Η Καλύτερη ή η Χειρότερη Κλινική Περίπτωση Ηλεκτροφυσιολογίας & Βηματοδοτών

Θεόδωρος Αποστολόπουλος

Διευθυντής Τμήματος Ηλεκτροφυσιολογίας, Βηματοδοτών και Απινιδωτών

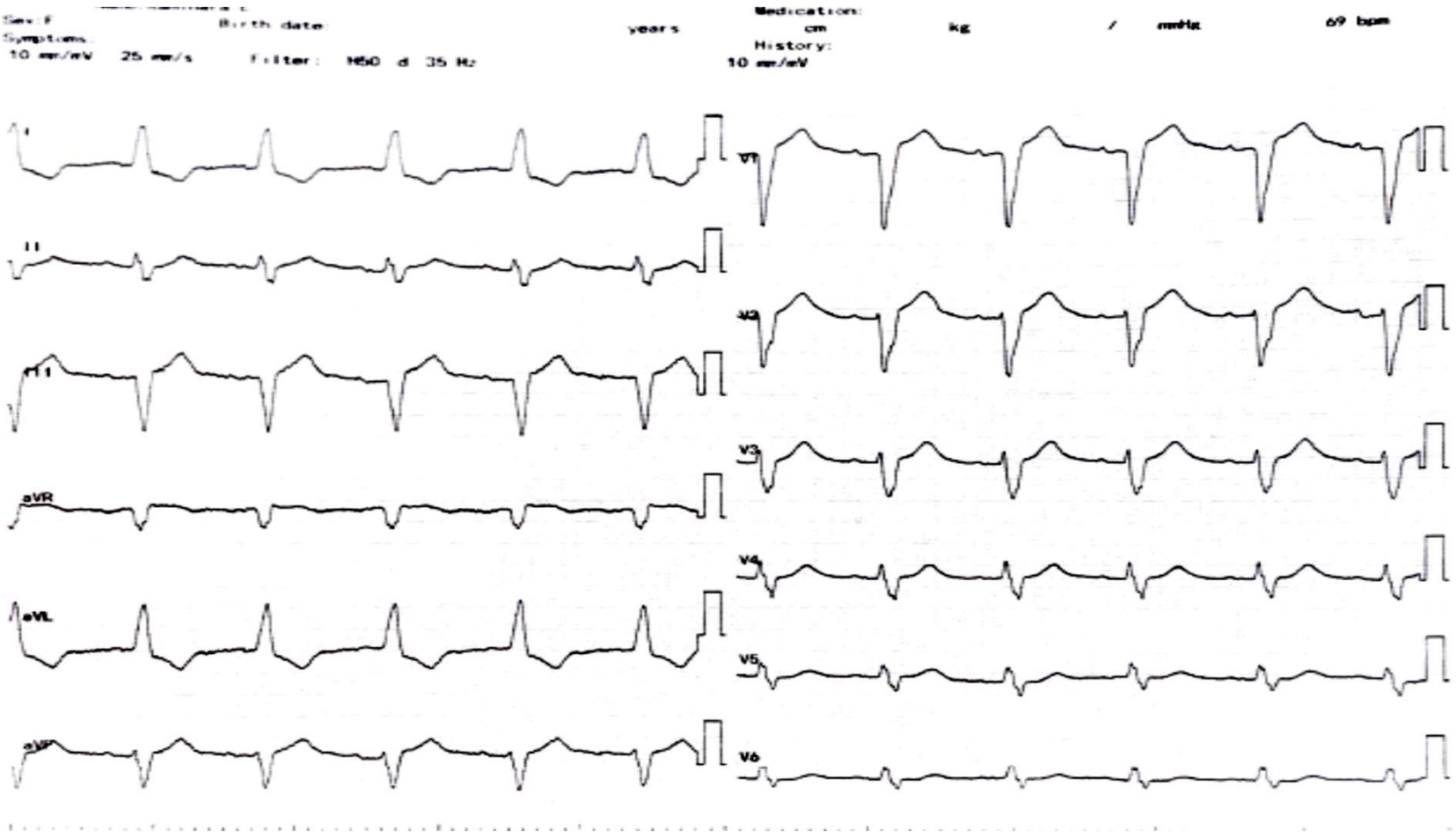
ΔΘΚΑ ΥΓΕΙΑ

Καλύτερο ή Χειρότερο;

Χειρότερο → Καλύτερο

Περιστατικό 1ο

- Γυναίκα 88 ετών
- Ισχαιμική μυοκαρδιοπάθεια – NYHA III-IV
- Ορθόπνοια – Χορήγηση οξυγόνου
- SR, LBBB, QRS 158 ms
- EF 25%, δυσυγχρονισμός 115ms


Sex: F
Birth date:
years
Medication:
cm
kg
/
mmHg
69 bpm
Symptoms:
History:
10 mm/mV
25 mm/s
Filter: H50 d 35 Hz
10 mm/mV
I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6

Περιστατικό 1ο

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2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

Recommendations for cardiac resynchronization therapy implantation in patients with heart failure

Recommendations	Class [a]	Level [b]	Ref [c]
CRT is recommended for symptomatic patients with HF in sinus rhythm with a QRS duration ≥150 msec and LBBB QRS morphology and with LVEF ≤35% despite OMT in order to improve symptoms and reduce morbidity and mortality.	I	A	261–272
CRT should be considered for symptomatic patients with HF in sinus rhythm with a QRS duration ≥150 msec and non-LBBB QRS morphology and with LVEF ≤35% despite OMT in order to improve symptoms and reduce morbidity and mortality.	IIa	B	261–272
CRT is recommended for symptomatic patients with HF in sinus rhythm with a QRS duration of 130–149 msec and LBBB QRS morphology and with LVEF ≤35% despite OMT in order to improve symptoms and reduce morbidity and mortality.	I	B	266, 273
CRT may be considered for symptomatic patients with HF in sinus rhythm with a QRS duration of 130–149 msec and non-LBBB QRS morphology and with LVEF ≤35% despite OMT in order to improve symptoms and reduce morbidity and mortality.	IIb	B	266, 273
CRT rather than RV pacing is recommended for patients with HFrEF regardless of NYHA class who have an indication for ventricular pacing and high degree AV block in order to reduce morbidity. This includes patients with AF (see Section 10.1).	I	A	274–277
CRT should be considered for patients with LVEF ≤35% in NYHA Class III–IV[d] despite OMT in order to improve symptoms and reduce morbidity and mortality, if they are in AF and have a QRS duration ≥130 msec provided a strategy to ensure bi-ventricular capture is in place or the patient is expected to return to sinus rhythm.	IIa	B	275, 278–281
Patients with HFrEF who have received a conventional pacemaker or an ICD and subsequently develop worsening HF despite OMT and who have a high proportion of RV pacing may be considered for upgrade to CRT. This does not apply to patients with stable HF.	IIb	B	282
CRT is contra-indicated in patients with a QRS duration < 130 msec.	III	A	266, 283–285

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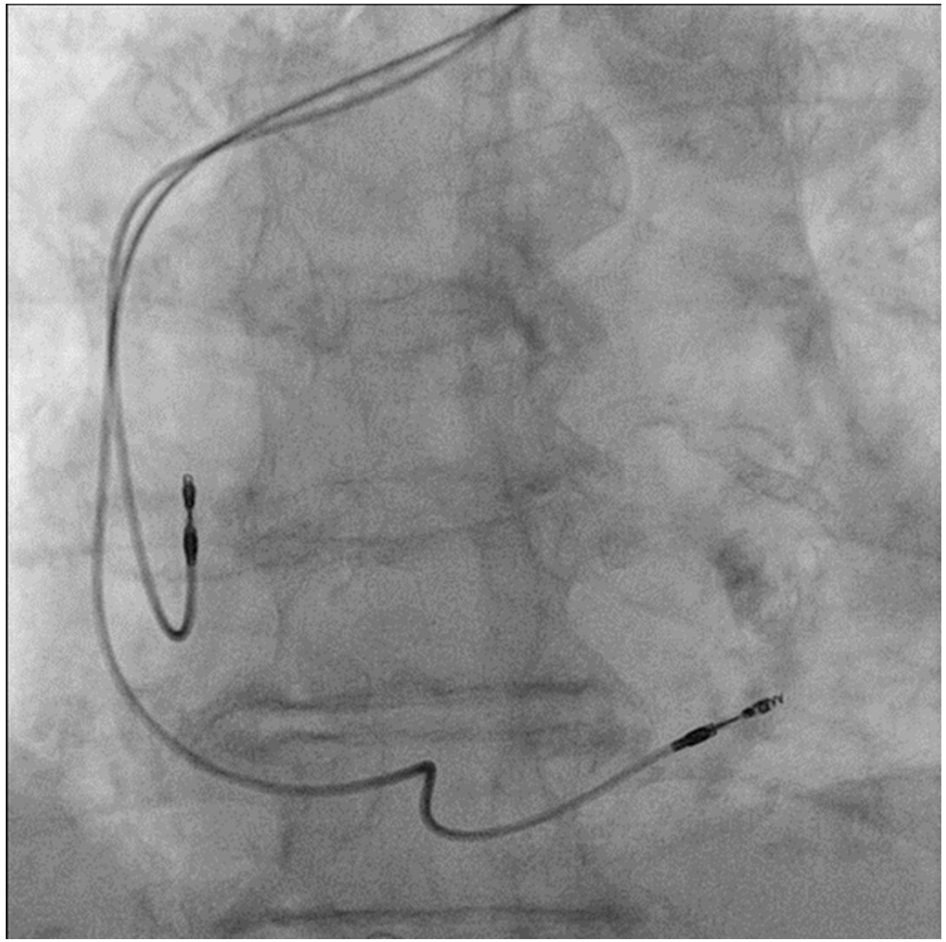
CRTP ή CRTD;

Εμφύτευση αμφικοιλιακού βηματοδότη

- **Τοποθέτηση ηλεκτροδίων ενεργητικής πρόσφυσης στο ΜΚΔ και το ωτίο του δεξιού κόλπου**



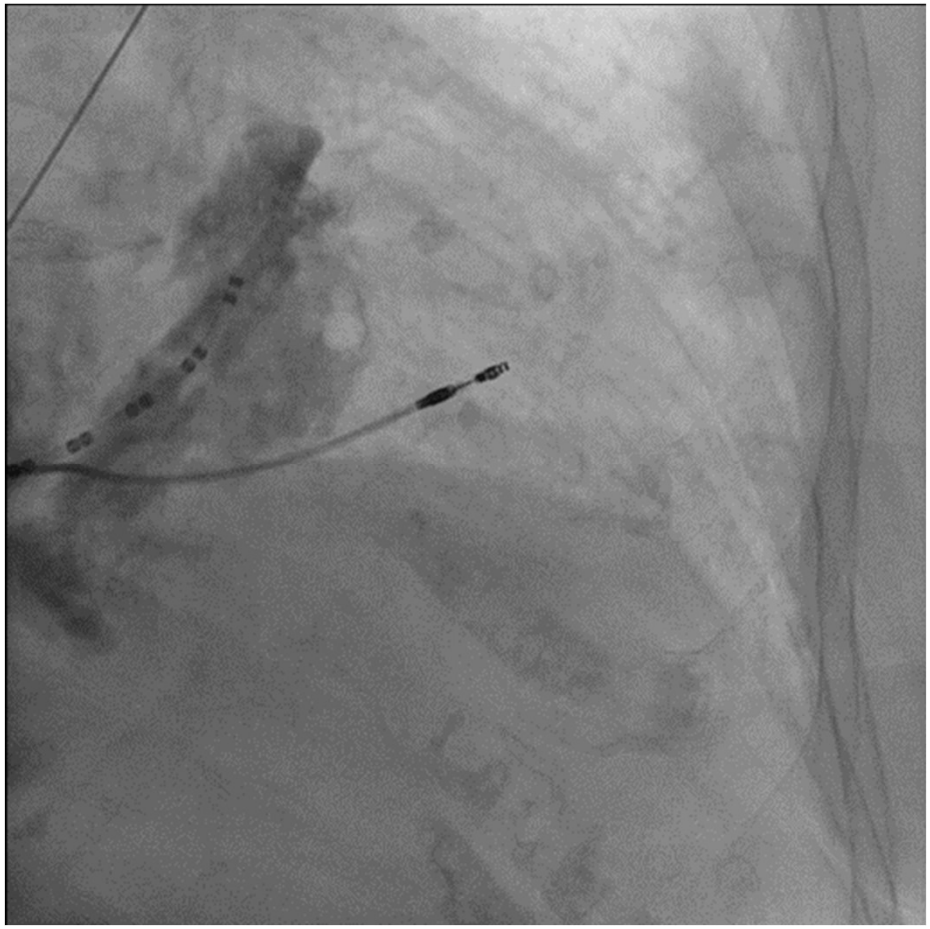
Εμφύτευση αμφικοιλιακού βηματοδότη

- **Αδυναμία προσπέλασης στομίου CS με οδηγό καθετήρα**
- **Καθετηριασμός CS με καθετήρα EP → εκτεταμένος διαχωρισμός**
- **Απόσυρση καθετήρα EP και αναμονή 10min**

