

CASE PRESENTATION

Inflammatory pericarditis leading to cardiac tamponade, following permanent cardiac pacing

Catalin Pestrea¹, Alexandra Gherghina¹, Diana-Georgiana Miron¹, Florin Ortan²

Abstract: Post-pacemaker insertion pericarditis is a rare form of post cardiac injury syndrome.

We present a 78-year-old woman, who received a VVIR pacemaker for sick sinus syndrome with the lead placed on the septal side of the right ventricular outflow tract. Eleven days later she presented with persistent fever and severe dyspnea. The echocardiography revealed a large circumferential pericardial effusion with signs of cardiac tamponade. Percutaneous pericardial drainage using the apical approach was performed and about 1000 ml of serofibrinous fluid were drained. The laboratory analyses showed highly elevated inflammatory markers with negative blood and pericardial fluid cultures. The patient was started on ibuprofen and colchicine with a favourable course and normalization of inflammatory markers.

Keywords: inflammatory pericarditis, tamponade, cardiac pacing, pericardiocentesis.

Rezumat: Pericardita apărută după cardiostimularea permanentă este o formă rară de sindrom postinjurie miocardică. Prezentăm în această lucrare cazul clinic al unei paciente de 78 de ani, căreia i-a fost implantat un stimulator cardiac VVIR pentru o boală de nod sinusal cu plasarea sondei de stimulare ventriculară pe peretele septal al tractului de ejecție al ventriculului drept. 11 zile mai târziu, pacienta s-a reinternat în spital pentru febră persistentă și dispnee severă. Ecocardiografia a evidențiat o colecție pericardică circumferențială în cantitate mare cu semne de tamponadă cardiacă. S-a efectuat drenaj pericardic percutan prin abord apical cu evacuarea a 1000 ml de lichid serocitrin. Analizele de laborator au evidențiat creșterea semnificativă a markerilor inflamatori fără pozitivarea culturilor din sânge și din lichidul pericardic. S-a inițiat terapia cu ibuprofen și colchicină cu evoluție clinică favorabilă și normalizarea parametrilor de inflamație.

Cuvinte cheie: pericardită inflamatorie, tamponadă, stimulare cardiacă, pericardiocenteză.

INTRODUCTION

Post-pacemaker insertion pericarditis is a rare form of post cardiac injury syndrome (PCIS) and represents a potential complication of permanent cardiac pacing with various clinical courses from a benign self-limiting condition to life-threatening cardiac tamponade.

CASE REPORT

A 78-year-old woman was admitted in our hospital for dizziness and fatigue. Her ECG showed atrial fibrillation with rapid ventricular rate which converted spontaneously to a period of sinoatrial block with low junctional escape rhythm (Figure 1).

The laboratory analyses were unremarkable and her echocardiography showed a normal left ventricular function and mild mitral regurgitation.

The case was interpreted as a sick sinus node disease with a brady-tachy syndrome and a VVIR pacer

maker with the lead placed on the septal side of the right ventricular outflow tract (RVOT) was implanted without any complications and the patient was discharged the next day.

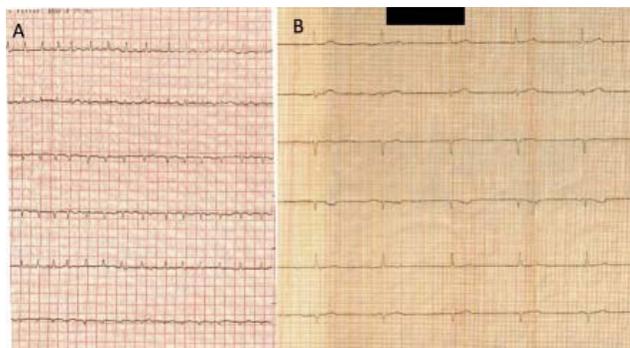


Figure 1. Presenting ECG rhythm: (A) Atrial fibrillation with rapid ventricular rate spontaneously converted to (B) Sinoatrial block with low junctional escape rhythm.

