Clinical Case Report

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Extraction of a dual-chamber pacemaker and inserting of a new automatic implantable cardioverter defibrillator

The easy procedure almost became catastrophic: a case report

Márcio Galindo Kiuchi, MD, MSc, PhD[a,*], Guilherme Miglioli Lobato, MD[b], Shaojie Chen, MD, MSc, PhD[c]

Abstract

Background: The cardiovascular illnesses are in the middle of the foremost reasons of death around the world. Deaths in Europe, from sudden cardiac death (SCD), reach nearby 700,000 individuals every year. In the United States, statistics point to the existence of nearly 1 million yearly deaths from cardiovascular sickness, of which 330,000 are the consequence of abrupt. The significance of automatic implantable cardioverter-defibrillator (ICD) has been proven in subjects with preceding myocardial infarction and stark systolic left ventricular dysfunction (secondary prevention).

Case Presentation: In this case, we describe a female patient, 94 years old, with a dual-chamber pacemaker since 2014, normal functioning, and controlled hypertension. The patient was in use of bisoprolol 10 mg daily, hydrochlorothiazide 25 mg daily, and candesartan cilexetil 16 mg daily. She presented 2 episodes of syncope associated with the high ventricular rate (HVR), which characterizes sustained ventricular tachycardia (SVT) due to its instability, besides 1 episode of cardiorespiratory arrest. During an attempt to position the active monocoil shock lead in the right ventricle, there was perforation of the upper posterolateral wall of the right atrium, transfixing the pericardium and constituting a pericardial-pleural fistula with hemothorax formation in the right hemithorax. We chose to remove the electrodes and suture the left pocket. There was no cardiac tamponade or pericardial effusion, verified by a pericardial puncture. Thoracic drainage was introduced into the right hemithorax, and 3 L of blood were drained acutely with volume replacement and hemotransfusion. We maintained thoracic drainage in water seal. The ICD was implanted on the right side.

Conclusion: So, in this case, we reported a rare complication during pacemakers or ICD implantation that is the pericardial-pleural fistula with hemothorax formation in the contralateral hemithorax. Despite the patient's advanced age, we had the dexterity and luck to save her life.

Abbreviations: ATP = antitachycardia pacing therapy, CPAP = continuous positive airway pressure, HVR = high ventricular rate, ICD = automatic implantable cardioverter-defibrillator, SCD = sudden cardiac death, SVT = sustained ventricular tachycardia, USA = United States of America.

Keywords: automatic implantable cardioverter defibrillator, hemothorax, pacemaker, pericardial-pleural fistula, sudden cardiac death

1. Introduction

The cardiovascular illnesses are in the middle of the foremost reasons of death around the world.[1,2] Deaths in Europe, from sudden cardiac death (SCD), reach nearby 700,000 individuals every year.[3–6] In the United States, statistics point to the existence of nearly 1 million yearly deaths from cardiovascular sickness, of which 330,000 are the consequence of SCD.[7,8] In above 70% of circumstances, the primary heart disease is the myocardial ischemia.[9] The significance of automatic implantable cardioverter-defibrillator (ICD) has been proven in subjects with preceding myocardial infarction and stark systolic left ventricular dysfunction (secondary prevention).[10,11] Survivors of cardiac halt or those ones with persistent ventricular tachycardia at in height risk of repetition of such happenings.[12] The conducts used include antiarrhythmic medications, surgical resection, endocardial/epicardial ablation, and use of ICD. In the attendance of ventricular tachycardia, the ICD will try to converse it by programmed ventricular anti-tachycardia pacing therapy (ATP) or synchronized cardioversion shock, in accordance with the pre-programed set. If ventricular fibrillation is identified, the ICD spread over an unsynchronized shock of great energy defibrillation. The ICD implant decreases mortality caused by heart diseases and is endorsed for the primary and secondary avoidance of SCD in individuals with structural cardiac disease and an ejection fraction of the left ventricle less or equal to 35%.[9]

Editor: Baltasar Sanchez Gonzalez.

The authors have no conflicts of interest to disclose.

