Minimal Floroskopi Gerektiren Ablasyon Sistemleri-EnSite

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Çocuk ve Genetik Aritmi Merkezi

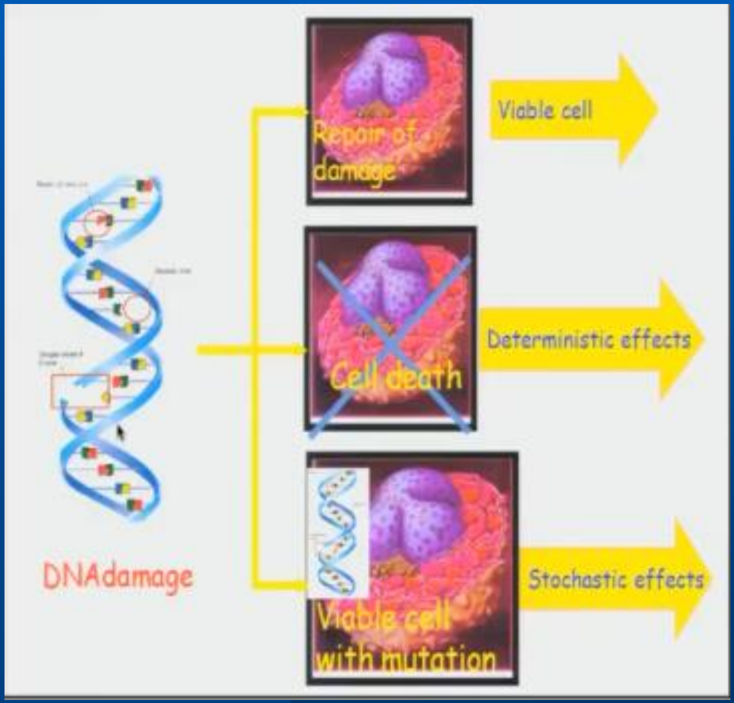
Elektroanatomik Anatomik Mapping Sistemleri

- Floroskopiyi azaltır.
- Mapping ve ablasyonu kolaylaştırır.

EAM Avantajları

- Floroskopinin ciddi oranda azaltılması
- Anatomik rekonstrüksiyon
- EP kateterlerinin navigasyonu
- Önemli yerlerin işaretlenmesi (lezyon yeri, His, frenik sinir, vs)
- Aktivasyon ve voltage*scar mapping.

Radyasyonun Zararları



- Deterministic effect (cell death)
  - Skin injury and hair loss
  - Eyes (cataract)
  - Other organs (tyhroid, paratroid)
- Stochastic effect (viable cell with mutation)
  - Neoplasm (leukemias, breast cancer, skin cancer)
  - Heritable genetic effect

Long-term effects of radiation exposure among adult survivors of childhood cancer: results from the childhood cancer survivor study. *Armstrong GT, Stowall M, Robison LL. Radiat Res. 2010 Dec; 174 (6): 840-50. Epub 2010 Sep 17.*

Radiation therapy has been associated with increased risk for late mortality, development of second neoplasms, obesity, and pulmonary, cardiac and thyroid dysfunction as well as an increased overall risk for chronic health conditions. ……….development of subsequent malignant neoplasms of the central nervous system, thyroid and breast.

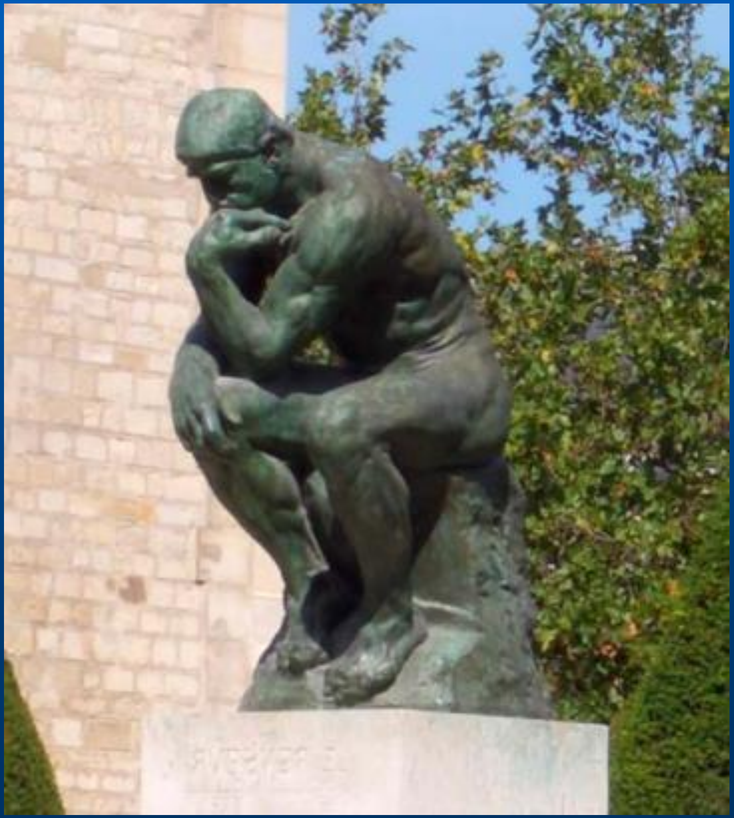
Cancer risks following diagnostic and therapeutic radiation exposure in children. *Ruth A. Kleinerman. Pediatr Radiol (2006) 36 (Suppl 2): 121–125*

multiple diagnostic radiation exposures have been informative about increased mortality from breast cancer with increasing radiation dose, and case-control studies of childhood leukemia and postnatal diagnostic radiation exposure have suggested increased risks with an increasing number of examinations. Risks of radiationrelated cancer are greatest for those exposed early in life, and these risks appear to persist throughout life.

H2AX Foci as a Biomarker for Patient X-Ray Exposure in Pediatric Cardiac Catheterization Are We Underestimating Radiation Risks? **Laurence Beels, MSc; Klaus Bacher, PhD; Daniël De Wolf, MD, PhD; Joke Werbrouck, MSc; Hubert Thierens, PhD.** *Circulation. 2009;120:1903-1909.*

Very low doses of radiation may be more harmful than previously suspected and that the relationship may not, in fact, be linear in the pediatric population at all

Çoğu EP Prosedüründe Floroskopi Önlenebilir mi ?




YES WE CAN!
OBAMA
OBAMA
OBAMA

Exclusion of fluoroscopy during ablation treatment of right accessory pathway in children.
Drago F, Silvetti MS, Di Pino A et al. J Cardiovasc Electrophysiol. 2002: 13(8)

Single catheter in 21 children with right sided WPW wucing CARTO.

Nonfluoroscopic catheter navigation for radiofrequency catheter ablation of supraventricular tachycardia in children. ***Papagiannis J****, Tsoutsinos A, Kirvassilis G, Sofianidou I, Koussi T, Laskari C, Kiaffas M, Apostolopoulou S, Rammos S.Pacing Clin Electrophysiol. 2006 Sep;29(9):971-8.*
CONCLUSIONS: The use of a nonfluoroscopic system for catheter navigation significantly reduced fluoroscopy exposure and total procedure duration of RCA of common SVT substrates in children.

A nonfluoroscopic approach for electrophysiology and catheter ablation procedures using a three-dimensional navigation system. ***Tuzcu V.*** *Pacing Clin Electrophysiol. 2007 Apr;30(4):519-25.*
METHODS AND RESULTS: Electrophysiologic studies were performed in **26 consecutive cases** (12.7 +/- 7.5 years) using NavX without fluoroscopy. The procedure time was 98.7 +/- 49.7 minutes.
CONCLUSION: This study demonstrates that nonfluoroscopic electrophysiologic studies and right-sided catheter ablations for supraventricular tachycardia can be safely and effectively performed in the majority of patients with normal cardiac anatomy using NavX.

Elimination of fluoroscopy use in a pediatric electrophysiology laboratory utilizing three-dimensional mapping. ***Smith G****, Clark JM. Pacing Clin Electrophysiol. 2007 Apr;30(4):510-8.*

Pediatrik EPS Ablasyonda Floroskopi

	Early Era	Late Era
N (total)	4,193	3,407
Fluoroskopi Süreleri	50,9 +39.9	40.1 + 35.1
Yaş (yıl)	12.4 + 4.7	12.2 + 4.6

	USA national data (2004)*	Boston (2008)**
Floroskopi süresi	38 dak	30 dak
Vakalar >50 dak. Floroskopi	22%	14%

*Prospective RF registry. JCE 2004 / ** Miyake CY. HRS 2011*
Pediatric RF registry. Kugler, j CadiovasElectrophsyology 2002

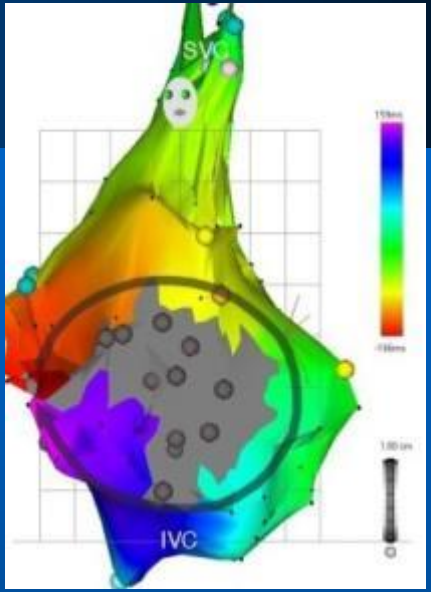
Floroskopisiz Ablasyon Metodları

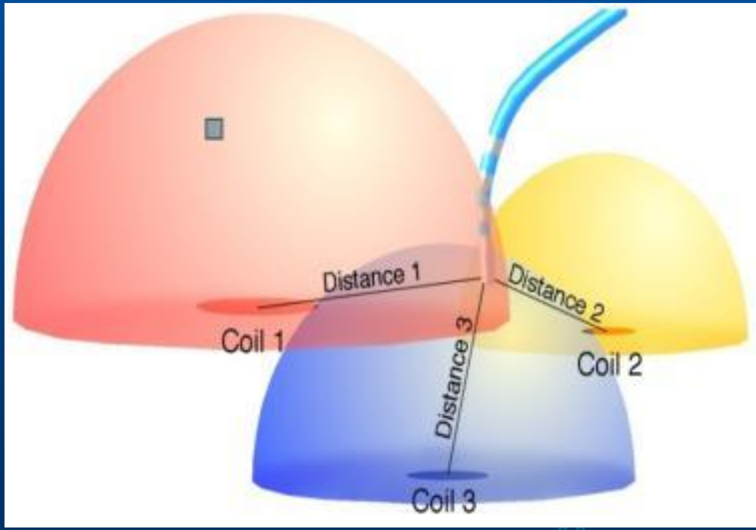
a) Biosense CARTO (Carto 3) mapping system
b) EnSite NavX (Velocity, St Jude Med) mapping system
c) EnSite Array (Noncontact mapping)
d) RHYTHMIA (Boston Scientific)
e) Magnetic Navigation System (Niobe, Stereotaxis System)
f) Intracardiac echocardiography (ICE) image integration
g) Digital Image (MRI-CT) Fusion
h) Dynamic 4-D mapping system (MediGuide, St Jude Med.)