Εμφύτευση αμφικοιλιακού βηματοδότη

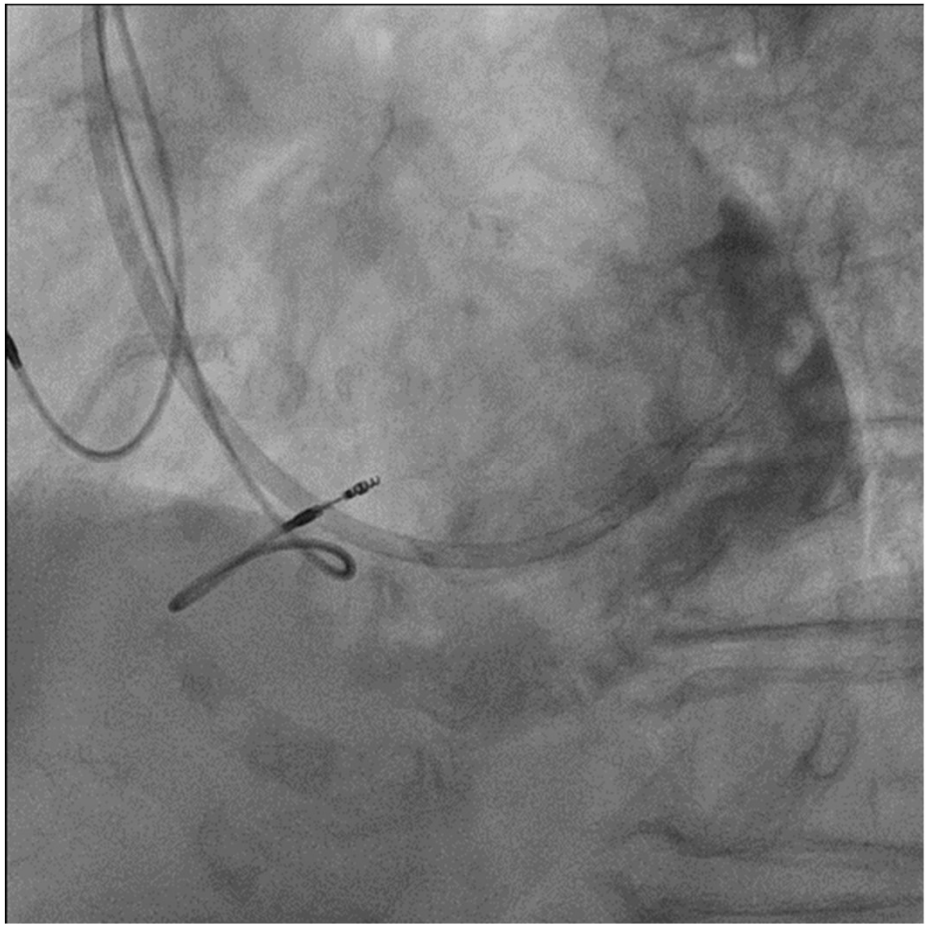
- **Προσπάθεια τοποθέτησης ηλεκτροδίου LV με σύρμα αγγειοπλαστικής → είσοδος στον ψευδοαυλό → απόσυρση**

- **Προσπάθεια με καθετήρα SupraCS → είσοδος στον ψευδοαυλό**



Εμφύτευση αμφικοιλιακού βηματοδότη

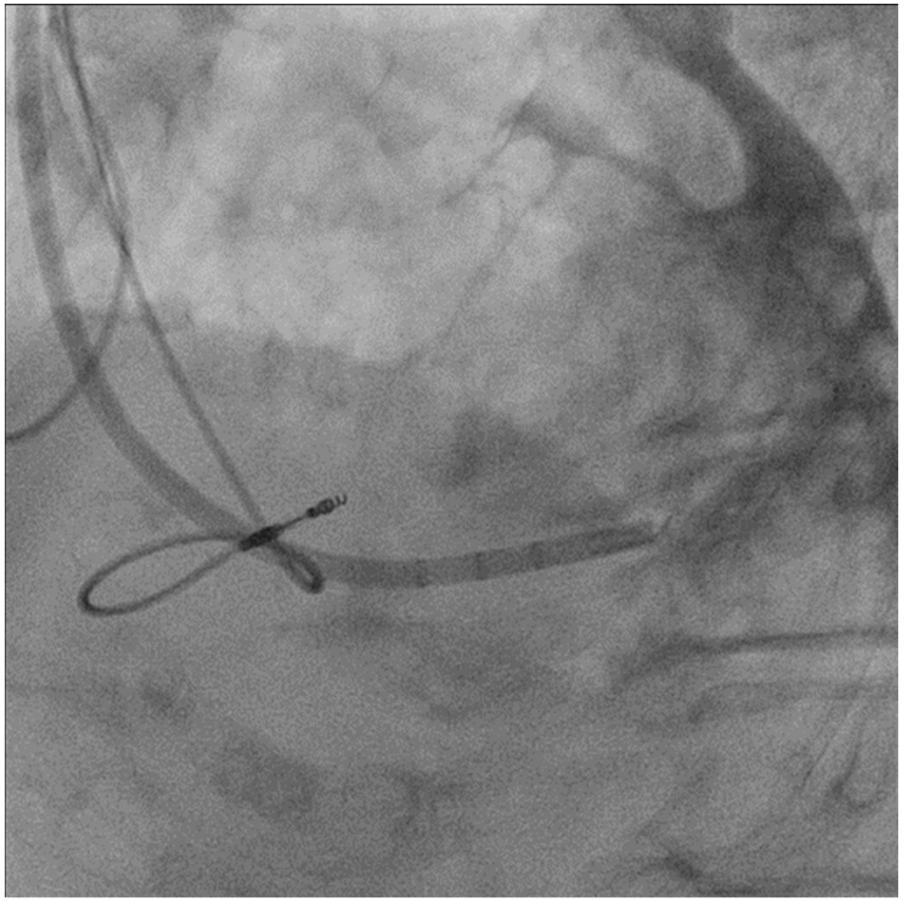
- **Επέκταση διαχωρισμού και έξοδος σκιαγραφικού στην περικαρδιακή κοιλότητα…**
- **Αναμονή για 20min…**



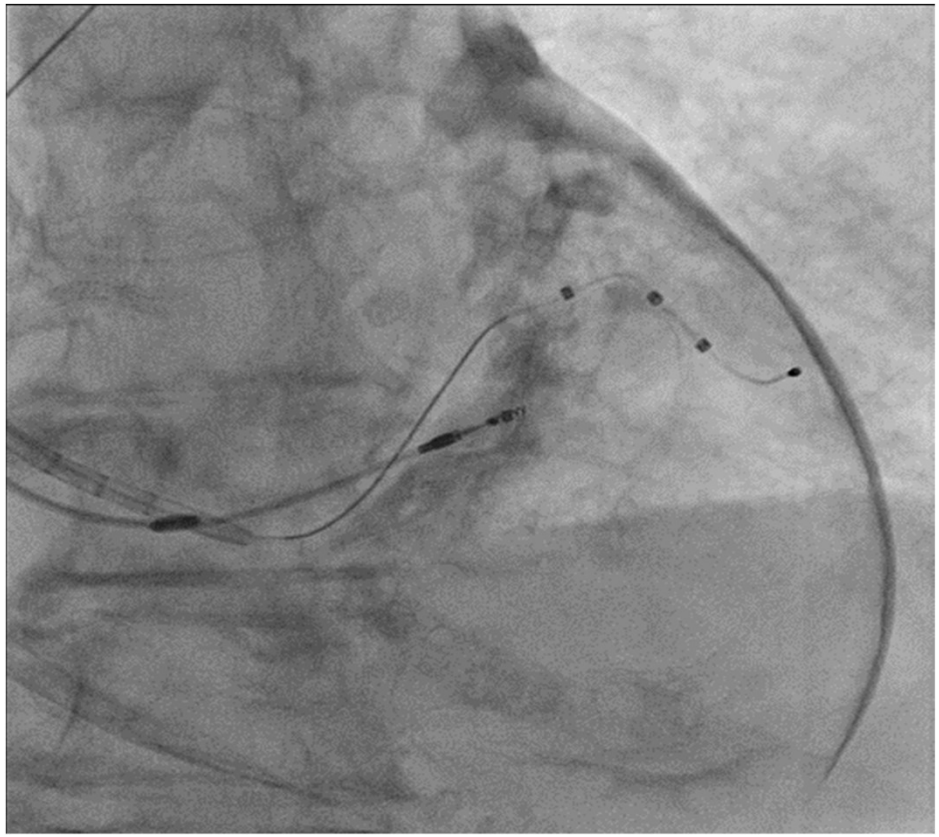
Εμφύτευση αμφικοιλιακού βηματοδότη

- **Νέα προσπάθεια καθετηριασμού με τον καθετήρα SupraCS**

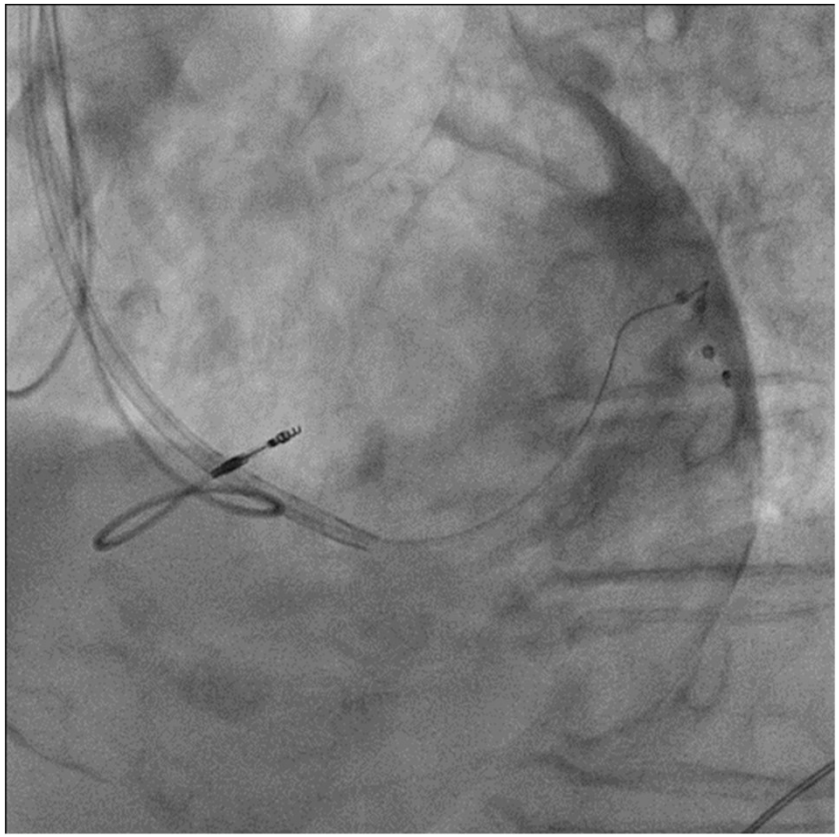
- **Επιτυχής είσοδος στον αληθή αυλό, προσπέλαση της θέσης του διαχωρισμού, ακολουθώντας όλη την πορεία του στεφανιαίου κόλπου μέχρι την πρόσθια φλέβα**



