

**Ankylosing Spondylitis Combining Severe Bradycardia Treated with
Leadless Pacemaker Implantation - A Case Report**

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Abstract

Background: Traditional intravenous pacing implantation is difficult in patients with thoracic malformation and cardiac compression combined with severe bradycardia.

Case report: We present a case of an 80-year-old man who underwent leadless pacemaker implantation. For ankylosing spondylitis, the patient cannot lie flat. The traditional subclavian vein approach is not easy to perform, therefore we decided to implant a leadless pacemaker. The implantation process is smooth without complications.

Conclusions: Therefore, implantation of leadless pacemaker is a method to treat severe bradycardia patients with thoracic malformation and cardiac compression.

Keywords: Ankylosing spondylitis; Bradycardia; Leadless pacemaker

Case Presentation

We present the case of an 80-year-old man with third degree atrioventricular block who underwent Leadless Pacemaker Implantation. In normal standing position, the upper body of the patient inclines forward about 40-50°, and the bed needs to be raised about 40-50° when lying. Chest X-ray showed bamboo spine appearance for he was previously diagnosed with ankylosing spondylitis.

The preoperative Chest X-ray showed that the patient had obvious chest deformity, scoliosis, and heart compression and displacement in the anteroposterior position (**Figure 1A**). In the left position, the patient's spine was shaped like a bamboo, compressing the tissues in the chest (**Figure 1B**). During the implantation procedure, the patient could not lie flat and need to lie at about 40 degrees (**Figure 1C**). The traditional subclavian vein approach is not easy to operate, complete sterile is hard to maintain, so we decided to implant a leadless pacemaker (micraVR) by femoral vein instead. After Puncturing the right femoral vein, we found it difficult for the long guide wire to reach the superior vena cava. The pig tail catheter was put into the right atrium along the steel wire, and the fluoroscopy position was adjusted to 35°-foot position and 30° right anterior tilt to simulate 30° right anterior tilt in the normal position. Vascular malformations were shown in the right cardiac angiography, and the right atrium was severely compressed shaping like tubular, with obvious anterior and posterior transposition of the superior and inferior vena cava (**Figure 1D**). The leadless pacemaker delivery system was sent into the right atrium along the outer sheath, and the regulating head end was sent to the right ventricular. Angiography showed that the head end is well attached (**Figure 1E and F** shows the image of leadless pacemaker implantation in normal position at 35 degrees of foot position), the Micra was released. The patient recovered well after operation and discharged afterwards.

