



THE CROSS VALVE INVERTED GOOSE: A NOVEL TECHNIQUE FOR LEADLESS PACEMAKER IMPLANTATION IN PATIENTS WITH SEVERE RIGHT ATRIAL DILATION

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Background

Leadless pacemakers have been shown to reduce procedure-related and long term complications associated with pacemaker implantation. The unidirectional steerable delivery catheter may limit the deliverability in patients with severe right atrial enlargement

Objective

To demonstrate a novel technique for leadless pacemaker delivery in the setting of severe right atrial enlargement.



Fig. 1 Right ventriculogram in our patient outlining severe right atrial enlargement.

Methods

Methods: A 67-year-old gentleman with paroxysmal atrial fibrillation and severe sleep apnea resulting in severe right atrial dilation (confirmed by right ventricular angiography) underwent leadless pacemaker implantation after having symptomatic post-conversion pauses. Initial attempts at leadless pacemaker placement using the recommended manufacturer's delivery techniques were unsuccessful as the fixed curve of the delivery catheter did not allow contact with the septal or apical right ventricular wall.



Fig. 2. Delivery catheter using standard technique unable to contact the septal or apical right ventricular wall.

To allow a further depth in the right ventricle, the delivery catheter was advanced to the anterior region of the tricuspid annulus. The delivery catheter was then rotated 180 degrees counterclockwise and advanced to the mid septal wall. A reverse "gooseneck" was then applied and the leadless pacemaker was deployed to the mid septal wall. The device passed the pull and hold test and was deployed using standard techniques.

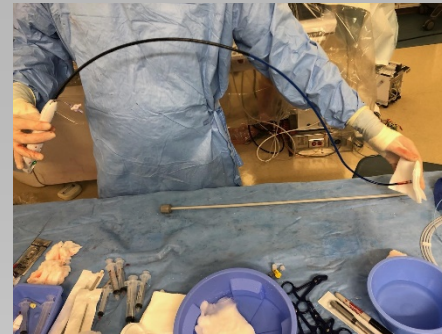


Fig. 3 The standard delivery catheter shown inverted demonstrating angulation that will achieve better contact with the interventricular septum

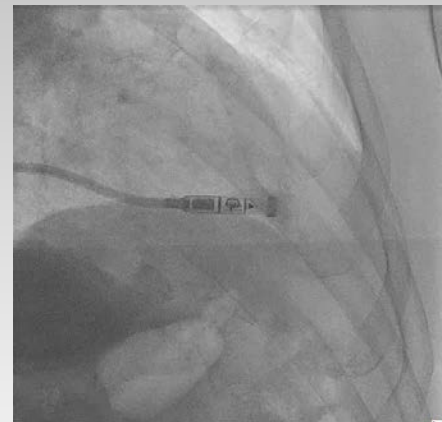


Fig. 4 Inverted gooseneck technique applied once across the tricuspid annulus, demonstrating contact with the interventricular septum.

Immediate post-deployment device threshold was 0.88 volts at 0.24 milliseconds and this remained stable during follow-up. The patient's pre-syncope symptoms resolved after pacemaker placement and he had no procedure-related complications.

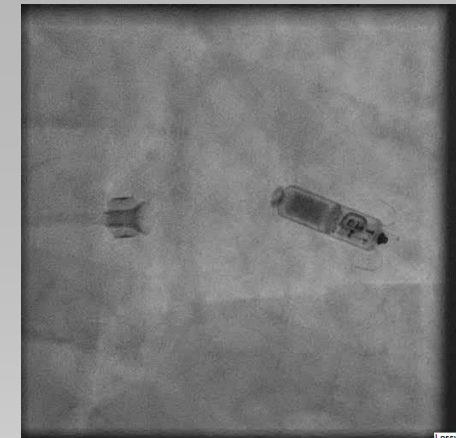


Fig. 5 Leadless pacemaker deployed, with tines anchored into the interventricular septum

Conclusions

Severe right atrial dilation limits the delivery of leadless pacemakers using the standard delivery sheath's curve. Right ventricular angiography is critical for planning leadless pacemaker placement in patients with structural abnormalities. Once past the tricuspid annulus, inverting the standard delivery sheath counterclockwise allowed attainment of further depth in the right ventricle allowing for successful leadless pacemaker placement in an otherwise challenging case.

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