

## Anomaly of Lead Path during Pacemaker Implantation in Patient with Persistence of the Vein Superior Left Cave: About a Case

Beye SM<sup>1\*</sup>, Yekeni CF<sup>2</sup>, Tabane A<sup>2</sup>, Diop KR<sup>2</sup>, Ndiaye M<sup>2</sup>, Diouf Y<sup>2</sup>, Sarr SA<sup>2</sup>, Aw F<sup>2</sup>, Bodian M<sup>2</sup>, Ndiaye MB<sup>2</sup>, M Diao<sup>2</sup> and Kane AD<sup>1</sup>

<sup>1</sup>Department of Cardiology, Regional Hospital of Saint Louis, Saint Louis, Senegal

<sup>2</sup>Department of Cardiology, Aristide Le Dantec Hospital, Dakar, Senegal

\*Corresponding author: Beye SM, Cardiology department, Regional Hospital of Saint Louis, Saint Louis, Senegal, Tel: +221 3393824 00; E-mail: serigne-mor.beye@ugb.edu.sn

Received: August 30, 2019; Accepted: September 13, 2019; Published: September 20, 2019

Copyright: © 2019 Beye SM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

The persistence of the left superior vena cava is a congenital anomaly most often associated with an abnormality of venous return, usually asymptomatic and fortuitous discovery. It can pose technical difficulties during cardiac pacing. We report the case of a pacemaker lead path abnormality related to persistence of the left superior vena cava in a 68-year-old patient. She was admitted to our unit for a symptomatic complete atrioventricular block with of vertigo. During the procedure, the progression of the lead through the left subclavian vein was slowed down by an obstacle. The lead presented an aberrant path with an early descent ahead of the aortic button and a defect of progression after product injection. Post-stimulation echocardiography revealed coronary sinus dilatation. Chest CTA had confirmed the left superior vena cava with a vertical pre-aortic seat and thrown into the right atrium. The pacemaker was finally implanted by right subclavian way successfully.

**Keywords:** Persistence of the left superior vena cava; Pacemaker; Lead path abnormality

### Introduction

The persistence of the left superior vena cava is a congenital anomaly most often associated with a venous return anomaly [1], usually asymptomatic and fortuitous discovery. It can pose technical difficulties during cardiac stimulation by changing the path of leads according to the anatomical relationship of the latter with the other supra-cardiac venous structures. We report the case of a pacemaker lead path abnormality related to persistence of the left superior vena cava.

### Case Report

This was a 68-year-old patient with no prior cardiovascular history who was admitted to our unit for a symptomatic complete atrioventricular block with of vertigo. A cardiac stimulation was indicated

During the procedure, the progression of the lead through the left subclavian vein was slowed down by an obstacle (Figures 1-5).

After several attempts, the lead presented an aberrant path with an early descent ahead of the aortic button and after injection of product, there was a defect in contrast progression at this level.

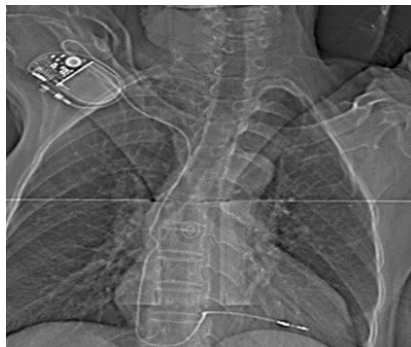


**Figure 1:** Fluoroscopy showing an obstacle to progression of the probe in the left subclavian vein.



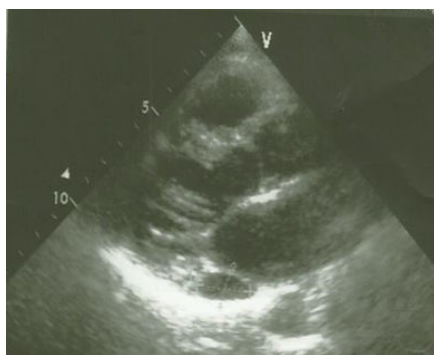
**Figure 2:** Fluoroscopy showing a pacemaker probe with an early course to the coronary sinus.