Τοποθέτηση ηλεκτροδίου LV στην πλάγια φλέβα

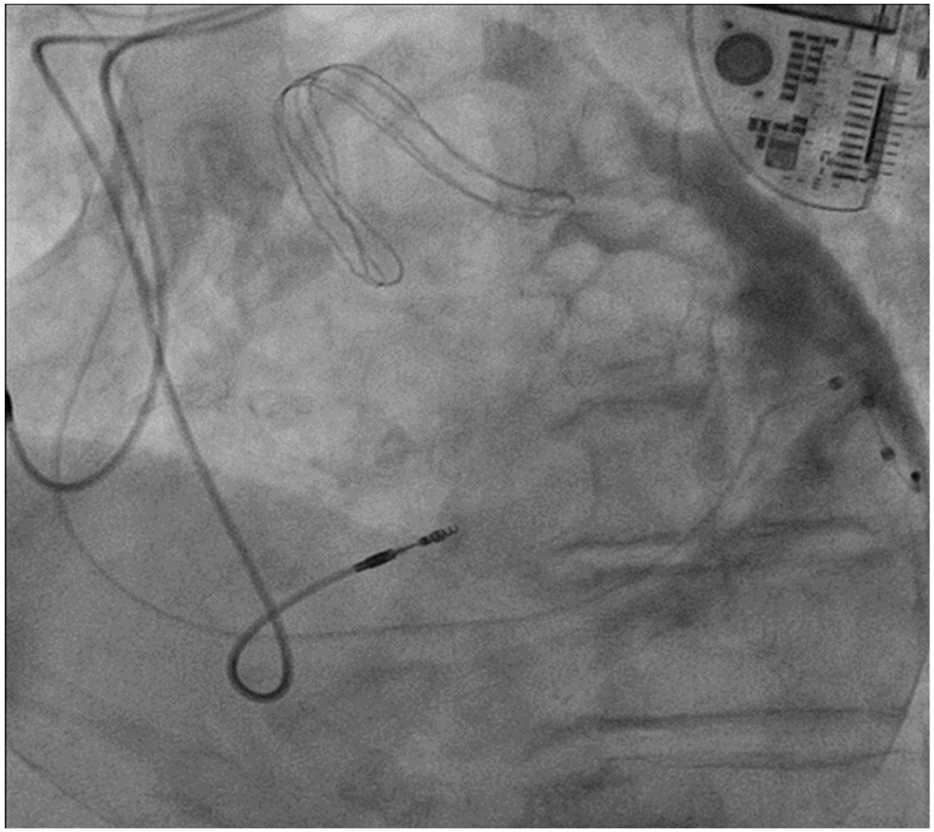


PA

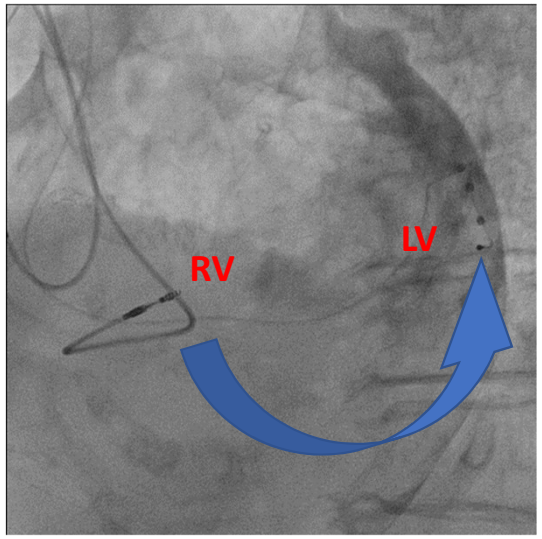


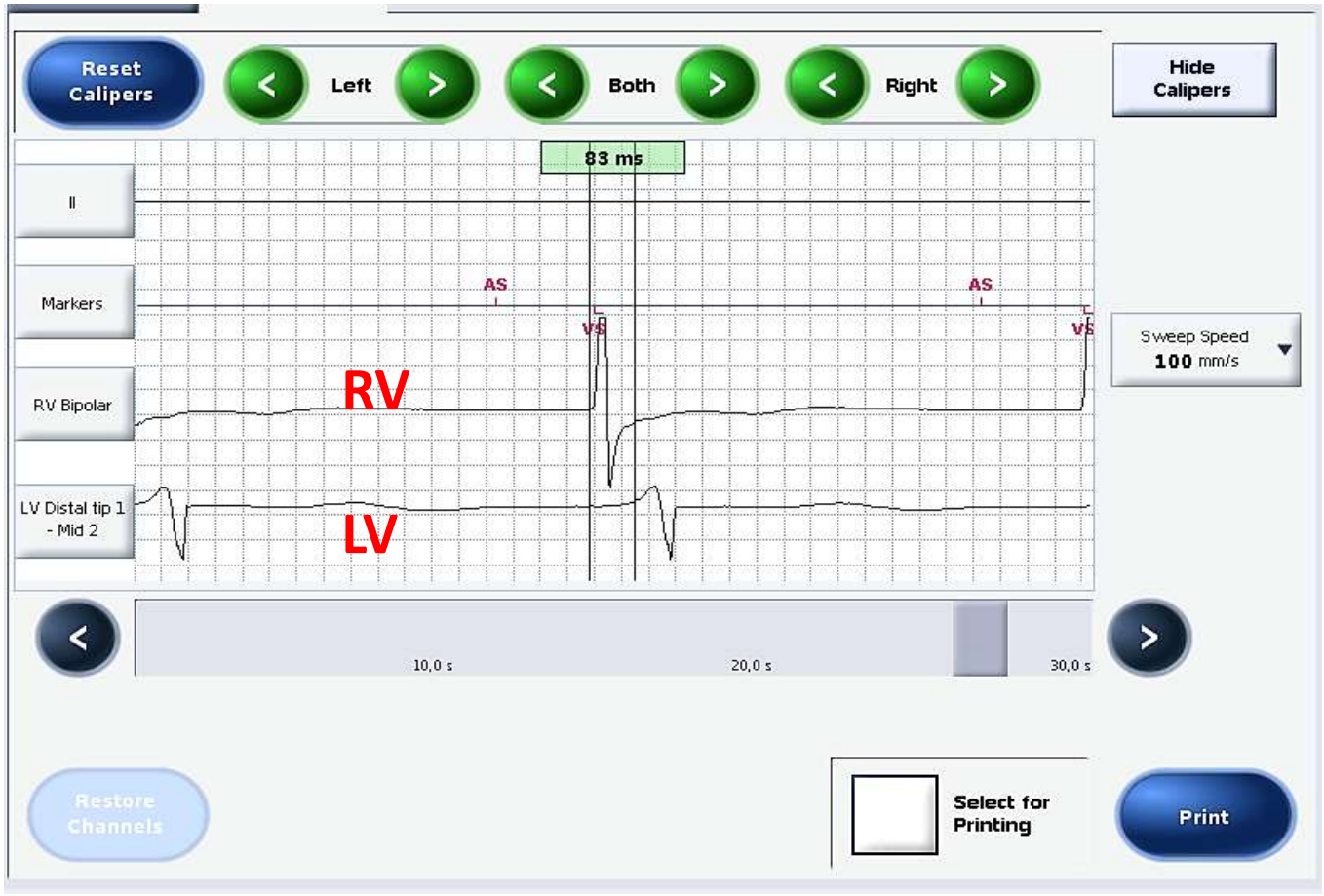
LAO

Εμφύτευση αμφικοιλιακού βηματοδότη



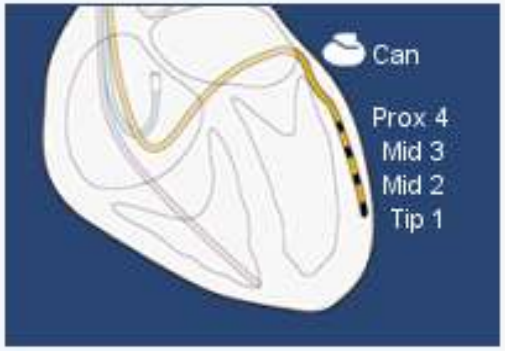
Μετά την εμφύτευση: Ενδοκοιλοτικά δυναμικά





The RV-LV conduction measurements are complete

The latest time is highlighted. Check thresholds to determine a suitable vector.



LV Electrode	Measured Time
Proximal 4	139 ms
Mid 3	140 ms
Mid 2	145 ms
Distal tip 1	141 ms

Additional Parameters

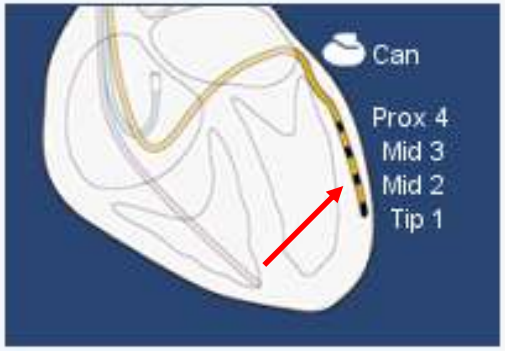
Test Method	**RV Sense**
Base Rate	**65** min^{-1}
Sensed AV Delay	**300** ms

Close

Perform Measurements

The RV-LV conduction measurements are complete

The latest time is highlighted. Check thresholds to determine a suitable vector.



