

Transmigration of Guide Wire from The Lateral Vein of Heart to Pericardium: An Experience from a Conservative Approach with Three Years Follow-Up Visit

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Abstract

Background: Any foreign particle in human body need to be removed to protect from different complication. But in our case patient could not be managed surgically so close medical management was selected on a context of sterile foreign body without further side effects.

Case report: We present a case of iatrogenic transmigration of foreign body within the pericardium. Which was regularly followed for three years without complications and symptoms.

Conclusion: None operable and sterile foreign body in pericardium may remain symptomless and it can be managed conservatively on poor general condition patient with regular follow-up.

Background

Many clinicians might have encountered patient with foreign body intruding problems. Various foreign particles usually get into our body through different sort of accidents. However, during some surgery or other procedure unknowingly iatrogenic foreign body can also get into human body although the rate is least. Foreign bodies if get inside our body it may trigger the immune or inflammatory cells thereby causing inflammation and swelling, releasing symptoms. And if it is not removed may lead to further complications. Despite, depending on particle, size, location and patient general condition all foreign body may not be harmful to human. In this paper, we have presented a rare case of broken guide wire transmigration in the pericardium which remained without any signs during 3 years close follow up.

Case Report

We report a case of 70 years old male with complete left bundle branch block and heart failure. Cardiac resynchronization therapy-defibrillator (CRT-D) was administered to a 70-year-old male patient with a 10 year history of cardiac enlargement. The left ventricular lead was placed in the lateral vein of heart, however, could not be fixed precisely. To fix the left ventricular electrode properly, a percutaneous coronary intervention (PCI) guide-wire was explored. Unfortunately, after several unsuccessful attempts, the guide wire was broken at the base and left in place. The distal detached portion remained in the lateral vein of heart (Figures 1 and 2). In consideration of greater risk of surgery to remove residual guide-wire and patient being asymptotic, a conservative approach was chosen. The patient was discharged in good condition without chest pain. Follow-up visit was normal during the next two years. Two years later, pacing dysfunction of the left ventricular lead was found. We removed the original left ventricular lead and implanted a new left ventricular lead, and no additional guide wire was adopted during the operation process. Meanwhile, no additional intra pericardial foreign body was revealed in the chest CT scanning (Figure 3).

Three years later, the patient was admitted to the hospital because of 10 days of chest pain. Radiograph shows the pacing electrode connected to the CRT-D pulse generator lies in the lateral vein of heart, but there are two pieces of foreign matter, one part is in the side wall of the heart and another part is in the pericardium at the bottom of the heart (Figures 4-7), both of which cannot be found by echocardiograph.

In addition, no pericardial effusion was found by echocardiography. We doubted the transmigration guide wire was related to the chest pain, and open-heart surgery seems to be a reasonable solution, but this patient cannot endure the risks involved considering the long duration of cardiac dysfunction and poor health conditions. So, after 10 days of hospitalization, the patient's pain was disappeared. It seems to keep on following-up is a more appropriate course of action.

Discussion

With advances in the examination and treatment of the heart and great vessels, the iatrogenic cardiac foreign bodies, which include fractured catheter, dislodged guide wire or stent [1], are significantly increased [2], whereas foreign body fracturing subsequently and lodging into the pericardium due to CRT-D implantation are rarely reported. Here, we report a case of placing a left ventricular lead into the lateral vein of heart in which a guide wire had lodged in, and been fixed during the following two years, but been fractured in the third year, and migrated in the opposite direction; one part is in the side wall of the heart, another part is in the pericardium at the bottom of the heart. Various radio graphical imaging technology has become vital on specifying the foreign body location, size and types. Advancement in different sectional view has paved operators' appropriate treatment strategy for favorable outcomes. Precisely, in most cardiac injuries echocardiography and computed tomography (CT) have superior benefit over foreign body correlation and revealing associated injuries. On the basis of our patient's history, chest radiograph and CT, we can exactly locate the fractured guide wire. Echocardiography has great

