



Interrupted Inferior Vena Cava with Hemiazygous Continuation Causing Difficulty in Right Heart Access

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Abstract

Congenital interruption of inferior vena cava (IVC) is a rare developmental malformation. We hereby present a case of temporary pacemaker insertion where interrupted IVC was discovered following an unexpected difficulty in advancing the pacing lead.

Keywords: Vena Cava; Inferior; Pacemaker; Artificial

Introduction

Interrupted IVC is a rare developmental malformation. Its incidence is 0.3% in individuals without any variations or cardiac anomalies while it is 0.6-2% in the presence of these anomalies [1]. An important clinical implication of congenitally interrupted IVC is unexpected difficulties in procedures requiring right heart access through femoral vein.

Case Presentation

An eighty three year old lady was brought to our hospital with history of sudden onset of syncopal attacks and shortness of breath of one hour duration. On examination, she had bradycardia with heart rate of 30/min. Her ECG revealed complete heart block. An emergency bedside transvenous pacing was arranged. Right femoral vein sheath was inserted and pacing wire was introduced. However bedside pacing could not be achieved. Transcutaneous pacing too had an unsatisfactory capture. The patient was then shifted to cath lab for temporary pacing under fluoroscopy guidance. A venogram revealed interrupted IVC (Figure 1). With manoeuvring of the pacing wire under fluoroscopy, the wire crossed midline above renal veins (into the hemiazygous vein), then ascended up in left paravertebral region across the diaphragm (in accessory hemiazygous vein) and continued on the left side (in left superior intercostal vein) with supracardiac arching (through left brachiocephalic vein) into the right sided superior vena cava and then into right atrium. Another venogram through pigtail demonstrated this course (Figure 2).

Discussion

The IVC is formed by the joining of the left and right common iliac veins and brings blood into the right atrium of the heart. An interrupted IVC can either have a direct azygous continuation or a hemiazygous continuation [2]. Azygous continuation of the IVC through the persistent intermediate part of the right supracardinal vein is the most common finding. In cases of hemiazygous continuation, there are three possible arrangements in the prerenal region. Most frequently, the enlarged hemiazygous vein drains into the dilated coronary sinus via the dilated accessory hemiazygous vein and the persistent left SVC. Secondly, the hemiazygous vein may drain into the azygous vein approximately at the level of T8-T9 and the hemiazygous vein and the terminal part of the azygous vein are enlarged. Thirdly, the hemiazygous vein drains into the right-sided SVC via the dilated accessory hemiazygous, left superior intercostal and left brachiocephalic veins [2]. In our case, it was this last course. A CT or MRI would have demonstrated this anomaly distinctly. It could not be done in this case due to cost constraints.

The clinical implication of this anomaly is its association with heterotaxy, polysplenia and cardiac malformations, particularly left isomerism [3]. Deep vein thrombosis has been reported with interrupted IVC. The mechanism explained is increased venous pressure in lower limb causing venous stasis [4]. Interrupted IVC causing difficulties in elective procedures like EP study [5], right heart catheterisation [6], transvenous device closures [7] and IVC filter placements [4] have been reported. However, awareness about interrupted IVC and knowledge regarding alternative channels

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Figure 1: Venogram showing interrupted IVC with hemiazygous continuation.

of venous return gains more importance during emergencies. Reports of interrupted IVC discovered during an emergency procedure are very rare. Vijayvergiya et al. [8], had previously described a case of temporary pacemaker placement in interrupted IVC [8]. Their patient had an azygous continuation of IVC as against a rare form of hemiazygous continuation in our case.

Conclusion

Procedural difficulties can occur during cardiac catheterisation, some of which are unexpected. We hereby report a case of interrupted IVC causing difficulty in right heart access. Right heart was then approached with hemiazygous route. The knowledge of this congenital anomaly is important to avoid and overcome such trouble.

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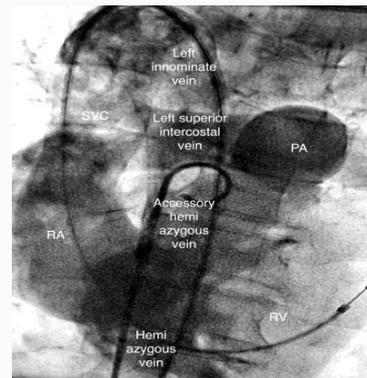


Figure 2: Venogram demonstrating course of pacing wire - through IVC - through hemiazygous vein - to accessory hemiazygous vein - Left superior intercostal vein - Left innominate vein - superior vena cava (SVC) - right atrium (RA) - right ventricle (RV).

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