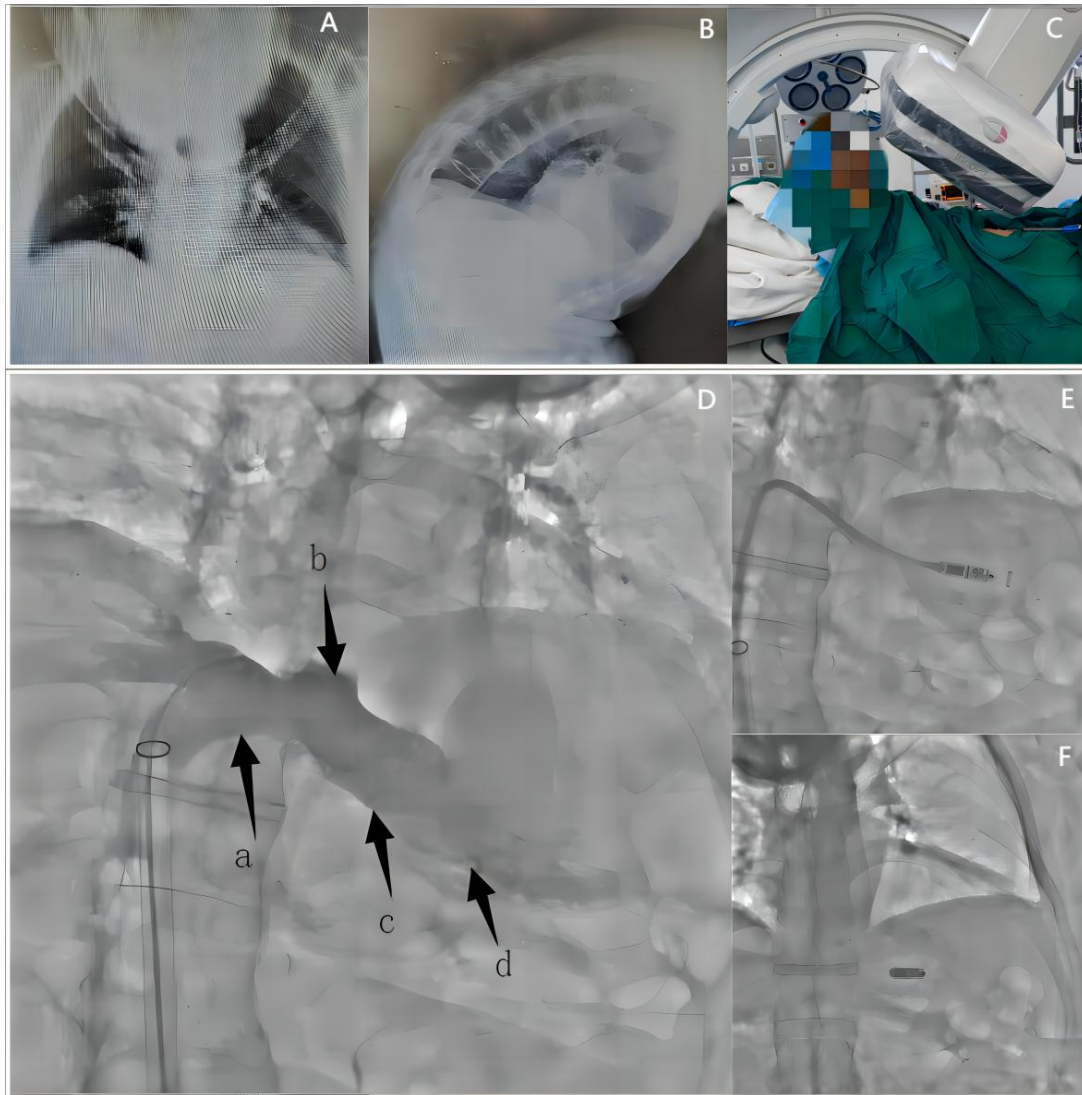


Figure 1A): Chest is in a normal position, with obvious deformity of thorax, scoliosis. B: On the left radiograph, it can be seen that the spine presents a bamboo shaped change, which compresses the tissues in the chest. C: The patient is in a half lying position at about 40°. D: With 35°-foot position and 30° right anteroposterior tilt, the right atrium angiography showed that the superior vena cava and inferior vena cava were obviously misaligned, and the right atrium was tubular due to the compression of the whole thoracic cavity. (The arrow points to a. inferior vena cava, b. superior vena cava, c. right atrium, d. right ventricle). E: Release the leadless pacemaker at the same angle of right atrial angiography. F: Foot position 35°, release leadless pacemaker in normal person's right position.

Discussion

The leadless pacemaker is small in size, about 25.9 mm in length, only 2g in weight, and has the characteristics of high implantation success rate and low incidence of postoperative complications. In 2022, the expert consensus on leadless pacemaker will recommend the implantation of leadless pacemaker for patients with abnormal or difficult implantation path of traditional pacemaker [1]. In this case, due to ankylosing spondylitis, the patient's spine inclines forward seriously and cannot lie flat. It is difficult for physician to enter the electrode lead into the right atrium through the right superior chamber system, and because of the patient's 40° semi

recumbent position, it is difficult to operate the traditional venous pathway. In this situation, an optional scheme is epicardial electrode implantation. Segar DE et al. [2] Patients with epicardial electrode implantation were found requiring a higher pacing threshold and higher tendency of frequent replacement and experience higher risk of thoracotomy. Although the implantation of epicardial electrode under the xiphoid process can reduce the surgical trauma to a certain extent, it will increase the incidence of infective endocarditis. In this case, the patient is older and complicated with coronary heart disease and other diseases, so it is not suitable for major trauma surgery. Implantation of leadless pacemaker is the best choice for him. Arana Rueda E et al. [3] first reported that leadless pacemaker implantation in patients with high atrioventricular block with thoracic malformation. There was no complication during perioperative period, and the patient's condition was stable, the pacemaker parameters were normal during follow-up period. Therefore, implantation of leadless pacemakers may be a better choice with severe spinal deformation, severe cardiac compression, and loss of the original structure of atrioventricular block.

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