[a] Artificial Cardiac Stimulation Division, [b] Anesthesiology Division, Department of Medicine, Hospital e Clínica São Gonçalo, São Gonçalo, RJ, Brazil, [c] Department of Cardiology, Shanghai First People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China.

[*] Correspondence: Márcio Galindo Kiuchi, Rua Cel. Moreira César, 138—Centro, São Gonçalo, Rio de Janeiro, Brazil (e-mail: marciokiuchi@gmail.com).

Medicine (2017) 96:35(e7919)

Received: 30 May 2017 / Received in final form: 1 August 2017 / Accepted: 4 August 2017

http://dx.doi.org/10.1097/MD.0000000000007919

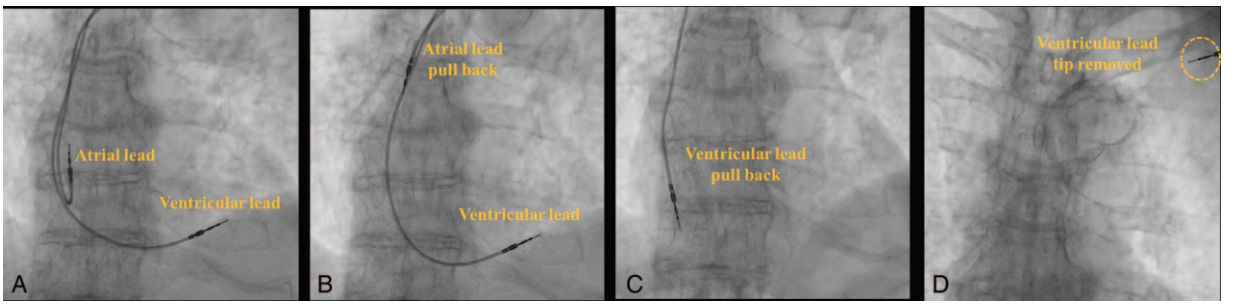

Figure 1. The patient already had a DDDR pacemaker implanted in the past (A). The atrial (B) and ventricular (C and D) leads were extracted without troubles. DDDR, dual chamber pacemaker.

Inherited pericardial-pleural fistula has been described to happen in subjects with congenital cardiac flaws. Drury and colleagues[13] have described a case of pleuro-pericardial imperfection in a subject programmed for intracardiac repair of an ostium primum atrial septal defect. Hypothetically, they can be of no significance until the individual develops pleural or pericardial outpouring, pneumothorax, or pneumo-pericardium for whatsoever causes. This can be very infrequent to find a unpredicted pericardial-pleural fistula in a subjet suffering concious surgery. Pericardial-pleural fistula can be of slight significance throughout operations performed under endotracheal general anesthesia; mechanical aeration will dodge the probable special effects of such a fistula. They may, nonetheless, gain significance during conscious cardiac operation; it will be essential to recognize and resolve such a defect prompt to sidestep an unavoidable pneumothorax. An untreated pneumothorax can be one of the signs for deserting concious operation and transforming to official general anesthesia. The incidence of iatrogenic pericardial-pleural fistula has been defined post endeavored drainage of pericardial outpouring (post-traumatic)[14] and afterward penetration by esophageal warp.[15]

In this case, we describe a female patient, 94 years old, with a dual-chamber pacemaker since 2014, normal functioning, and controlled hypertension. The patient was in use of bisoprolol 10 mg daily, hydrochlorothiazide 25 mg daily, and candesartan cilexetil 16 mg daily. She presented 2 episodes of syncope associated with the high ventricular rate (HVR), which characterizes sustained ventricular tachycardia (SVT) due to its instability, besides 1 episode of cardiorespiratory arrest. The pacemaker presented the folowing parameters:

P wave: 4.2 mV Impedance: 380 Ω Threshold: 0.50 V @ 0.5 ms
R wave: 12.5 mV Impedance: 530 Ω Threshold: 0.25 V @ 0.5 ms

The tranthoracic echocardiogram showed an acinetic zone on the lateral wall with a left ventricular ejection fraction of 42%. The coronary angiography did not present any new obstruction. Due to the serious illness was actually defined the need for the patient to undergo the implant of ICD-DR. The ethical approval was not necessary because this case describes a complication of a routine procedure. However, the patient signed the informed consent.

