

Feasibility of LV Endocardial lead for Cardiac Resynchronization Therapy

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Biventricular resynchronization therapy is recommended for patients presenting with left ventricular (LV) dysfunction and ventricular dys-synchrony.

CRT requires the implantation of an **LV lead**, usually placed in a lateral or posterolateral tributary of the **coronary sinus**



Implantation of a left ventricular (LV) lead fails in **5% to 10% of patients in whom CRT is attempted**



Conventional approach is not feasible due to :

- ❖ Anatomic abnormalities in the CS and its tributaries
- ❖ High pacing thresholds
- ❖ Phrenic nerve stimulation.

In these cases, surgical implantation of a lead onto the LV epicardium via thoracotomy or thoracoscopy is considered the alternative.

However, this is a more invasive procedure having a limited applicability in some patients with very low LV ejection fraction and high anesthetic risk.

LV endocardial lead placement allows unrestricted lead positioning, and thus the selection of the pacing site offering the best achievable hemodynamic response.

There is some evidence that LV endocardial pacing may be significantly superior to epicardial pacing, providing more a physiological and effective contraction of the heart muscle.

This may improve response to CRT, and potentially provide response to the therapy in patients who haven't previously responded to conventional CRT

Case presentation

62 years old male who was complaining of dyspnea , NYHA Class III/IV .

He was admitted to national heart institute, Egypt, with severe LV dysfunction due to ischemic cardiomyopathy.

He had history of surgical coronary revascularization in 2006 with retrograde cardioplegia then percutaneous coronary intervention in 2015 to native vessels due to graft failure.

His echocardiography showed ischemic dilated cardiomyopathy with poor LV systolic function , ejection fraction 20%, and mild MR.

12 leads ECG shows LBBB with QRS duration of 130 ms

His medical history included chronic kidney disease with serum creatinine during admission 1.6. Mg/dl.

The patient was prepared in the standard manner for CRT implantation (Viva XT ,Medtronic, MN, USA).

Venous access was gained using the Seldinger technique to the left subclavian vein.

Thereafter, right atrial and right ventricular pacing leads were implanted in a conventional manner.

LV lead implantation was tried many times, which was unsuccessful due to ostial stenosis of coronary sinus (CS) mostly due to previous retrograde cardioplegia and downward sigmoid coronary sinus anatomy.



**THE PT REFUSED ANY SURGICAL PROCEDURE.
WHAT WILL WE DO ?**



**SIMPLE IDEAS CAN ACHIEVE
GREAT MISSIONS**

We decided to implant the LV lead via trans-septal approach.

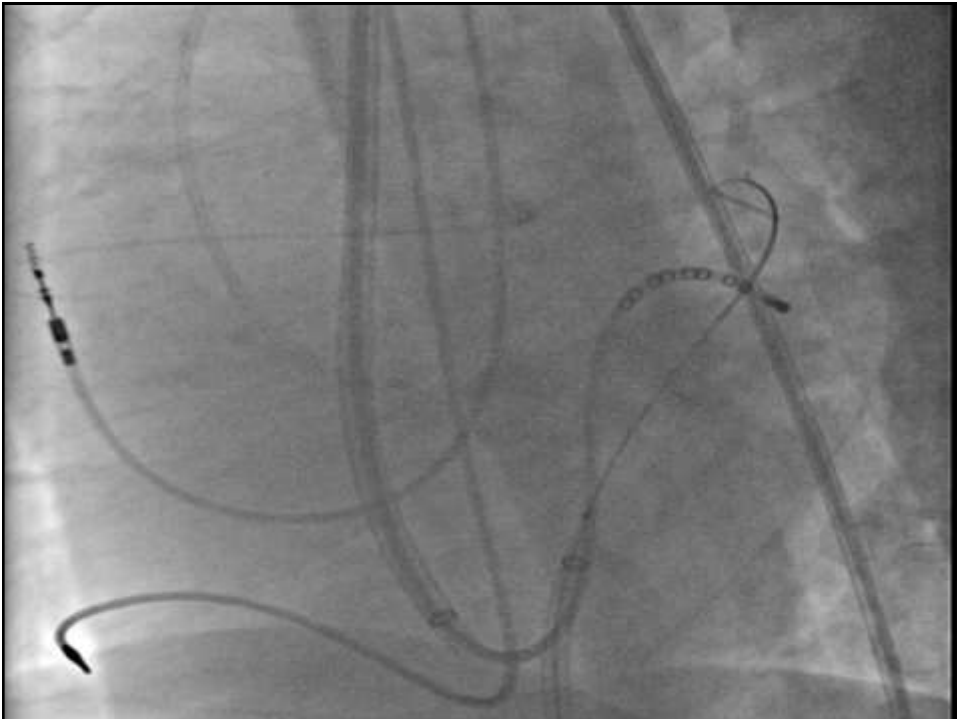
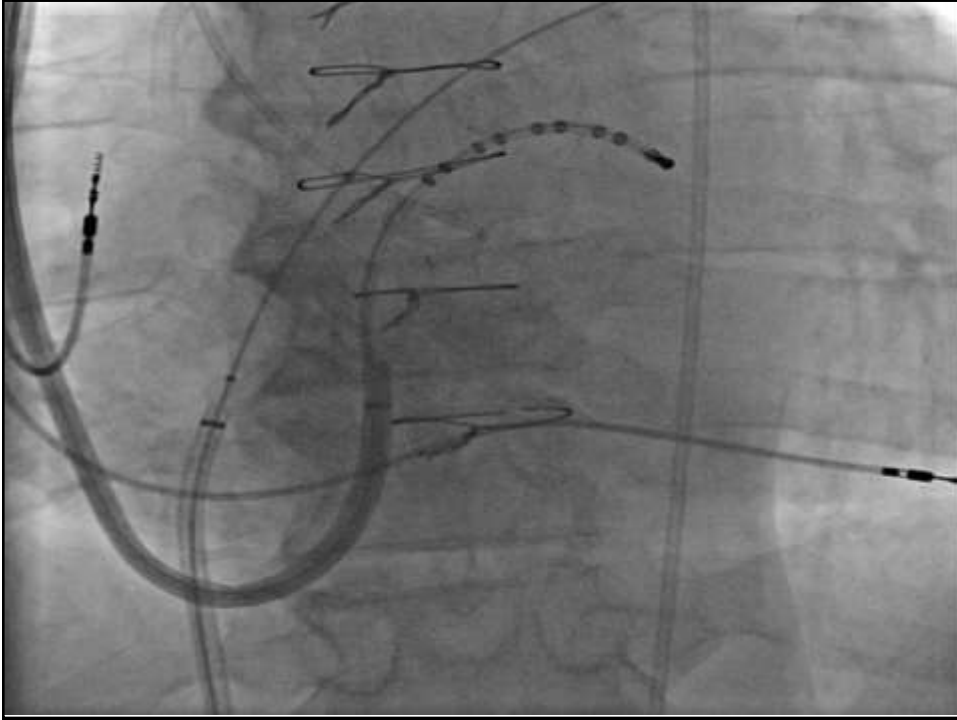
Right femoral artery was punctured via a 6F introducer and pig tail catheter was introduced to landmark the aortic root.

