EP CASE REPORT

# Left ventricular endocardial pacing by the interventricular septum route

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After failure of the coronary sinus lead and recurrence of symptoms, a left ventricular (LV) endocardial lead was successfully implanted through the ventricular septum. A patient experienced pericardial effusion after the procedure, relieved by pericardiocentesis. Perforation of the LV lead was excluded. She recovered completely and after 3 months she was free of heart failure symptoms.

### Introduction

Left ventricular (LV) endocardial pacing is an alternative for failed coronary sinus (CS) leads in cardiac resynchronization therapy. Implantations using a transatrial septum and transapical apical approach are described previously.[1,2] Recently, Betts *et al.*[3] presented their experience with LV endocardial pacing through the interventricular septum. We describe our first experience with a similar approach.

### Case report

A 75-year-old female patient with dilated cardiomyopathy, sinus rhythm, and left bundle branch block (QRS 164 ms.) had a cardiac resynchronisation therapy pacemaker (CRT-P) device implanted resulting in complete relief of heart failure (HF) symptoms. She developed phrenic nerve stimulation that could not be prevented by reprogramming nor by repositioning the CS lead, or by implanting a new lead in the same vessel. After disabling LV pacing, HF symptoms recurred with LV ejection fraction (LVEF) decreasing to 23%. She refused implantation of an epicardial lead but agreed with implantation of an LV endocardial lead.

### Implantation technique

A coronary angiogram was performed to be informed about the position of septal branches. An intracardiac echo catheter (ICE) was inserted and the left subclavian vein catheterized. A deflectable 12F sheath (Agilis 408310) was advanced into the right ventricle (RV) towards the interventricular septum (*Figure 1*).The dilator of the Agilis sheath was advanced to stabilize the septum but penetrated the septum without applying noticeable force. The position was confirmed by fluoroscopy, ICE, and LV cavity pressure. After changing the Agilis sheath for an Attain deflectable CS catheter (Medtronic Inc.), a Medtronic SelectSecure 3830 was implanted in the LV posterolateral area (*Figure 1*, left panel). The pacing and sensing parameters were comparable with RV implantation of this lead Q-LV sense interval 120 ms. After checking lead stability and proper fixation, the Attain catheter was slit and removed. The lead was provided with ample slack in the LV (*Figure 1*, right panel) and connected to the CRT-P device. A repeated coronary angiogram showed neither penetration nor other damage to the septal branches. After implant, the patient developed pericardial effusion which was relieved by pericardiocentesis. Perforation of the LV lead was excluded by computed tomography scan and electrical parameters. The patient recovered completely and after 3 months, she was free of HF symptoms and the LVEF had increased to 50%.

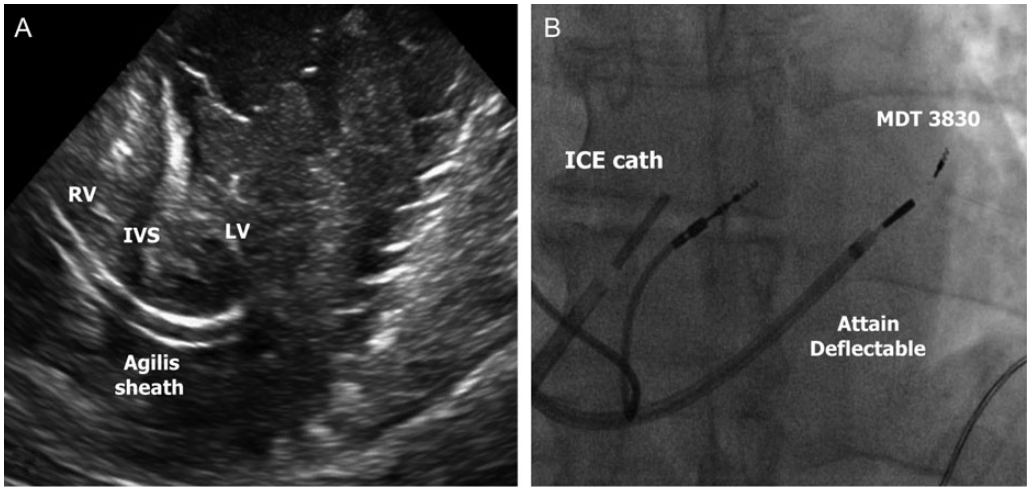


**Figure 1** Intracardiac echo catheter picture showing the Agilis sheath crossing from the RV towards the interventricular septum (IVS) into the LV, (*A*). Attain deflectable catheter withdrawn after fixation of the pacing lead (MDT 3830) in the basal posterolateral area of the LV (*B*).

**Discussion**

Implantation of a LV endocardial lead through the interventricular septum has potential advantages over the transatrial septum approach. No lead dwelling in the left atrium may minimize the risk of thromboembolism and mitral valve dysfunction. We believe that the pericardial effusion was unrelated to the crossing of the septum itself, nor implantation of the LV lead. Most likely, the stiff ICE catheter manoeuvred into the CS has initiated dissection and/or perforation and pericardial effusion is later on provoked by the initiation of anticoagulant therapy. In conclusion, transventricular septal implantation seems a new promising technique in selected patients after failure of CS implants.


## Acknowledgements

The authors acknowledge Dr Frank A. Bracke for his input in the set up of the procedure and critical review of the case report.

**Conflict of interest:** B.M.v.G. served as a Clinical Advisor, Medtronic Trading, NL BV, Heerlen, the Netherlands, and as a Consultant in RADI Pressure Wire Systems, a Sint Jude Medical company. M.G.S. and H.R. have no conflicts of interest to disclose.


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