During the procedure, the patient was placed in dorsal decubitus submitted to general anesthesia by an anesthesiologist. Two grams of intravenous vancomycin was given. Asepsis and antisepsis of the left delto-pectoral region were performed with dextermant and topical chlorhexidine, followed by local anesthesia with 7.5% ropivacaine and incision over the anterior scar, in the left pectoral region, since the patient already had a dual chamber pacemaker implanted in the past (Fig. 1A). The atrial (Fig. 1B) and ventricular (Fig. 1C and D) leads were extracted without troubles, after the introduction of the guides on both electrodes, dilation of the initial and middle portions of the left subclavian vein, clockwise and counterclockwise rotation of the leads, besides manual traction. Double axillary vein puncture was performed with the introduction of 2 short introducers, 1 7F and another. Positioned the Biotronik lead model Safio S 53 in apendex of the right atrium. During an attempt to position the Biotronik active monocoil shock lead in the right ventricle, there was a dissection of the superior vena cava, perforation of the upper posterolateral wall of the right atrium, transfixing the pericardium and constituting a pericardial-pleural fistula (Fig. 2A–D) with hemothorax (Fig. 3A) formation in the right hemithorax. We chose to remove the electrodes and suture the left pocket. Thoracic drainage was introduced into the right hemithorax (Fig. 3B), and 3 L of blood were drained acutely with volume replacement and hemotransfusion. We maintained

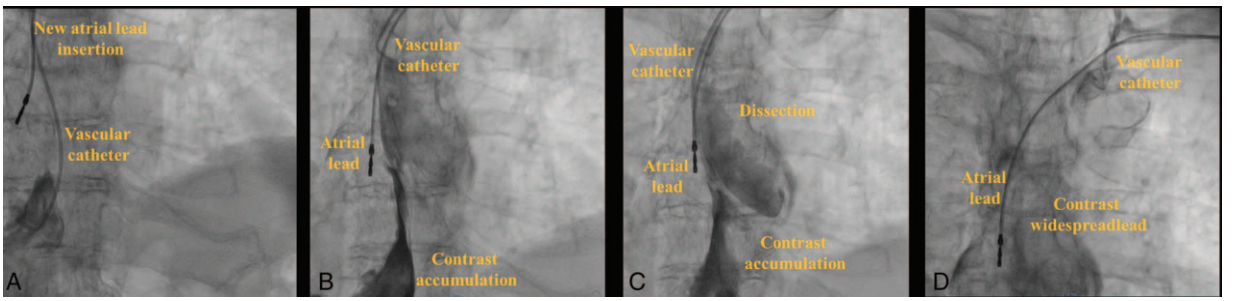

Figure 2. During an attempt to position the Biotronik active monocoil shock lead in the right ventricle, there was (A and B) dissection of the superior vena cava, (C and D) perforation of the upper posterolateral wall of the right atrium, transfixing the pericardium and constituting a pericardial–pleural fistula.

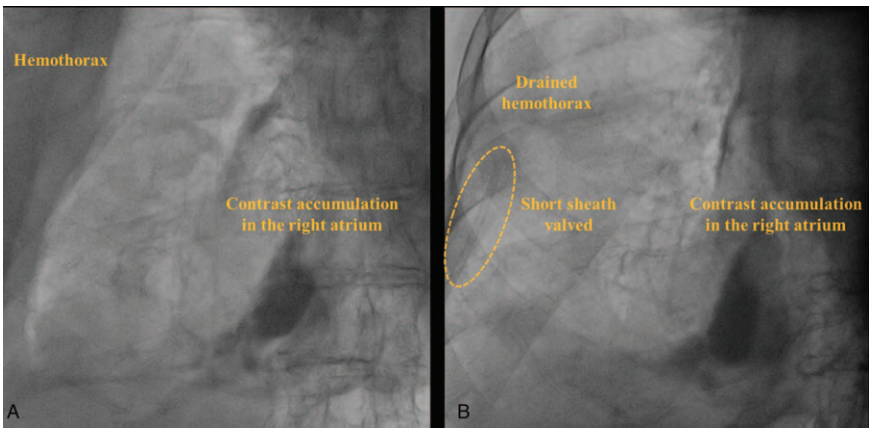

Figure 3. Hemothorax formation in the right hemithorax (A), and thoracic drainage was introduced into the right hemithorax (B).

