CARDIAC TAMPONADE AFTER PACEMAKER IMPLANTATION

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Abstract

We report a 71-year-old woman with syncope that occurred during hemodialysis. The patient underwent transvenous temporary and permanent pacemaker implantation for sick sinus syndrome. Acute cardiac tamponade with shock developed after pacemaker implantation in our intensive care unit, which was successfully managed by emergency pericardiocentesis as well as medical therapy. Our report illustrates the importance of including cardiac tamponade in the differential diagnosis of unexplained shock after pacemaker implantation. A high index of suspicion may lead to early diagnosis, which is essential to reach a good outcome.

Key words: Cardiac tamponade, Pacemaker, Pericardiocentesis

Introduction

Cardiac tamponade following pacemaker implantation is a rare but life-threatening complication. Early recognition and treatment of cardiac tamponade is crucial to achieve good outcome. We present a case report of cardiac tamponade following transvenous pacemaker implantation.

Case Report

A 71-year-old woman was admitted to our hospital because of syncope during hemodialysis 5 days ago. She had a long history of hypertension and chronic kidney disease. She had been on hemodialysis for 10 months. The maintenance hemodialysis was relative stable and the appropriate dry weight was maintained. Her antihypertensive medications consisted of amlodipine 10 mg and doxazosin 4 mg/day. The Holter monitor showed sick sinus syndrome with several long pauses (up to 5.7 seconds). A transthoracic echocardiography performed one day prior to admission demonstrated left ventricular hypertrophy with preserved left ventricular function (ejection fraction 66%), mild mitral regurgitation and tricuspid regurgitation, and small amount pericardial effusion. On physical examination, her blood pressure was 104/65 mmHg, heart rate 45 beats per minute, and temperature 36.9°C. Her palpebral conjunctiva were pale. There was a soft II/IV systolic murmur over left sternal border and apex. There were no other noteworthy findings.

A 5-French temporary pacemaker lead was introduced through the right femoral vein and positioned at the right ventricular apex under fluoroscopic guidance. After that, she was admitted to our intensive care unit. Blood tests was shown in the following: a white blood cell count of 6700/uL (normal range: 3500-9900); hemoglobin level of 9.0 g/dL (normal range: 14-18);
hematocrit level of 28.4%; platelet count of 148,000/uL (normal range: 130,000-340,000). A permanent DDD pacemaker was implanted smoothly on next day. The temporary pacemaker lead was removed at the end of procedure. When the patient lefted our cardiac catheterization room, she was alert and hemodynamically stable. Twenty minutes after the removal of the temporary pacemaker lead, she complained short of breath in our intensive care unit. After ten more minutes, she was found unconscious. Her blood pressure was 55/31 mmHg, and her heart rate was 50 beats per minute (pacemaker rhythm). Her heart sound was distant. She was resuscitated with fluid and dopamine infusion. Intubation was performed immediately. An urgent echocardiogram demonstrated large pericardial effusion with tamponade. Emergency pericardiocentesis under echocardiographic guidance was performed and a drain was placed in the pericardial space. After 100 ml of bloody fluid was removed from pericardium, the patient regained consciousness and her blood pressure was 153/74 mmHg. She received 4 units of packed red blood cells, 12 units of cryoprecipitate and desmopressin intravenous infusion. The hematocrit of bloody pericardial fluid was 24.3%. Two days after the event, the output from the drain had nearly stopped. Four follow-up echocardiograms also showed resolution of pericardial effusion. The endotracheal tube and pericardial drain were then removed. A total 350 ml of bloody pericardial fluid had been drained. The patient was discharged 10 days after the event, when a repeat echocardiogram showed no reaccumulation of pericardial effusion. The patient remained asymptomatic with adequate function of permanent pacemaker 10 weeks later.