¹ Intensive Cardiac Care Unit, Emergency County Clinical Hospital, Brasov, Romania

² Interventional Cardiology Unit, Emergency County Clinical Hospital, Brasov, Romania

✉ Contact address:

Catalin Pestrea, Intensive Cardiac Care Unit, Emergency County Clinical Hospital, Calea Bucuresti 25-27, Brasov, Romania.
E-mail: pestrea.catalin@gmail.com

Eight days later the patient experienced fever (38.7°C) and on the eleventh day postdischarge she presented to the emergency unit for severe dyspnea and fatigue.

The ECG showed atrial fibrillation with a ventricular rate of 140 bpm. Device interrogation showed normal impedance, sensing and pacing parameters. Blood tests showed markedly elevated inflammatory markers (white blood count - 15.690/mm³, C-reactive protein - 235mg/l, erythrocyte sedimentation rate – 72 mm/h). The chest X-ray showed an enlarged cardiac silhouette with a normal lung image and no apparent dislodgement of the lead (Figure 2).

The echocardiography revealed a large circumferential pericardial effusion with collapse of the right cavities. A CT scan was performed which confirmed the septal placement of the lead without any signs of

perforation and identified the pericardial fluid as having a low density, much lower than blood (Figure 3).

In this situation a pericardiocentesis was performed using the apical approach, which revealed a serofibrinous pericardial fluid. A 8F drainage tube was placed in the pericardial cavity and a total of 1000 ml of fluid was drained with significant symptomatic relief.

The laboratory analyses of the fluid showed exsudate characteristics and both cultures from the blood and pericardial fluid were negative.

The patient was started on ibuprofen (600 mg three times daily for two weeks, then 400 mg three times daily for another two weeks) and colchicine (0.5 mg once daily for three months) with a favourable course and normalization of inflammatory markers. The pericardial drainage tube was removed after four days and she was discharged after seven days from the day of admittance.

The one month and three month echocardiographic follow-up showed no recurrence of pericarditis (Figure 4).

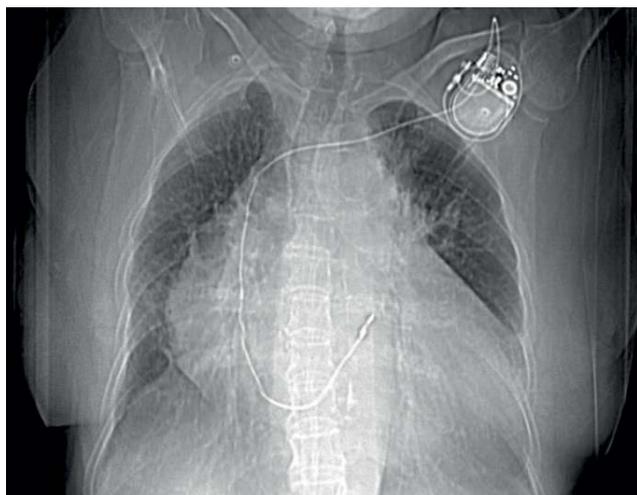


Figure 2. Chest X-ray image showing an enlarged cardiac silhouette with a normal lung image and no apparent dislodgement of the lead.

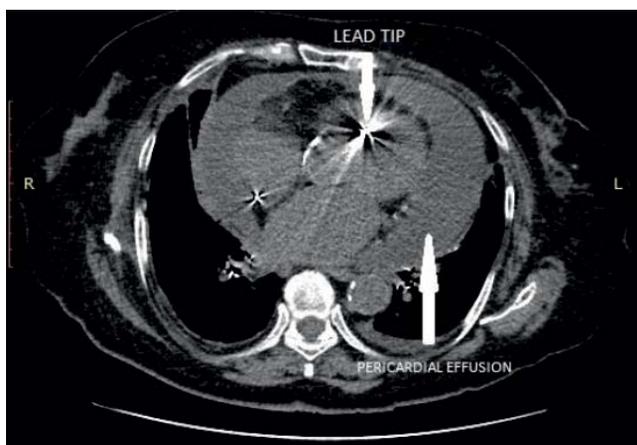


Figure 3. Chest CT image showing a circumferential large pericardial effusion and the ventricular lead placed on the septal side of the right ventricular outflow tract.



Figure 4. Echocardiography image showing no pericardial effusion recurrence after three months.

