fig. 1) and interpreted as supraventricular tachycardia (SVT) with aberrant conduction. The chest x-ray demonstrated severe bilateral pleural effusions, bilateral basal pulmonary atelectasis, and diffuse adenopathy. The echocardiogram showed the following alterations: severe reduction of ejection fraction (EF) (EF: 25%), severe mitral valve regurgitation, moderate aortic valve regurgitation, and left atrial enlargement: diameter 54 mm (nr: 30–42) [Fig. 2]. Oxygen administered through a 100% non - rebreather face mask improved the patient's pulse oximetry to 94%. The second step was to evaluate and treat the regular broad-complex tachycardia and heart failure. Intravenous amiodarone (300 mg/30 min) and furosemide (40 mg) were administered to the patient. He developed hypotension, and amiodarone administration was then interrupted. The ICD expert consultant, after ICD interrogation (see Fig. 3), diagnosed slow VT. After six ineffective attempts of manual anti-tachycardia pacing via the programmer, the ICD specialist chose to deliver a DC shock as urgent therapy which restored sinus rhythm (see Fig. 4). The physicians used a low dose of intravenous midazolam (0.009–1 mg/kg) and supplemental oxygen through the face mask before delivering DC shock. The CPAP as ventilatory support was later started due to persistence of respiratory distress. The patient's blood

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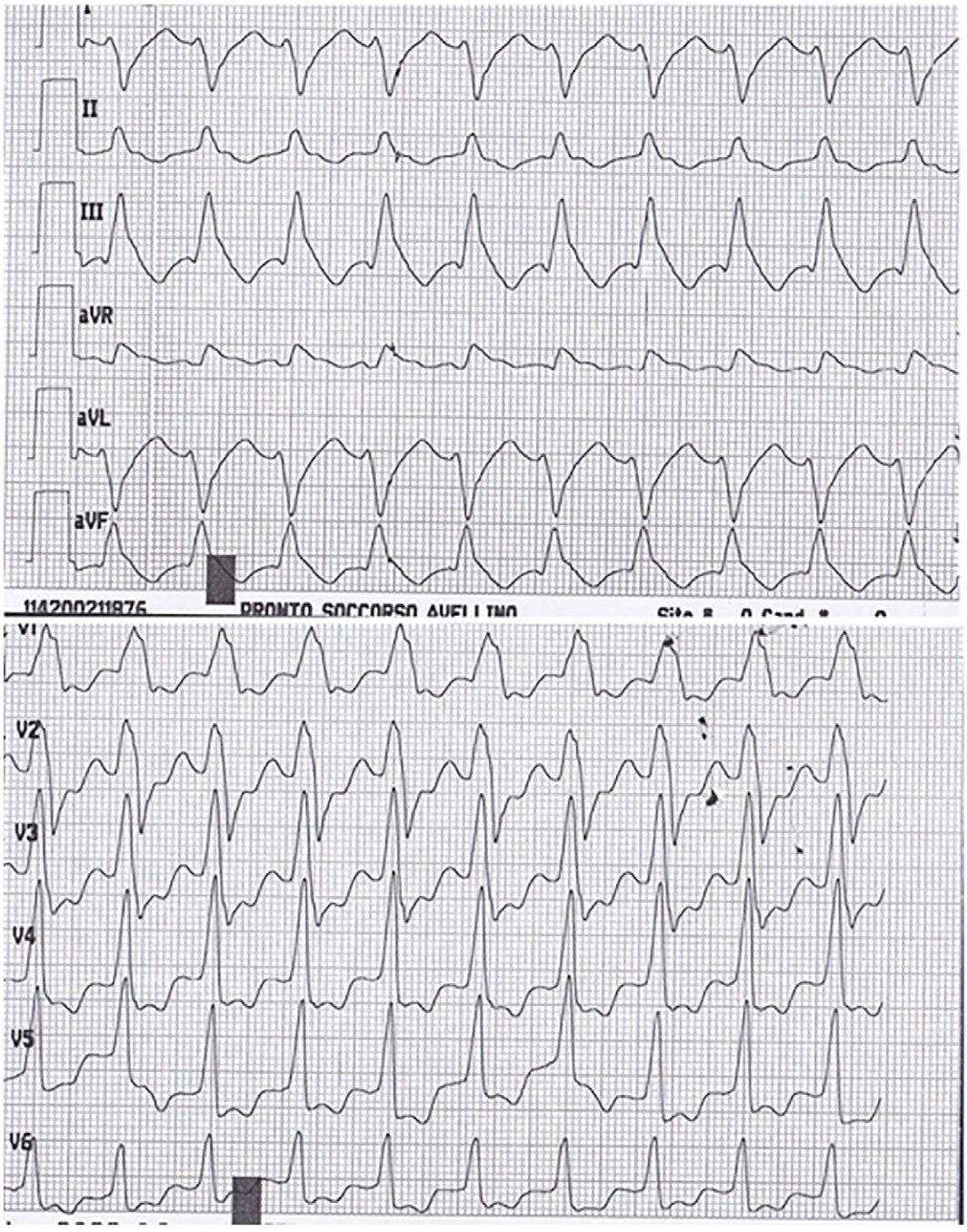

Fig. 1. Basal ECG.

pressure after sinus rhythm was restored was 110/60 mm Hg. In patients with an ICD, VT rate can fall below the lower rate of VT detection, causing underdetection of VT that can prevent arrhythmia termination [4]. Very elderly patients have poor cardiac reserve, and minor deterioration in cardiac function can have serious consequences such as ventricular fibrillation, cardiac arrest, and sudden cardiac death [5]. The persistent ventricular rhythm may have a deleterious effect on their hemodynamic status, with potential aggravation of symptoms of heart failure and further impairment of ventricular function. The European Society of Cardiology guideline states that amiodarone may be used to suppress symptomatic ventricular arrhythmias. Patients may benefit by shifting to sotalol to suppress VT. However, sotalol should be avoided in patients with severely depressed LV function and in presence of poor renal function. This guideline recommends the urgent catheter ablation in specialized or experienced centres in patients with an ICD and incessant VT [6]. An incorrect diagnosis of slow VT occurs in as many as 30% of cases because it may be commonly mistaken for SVT with aberrant conduction [7]. Patients with VT treated as SVT using agents with negative inotropic effects could have hemodynamic deterioration [8]. However, a few general rules apply to the diagnosis of VT: (1) If there is any question regarding diagnosis, the patient should be treated as if the rhythm is VT; (2) the rhythm is much more likely to be VT in patients with ischemic heart disease or systolic congestive heart failure; and (3) VT is more likely with advancing age.

The patient's clinical conditions improved, and he was admitted to the geriatric department. His neurologic state improved rapidly with