Kazuistika | Case report

Cough, a rare and not well recognized symptom of lead perforation

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ARTICLE INFO

Article history:
Submitted: 2. 9. 2021
Accepted: 18. 9. 2021
Available online: 10. 10. 2022

Keywords:
Cough
Lead perforation
Pacemaker implantation
Tamponade

ABSTRACT

A 64-year-old woman was admitted to our department for dual-chamber pacemaker implantation. No complication apparently occurred during the procedure. An active fixation ventricular lead was positioned in right ventricular septal apex. Soon after implantation the patient started to suffer from non-productive cough, clearly related to ventricular stimulation. Transthoracic echocardiography revealed a small pericardial effusion along the apical segments. The patient underwent urgent contrast chest CT confirming pericardial effusion, and showing an intramyocardium placement of the right ventricular apical lead. Due to persistence of symptoms, we decided to perform right ventricular lead repositioning in right middle septum. Post-procedure, cough abruptly disappeared.

Introduction

Along with relevant progress in technology, pacemaker implantation is continuously improving its safety and efficacy in treating patients with bradyarrhythmias.1 Despite this, this procedure has several complications, including hematoma, pneumothorax, lead dislodgement, infection, lead perforation and tamponade.2 Atypical symptoms, like headache and palpitation, are also described and defined as pacemaker syndrome. In our report, we describe a case of a woman developing non-productive cough and palpitation soon after pacemaker implantation.

Case report

A 64-year-old woman, suffered from hypertension, was admitted to our emergency department for recurrent loss of consciousness. Vital parameters were normal (BP 115/85 mmHg, HR 80 b/m, SO2 98%). Her ECG showed sinus rhythm, normal atrioventricular conduction, and right bundle branch block (RBBB). 24-hour 12-lead ECG recording, CT and MRI brain and electroencephalography resulted negative. The patient underwent loop recorder implantation (Medtronic Reveal LinQ), in order to assess arrhythmic causes of syncope, and was discharged. Two weeks later, an episode of paroxysmal complete AV block, conditioning a pause of 3 seconds, was recorded (Fig. 1). Thus, the patient was scheduled for urgent dual-chamber pacemaker implantation and loop recorder removal. No complication apparently occurred during the procedure. An active fixation ventricular lead was positioned in right ventricular septal apex while passive fixation atrium lead in the right appendage (Fig. 2A). Soon after implantation the patient started to suffer from non-productive cough, clearly re-
lated to ventricular stimulation, either in DDD or in VVI pacing modality. Vital parameters were always normal (BP 120/75 mmHg, HR 85 bpm, SO2 99%). During spontaneous ventricular activation (RBBB) no symptoms occurred. Transthoracic echocardiography, performed the day after implantation, revealed a small pericardial effusion (diastolic diameter < 10 mm) along the apical segments, near the tip of the right ventricular lead. Suspicion of right ventricular lead perforation arose. The patient underwent urgent contrast chest CT confirming pericardial effusion, and showing an intramyocardium placement of the right ventricular apical lead (Fig. 3). No active bleeding in pericardium was observed. Due to persistence of symptoms, we decided to perform right ventricular lead repositioning in right middle septum (Fig. 2B), with pericardiocentesis back-up promptly available. However, pericardial effusion remained stable during and after the procedure. Post-procedure, palpitation and cough abruptly disappeared. Two days later the patient was discharged. After three months of follow-up, no significant symptoms were reported and pericardial effusion gradually disappeared.
Discussion

We describe a singular case of cough, as atypical symptom immediately after pacemaker implantation. Although a clear time-correlation between cough and pacemaker implantation, we excluded other common causes of non-productive cough: bronchial or pulmonary inflammation/infections or ACE inhibitor use. The cough could be an atypical but recognized feature of the pacemaker syndrome defined as “the symptoms and signs present in the pacemaker patient which are caused by inadequate timing of atrial and ventricular contractions.”. This happens because the pacing produces adverse hemodynamic changes and, in some instances, the atrial contraction occurs against closed atrioventricular valves, producing reverse blood flow and non-physiologic pressure waves. This event causes the development of symptoms including pulsation in the neck and in the abdomen, headache, cough, and jaw pain. Moreover, the findings suggest a possible role for afferent vagal receptors from the airways. In our case, the patient started to suffer from non-productive cough, clearly related to ventricular stimulation either in DDD or in VVI pacing modality. Cough in DDD modality, with preserved atrioventricular synchrony, makes unlikely the hypothesis of pacemaker syndrome. Pericardial effusion and contrast-CT showing intramyocardial position of the tip guided our suspicion to a possible right ventricular lead microperforation. Although right ventricular lead parameters were completely normal (namely RV threshold < 1 V and RV impedance near 650 ohm either in unipolar or bipolar configuration), this findings didn’t exclude RV perforation. The lead perforation is known as a rare complication of device implantation; previous studies have reported a lead perforation rates after pacemaker placement of 0.1–0.8%, and 0.6–5.2% after ICD placement. Typical symptoms of RV lead perforation are chest pain and hypotension. The patient described in our case showed a hemodynamically stable pericardial effusion accompanied by non-productive cough, clearly time-related to RV stimulation. In literature, there is only one similar case report. Steiner et al. described cough as a rare symptom of right ventricular lead perforation. Since pacemaker implantation, the patient suffered from chronic cough and he was symptomatic for several weeks before he underwent a lead replacement. The authors suspected lead perforation after chest CT showing the intracardiac lead placement. Pericardial effusion, contrast-CT showing intramyocardial position of the tip and, in the end, disappearance of symptoms just after RV repositioning justifying the hypothesis of RV lead microperforation.

Conclusions

The cough is a rare and not well recognized symptom of lead perforation. Early diagnosis of RV perforation allows performing urgently and safely (pericardiocentesis back-up) lead replacement/repositioning. Echocardiography and contrast-CT could be useful in order to assess a possible pericardial effusion or intramyocardial/pericardial position of RV lead tip.

Conflict of interest
None declared.

Funding body
None.

Ethical statement
Authors state that the research was conducted according to ethical standards.

Informed consent
The patient was asked to consider allowing Dr. Pasquale Crea to use his medical records to write a case report. The case report has been fully explained to the patient and all questions have been answered. We explained to the patient the objective of this manuscript, share information experienced by one patient during his clinical care that may be useful for other physicians and members of a healthcare team, and may be published in JECG for others to read. The patient authorized access to his personal health information and she has agreed to participate in this case report.

References