PCIS is a well described clinical entity for decades and usually follows heart surgery or trauma⁴. Nevertheless, any kind of myocardial injury, including percutaneous cardiac interventions as ablation procedures, coronary angioplasties or heart device implantations could cause PCIS.

The presumed mechanisms of PCIS after pacemaker implantation are an autoimmune inflammatory process triggered by myocardial injury after an active lead fixation and mediated by antimyocardial antibodies, or a minimally protruding exposed helix which directly irritates the pericardium, either mechanically or through minor bleeding, causing inflammation and fluid secretion⁵.

The differential diagnosis between cardiac perforation and PCIS could be difficult to make⁶. However, there are signs and symptoms which could point towards an inflammatory process:

1) Fever >38°C; 2) pericardial or pleural friction rub; 3) no proof of cardiac perforation on imaging studies; 4) elevated inflammatory markers; 5) a yellow serofibrinous pericardial fluid; 6) development between 7 days and 4 weeks after the procedure; 7) acute response to anti-inflammatory drugs (NSAIDs, colchicine, cortisone).

The case we described fulfilled almost all of the above criteria.

The vast majority of PCIS cases following pacemaker implantation were reported in patients with atrial active fixation leads⁷, with very few cases after passive fixation leads and ventricular only pacing^{8,9}.

Although myocardial injury occurs irrespective of ventricular pacing site, as a particularity, we didn't find any other mention of RVOT placed leads causing PCIS.

PCIS is considered usually a benign condition, but occasionally could lead to cardiac tamponade as it was in our case¹⁰.

Fortunately, pericardial drainage and anti-inflammatory medication resolves this problem in almost all cases.

CONCLUSION

Cardiac pacing could be a cause of post cardiac injury syndrome and implanters should take this diagnosis in consideration whenever symptoms of inflammatory pericarditis occur in the first month after the procedure.

Conflict of interest: none declared.

References

1. Ohlow MA, Lauer B, Brunelli M, Geller JC. Incidence and predictors of pericardial effusion after permanent heart rhythm device implantation. *Circ J* 2013; 77: 975–981.
2. Wei-Che Tsai, Ching-Ting Liou, Cheng-Chung Cheng, Kuo-Sheng Tsai, Shu-Meng Cheng and Wei-Shiang Lin. Post-Cardiac Injury Syndrome after Permanent Pacemaker Implantation. *Acta Cardiol Sin* 2012;28:53-55.
3. Miller GL, Coccio EB, Sharma SC. Postpericardiotomy syndrome and cardiac tamponade following transvenous pacemaker placement. *Clin Cardiol*. 1996 Mar;19(3):255-6.
4. Dressler W. The postmyocardial infarction syndrome. *Arch Int Med* 1959;103:28-42.
5. Levy Y, Shovman O, Granit C, Luria D, Gurevitz O, Bar-Lev D, Eldar M, Shoenfeld Y, Glikson M. Pericarditis following permanent pacemaker insertion. *Isr Med Assoc J*. 2004 Oct;6(10):599-602.
6. Salih M, Gashouta M, Pearson A, Smer A, Ayan M (2015) Pacemaker Induced Post Cardiac Injury Syndrome. *MOJ Clin Med Case Rep* 2(4): 00028.
7. Sivakumaran S, Irwin ME, Gulamhusein SS, Senaratne MP. Postpacemaker implant pericarditis: incidence and outcomes with active-fixation leads. *Pacing Clin Electrophysiol*. 2002 May;25(5):833-7.
8. Gatzoulis, K., Archontakis, S., Tsiachris, D. et al. Post-cardiac injury syndrome after permanent electronic cardiac device implantation. Incidence, presentation, management and long-term prognosis. *International Journal of Cardiology*, 174(1), 163–164.
9. Greene TO, Portnow AS, Huang SK. Acute pericarditis resulting from an endocardial active fixation screw-in atrial lead. *Pacing Clin Electrophysiol*. 1994 Jan;17(1):21-5.
10. Shingaki, M., Kobayashi, Y., & Suzuki, H. (2014). Acute pericarditis with cardiac tamponade induced by pacemaker implantation. *Asian Cardiovascular and Thoracic Annals*, 23(9), 1093–1095.