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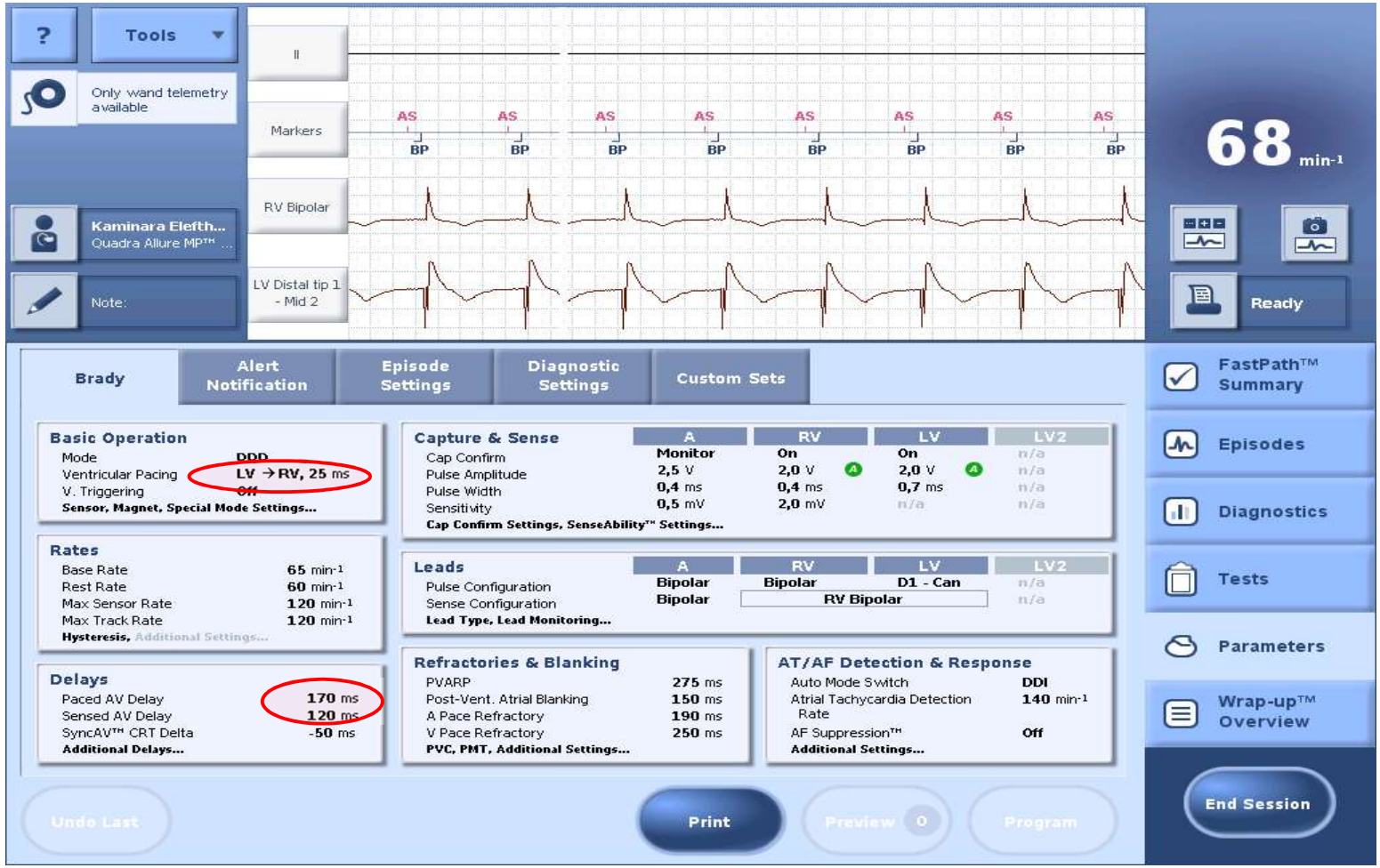
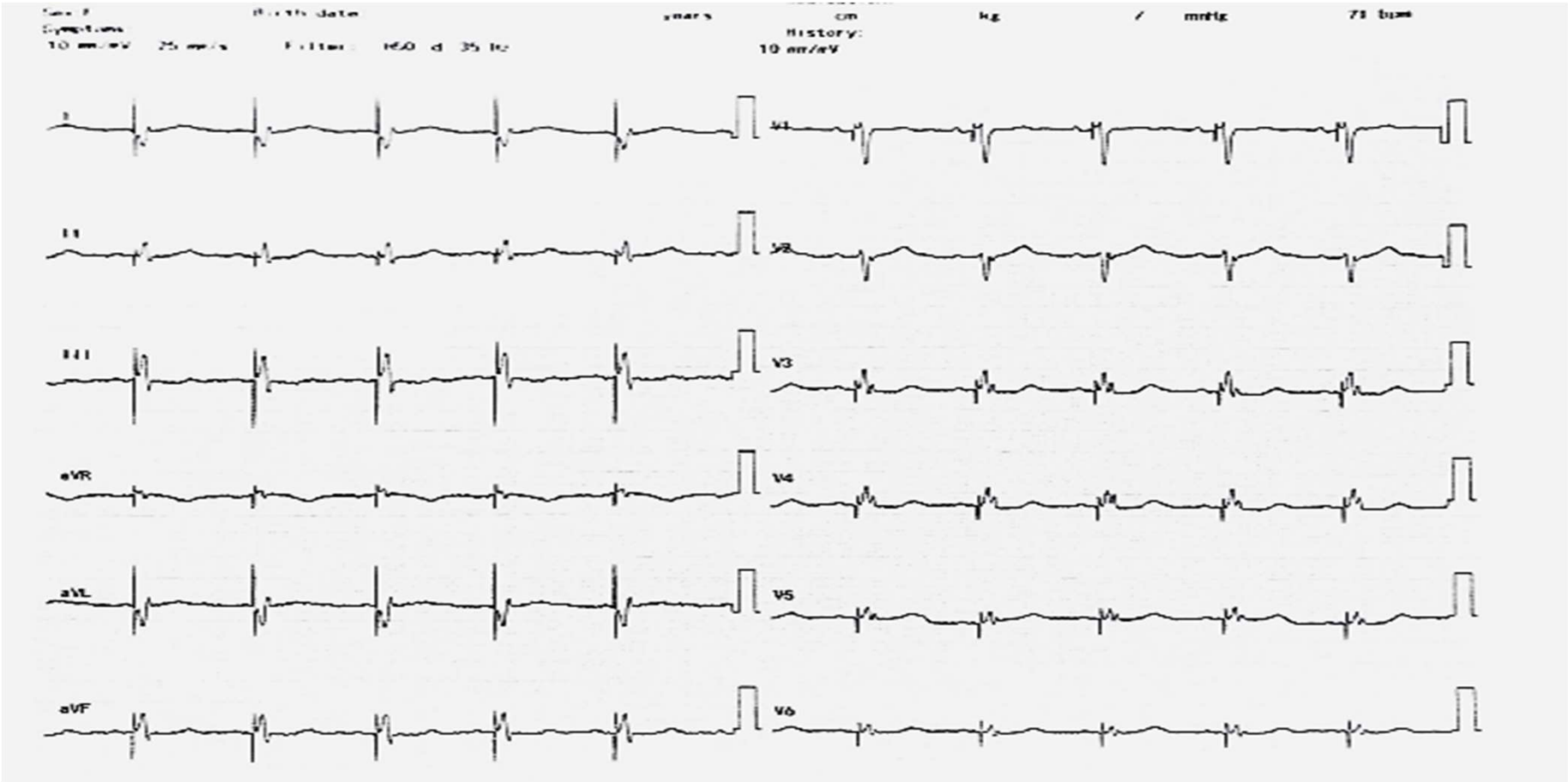
Τελικές παράμετροι