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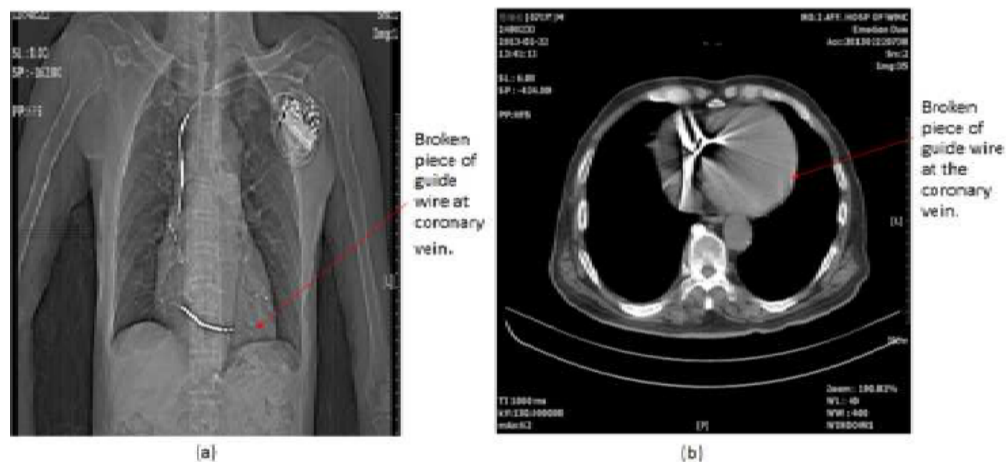


Figure 1: (a) X-ray chest showing broken piece of guide wire in the coronary vein (pacemaker *in situ*) (b) plain CT chest showing broken piece at coronary vein.



Figure 2: Plain chest showing broken PCI guide wire residue at the pericardium.

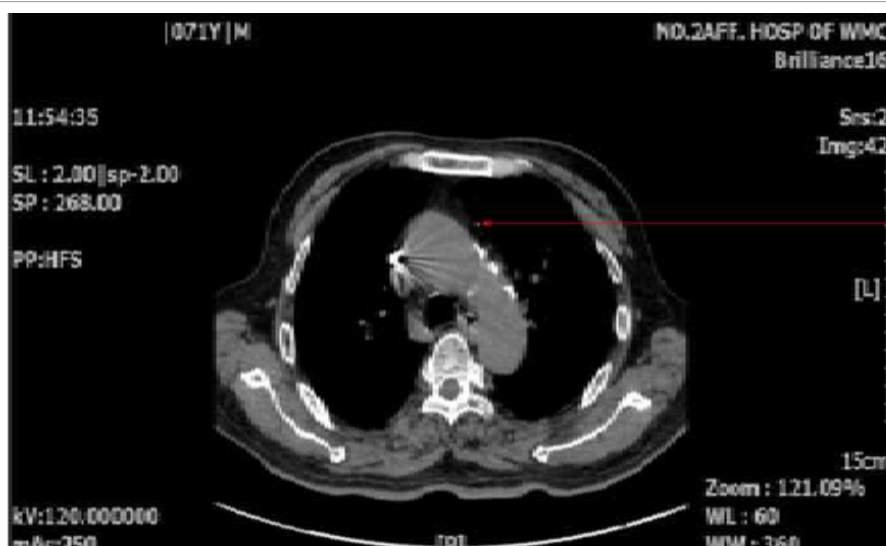


Figure 3: Plain chest showing broken PCI guide wire residue at the pericardium.

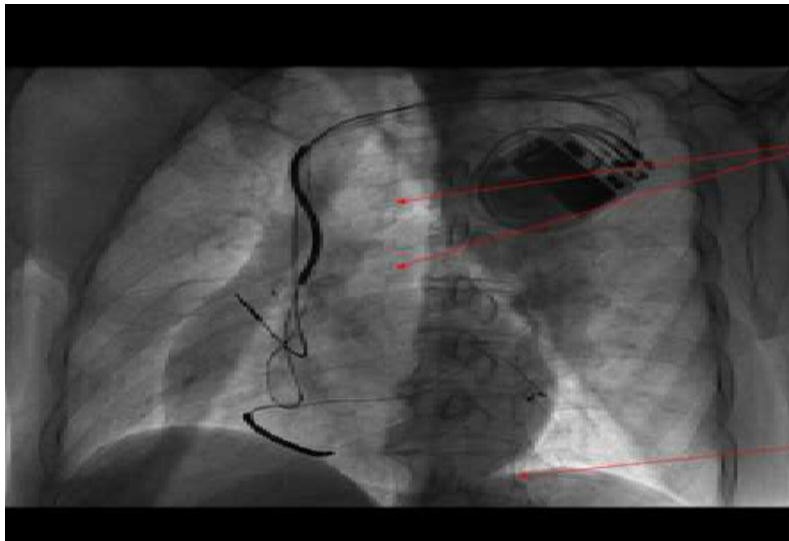


Figure 4: Left lateral VIEW: Fluoroscopy showing the residue of broken PCI guide wire in left coronary vein and pericardium.