With courtesy of Enes E. Gul

The CARTO mapping system
(Biosense, Diamond Bar, CA, USA)

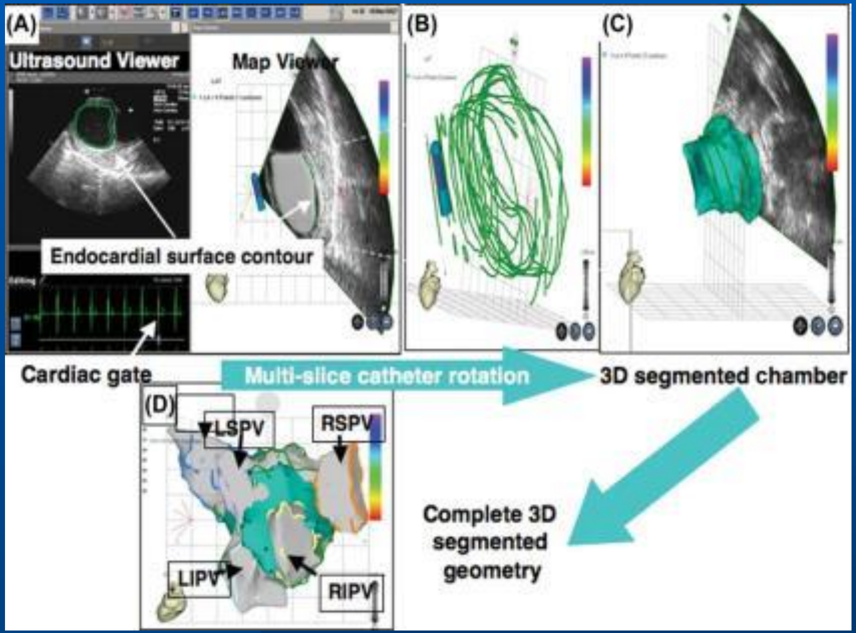
- Utilizes a low-level magnetic field (5 x 10-6 to 5 x 10-5 Tesla) delivered from three separate coils in a locator pad beneath the patient.
- Location sensor embedded tip of a specialized mapping catheter.
- The strength of each coil's magnetic field measured by the location sensor is inversely proportional to the distance between the sensor and coil.

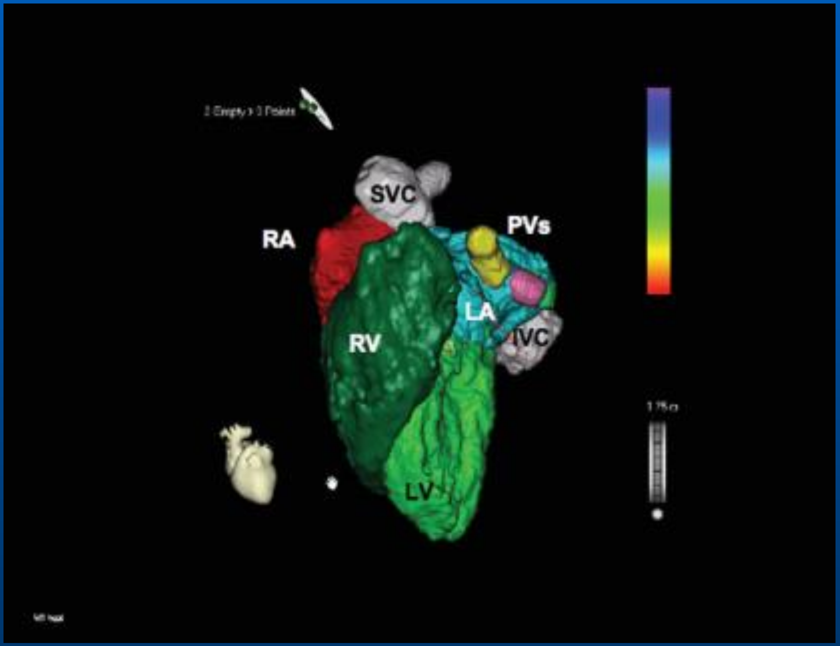




With courtesy of Enes E. Gul

Intracardiac Echocardiography (ICE) image integration with CARTO



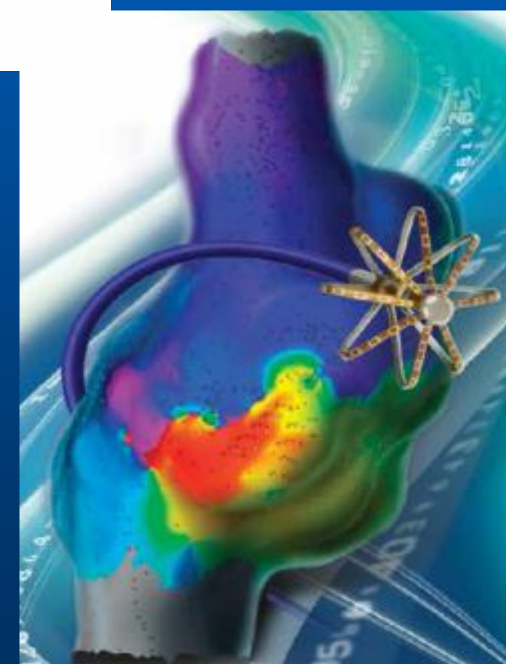


New generation of electro-anatomic mapping: full intracardiac ultrasound image integration. Douglas L. Packer*, Susan B. Johnson, Mark W. Kolasa, Thomas J. Bunch, Benhur D. Henz, and Yasuo Okumura. Europace (2008)

13.04.2015

With courtesy of Enes E. Gul

RHYTHMIA



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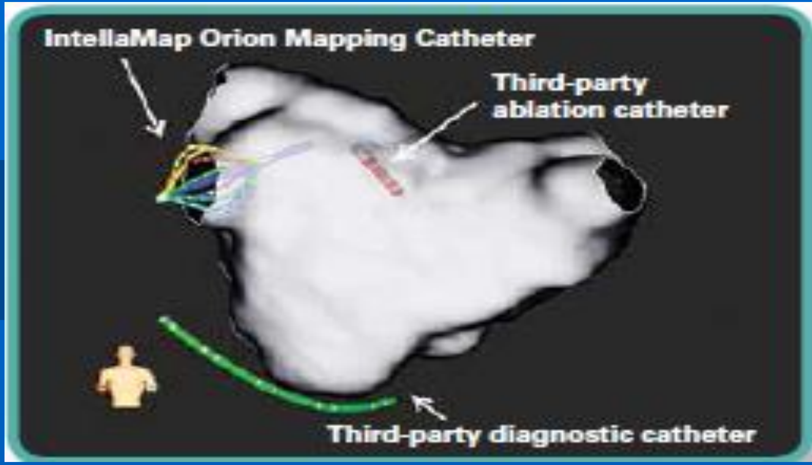


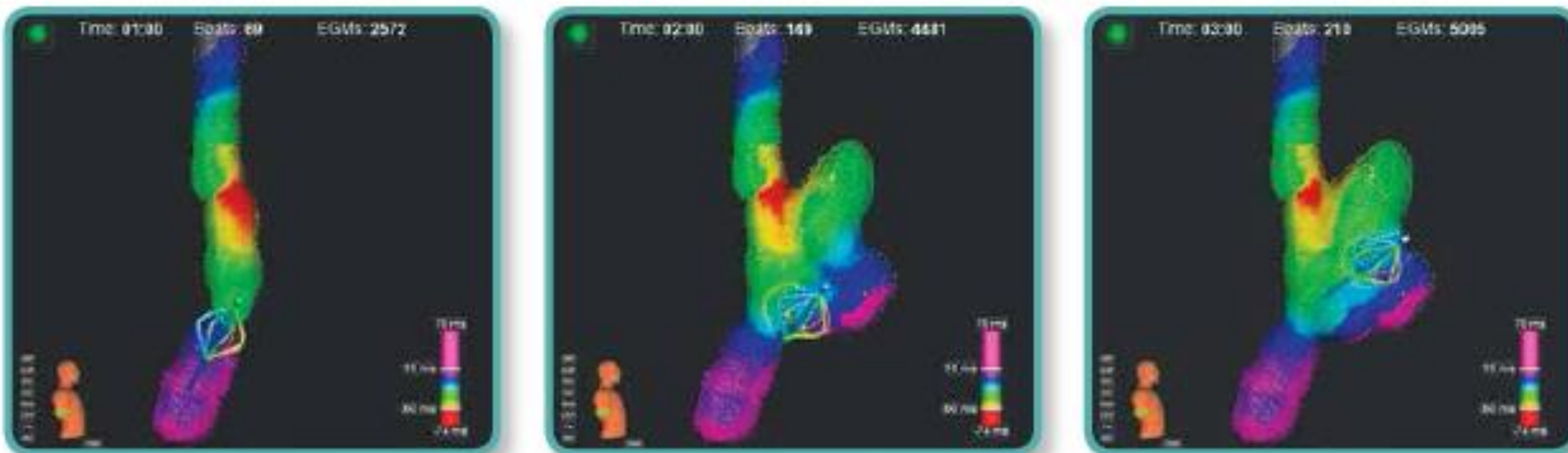
- 64-electrode basket design, bi-directional steerable catheter
- Rapid collection of clear signals
- Multicatheter support (visualize and use the diagnostic and ablation catheters
- Accurate tracking and high-resolution 3-D mapping

With courtesy of Enes E. Gul

Continuous Mapping

- Continuous acquisition of points based on user-defined criteria creates maps in 1/3 of the time
- Repeatable maps generated in minutes offer more predictability and less variability
- Seamless map creation for all rhythm types, including ectopic beat maps
- 99.8% accuracy in automated annotation algorithm eliminates the need for manual beat acceptance[2]

High-Resolution, 3D Electroanatomical Map Captured in 3 Minutes



1-minute
# of EGMs = 2,572

2-minute
# of EGMs = 4,481

3-minute
# of EGMs = 5,005

https://clinicaltrials.gov/ct2/results?term=Rhythmia&Search=Search

With courtesy of Enes E. Gul

Magnetic Navigation System

- The NIOBE magnetic navigation system (MNS, Stereotaxis, St. Louis, MO, USA) consists of two neodymium-iron-boron magnets positioned on each side of a single-plane fluoroscopy table
- Provides remote, robotic control of diagnostic devices
- Maintains stability of devices
- Provides precise movement of devices
- Very safe (due to the specific catheter design no catheter-related cardiac perforations have been reported)
- Was associated with longer procedure times and higher procedural expense (recent data showed comparable procedure times)
- Decreased fluoroscopic exposure