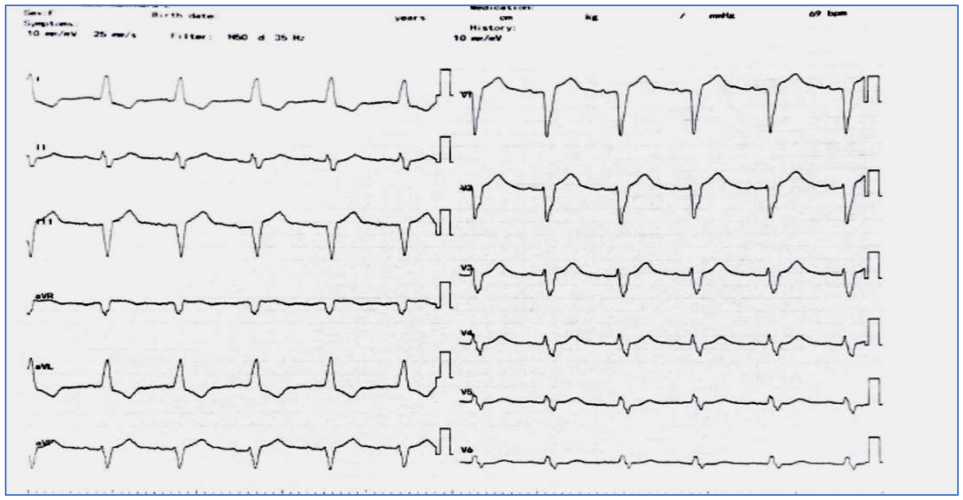


ΗΚΓ με αμφικοιλιακή βηματοδότηση

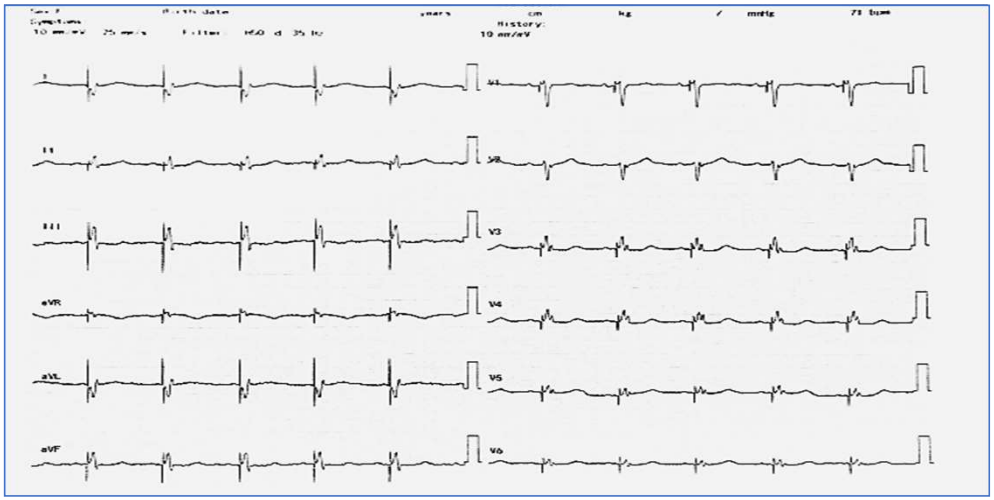


ΗΚΓ

Αρχικό



CRT



ECHO με αμφικοιλιακή βηματοδότηση

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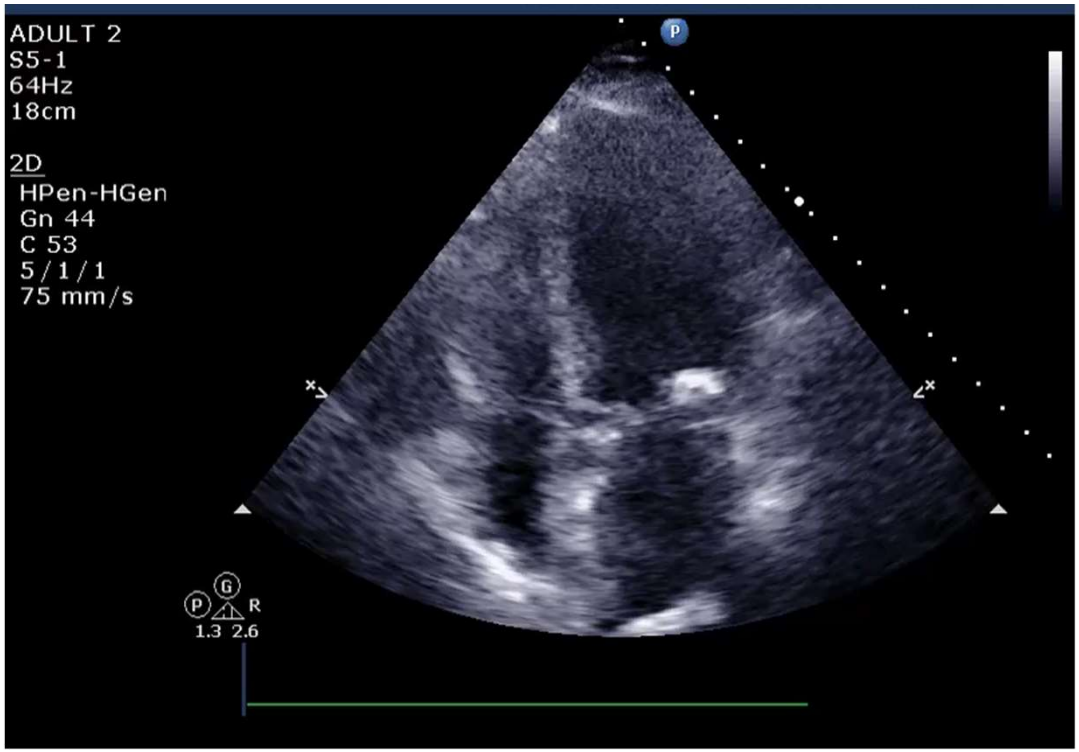
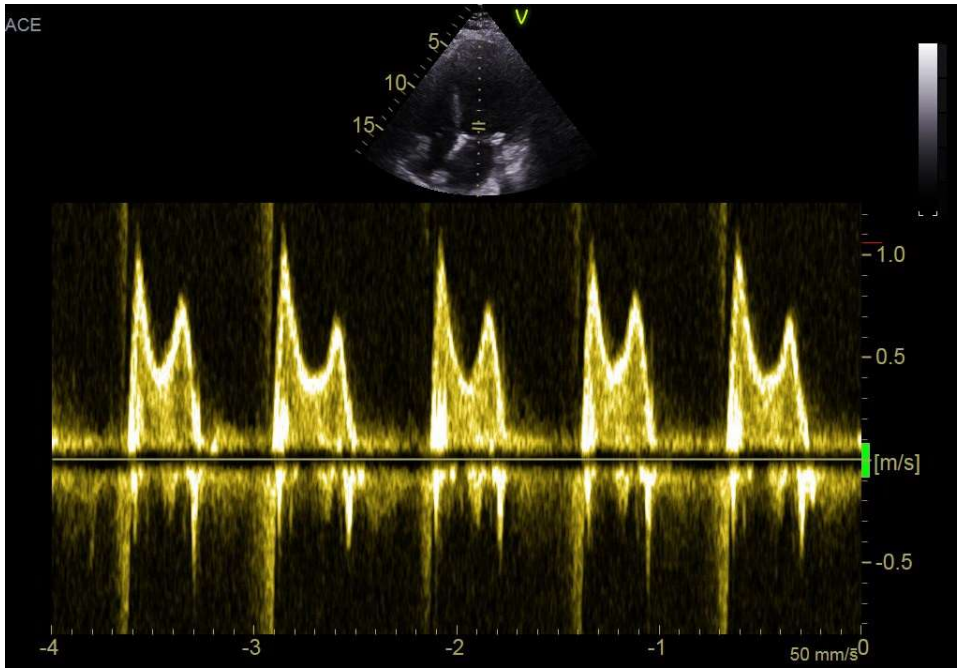
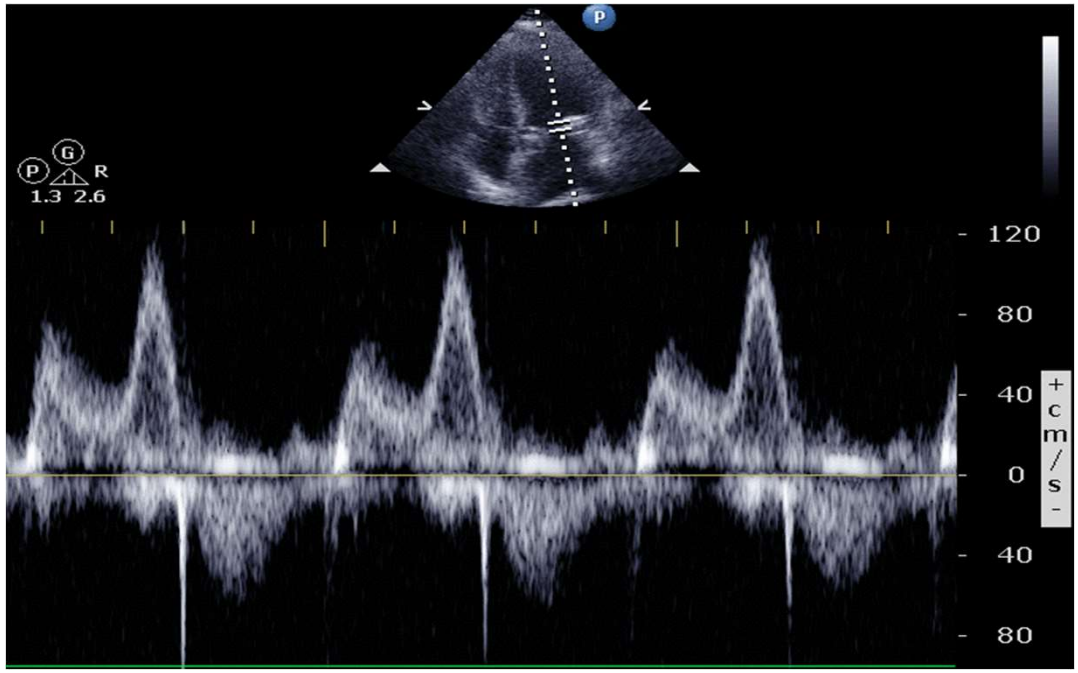


ECHO με αμφικοιλιακή βηματοδότηση



Προ CRT



CRT

10 μήνες μετά…

- **ΛΣ ΝΥΗΑ IV → II**
- **Αποσυμφόρηση πνευμόνων → αύξηση ηλεκτρικής ενδοθωρακικής R**

Περιστατικό 2ο

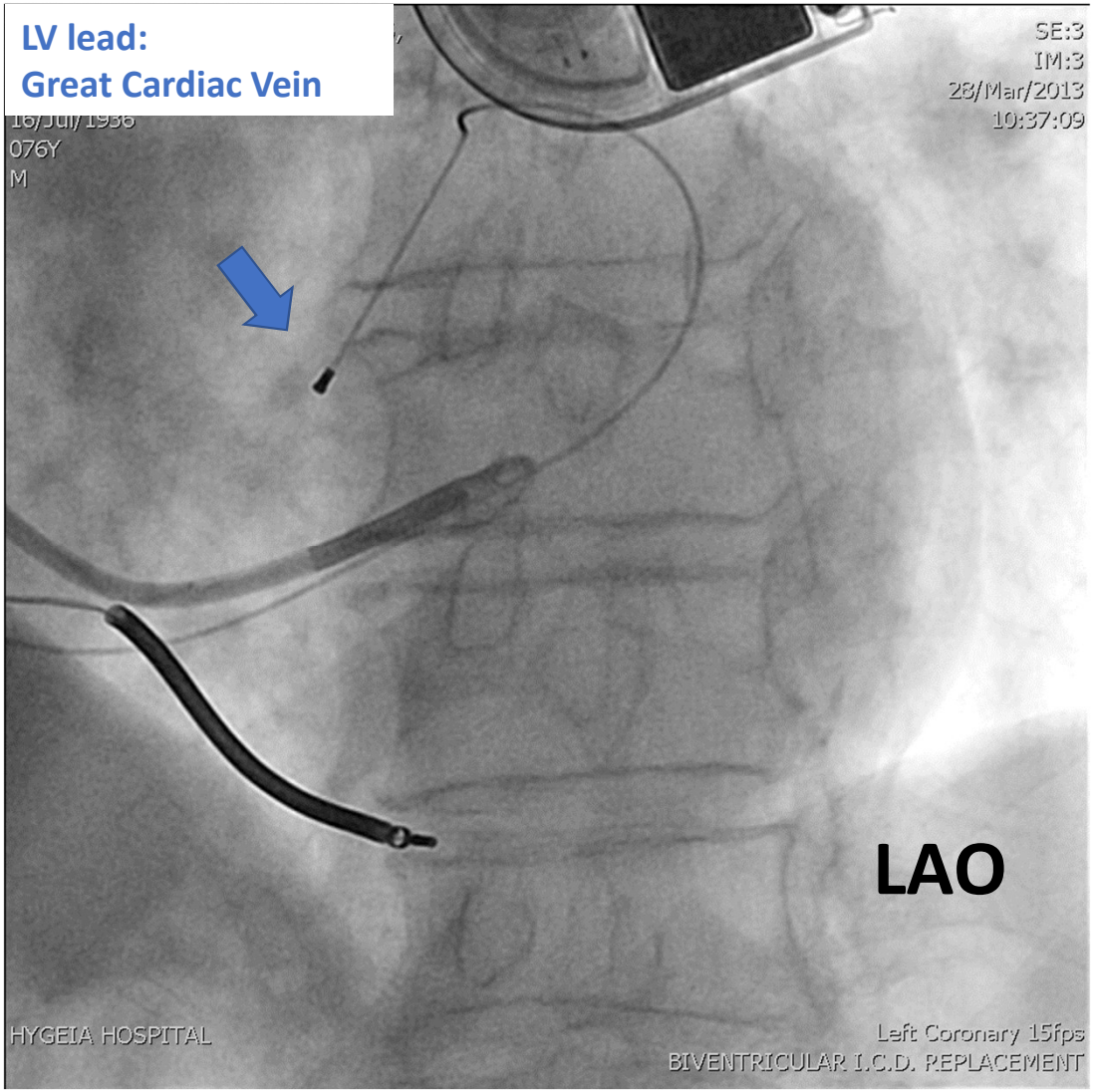
- Άνδρας 66 ετών, μη ισχαιμική καρδιακή ανεπάρκεια

- 2002, πρώτη εκδήλωση συγκοπτική VT, NYHA III, EF= 20%, LBBB 170ms → φαρμακευτική αγωγή, μετά 2μηνο ΗΦΜ: SMVT →
  CRTD (LV lead: great cardiac vein) → **Responder** (NYHA II, EF=35%)