The pacemaker was finally implanted right successfully.



**Figure 3:** Fluoroscopy showing the final result the pose of the pacemaker on the right.

The echocardiography performed after the pacemaker was placed showed a dilation of the coronary sinus.



**Figure 4:** Echocardiography in the left parasternal area showing significant dilatation of the coronary sinus (arrow).

Chest CTA had confirmed the left superior vena cava with a vertical pre-aortic seat and thrown into the right atrium. It was permeable all the way, with no abnormality of intra luminal density. The right superior vena cava was visualized without abnormality. There was no communication between the two upper cellular systems from their origin until their entry into the right atrium, realizing a type IIIb of the classification of the supra-cardinal venous system.



**Figure 5:** Thoracic CT angiography showing right superior vena cava (yellow arrow) and left (orange arrow).

## Discussion

The right superior vena cava is derived from the right anterior cardinal vein and normally the left anterior cardinal vein and the left horn of the venous sinus involute.

The left superior vena cava draining into the coronary sinus is due to the persistence of the left anterior cardinal vein and its junction with the part of the venous sinus that will give the coronary sinus. In the case where the anterior cardinal vein left persists giving rise to the superior left vena cava the right can persist realizing a double superior vena cava or regress with presence or not of an innominate venous trunk. This is the case in our patient and corresponds to the type III b described by Webb [2-5].

In 80% the left superior vena cava flows into the coronary sinus without any hemodynamic consequence which corresponds to our case [1,5].

Her diagnosis is usually fortuitous, during a cardiovascular imaging or an unusual path of venous catheter under left keyboard.

Echocardiography in our case found a dilated coronary sinus with no abnormalities of pulmonary venous return. Thoracic CT angiography is the gold standard examination for confirmation of an upper left vena cava and for other associated abnormalities (inter auricular communication, aortic bicuspid, coarctation of the aorta, coronary atresia).

The persistence of the left superior vena cava has various implications in practice.

It can complicate the implantation of a defibrillator or a pacemaker.

Indeed, the orifice of the coronary sinus forms an acute angle with the tricuspid valve thus preventing the lead from joining the apex of the right ventricle by the tricuspid. This may lengthen the procedure and expose to rhythmic complications, cardiogenic shock, tamponade and coronary thrombosis. Fortunately, the incidence of these complications is relatively low [3,4].

The positioning of a cardiac pacing lead by the left superior vena cava can be difficult especially in the absence of an innominate vein between the left and the right. Finally, in our patient, the implantation could be carried out successfully by right keyway.

## Conclusion

The left superior vena cava is a rare congenital anomaly, often discovered by chance during venous catheterization. It is to be sought in case of dilatation of the coronary sinus echocardiography. Thoracic CT angiography can confirm the diagnosis and look for other associated malformations. The presence of an upper left vena cava makes the implantation technique difficult and lengthens the duration of exposure to radiation.

## References

1. Goyal SK, Punnam SR, Verma G, Ruberg FL (2008) Persistent left superior vena cava: a case report and review of literature. Cardiovascular Ultrasound 6: 50.
2. Nsah EN, Moore GW, Hutchins GM (1991) Pathogenesis of persistent left superior vena cava with a coronary sinus collection. *Pediatr Pathol* 11 : 261-269.

3. Webb W, Gamsu G, Speckman J (1982) Computed tomographic demonstration of mediastinal venous anomalies. AJR Am J Roentgenol 139 : 157-161.
4. Morgan LG, Gardner J, Calkins J (2015) The incidental finding of a persistent left superior vena cava: Implications for primary care providers-case and review. Case Rep Med 2015: 198754.
5. Webb W, Gamsu G, Speckman J, Kaiser JA, Federle MP, et al. (1982) Computed tomographic demonstration of mediastinal venous anomalies. AJR Am J Roentgenol 139: 157-161.