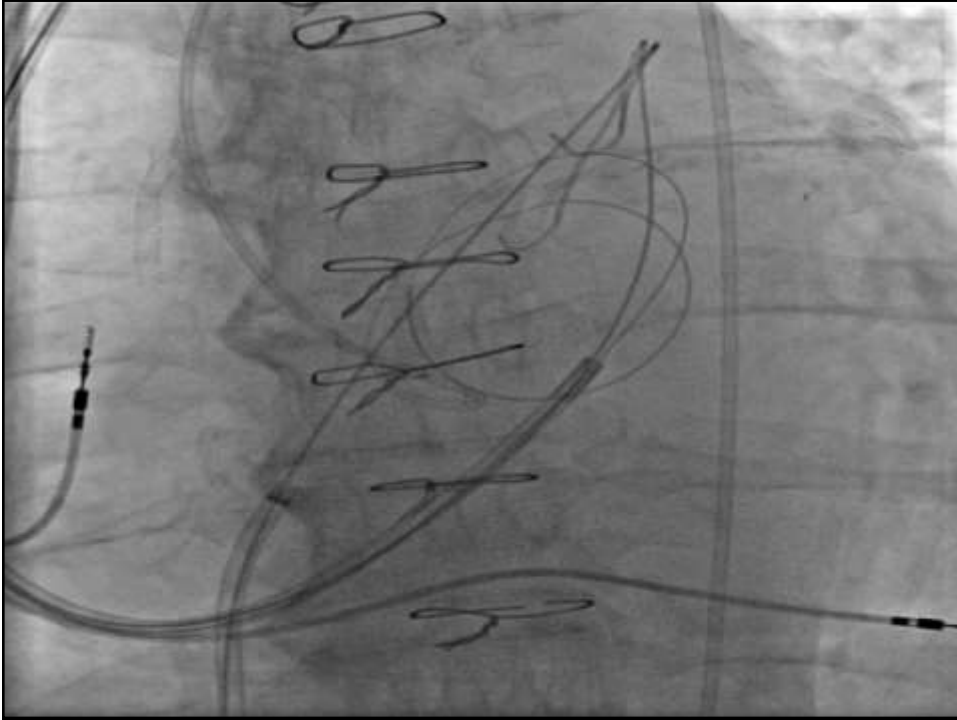
An access was obtained to the right femoral vein via a 9F introducer and standard **trans-septal sheath** was introduced in the left atrium from the right femoral vein followed by an intravenous injection of 5000 international units of heparin.