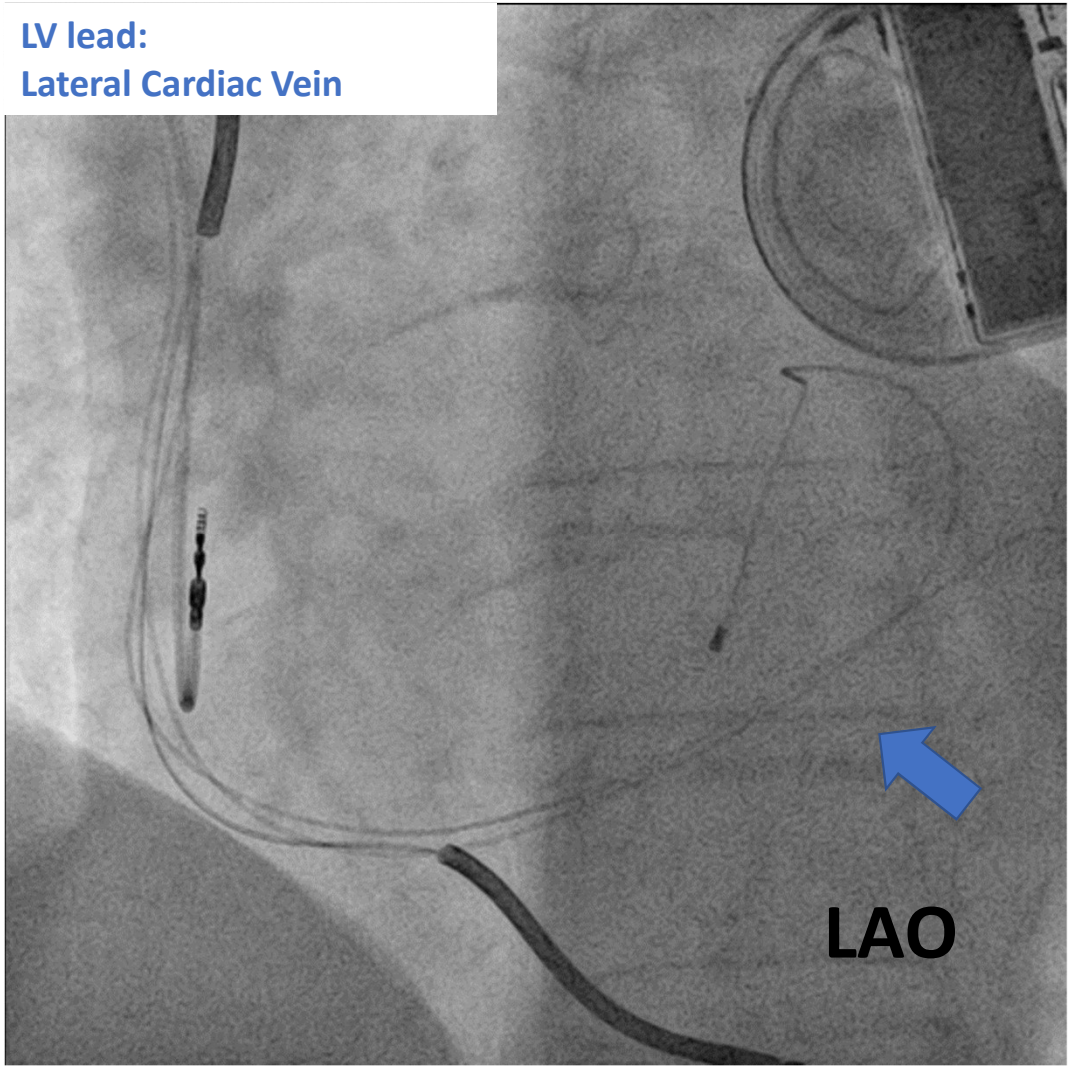
- 2008, αντικατάσταση γεννήτριας

- 2013, επιδείνωση ΛΣ NYHA III, EF=30% →
  αντικατάσταση γεννήτριας + νέο LV lead, lateral vein → **Responder**

Αρχικό μονοπολικό ηλεκτρόδιο LV



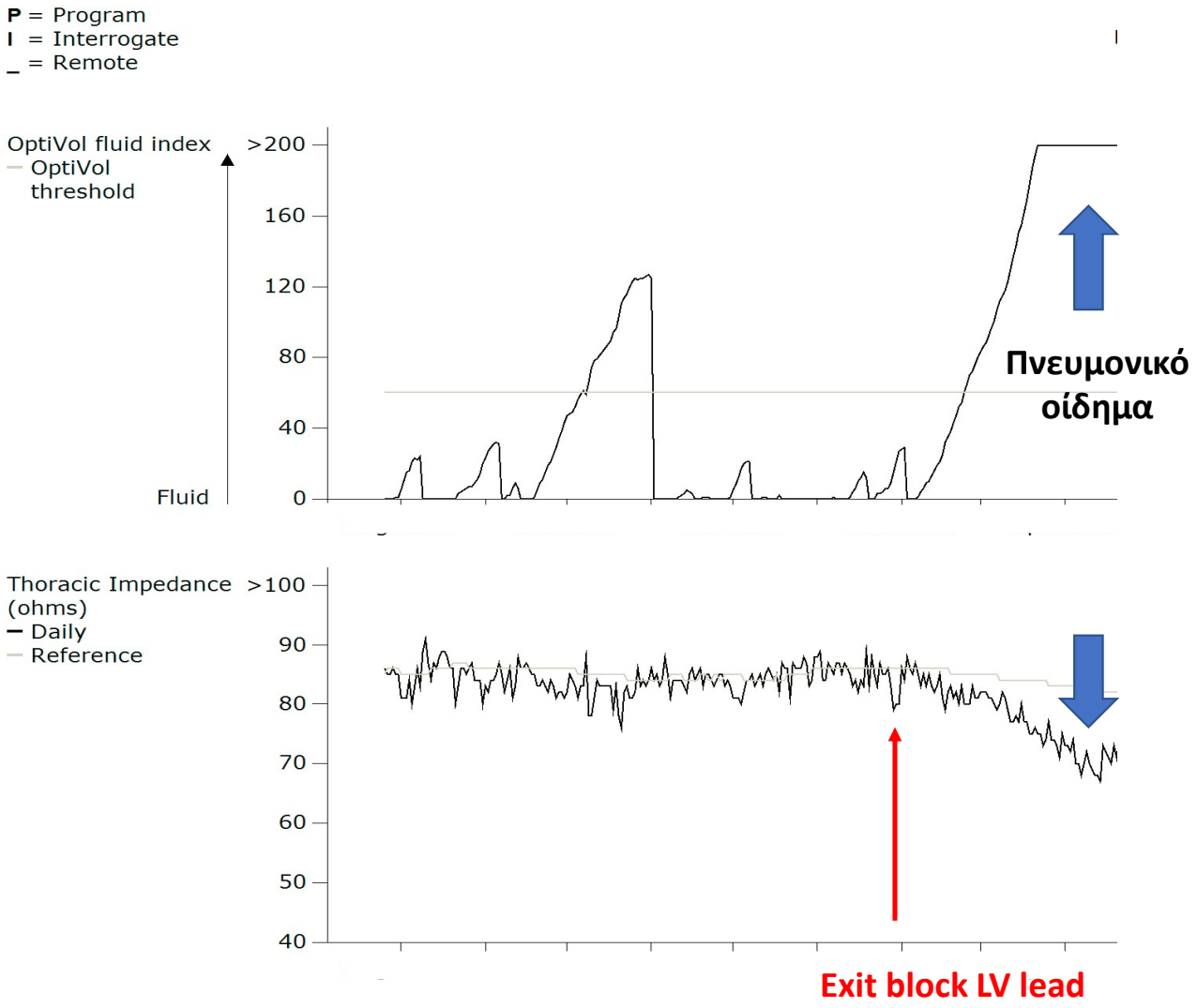
Αντικατάσταση γεννήτριας και τοποθέτηση 2ου διπολικού ηλεκτροδίου LV



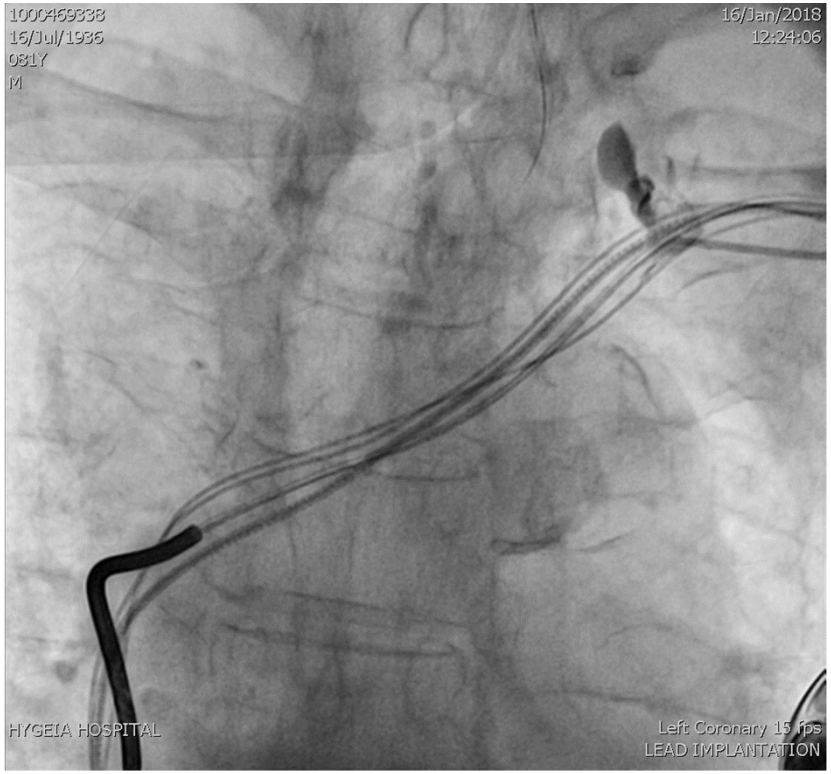
Περιστατικό 2ο

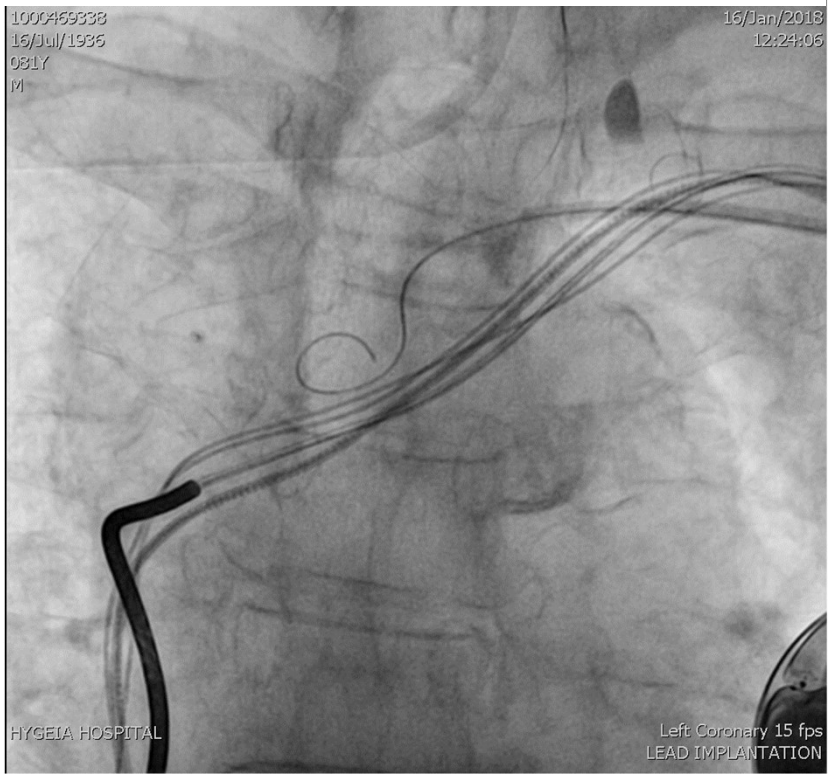
- **2013 νέο LV lead, lateral vein → Responder**
- **2015 αύξηση ουδού LV lead**
- **2017 διαλείπουσα βηματοδότηση και τελικά exit block LV lead → πνευμονικό οίδημα, NYHA IV, EF=25%**