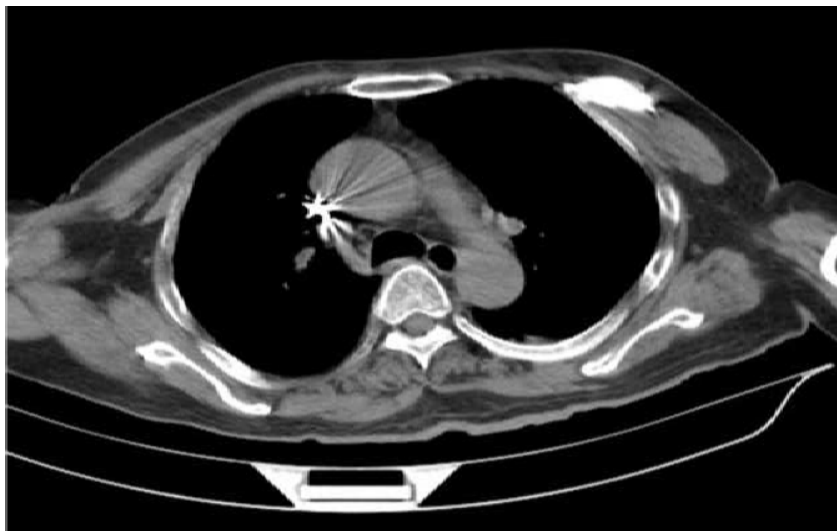


Figure 5: Normal plain chest. No foreign body could be seen in the pericardial region.

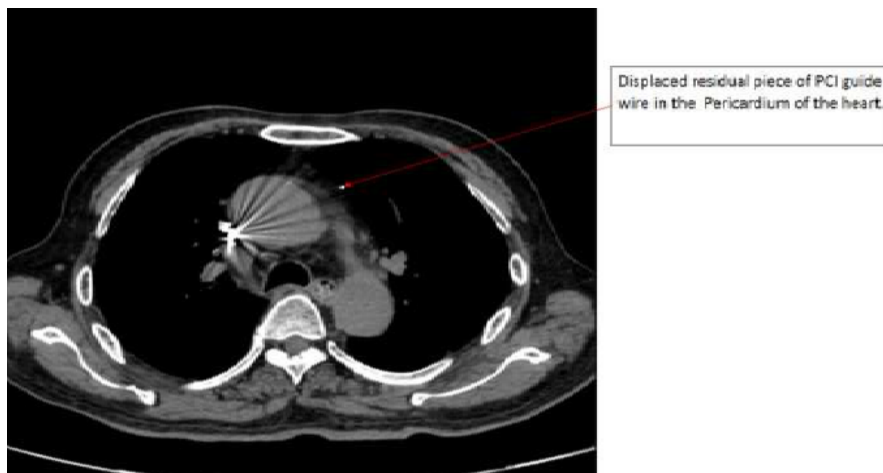


Figure 6: Transverse section of plain chest showing broken guide wire piece in the pericardium (Post CRTD installation).

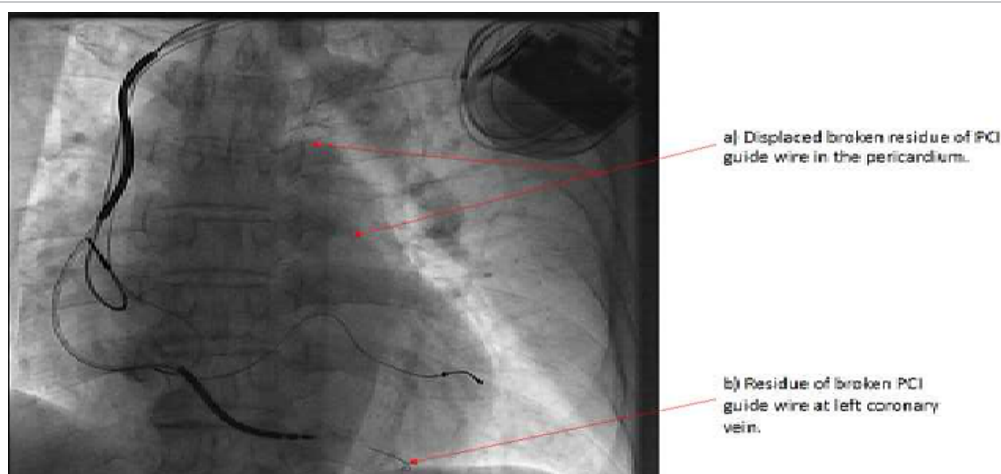


Figure 7: Latest fluoroscopy showing the residue of broken PCI guide wire (a) at the pericardium (b) at left coronary vein.

value in deducing the position of foreign body in the heart [3]. In this particular case, the echocardiographic examination failed to locate the foreign body in the pericardial cavity because the foreign body of this patient was a very small segment of PCI guide wire. The chest X-ray examination is great for the diagnosis of metallic foreign bodies, but is limited in the diagnostic value of non-metallic foreign bodies [4].