**WE USED A HYBRID EPS MBV
TECHNIQUE !!!!!**

Hereafter a steerable (Agilis™, St Jude Medical) introducer with dilator was introduced through the left subclavian vein and used to negotiate passing the septostomy site

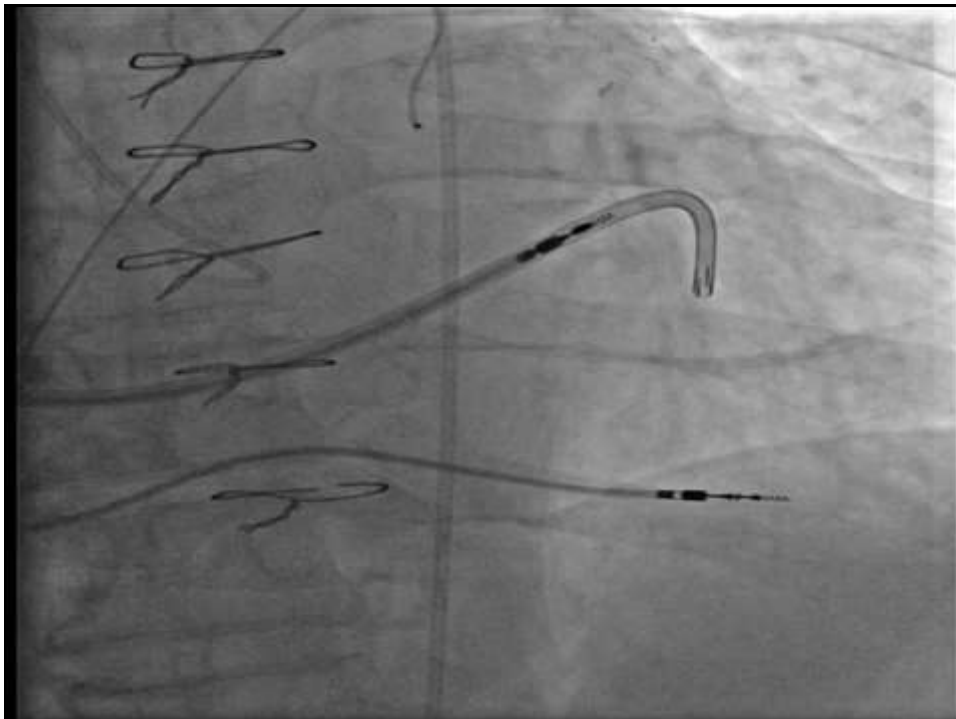
CS catheter then inserted LA through the atrial septum with help of steerable agilis but the sheath was difficult to pass through even after many times of balloon septal dilatation



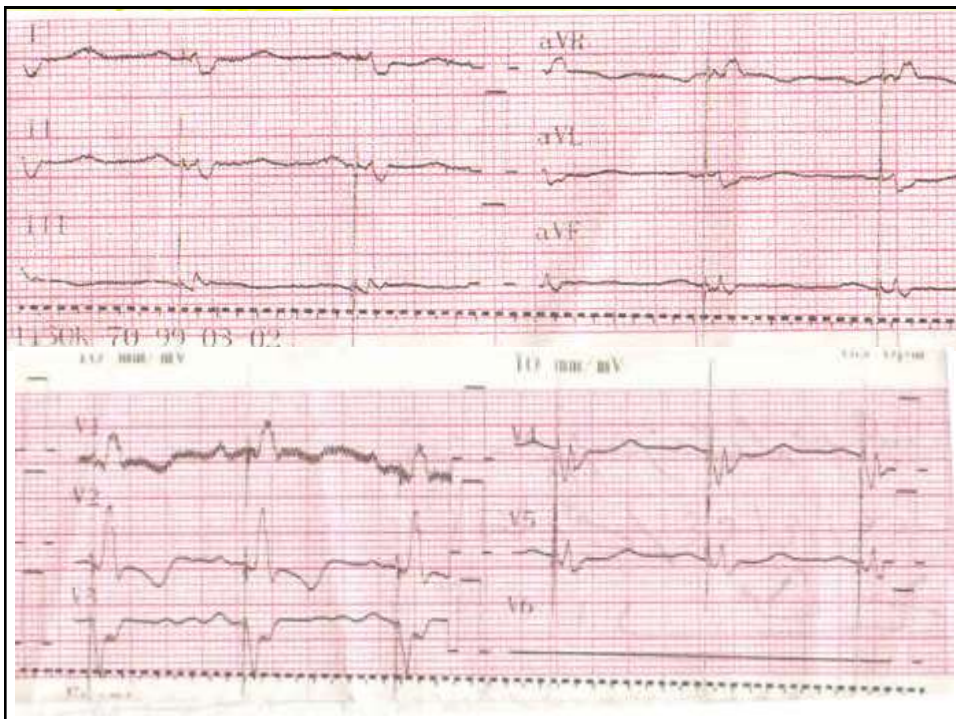


A guidewire was positioned within the LV, the Agilis Steerable Introducer was exchanged for a straight 45 cm slittable CS delivery sheath and positioned in the left ventricle at the posterolateral area.

A standard bipolar screw-in lead Medtronic 58 cm was difficult to advance through the CS sheath in the postero-lateral area.



A sweet bipolar lead of Boston sc. was advanced through the CS sheath in the postero-lateral area.



Anticoagulant therapy with warfarin was instituted immediately after the procedure.

Echocardiographic examination was done after implant showed

- No increase in mitral regurgitation,
- There was no a trans-septal shunt,
- No pericardial fluid, or any other complication





**God's help, patience and blessing of
a good team → Achievement**



