

Perforation of the Right Innominate Vein by Pacemaker Lead During Implantation: A Report of 2 Cases

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WAN ET AL.: Perforation of the Right Innominate Vein by Pacemaker Lead During Implantation: A Report of 2 Cases. Injury to vascular structures is a well recognized complication during invasive cardiac procedures. We report 2 cases of right innominate vein perforation during the permanent pacemaker implantation. Early suspicion could be made by noting the restricted "linear" up and down movement of the lead along the right cardiac silhouette under fluoroscopy. Confirmation could then be made by making a LAO 40° view with contrast venography. Using long sheath and early guiding venogram could reduce the complication of perforation. (J HK Coll Cardiol 2007;15: 74-75)

Implantation, Innominate vein, Pacemaker lead, Perforation

摘要

在心臟介入治療中，靜脈系統的損傷足以引起受重視的併發症。我們報導兩例在植入心臟起搏器過程中，導線引發右側無名靜脈穿洞的病例。最初期被懷疑的情況是在X - 光透視檢查下發現導線在右心的側面影像呈現出上下線性活動受限制，而在LAO 40°的位置下通過靜脈造影則可確診。使用長鞘、早期以靜脈造影指引，可以減少穿洞的併發症。

關鍵詞：植入 無名靜脈 起搏器導線 穿孔

Introduction

Injury to vascular structures is a well recognized complication during invasive cardiac procedures or catheters insertion.¹ However, few data was available on the diagnosis and management of innominate vein perforation by pacemaker leads during pacemaker implantation.

We report 2 cases of right innominate vein perforation during the permanent pacemaker implantation in our hospital. Patients' procedural records, X-Rays, cine films and progress notes were studied.

Case Reports

Case 1 was a 70 years old male with symptomatic Sick Sinus Syndrome and Case 2 was a 54 years old male with advanced heart block. In both cases, left-sided approach for venous access was being used. Left subclavian vein puncture was performed and standard lead sheath was used. During the insertion of the ventricular pacing lead (with stylet), minor resistance was encountered while negotiating the 90-degree turn from the left subclavian to the right innominate vein into the superior vena cava. Early suspicion of perforation was made by noting the restricted movement of the lead under fluoroscopy when negotiating the lead toward the right ventricular apex. In fact, in both cases, the real time fluoroscopy revealed that the tip of the pacing lead was travelling up and down along the right side of the cardiac silhouette without any advancement towards the right ventricular apex. Diagnosis was

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confirmed by the LAO 40° view showing the pacing lead outside the cardiac silhouette and supplemented with contrast venogram (Figure 1).

For Case 1, immediate consultation with the cardiothoracic surgeon was made. Haemodynamic monitoring showed a drop in blood pressure and the patient complained of chest pain. The pacing lead was not withdrawn and the patient was sent for open thoracotomy. During the operation, the venous perforation was confirmed to be at the right innominate vein and there was no haemomediastinum or haemothorax. Surgical repair of the perforation followed by pacemaker implantation was performed. Recovery was uneventful.

For Case 2, conservative management was adopted as contrast venogram performed after the pacing lead withdrawal showed no contrast leakage. As intensive haemodynamic monitoring after the lead withdrawal was stable, implantation continued. A long sheath was used to guide the lead through the 90-degree turn. Post-procedural monitoring in the Coronary Care Unit was uneventful.

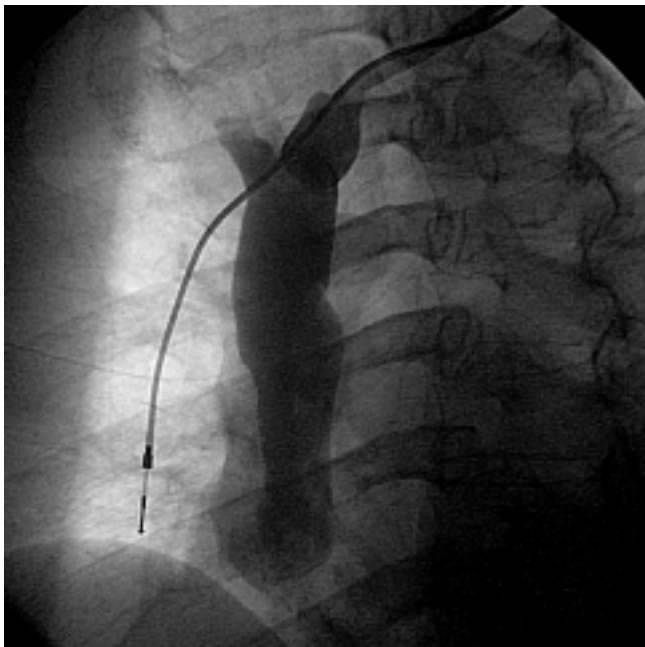


Figure 1. LAO 40° view after contrast venogram showing ventricular pacing lead outside cardiac silhouette.

Discussion

Perforation of the innominate vein by various catheters inserted into the venous system had been reported in the literature.^{2,3} Underlying mechanisms include malposition of the catheter, repetitive movement of the catheter tip against the venous wall due to respiration or cardiac cycle resulting in erosion.³

During pacemaker lead insertion, injury to the innominate vein could be due to over-advancement of the guiding sheath while trying to negotiate the lead through the 90-degree turn from the left subclavian to the right innominate vein into the superior vena cava. The stylet inside the lead may also contribute to the additional pressure on the tip of the lead increasing the risk of damage to the venous wall. Therefore, it is important to withdraw the stylet away from the tip of the lead to make it more floppy while negotiating in the venous system. In case resistance is encountered, early use of contrast venogram to guide lead manipulation is recommended. As reported in Case 2, long sheath could be used to guide the pacing lead beyond the sharp turn in the innominate vein.

In case perforation occurs, early suspicion could be made by noting the restricted "linear" up and down movement of the lead along the right cardiac silhouette under fluoroscopy when negotiating the lead toward the right ventricular apex. Confirmation could then be made by making a LAO 40° view with contrast venography. Management would depend on the haemodynamics of the patient and findings in the venogram. Other imaging modalities like Computer Tomography can provide additional information in such case.

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