Discussion

Myocardial perforation is a rare complication following transvenous pacemaker implantation with contemporary leads. It may be recognized by pericardial pain, friction rub, diaphragmatic stimulation, increasing pacing threshold or hemopericardium. Cardiac tamponade caused by myocardial perforation is uncommon. But our patient did not have any symptoms and signs of myocardial perforation, but hemopericardium with cardiac tamponade.

The incidence of myocardial perforation due to a temporary pacemaker lead was reported to be 2.1-2.8%. Hynes et al. reported that right ventricular perforation occurred in 21 patients after temporary pacemaker therapy and only one patient developed cardiac tamponade necessitating pericardiocentesis. In a prospective study of 119 patients undergoing implantation of atrial and ventricular leads, Trigano et al. reported that only one patient developed symptomatic pericarditis with pericardial effusion on postoperative day 1, which resolved spontaneously. In a retrospective review of 1474 primary pacemaker implantations, Parsonnet et al. reported that cardiac perforation developed in nine patients (0.6%), and cardiac tamponade occurred in 2 patients (0.1%).

Our patient was hemodynamically stable and did not complaint pericardial pain during the procedure of permanent pacemaker implantation. Thirty minutes after removal of the temporary pacemaker lead, acute cardiac tamponade developed in our intensive care unit. We speculate that right ventricular perforation was caused by the temporary pacemaker lead because the permanent pacemaker leads were inserted without difficulty. The temporary pacemaker lead may partially seal the perforation, the cardiac tamponade did not occur until the lead was pulled out.

Early recognition and treatment of cardiac tamponade is crucial to achieve a good outcome. Symptoms and signs are usually sudden and include dyspnea, fatigue and light-headedness, venous engorgement, pulsus paradoxus, shock and confusion. Electrocardiogram and chest radiograph findings may not always diagnostic. Electrocardiographic findings such as low voltage of QRS complexes or electrical alternans may not always be present. Chest radiography may be within normal limits until considerable fluid has accumulated in the pericardial space. A high index of suspicion is required and we advocate
immediate echocardiography in patients who have unexplained shock after pacemaker implantation. Echocardiogram can be done within minutes and is highly accurate. Pericardiocentesis under echocardiographic guidance may be performed at the same time with a high degree of success.7 Pericardiocentesis is usually performed for urgent management of an acute cardiac tamponade. In this situation, removal of even a small amount of pericardial effusion can be life-saving. A thoracotomy is indicated when pericardiocentesis has failed to relieve the cardiac tamponade. Therefore, serial echocardiograms and early surgical consultation are necessary.

It is well known that there is bleeding tendency in uremic patients. And impaired platelet function is one of the main determinants of uremic bleeding.8 Earlier surgery would probably be better in uremic patient with cardiac tamponade caused by myocardial perforation. But emergency pericardiocentesis is still indicated in uremic patients with acute cardiac tamponade. In our patient, spontaneous hemostasis could be achieved by medical therapy, including desmopressin infusion, hemodialysis and blood transfusions with packed red blood cells and cryoprecipitate.

In summary, we describe a patient of cardiac tamponade, which occurred after transvenous pacemaker implantation. Cardiologists and critical care physicians should be aware of the possibility of cardiac tamponade in any patient who has unexplained shock after pacemaker implantation. A high index of suspicion may lead to early diagnosis, which is essential to reach a good outcome.

References
心律調節器植入後引發之心包膜填塞

許振東，張瑞月，陳政康

摘要

我們報告一名在洗腎中昏厥的71歲女性。這位病人因病竇症候群而接受經靜脈暫時及永久性心律調節器植入。植入後，於加護病房中發生急性心包膜填塞及休克。我們施行緊急心包膜穿刺術及內科治療，成功的治癒此病人。此病例說明心包膜填塞，應該被包含在心律調節器植入後的不明原因休克之鑑別診斷中。及早的正確診斷及治療，將是治癒此類病人的不二法門。

關鍵詞：心包膜填塞，心律調節器，心包膜穿刺術