Moreover, acute characteristics of foreign body consequences are determined by the nature, location and sizes. Prompt and timely localization could decline the failure rate in invasive foreign body removal. Many research has reported sharp wound and gunshot wound lead to difficult complications with higher number of death. Shannon et al. [5] stated smaller caliber wound (79%) with higher risk of embolization through peripheral vessel into major vessels and clinical symptoms were associated with arterial ischemia from intra-arterial projection. However, our patient did not revealed any symptoms of embolism. The proposed hypothesis is that the embolism is small and only involved the pulmonary vascular system, which cannot be easily manifested.

Mattox et al. [6] reported two cases where the right heart foreign body embolized into the IVC and subsequently migrated in the renal and the hepatic vein. Various reports have mentioned about the foreign body movement from the periphery to the right heart but our study for the first time has described incidence of a foreign body traversing to the pericardium via the lateral vein penetration of the heart.

To the best of the authors' knowledge, none of the previous reports documented on the re-fracture of foreign body after reserved in the body. The only explanation of this abnormal rupture of the guide wire is because of Cardiac contractions and postural changes. Different reports have been documented on asymptomatic foreign body migrations to the heart from the vascular system after trauma and diagnosis were made years later during a routine chest roentgenogram [7]. About 70% of these patients could be remained as symptomless. Although our patient is asymptomatic and uneventful, it is very dangerous to remain the guide wire in the heart vein and to ignore that the guide wire might be re-fractured or penetrate the heart or vessel.

There are varying views on the treatment of cardiac foreign body. Foreign body leading to an obstruction in main venous effluent or wandering, posing a threat to pulmonary vessel embolization, risk of bacterial endocarditis, myocardial irritation or erosion are recommended to remove [6]. On the contrary, asymptomatic foreign

bodies residing in pericardium or myocardium and not leading to future complications or discovered later could be managed conservatively [8]. The literature also reports the morbidity of retained foreign bodies (late migration, partial organ infarction, septicemia and thromboembolism) to be <25%, although retrieval with the aid of latest techniques are safer and has less complications (1% to 2%) [8]. However, Schechter et al. suggest that the cardiac foreign body is an emergency and should be urgently removed whether it causes acute symptoms or not. Actis Dato et al. [9] suggested that a foreign body detected early enough for instance due to trauma, even in the absence of obvious symptoms, should be removed as soon as possible because of the possibility of complications such as infection and embolism. The foreign body of heart which is found later should also be removed when there are complications such as infection, embolism, and arrhythmia and so on.

Different operative approaches may be employed to remove the foreign body depending upon its location. The use of sternotomy in favour of thoracotomy is associated with increased safety, decreased morbidity and shortened hospitalization. Selective management about removal of an intravascular foreign body should be implemented. Although no adverse event was happened during the following two years' visit, the removal surgery should be taken to our patients at the first time. In retrospect, it is inappropriate to give up approaching the surgery anymore after seeing a benign follow-up result.

Conservative treatment is advocated if the foreign body is smooth and not contaminated, but the foreign body should be closely monitored. In contrast, if a sharp foreign body has lodged in the vascular system, it frequently causes complications [10]. The primary selection of management for a wandering foreign body, if possible, should always be interventional radiology [11]. Furthermore, Zhang et al. [12] on their case reports stated that rusted foreign body in posterior papillary muscle near the back of left ventricle and halts blood flow may be associated with severe complication and it should be removed with emergency surgery. However cardiac tamponade needs to be monitored with penetrating wound of foreign body in heart. And pericardiotomy should be done rather than pericardial puncture. But the patient without tamponade could continue the treatment with observation. In present report, the problem was getting control over the coronary sinus and evading foreign body migration and pulmonary embolism, so an invasive intervention was preferred over an interventional procedure. However, after fracturing of the guide wire and being embedded in the myocardium, conservative treatment was performed to our patients.

Even so, it seems more reasonable to properly fix the guide wire adopt stent or something else.

Based on this case, PCI guide wire should have been removed or surgical intervention administered when the guide wire dislodged from its ventricular electrode during the initial CRT or CRT-D treatment. A foreign particle inside the cardiovascular system is a real-time problem. Careful planning, suitable strategy, optimal application of modern diagnostic techniques and above all meticulous surgery are necessary to overcome such difficult conditions without causing further damage to the victim, even it is seemed benign of the foreign body, for it might be re-fractured and transmigrated.

Conclusion

Surgery and immediate removal of foreign body in cardiac vein are mandatory and definite treatment. However, conservative management could also be applied if patient general condition is poor, non-operable and patient is asymptomatic regarding it. Foreign body left (if sterile) or dislodged in myocardium may not cause pericardial effusion and other side effects. But regular close follow up is required.

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