Persistent Left Superior Vena Cava Complicating Pacemaker Catheter Insertion*

Leonda Garcia, M.D.;** Richard S. Levine, M.D., F.C.C.P.;* Warren Kossowsky, M.D.;† and Alan F. Lyon, M.D.†

Transvenous pacemaker therapy was complicated by the presence of a persistent left superior vena cava and absence of the right superior vena cava. The correct diagnosis was made during life by venous angiography and enabled successful therapy to be instituted utilizing the transthoracic placement of pacemaker electrodes.

The transvenous catheter technique for pacemaker therapy of complete heart block has met with widespread acceptance, since its clinical introduction in 1958.† Complications associated with its use have included infection, cardiac perforation, ventricular fibrillation, pulmonary emboli, and failure to pace due to catheter tip displacement.‡ Recently, a case was reported in which pacemaker failure and death was believed to occur secondary to catheter tip displacement due to anomalous venous return to the heart.‡

This report describes a patient, requiring a pacemaker, in whom a similar venous anomaly was recognized during life. The transthoracic approach to pacemaker implantation was utilized successfully.

CASE REPORT

The patient, a 79-year-old white woman, was first seen at the Brookdale Hospital Center in 1968. She had had a slow heart rate for many years. Three years prior to admission, she had collapsed and pacemaker therapy was advised. The patient refused and was placed on isoproterenol tablets three times per day. Since then, the pulse rate had generally remained slow, but she also experienced episodes of paroxysmal rapid heart beating. These latter episodes were associated with dyspnea and angina pectoris. Just prior to admission she had an attack of syncope and fell down a flight of stairs.

Physical Examination: The blood pressure was 140/90. The pulse rate was slow, varying between 35 and 40, and was occasionally irregular. The neck veins were distended and hepatosplenic reflux was present. The lungs were clear to auscultation. The heart was not enlarged and no gallop or murmur was detected. There was moderate pretilial edema.

The electrocardiogram showed sinus bradycardia with a rate varying between 30 and 40. There were occasional premature nodal ventricular contractions, atrial activity was occasionally absent and there was A-V nodal escape rhythm. The initial chest x-ray film showed no abnormalities of the heart or lungs. The aorta was widened and calcified on chest roentgenogram.

A demand type transvenous catheter pacemaker was inserted through the left cephalic vein. The catheter course was noted by the surgeon to be atypical and persistent left superior vena cava was suspected at that time. Although some difficulty in manipulation was noted, the catheter was passed down the left cava, through the coronary sinus and into the right atrium. From there it was deflected off the lateral wall of the atrium and into the right ventricle where effective pacing was obtained (Fig 1). The QRS complex on the electrocardiogram demonstrated the expected left bundle branch block pattern.

The patient was discharged from the hospital and apparently did well for 23 months when she again noted slow pulse rate and experienced marked dizziness. She was readmitted and the electrocardiogram showed ineffective pacemaker activity at a very slow rate with an underlying sinus bradycardia varying with atrial standstill and a nodal escape rhythm. The pacemaker battery pack was replaced by the surgeon, but under fluoroscopy, it was noted that the catheter tip was no longer located within the right ventricle. Attempts at manipulating the permanent catheter were repeatedly unsuccessful but a more rigid, No. 7, temporary pacemaker catheter was introduced through the previously described route followed by effective pacing. An angiogram was per-
Our case would appear to present similar anatomic findings which were recognized during life and successful therapy instituted by the transthoracic route of implantation.

While our patient was paced successfully for 23 months initially, we would agree with Kukral that the catheter position attained through the tortuous course presented by this set of anatomic relationships is tenuous at best. When a pacemaker catheter, passed from the left side, fails to pass the midline and enters the right heart via persistent left superior vena cava, an alternate method of therapy should be sought.

In an emergency situation where temporary pacing is required immediately, a femoral vein approach may be utilized to bypass the venous anomalies above the diaphragm. The anatomy of the superior vena cava may be investigated by angiography performed from the right arm or right external jugular vein. A normal superior vena cava properly communicating with the right atrium, would indicate placement of a permanent transvenous pacemaker through the right cephalic vein. The transthoracic approach would appear to offer one satisfactory alternative in the presence of an additional right superior vena caval anomaly.

REFERENCES

Glomerulonephritis following Streptococcal Pneumonia*

David A. Levinson, M.D.,** and Kenneth D. Litwack, M.D.†

A case of glomerulonephritis following streptococcal pneumonia in an elderly man is described. The importance of considering the Streptococcus in the differential diagnosis of bacterial pneumonias is stressed. The nonsuppurative complication of this pneumonia is documented.

*From the United States Public Health Service Hospital, San Francisco.
**Assistant Resident in Medicine.
†Chief, Infectious Disease Service.

Reprint requests: Director, PHS Hospital, 15th Avenue and Lake Street, San Francisco 94118