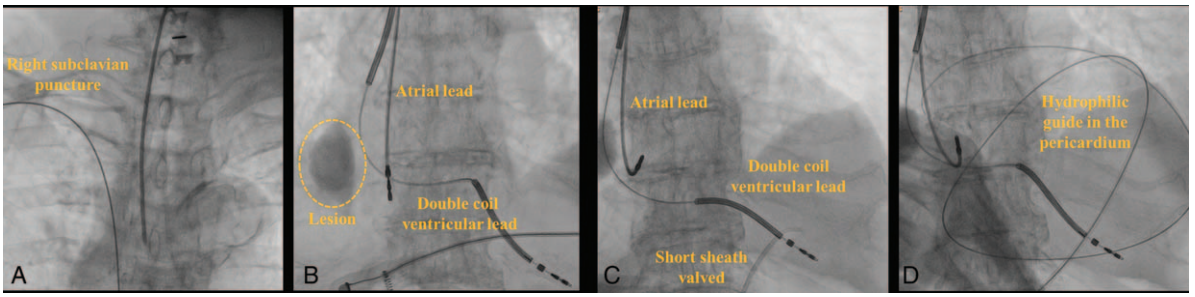

Figure 4. The right subclavian double puncture (A) was performed. We positioned the lead Biotronik model Safio S 53 in the right atrium atrium (B) and active electrode monocoil in the lower septum of the right ventricle. The monocoil shock electrode was replaced by a Biotronik doublecoil shock electrode model Protego SD (C) because the first one was not effective in the reversion of ventricular fibrillation induced by direct current, whereas the second electrode was effective. There was no cardiac tamponade or pericardial effusion, verified by a pericardial puncture (D). SD, standard deviation.

thoracic drainage in water seal. Asepsis and antisepsis of the right delto-pectoral region were performed with dextermant and topical chlorhexidine, followed by local anesthesia with 2% lidocaine without vasoconstrictor and surgical incision in the right pectoral region, with the right pocket for the ICD. The right subclavian double puncture (Fig. 4A) was performed with the introduction of 2 short introducers, 1 7F and another. We positioned the lead Biotronik model Safio S 53 in the right atrium atrium (Fig. 4B) and active electrode monocoil in the lower septum of the right ventricle. The monocoil shock electrode was replaced by a Biotronik doublecoil shock electrode model Protego standard deviation (Fig. 4C) because the first one was not effective in the reversion of ventricular fibrillation induced by direct current, whereas the second electrode was effective. The ICD presented the folowing parameters:

P wave: 2.8 mV Impedance: 450 Ω Threshold: 0.80 V @ 0.5 ms

R wave: 8.9 mV Impedance: 620 Ω Threshold: 0.70 V @ 0.5 ms

The leads were fixed to the pectoral muscles and connected to the Biotronik Ilesto ICD generator. There was no cardiac tamponade or pericardial effusion, verified by a pericardial puncture (Fig. 4D). We reviewed the hemostasis and fixed the generator. The suture was made by plans, as well as, an occlusive dressing. The patient was referred on mechanical ventilation to the intensive care unit, where she remained for 10 days. The endotracheal tube was removed on the fifth day after the procedure, and the patient remained on spontaneous ventilation. Thoracic drainage was removed on the seventh day of follow-up. Antibiotic therapy was maintained, as well as, volume and blood replacement. On the 12th day of follow-up, the patient was discharged.

So, in this case, we reported a rare complication during pacemakers or ICD implantation that is the pericardial-pleural fistula with hemothorax formation in the contralateral hemithorax. Despite the patient's advanced age, we had the dexterity and luck to save her life.

Acknowledgment

The authors would like to thank Biotronik for their technical support.

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