Bradfield et al. PACE 2012

With courtesy of Enes E. Gul

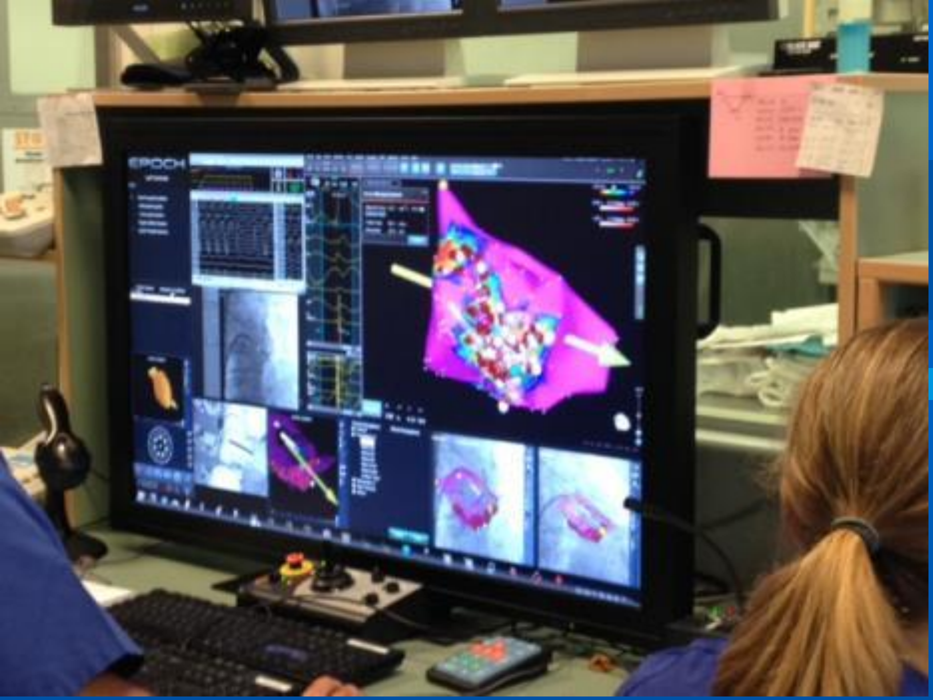
Meta-Analysis Summary for Success

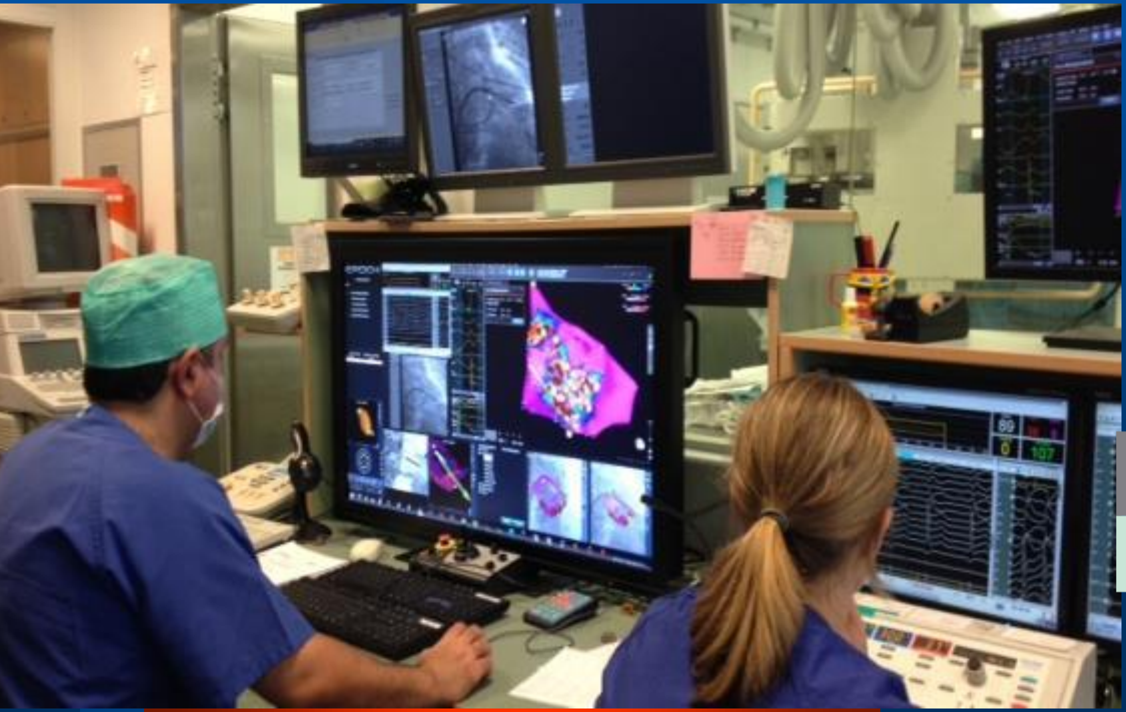
Type of study	Acute success-MNS n studies	n	pct	Lower	Upper	Acute success-manual n studies	n	pct	Lower	Upper	Diff	P Value
AVNRT	7	221	95.0%	90.5%	97.4%	4	125	95.3%	88.9%	98.1%	−0.3%	0.9222
AVRT	7	189	79.3%	69.6%	86.4%	2	50	84.4%	71.7%	92.0%	−5.1%	0.4817
AFIB	6	342	91.8%	86.6%	95.1%	3	406	99.0%	97.1%	99.6%	−7.1%	0.0094
Aflutter	4	117	85.7%	64.5%	95.2%	2	129	94.2%	82.5%	98.3%	−8.5%	0.3173
VT-structural normal	7	149	93.2%	84.1%	97.2%	2	57	92.9%	35.4%	99.7%	−0.2%	0.9826
VT-structural disease	4	98	81.3%	57.4%	93.3%	2	64	91.7%	19.0%	99.8%	−10.4%	0.6732
Complex congenital	3	20	60.7%	20.3%	90.4%	0	0				–	–
	Intermediate success-MNS					**Intermediate success-manual**						
AVNRT	7	221	93.4%	88.5%	96.3%	4	125	93.8%	87.5%	97.0%	−0.4%	0.8887
AVRT	5	162	83.1%	73.7%	89.6%	2	50	83.9%	30.5%	98.4%	−0.8%	0.9679
AFIB	6	377	70.1%	62.0%	77.1%	4	435	69.4%	58.9%	78.2%	0.7%	0.9170
Aflutter	3	91	74.1%	62.4%	83.2%	2	129	88.5%	81.9%	93.0%	−14.4%	0.0848
VT-structural normal	7	149	80.0%	69.9%	87.3%	2	57	84.7%	73.2%	91.9%	−4.8%	0.4941
VT-structural disease	4	98	72.2%	62.6%	80.1%	2	64	84.8%	74.1%	91.7%	−12.7%	0.0491
Complex congenital	2	13	60.8%	34.5%	82.0%	0	0				–	–

Bradfield et al. PACE 2012

Meta-Analysis Summary for Procedural Data

Outcome	dx category	MNS n Studies	Mean	SE	Control n Studies	Mean	SE	Difference = MNS – control Mean diff	SE d	P Value
Procedure time	AVNRT	7	138.6	19.4	4	157.5	33.3	−18.9	38.51	0.6362
Procedure time	AVRT	10	173.1	15.3	2	150.1	51.8	23.0	54.03	0.6796
Procedure time	A fib	4	241.8	27.9	3	164.7	33.2	77.1	43.35	0.1355
Procedure time	A flutter	4	106.7	27.8	2	86.5	21.4	20.1	35.04	0.5962
Procedure time	VT-normal	6	154.3	22.3	2	205.6	54.6	−51.3	58.97	0.4179
Procedure time	VT-structural	3	163.6	32.3	2	205.6	54.6	−42.0	63.40	0.5550
Procedure time	Congenital	2	278.9	79.8	0					
Fluoroscopy time	AVNRT	7	13.3	1.3	4	19.7	7.6	−6.3	7.69	0.4306
Fluoroscopy time	AVRT	10	15.6	3.1	2	30.1	16.8	−14.5	17.10	0.4153
Fluoroscopy time	A fib	4	23.4	7.0	3	37.9	9.3	−14.5	11.67	0.2697
Fluoroscopy time	A flutter	4	13.2	1.9	2	16.9	8.1	−3.8	8.31	0.6733
Fluoroscopy time	VT-normal	6	13.6	1.3	2	31.1	12.8	−17.5	12.83	0.2208
Fluoroscopy time	VT-structural	3	14.2	7.2	2	31.1	12.8	−16.9	14.66	0.3323
Fluoroscopy time	Congenital	2	30.2	12.9	0					
Ablation time	AVNRT	5	4.1	1.5	3	6.8	4.6	−2.6	4.85	0.6061
Ablation time	AVRT	3	5.0	1.3	1	10.0	14.1	−5.0	14.14	0.7596
Ablation time	A fib	2	69.6	16.5	2	46.7	12.8	23.0	20.91	0.3866
Ablation time	a flutter	2	19.8	9.9	1	7.5	5.4	12.3	11.25	0.4716
Ablation time	VT-normal	1	24.0	12.0	1	33.0	18.0	−9.0	21.63	0.7490
Ablation time	VT-structural	2	27.6	10.7	1	33.0	18.0	−5.4	20.92	0.8394
Ablation time	Congenital	1	26.0		0					





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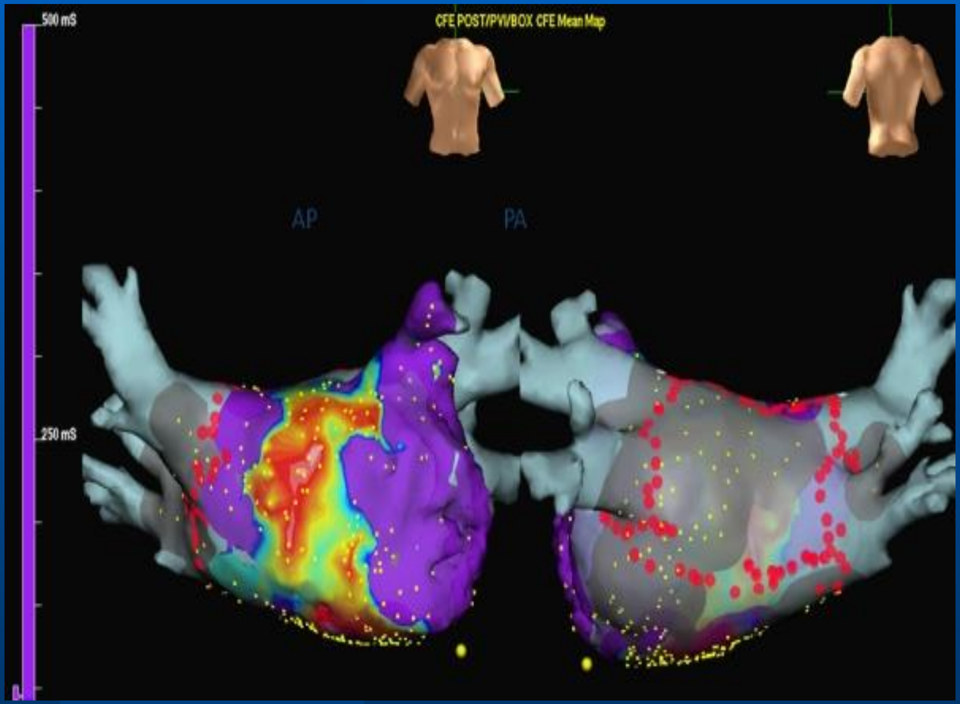
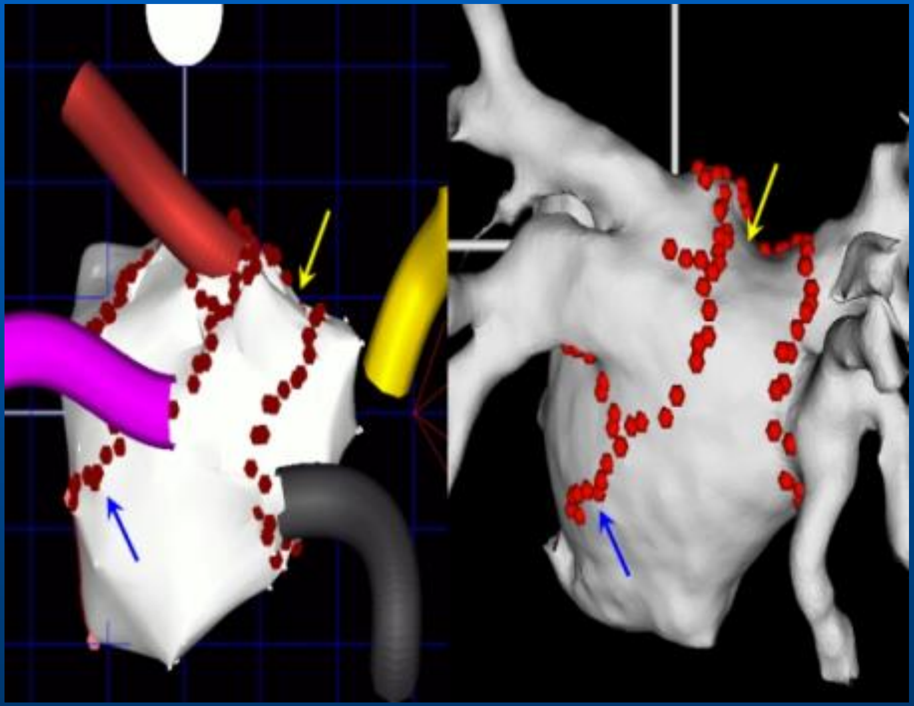
With courtesy of Enes E. Gul

Digital Image Fusion (DIF)