Αποκλεισμός εξόδου LV lead → πνευμονικό οίδημα

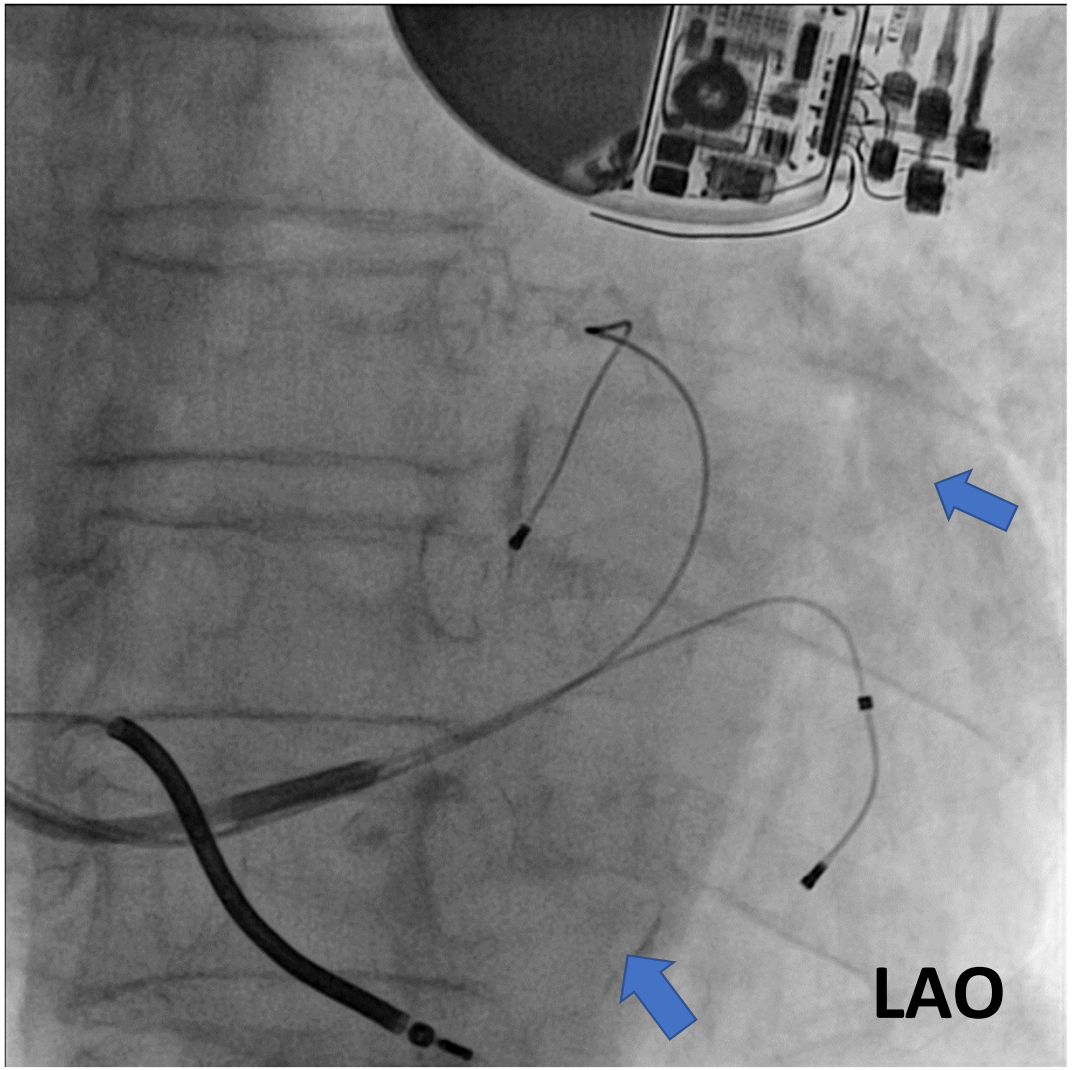


Παρακέντηση αριστερής υποκλειδίου & φλεβογραφία



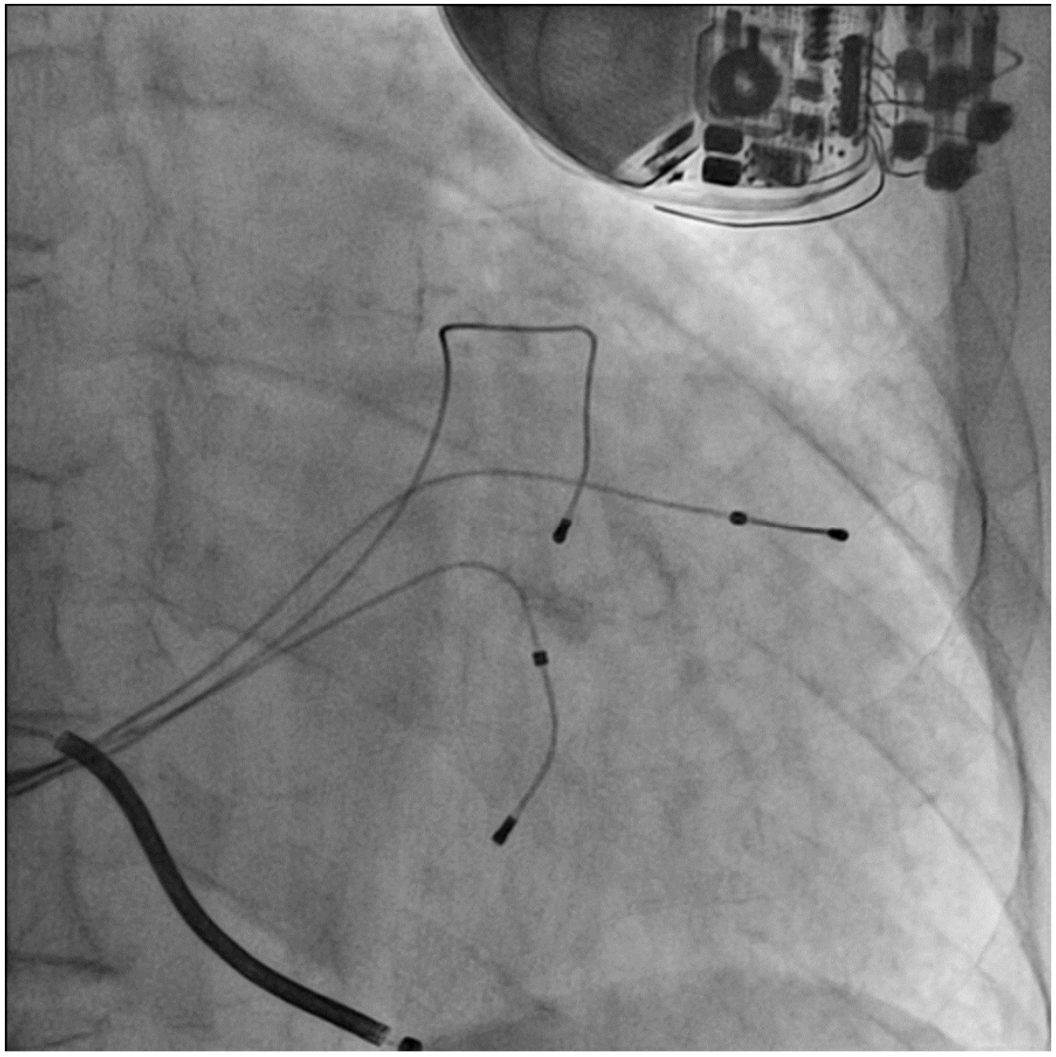


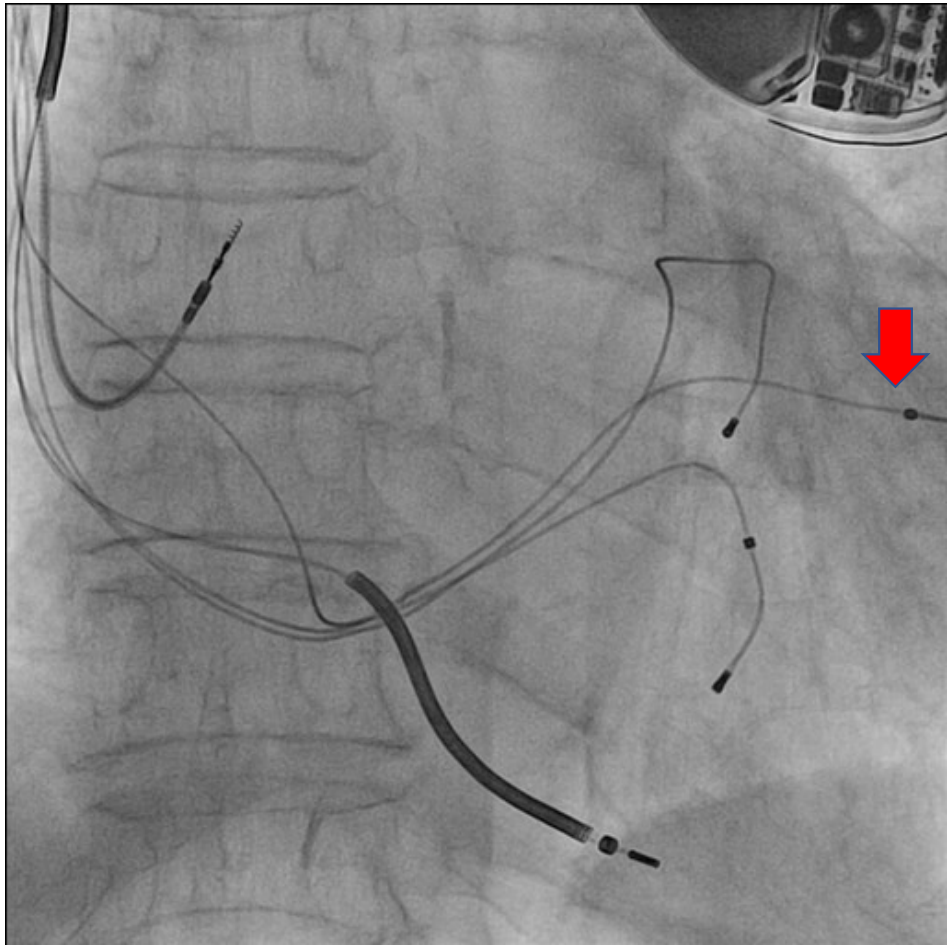
Καθετηριασμός και φλεβογραφία CS από δεξιά υποκλείδιο φλέβα



- **Τοποθέτηση 3ου διπολικού ηλεκτροδίου CS στην πλάγια φλέβα**

- **Μέσω υποδορίου τούνελ, σύνδεση με γεννήτρια**





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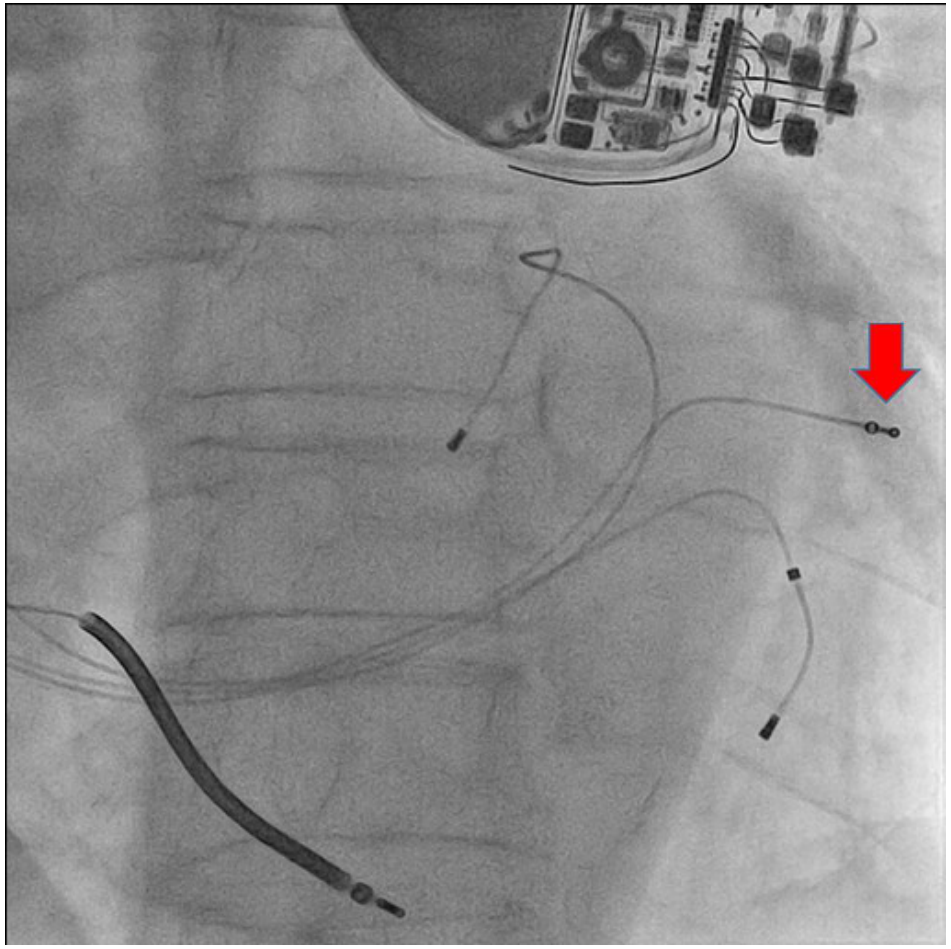


