

# Cardiac arrest due to ineffective pacing caused by metabolic disorders and ischaemia

Zatrzymanie akcji serca w wyniku nieskutecznej stymulacji spowodowanej przez zaburzenia metaboliczne i niedokrwienie

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In patients with an implanted pacemaker, an increase of pacing threshold is one of the most dangerous complications, which may lead to syncope, cardiac arrest, or death in pacemaker-dependent patients. The increase of pacing threshold may be caused by electrolyte disturbances, acid-base disorders, hyperglycaemia, or hypothyroidism. In some cases it may also occur due to ischaemia or myocardial infarction in the area near the tip of the electrode. However, it is uncommon because pacing leads are usually implanted in the apex of the right ventricle where ischaemia is relatively rare. We present an illustrative case of an 84-year-old man with a dual-chamber pacemaker implanted due to complete atrioventricular block 10 years ago, hypertension, diabetes mellitus, chronic kidney disease, and hyperlipidaemia, without previous history of coronary artery disease, who was admitted to our hospital after sudden cardiac arrest due to ineffective pacing with no escape rhythm (Fig. 1). Interrogation of the pacemaker was performed and an increase of pacing threshold to 7.5 V at 1.0 ms was found. The chest radiograph and transthoracic echocardiography showed no pacing lead dislocation. Blood tests showed hyperglycaemia (330 mg/dL) and mild metabolic acidosis (pH 7.2). The level of serum troponin T increased, but without growth typical for myocardial infarction. After compensation of metabolic disorders (pH 7.45, glycaemia 171 mg/dL) a decrease in the pacing threshold was observed to 1.25 V at 1.0 ms, but it still remained elevated in comparison to the baseline parameters obtained at the last scheduled visit (1.0 V at 0.4 ms). Transthoracic echocardiography showed regional wall motion abnormalities near the tip of the ventricular pacing lead (Fig. 2). Next, coronary angiography was performed and showed significant stenosis of the left anterior descending artery with TIMI-2 flow (Fig. 3), requiring angioplasty and stent implantation with the final TIMI-3 effect. After percutaneous coronary intervention, an interrogation of the pacemaker was performed and a decrease in the pacing threshold was found 1.0 V at 1.0 ms (the trend of pacing threshold is shown in Fig. 4). This case report shows that metabolic disturbances and ischaemia may elevate the pacing threshold to very high values and should be considered as a possible and treatable cause of ineffective pacing.

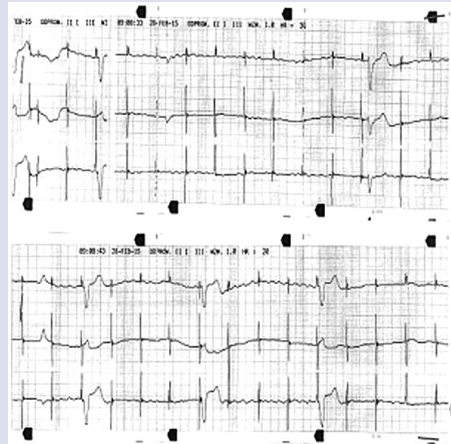


Figure 1. Electrocardiogram showing ineffective pacing without escape rhythm



Figure 2. Transthoracic echocardiography showing regional wall motion abnormalities near the tip of the ventricular pacing lead (arrows)

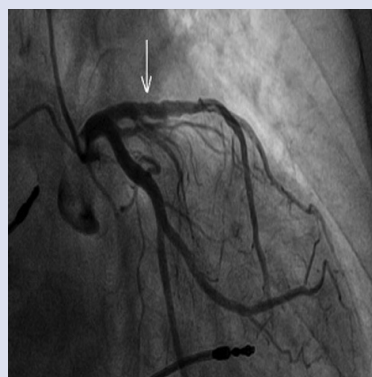


Figure 3. Coronary angiography showing significant stenosis (arrow) of the left anterior descending artery before stent implantation

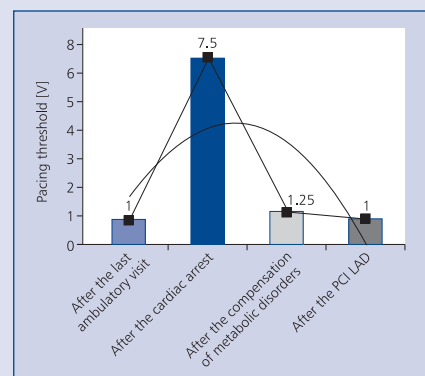


Figure 4. Values and trend of pacing thresholds; LAD — left anterior descending artery; PCI — percutaneous coronary intervention

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**Conflict of interest:** none declared

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