EnSite Velocity



CARTO

With courtesy of Enes E. Gul

MediGuide

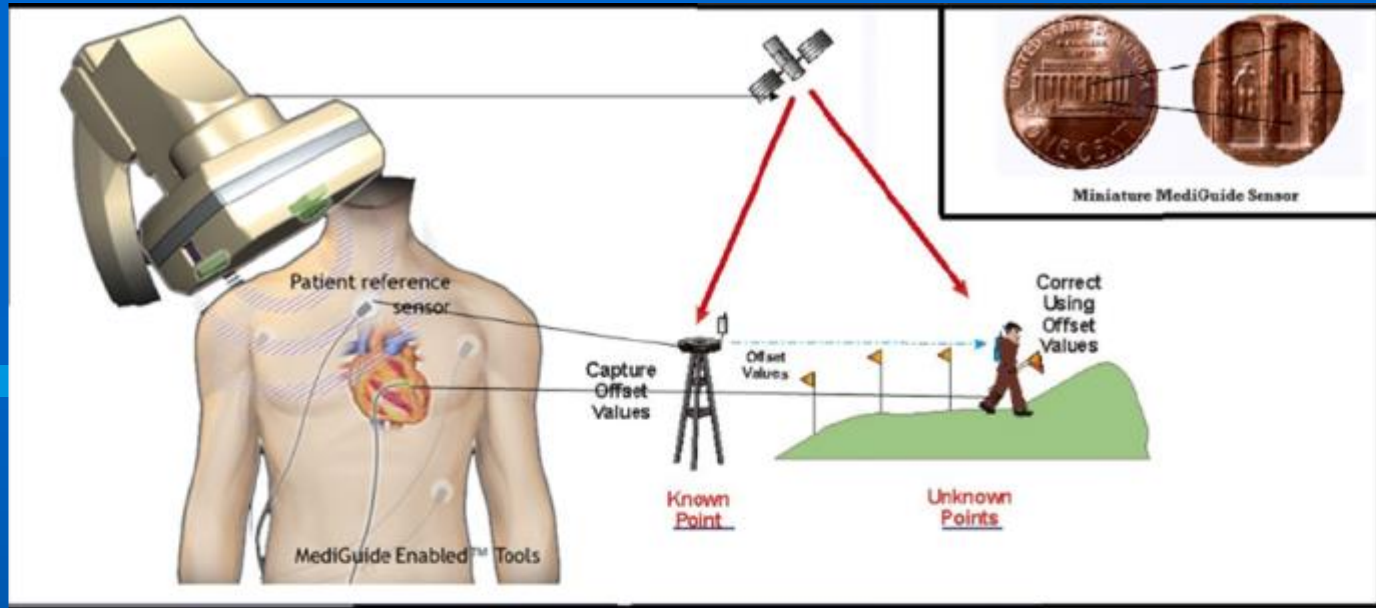
- MediGuide Technology (St. Jude Medical) GPS e benzer ve vücudun içindeki kateterin yerini gösterir.
- Siemens Healthcare MediGuide teknolojisini Artis Zee anjiyografi sistemlerine entegre etti
- Önceden alınmış floroskopi imajı üzerinde 4-D mapping imkanı

MediGuide components

1. Transmitters that generate a low-intensity (< 200 μT) alternating electromagnetic field and are integrated in the Artis zee fluoroscopy detector.
2. Miniaturized passive single-coil sensor in the tip of the EP catheter
3. Electromagnetic field reference sensor attached to the patient’s sternum.

The movements of the catheter are detected based on the voltage changes generated in the magnetic field

With courtesy of Enes E. Gul



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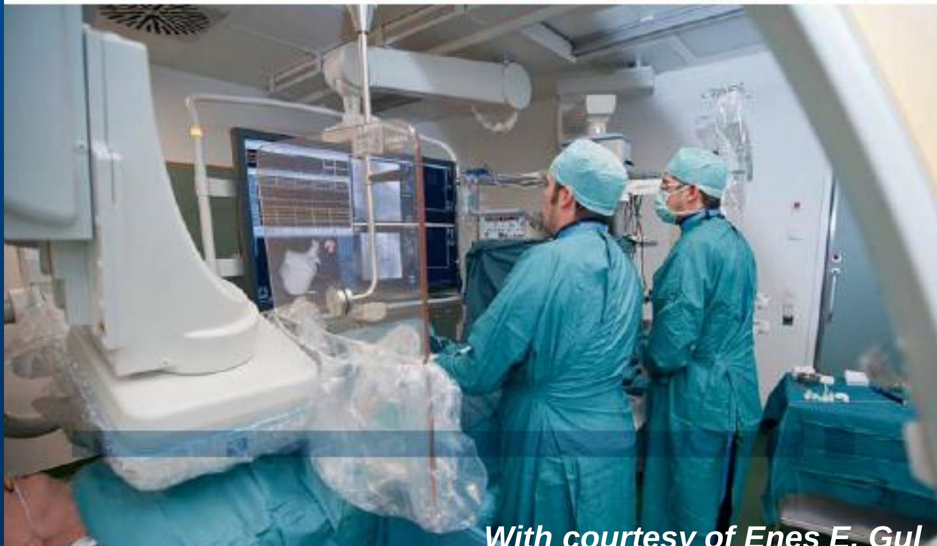


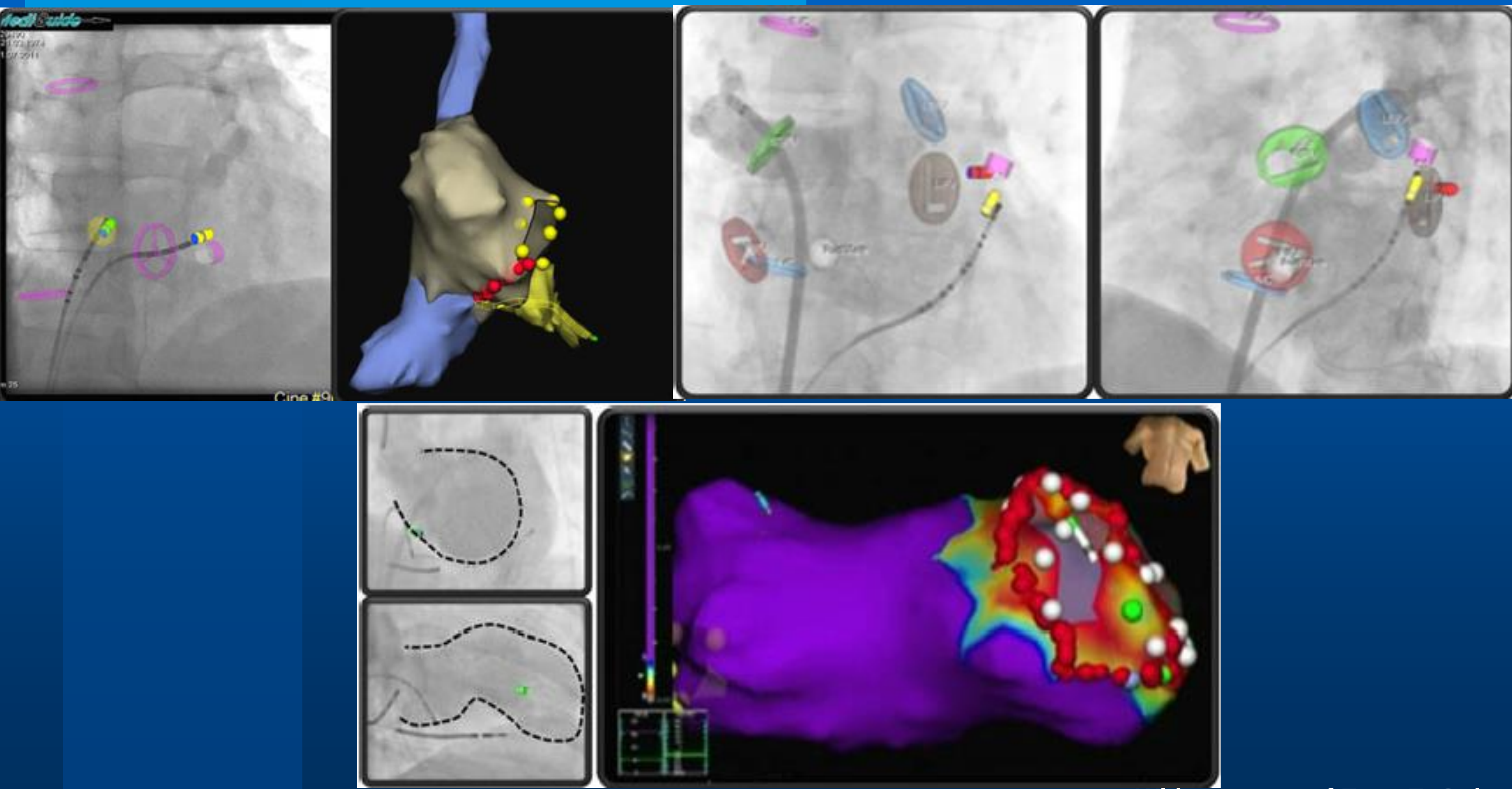
With courtesy of Enes E. Gul

J Interv Card Electrophysiol
DOI 10.1007/s10840-013-9859-6

MULTIMEDIA REPORT

Non-fluoroscopic catheter visualization using MediGuide™ technology: experience from the first 600 procedures

P. Sommer · S. Richter · G. Hindricks · S. Rolf



With courtesy of Enes E. Gul

Circulation
Arrhythmia and Electrophysiology

American Heart Association

Nonfluoroscopic Catheter Visualization in Atrial Fibrillation Ablation: Experience From 375 Consecutive Procedures

Philipp Sommer, Sascha Rolf, Christopher Piorkowski, Thomas Gaspar, Yan Huo, Carlos Piedra, Sergio Richter, Andreas Bollmann, Arash Arya and Gerhard Hindricks

Circ Arrhythm Electrophysiol. 2014;7:869-874; originally published online July 19, 2014;
doi: 10.1161/CIRCEP.114.001542
Circulation: Arrhythmia and Electrophysiology is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 1941-3149. Online ISSN: 1941-3084

Background—A technological platform (MediGuide) has been recently introduced for nonfluoroscopic catheter tracking. No data on the safety of this technology are yet available in a large cohort of patients.

Methods and Results—Data from a prospective ablation registry were analyzed. All patients undergoing atrial fibrillation ablation procedures supported by nonfluoroscopic catheter visualization technology were included. Patient characteristics and procedural data and complications within the first 3 months were recorded. Between May 2012 and February 2014, a total of 375 patients underwent atrial fibrillation ablation using nonfluoroscopic catheter visualization technology. The patients were predominantly men (68%); the majority were ablated for the first time (71%); left atrium was 43±6 mm; and left ventricular function was normal (59±9%). The median ablation procedure time was 135 (113–170) minutes, median fluoroscopy time 2.8 (1.5–4.4) minutes, and median radiation dose 789 (470–1466) cGy*cm². Regression analysis demonstrated a significant decrease of fluoroscopy time, dose, and procedure time. To confirm the result and show overall changes, the initial 50 cases (group 1) to the last 50 cases (group 2) of the series were compared: fluoroscopy time decreased from 6.0 (4.1–10.3) minutes in group 1 to 1.1 (0.7–1.5) minutes in group 2 and radiation dose from 2363 (1413–3475) to 490 (230–654) cGy*cm², respectively. Ten patients (2.7%) experienced complications: 5 cardiac tamponades (1.4%), 4 pseudoaneurysms (1.1%), and 1 stroke (0.3%).