LAO

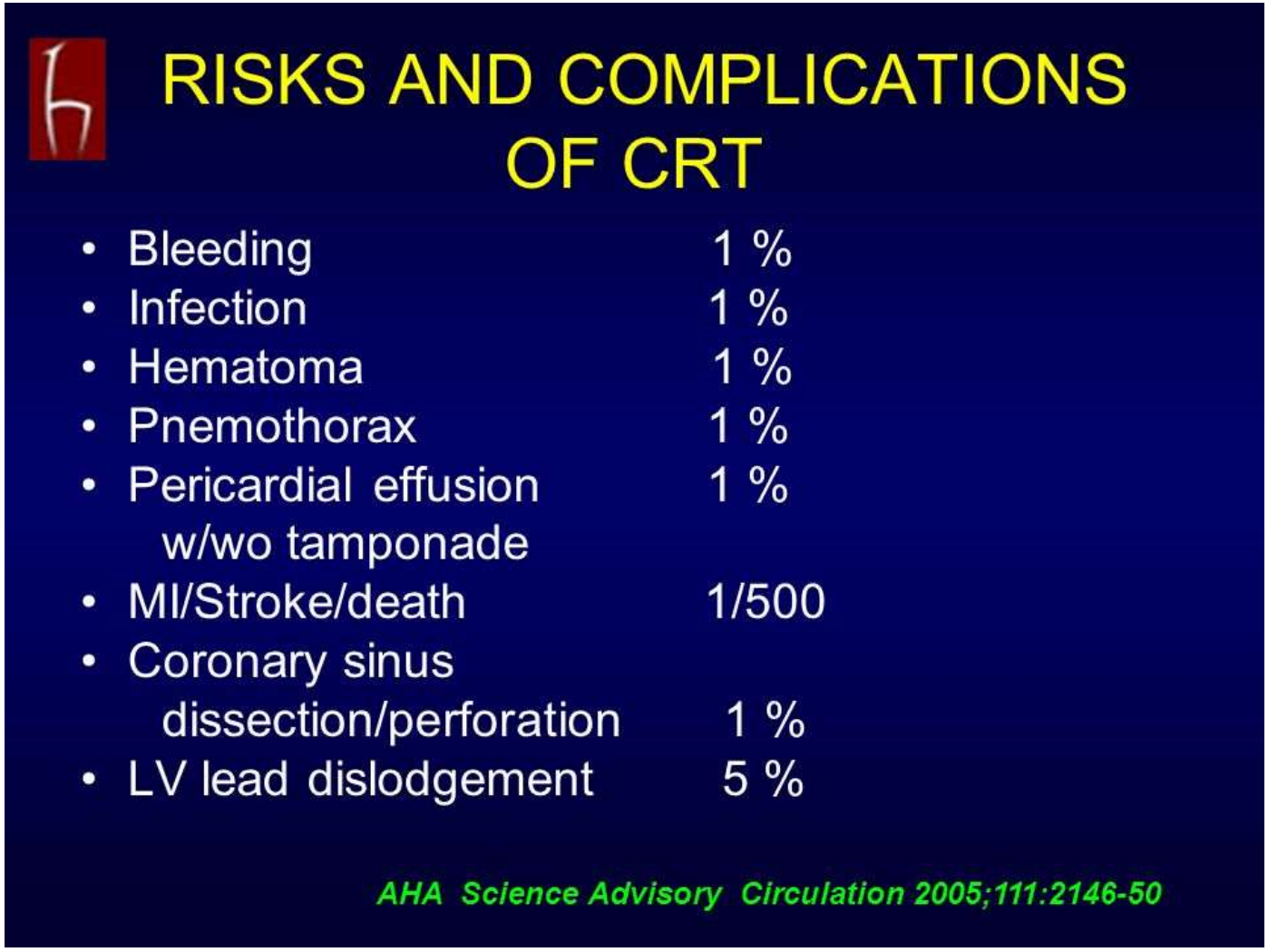
Super? Responder

- 2018 τοποθέτηση νέου LV lead, lateral vein
- 2019 NYHA II, EF=40%

Καλέ μου άνθρωπε, ξέρεις από βέσπα;

Καλέ μου άνθρωπε, ξέρεις από βέσπα;

Πρώιμες επιπλοκές αμφικοιλιακής βηματοδότησης



Format: Abstract

Send to

Europace. 2004 Jan;6(1):43-7.

Major dissection of the coronary sinus and its tributaries during lead implantation for biventricular stimulation: angiographic follow-up.

de Cock CC[1], van Campen CM, Visser CA.

Author information

Abstract

Dissection of the coronary sinus during lead implantation for biventricular pacemaker implantation in patients with advanced heart failure is a serious complication that has occasionally been reported. We report on the clinical outcome and angiographic follow-up in a series of 7 patients with acute major dissection from 103 consecutive attempts (incidence 6.8%). Serial echocardiography was performed in all patients and all underwent follow-up angiography 2-3 months after the procedure. In 1 patient, pericardial extravasation was seen during retrograde venography. Clinical follow-up was uneventful except for one other patient who complained of prolonged chest discomfort for several hours after the procedure. In none of the patients were there signs of pericardial effusion or tamponade demonstrated on echocardiography. Venograms during the procedure and after follow-up were analysed using a quantitative coronary angiography system (CAAS II). Parameters included minimal luminal diameter, diameter stenosis, minimal cross-sectional area and an estimation of the reference diameter. There were no significant differences in all analysed parameters, although in 1 patient a small partial dissection was present. Thus, although dissection of the coronary sinus following lead implantation for biventricular stimulation is not an uncommon complication, it is usually well tolerated. Long-term angiographic follow-up demonstrated no significant vessel damage or vessel remodeling.

PMID: 14697725

[Indexed for MEDLINE]

Ann Thorac Cardiovasc Surg. 2007 Aug;13(4):275-7.

Coronary sinus dissection during left ventricular pacing electrode implantation.

Yoda M[1], Hansky B, Koerfer R, Minami K.

Author information

Abstract

Coronary sinus (CS) dissection during biventricular pacing electrode implantation is a complication that rarely develops. A 71-year-old female with recurrent ventricular tachycardia, heart decompensation, and poor left ventricular function because of dilated cardiomyopathy was admitted for the implantation of a cardioverter-defibrillator for biventricular pacing. During the operation, we experienced a CS dissection with hematoma in the left ventricle wall while introducing the guidance catheter into the CS. However, the pacing lead was successfully implanted into the posterolateral vein using the "over-the-wire" technique. The postoperative electrocardiogram showed a decreased QRS; meanwhile, the echocardiography revealed dimensional reduction and functional improvement of the left ventricle.

PMID: 17717507

Pacing Clin Electrophysiol. 2008 Jul;31(7):904-7. doi: 10.1111/j.1540-8159.2008.01108.x.

Coronary vein rupture during venoplasty for LV lead placement.

Worley SJ[1], Gohn DC, Pulliam RW.

Author information

Abstract

Coronary vein rupture is a potential complication of venoplasty for LV lead placement. Vein rupture in a patient with a virgin pericardium would be anticipated to have a profound hemodynamic impact from bleeding into the pericardial space. This report describes an elderly woman with a virgin pericardial space who underwent cardiac resynchronization therapy (CRT). Venoplasty of a lead limiting venous stenosis was performed on the lateral coronary vein. The stenosis was unresponsive to a standard noncompliant balloon with side wire. When the inflation pressure was increased beyond the rated burst pressure the balloon ruptured, perforating the vein. We describe our experience in successfully placing the left ventricular lead safely despite the problems arising from these circumstances.

Europace. 2008 Dec;10(12):1442-4. doi: 10.1093/europace/eun266. Epub 2008 Sep 22.

Rescue-stenting of an occluded lateral coronary sinus branch for recanalization after dissection during cardiac resynchronization device implantation.

Gutleben KJ[1], Nölker G, Marschang H, Sinha AM, Schmidt M, Ritscher G, Brachmann J.

Author information

Abstract

Cardiac resynchronization therapy (CRT) using left- (LV) or biventricular pacing is widely applied in selected heart failure patients. However, transvenous LV-lead placement into coronary sinus (CS) branches can be challenging. A 77-year-old female patient with New York Heart Association class III symptoms due to dilated cardiomyopathy [LV ejection fraction (LVEF): 10%, QRS-duration: 150 ms], despite optimal medical treatment presented for CRT. Coronary sinus angiograms were performed after transvenous CS cannulation. Within a large posterolateral vein, low phrenic nerve stimulation thresholds were found. The only alternative smaller tortuous lateral branch showed a significant narrowing, making LV-lead advancement impossible. Angioplasty was performed, using a venoplasty balloon. This caused complete branch occlusion. After recanalization of the vessel by implantation of a bare metal stent, the lead could be advanced through the stent. Optimal pacing parameters without phrenic nerve stimulation were established. Angioplasty of CS branches during CRT implantation procedures bears the risk of complete branch occlusion, but recanalization can acutely be achieved by stent implantation. This is the first report on rescue-stenting of a CS branch after angioplasty-related occlusion. Transthoracic lead implantation, accompanied risks, and slower recovery could thus be avoided.

Συμπεράσματα

- Ο διαχωρισμός του στεφανιαίου κόλπου δεν είναι σπάνια επιπλοκή, αλλά δεν αποτελεί αιτία αναγκαστικής διακοπής της εμφύτευσης. Πρέπει να καταβάλλεται προσπάθεια να καθετηριαστεί ο αληθής αυλός, εφόσον οι αιμοδυναμικές συνθήκες το επιτρέπουν, ωστε να τοποθετηθεί το LV ηλεκτρόδιο στη σωστή θέση.

- Η αύξηση της εμπειρίας (ιδιαίτερα σε κέντρα με μεγάλο αριθμό επεμβάσεων) και οι τεχνολογικές εξελίξεις των καθετήρων επιτρέπουν την ολοκλήρωση της διαδικασίας σε επιπλεγμένες περιπτώσεις. Επίσης με τη χρήση εναλλακτικών τεχνικών (πχ επιλογή τοποθέτησης νέου ηλεκτροδίου LV) **είναι δυνατό να ανατραπεί και το χειρότερο σενάριο και να μετατραπεί στο καλύτερο!**

Successful Implantation of the Left Ventricular Pacing Lead in the Postero-Lateral Cardiac Vein After Coronary Sinus Dissection During Biventricular Pacing

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hospital. Eighteen months post-implantation he remains in NYHA functional class II, echocardiography shows decreased dimensions of the left ventricle and the right and left ventricular sensing and pacing thresholds remain stable.

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Ευχαριστώ
για την προσοχή σας