Conclusions—Atrial fibrillation ablation using the nonfluoroscopic catheter visualization technology is safe with a rate of complications of 2.7%. Procedure time (135 minutes) is not prolonged. A dramatic reduction in fluoroscopy time and dose was achieved. (*Circ Arrhythm Electrophysiol*. **2014;7:869-874.**)

With courtesy of Enes E. Gul

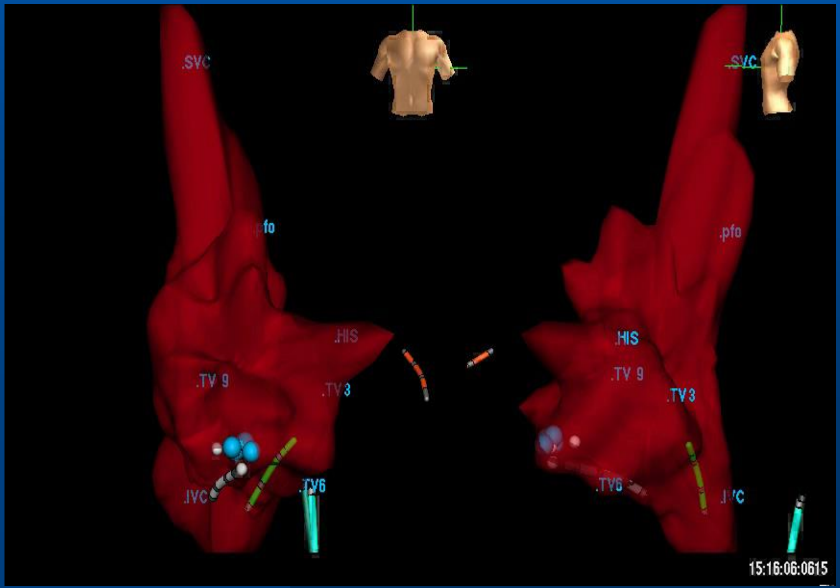
The Real-Time Position Management (RPM) System (Cardiac Pathways, Sunnyvale, CA, USA)

- **Employs ultrasound ranging to localize reference and mapping/ablation catheter positions.**
- **Two reference catheters, one typically situated in the RA, CS, or RV, and the mapping/ablation catheter each contain an ultrasound transducer along their shaft.**
- **Continuous real-time location of ablation and reference catheters.**
- **Disadvantages: distortion of cardiac geometry, and the need to use specific reference and ablation catheters equipped with ultrasound transducers.**

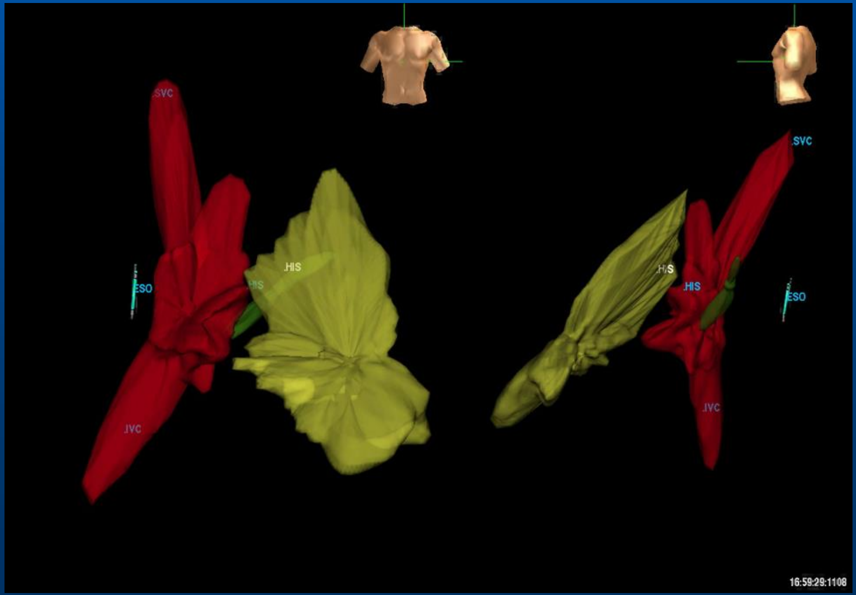
With courtesy of Enes E. Gul

EnSite NavX® Mapping System
(St. Jude Medical, Inc., St. Paul, MN, USA)

- This is achieved by applying a low-level 5.6 kHz current through orthogonally-located skin patches.
- The recorded voltage and impedance at each catheter's electrodes generated from this current allows their distance from each skin patch, and ultimately, their location in space, to be triangulated with the help of a reference electrode.



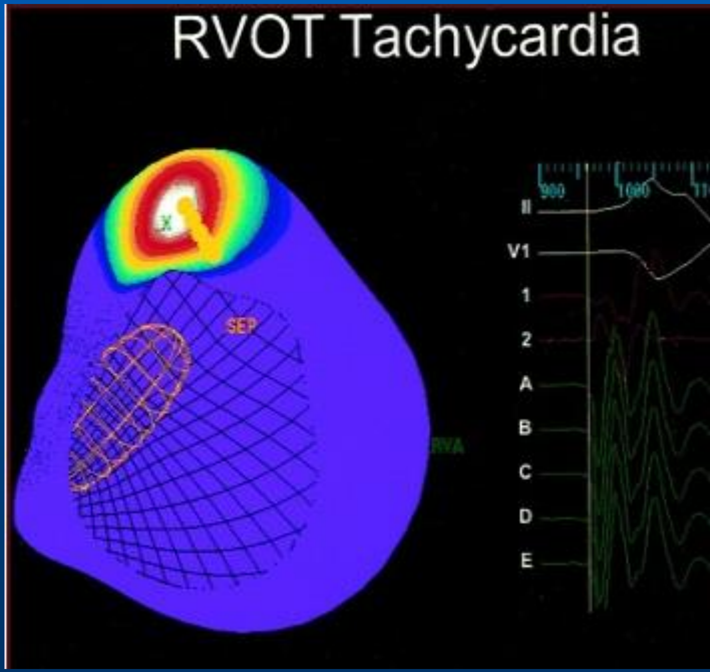
CS entry and reconstruction of anatomy .



Rotation of full anatomic construction and different views

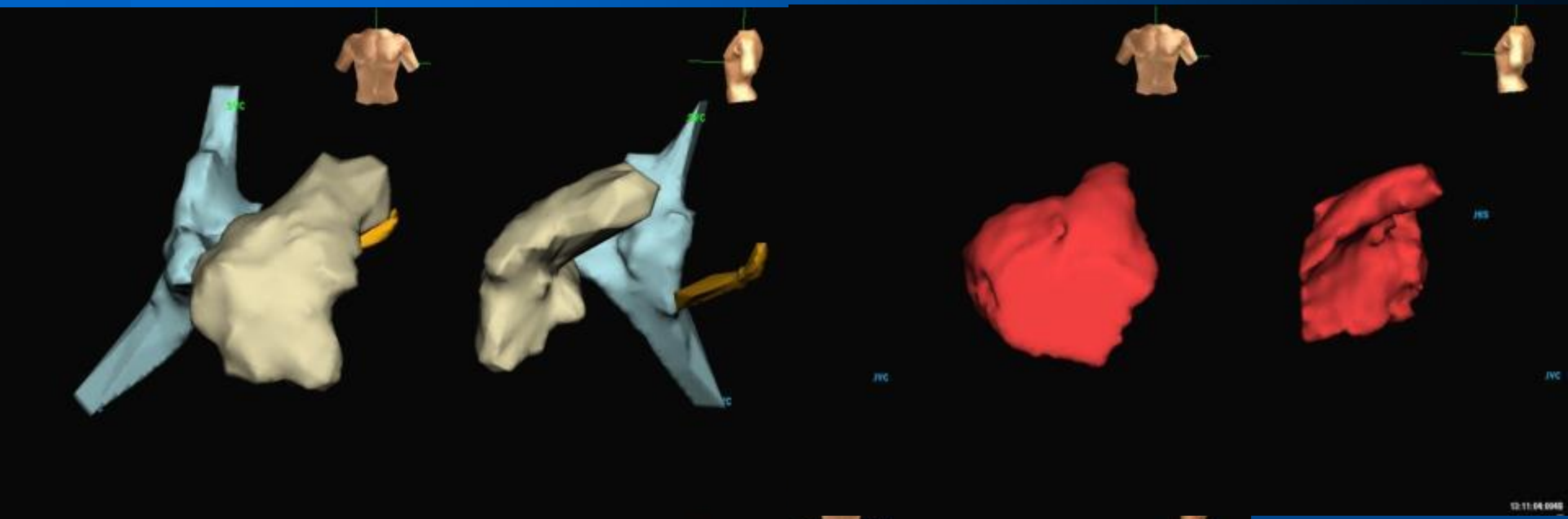
Noncontact mapping (Ensite, Endocardial Solutions Inc., St. Paul, MN, USA)

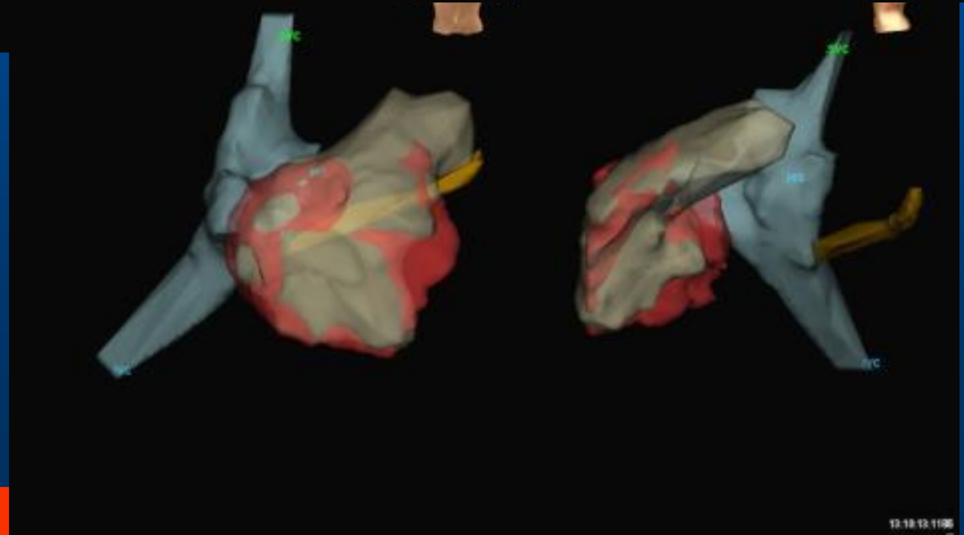
- Uses multi-electrode array (MEA) catheter (inflatable balloon with 64 electrodes on its surface) to simultaneously record multiple areas of endocardial activation.
- Can be performed from even a single beat of tachycardia.
- Three-dimensional (3D) localization of the MEA surface electrodes is achieved by applying a low-level 5.6 kHz current between an electrode on the distal end of the MEA catheter and two ring electrodes along its shaft, proximal and distal to the MEA itself.
- Different mapping catheter's position can be determined
- EnSite system to have excellent locator precision and accuracy at distances <50 mm from the MEA.
- Timing correlation. significantly worsened at a threshold distance of >34 mm from the MEA center;



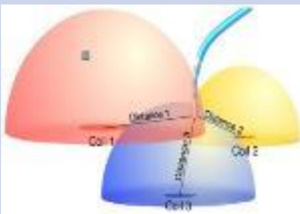
Digital Image Fusion (DIF) with EnSite

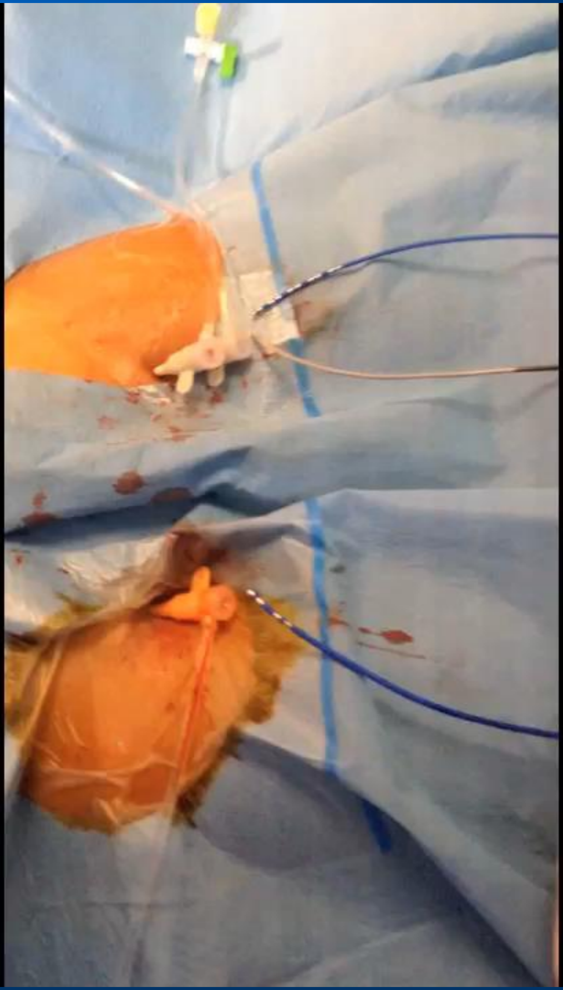
Both CT and MR images can be integrated with EAM systems in order to improve the 3D geometry.

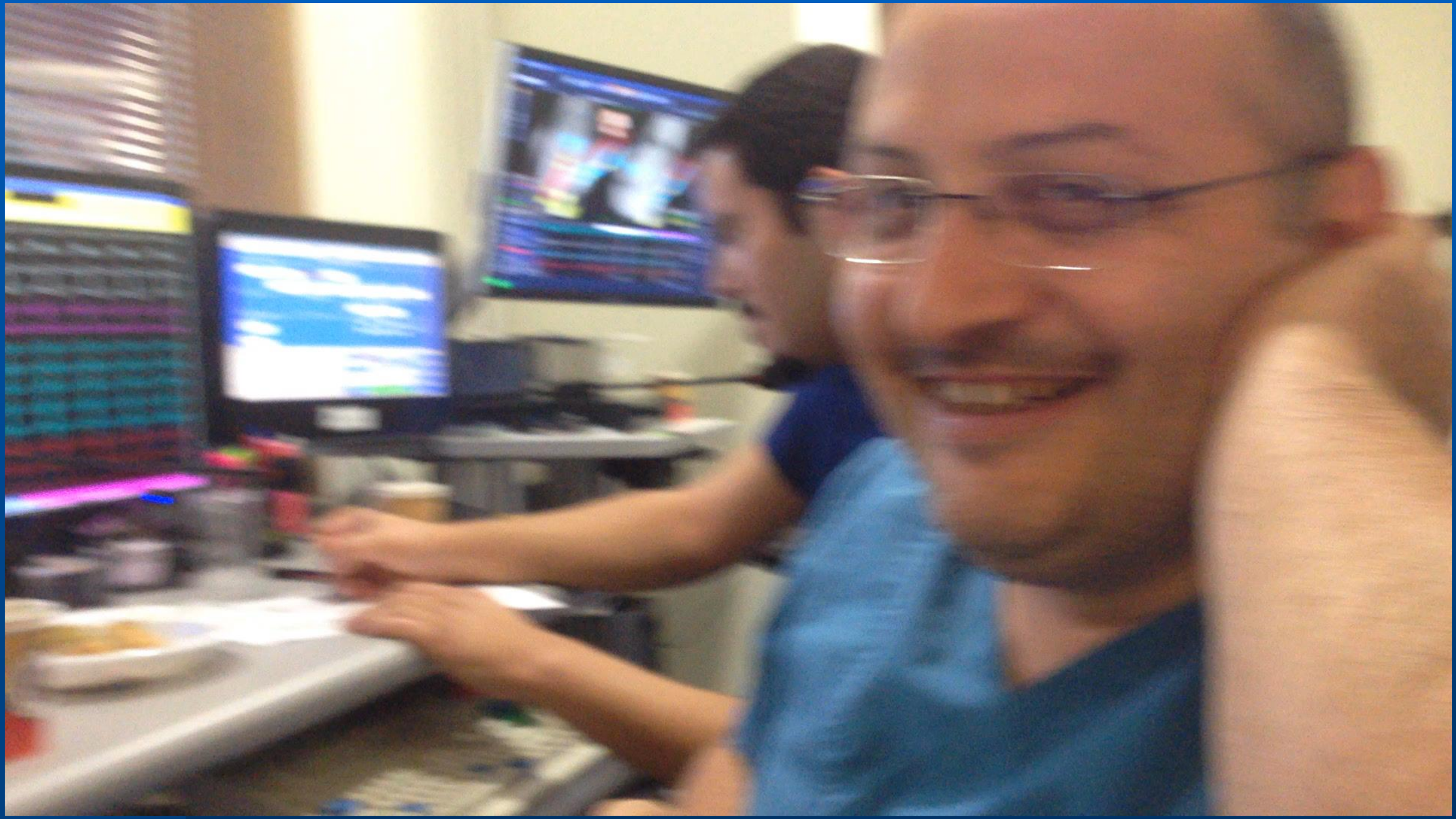




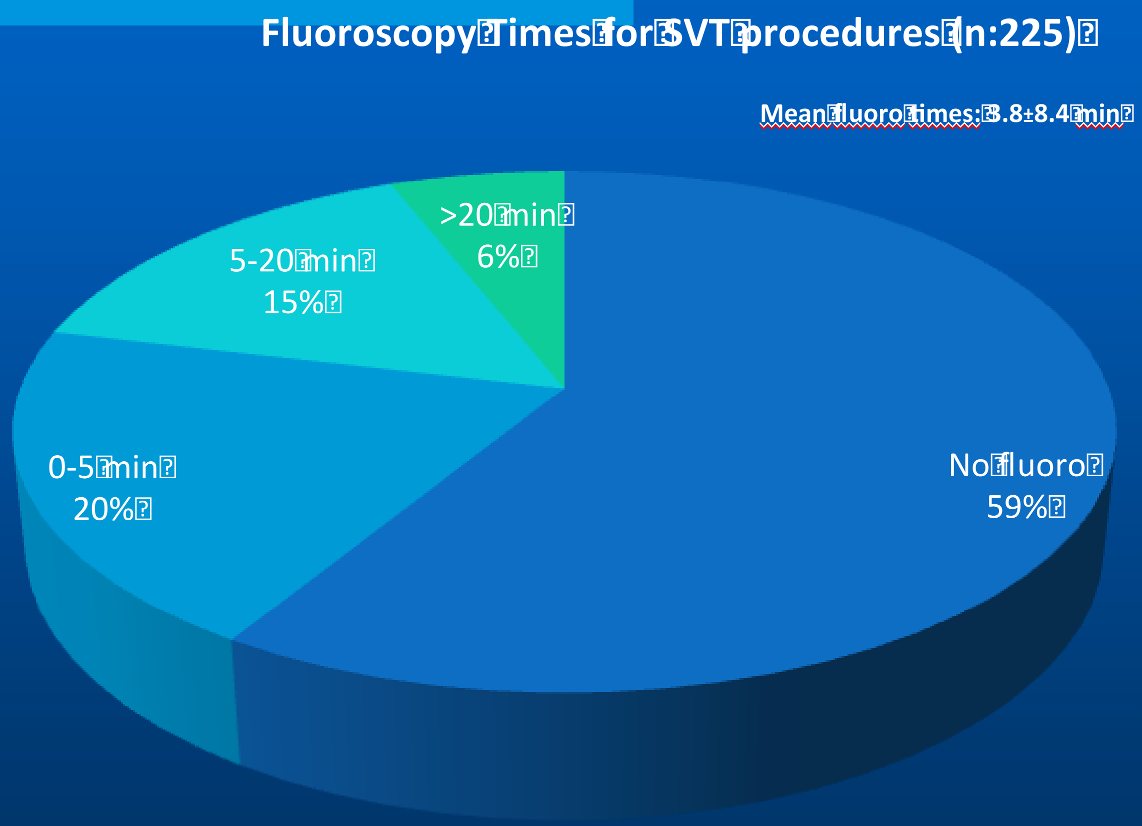
ADVANTAGES AND DİSADVANTAGES OF COMMONLY USE EAM SYSTEMS

System	Strength	Weakness
Carto 	•Record local endocardial activation times for arrhythmia mapping, •Generate 3D chamber geometry. • Record locations of important anatomic landmarks •Recording ablation lesion location	•Difficulties mapping for nonsustained or unstable tachycardia •Need a special (NaviSTAR) catheter, •İnability to easily relocate a displaced reference catheter, •İnability display the location of diagnostic/reference catheters.
Ensite 	•Same as Carto •Can use any diagnostic or ablation (even cryo) catheter •Respiratory motion artifact can also be eliminated	•Difficulty in mapping of nonsustained or unstable tachycardia
Noncontact mapping 	•Can map single beat (non-sustained arrhythmias) •Can be used in poorly tolerated arrhythmias •Compatible with any mapping/ablation catheter	• İnaccuracy of electrogram timing and morphology at greater distances from the MEA, •Difficulty in positioning the MEA balloon, • İnaccuracy in reconstructing certain features of chamber geometry. Difficult to use in small heart (child)

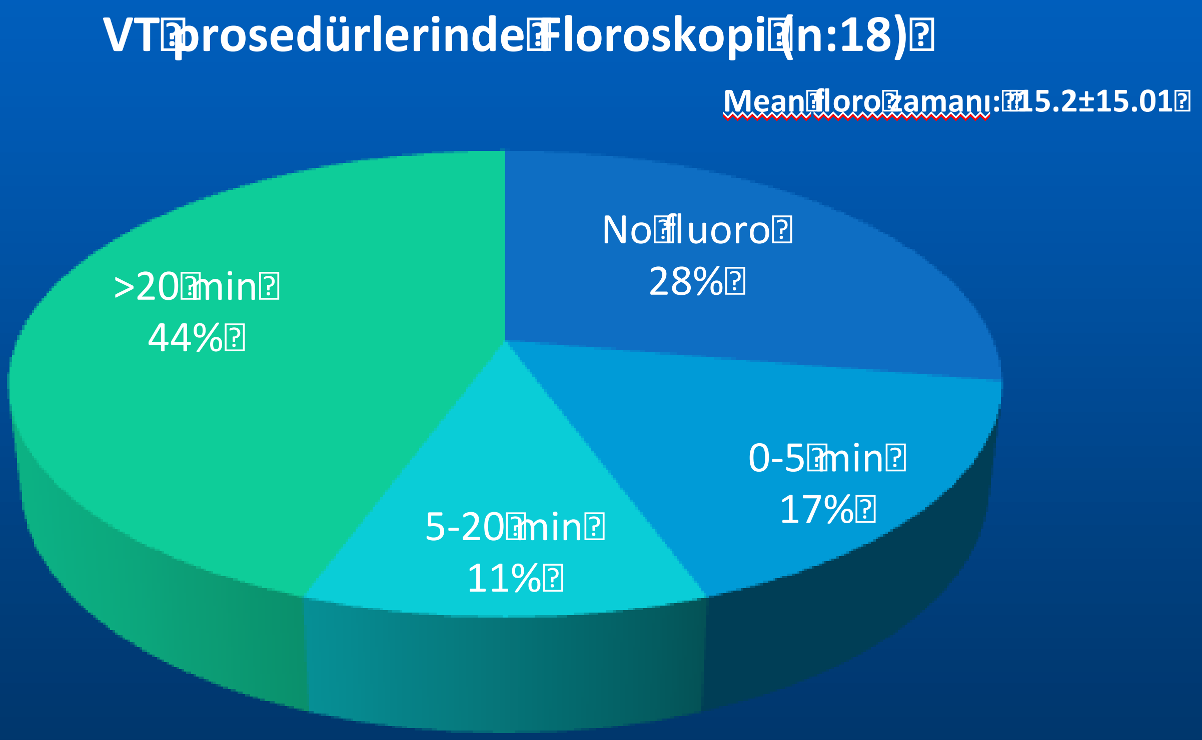




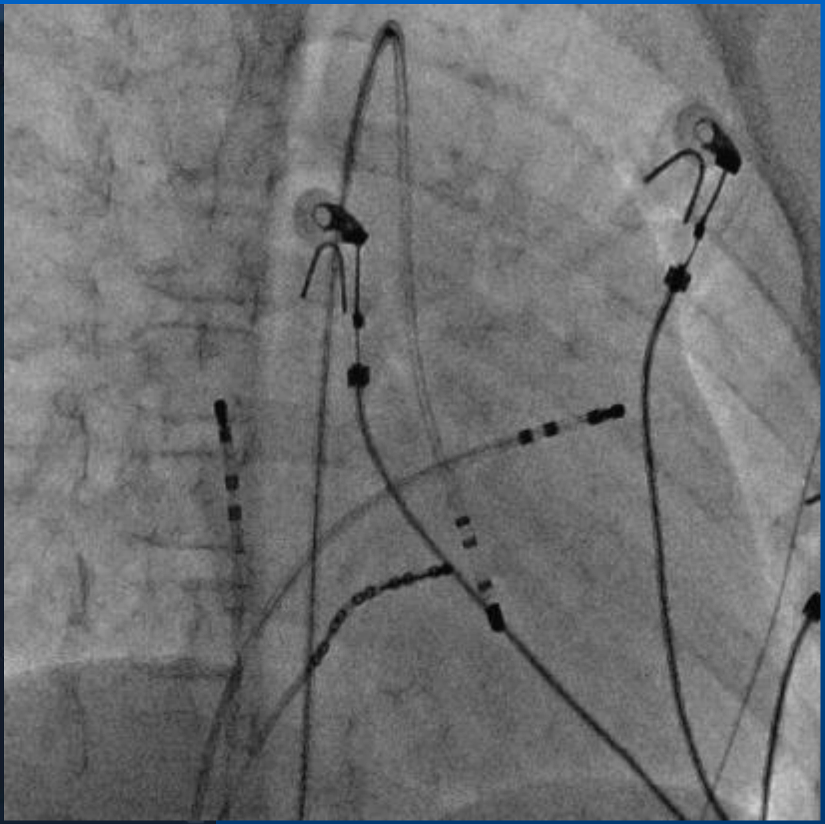
Medipol Üniversitesi Çocuk ve Genetik Aritmi Merkezi Sonuçları



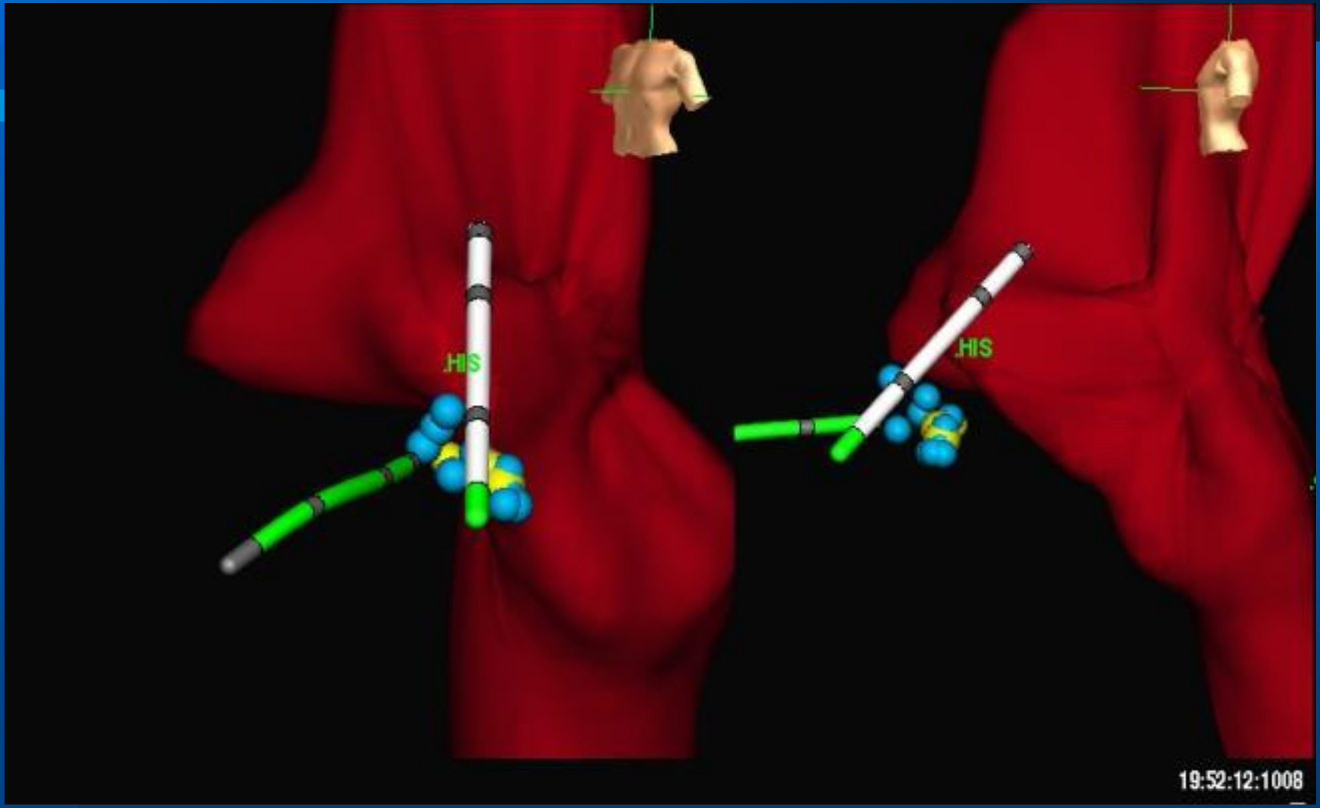
Medipol Üniversitesi Çocuk ve Genetik Aritmi Merkezi Sonuçları



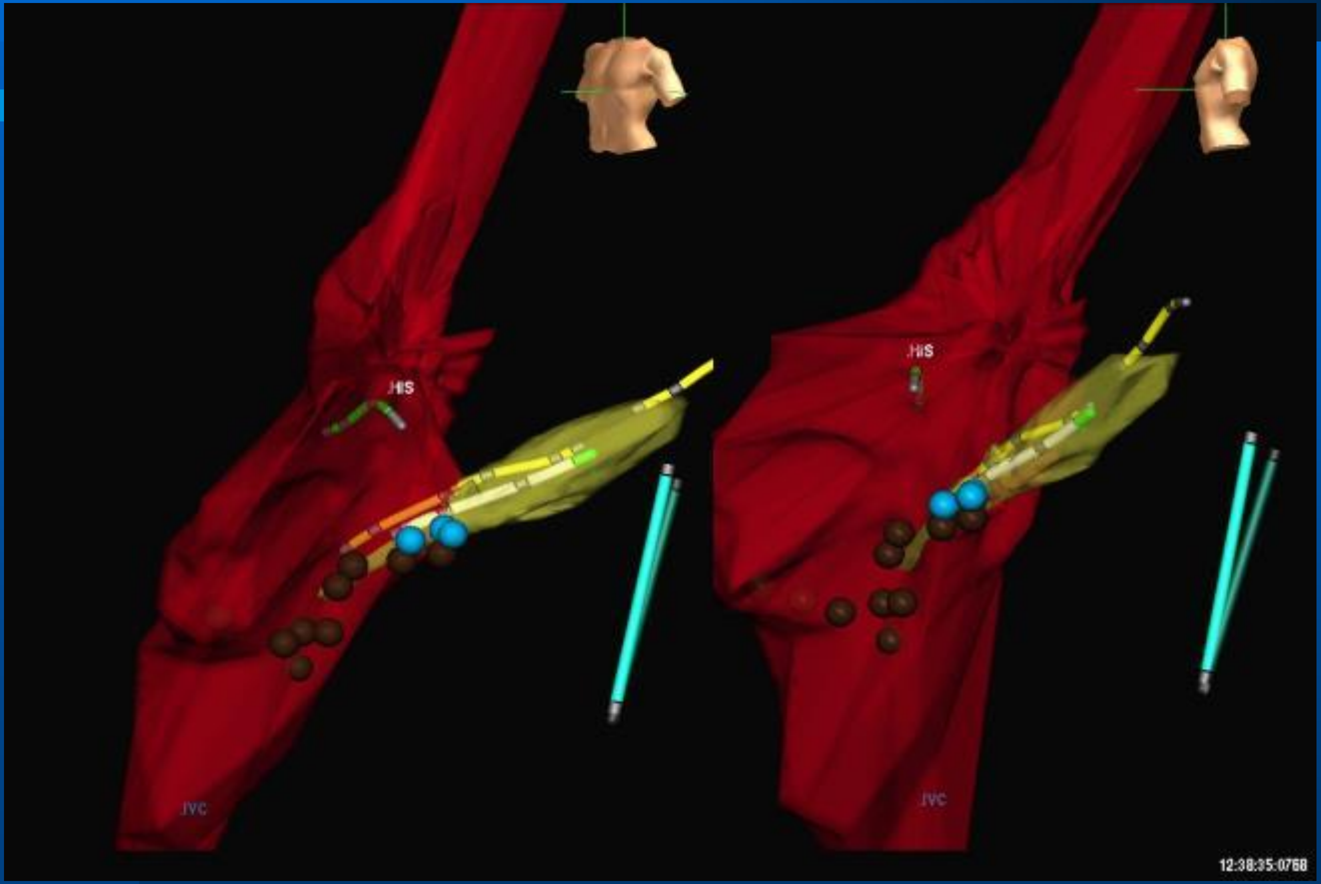
left lateral AP...no-transseptal puncture, acces from pfo..no fluroscopy use



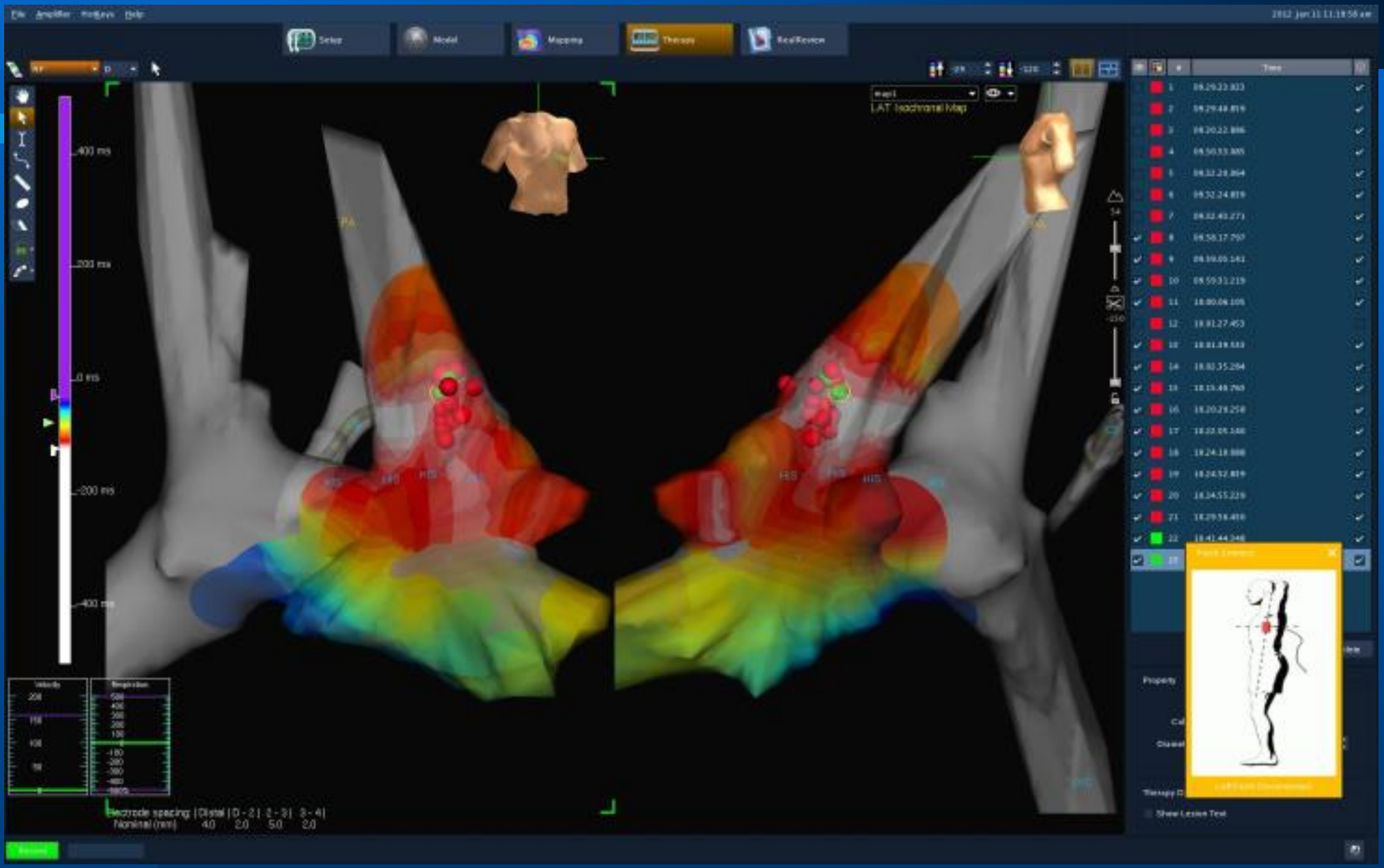
Left post fas VT..procedure time 135min..fluoro:4 min.



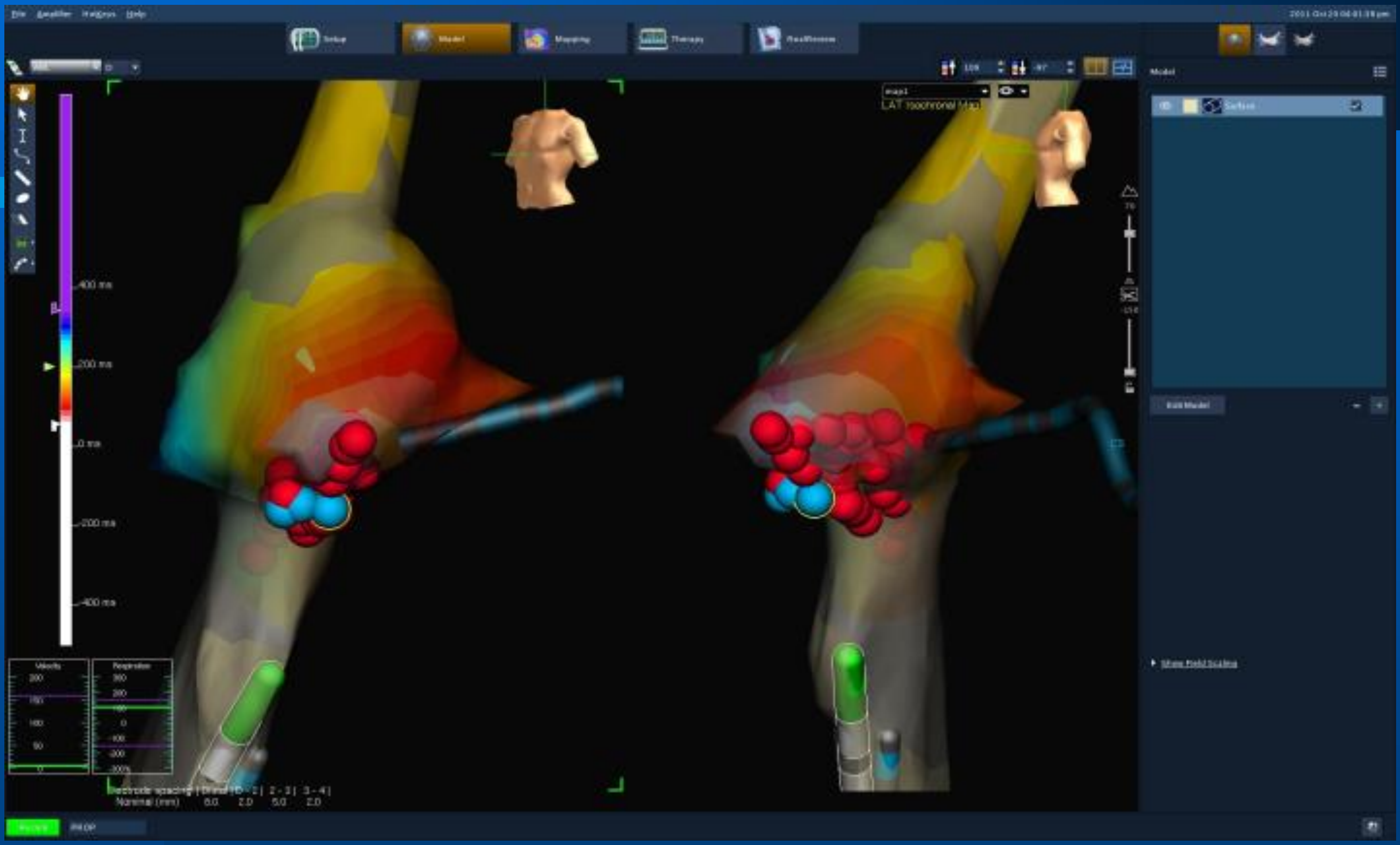
JET li bir infant



CS içinde slow pathway kriyoablasyonu



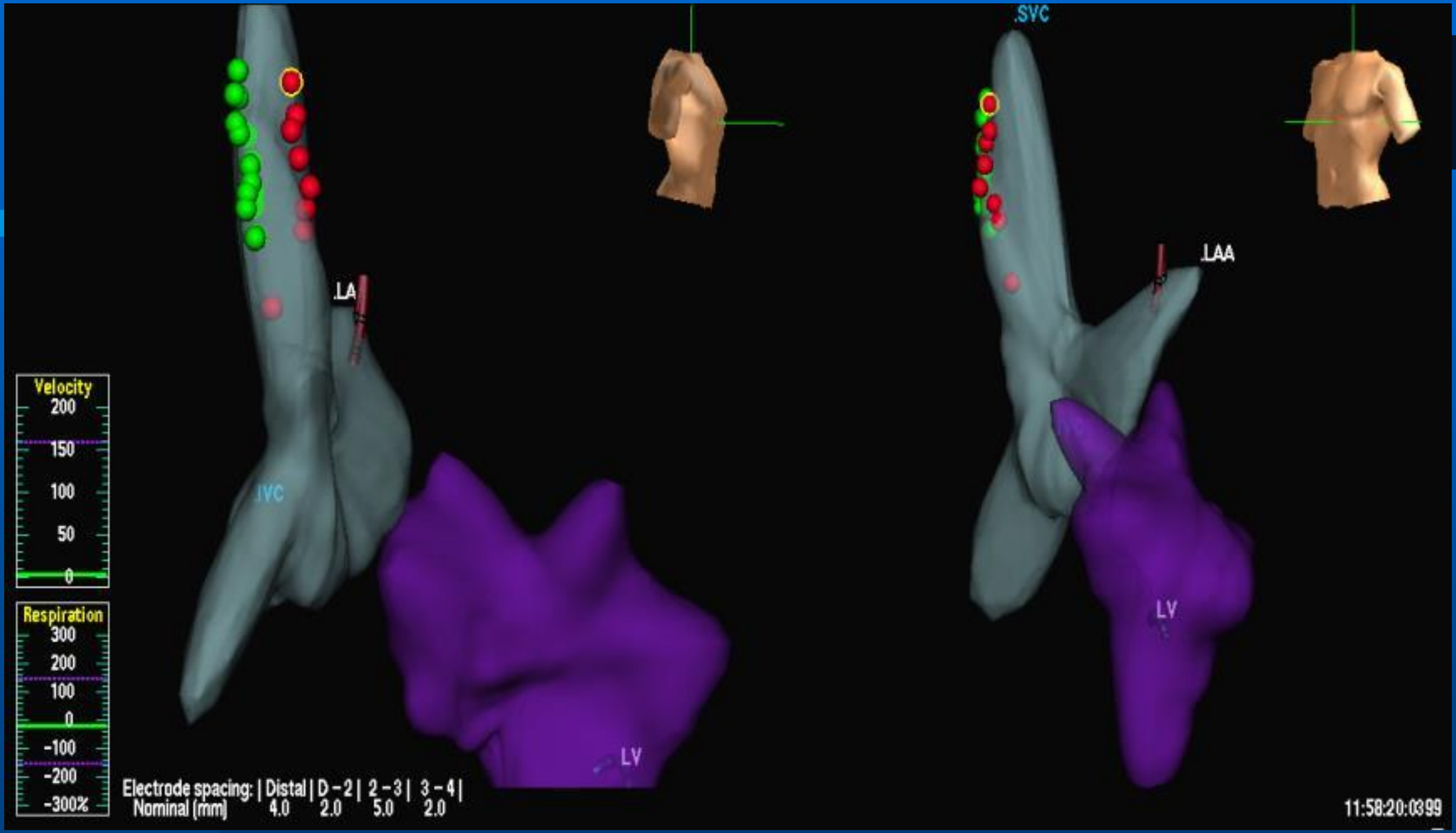
RVOT VT...total procedure time:130min...fluoro: 0 min



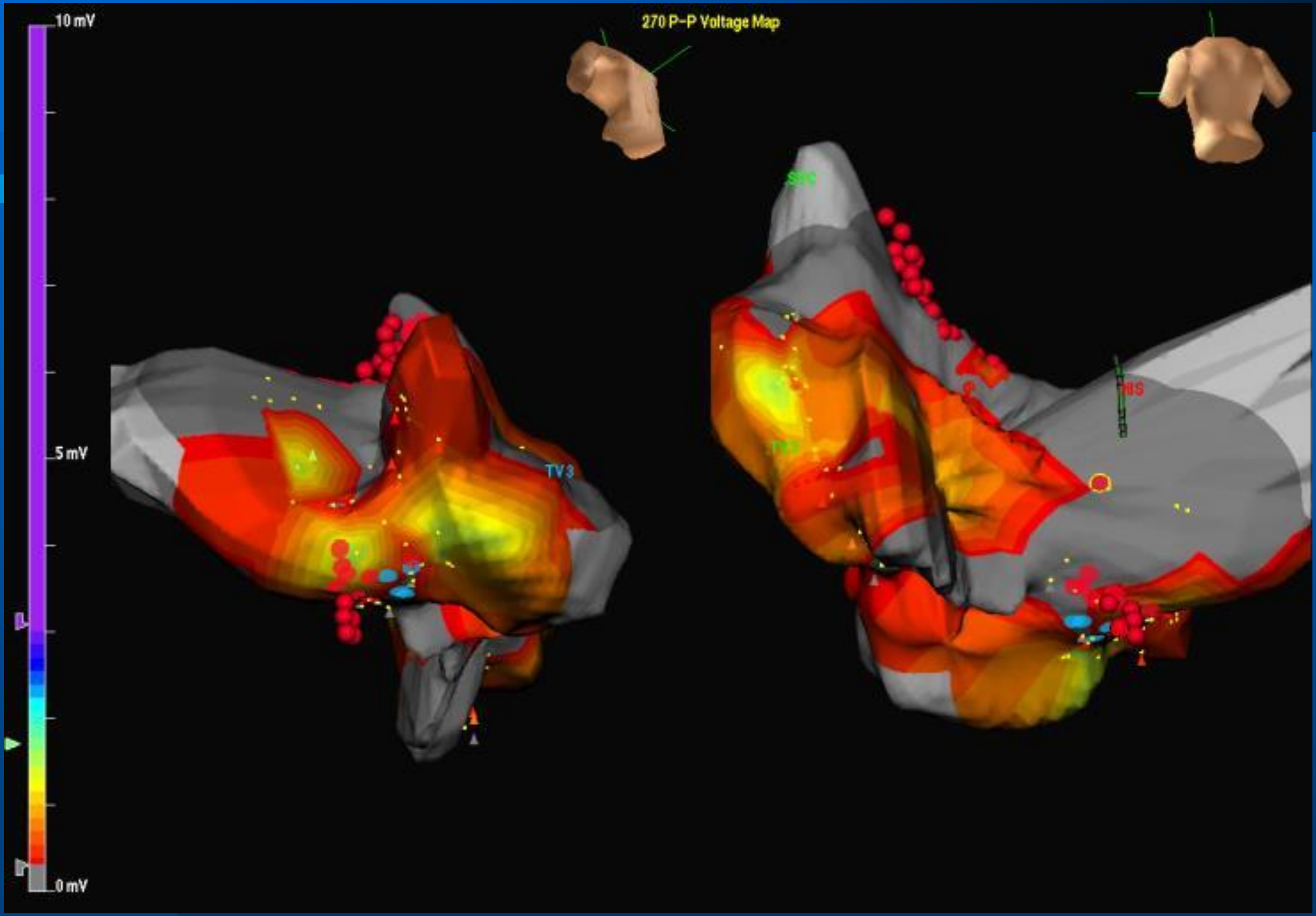
IART ablation (opere TOF), procedure: 330 min, Fluoro:0.

AVNRT de florosuz ablasyon neredeyse 100%

13.04.2015



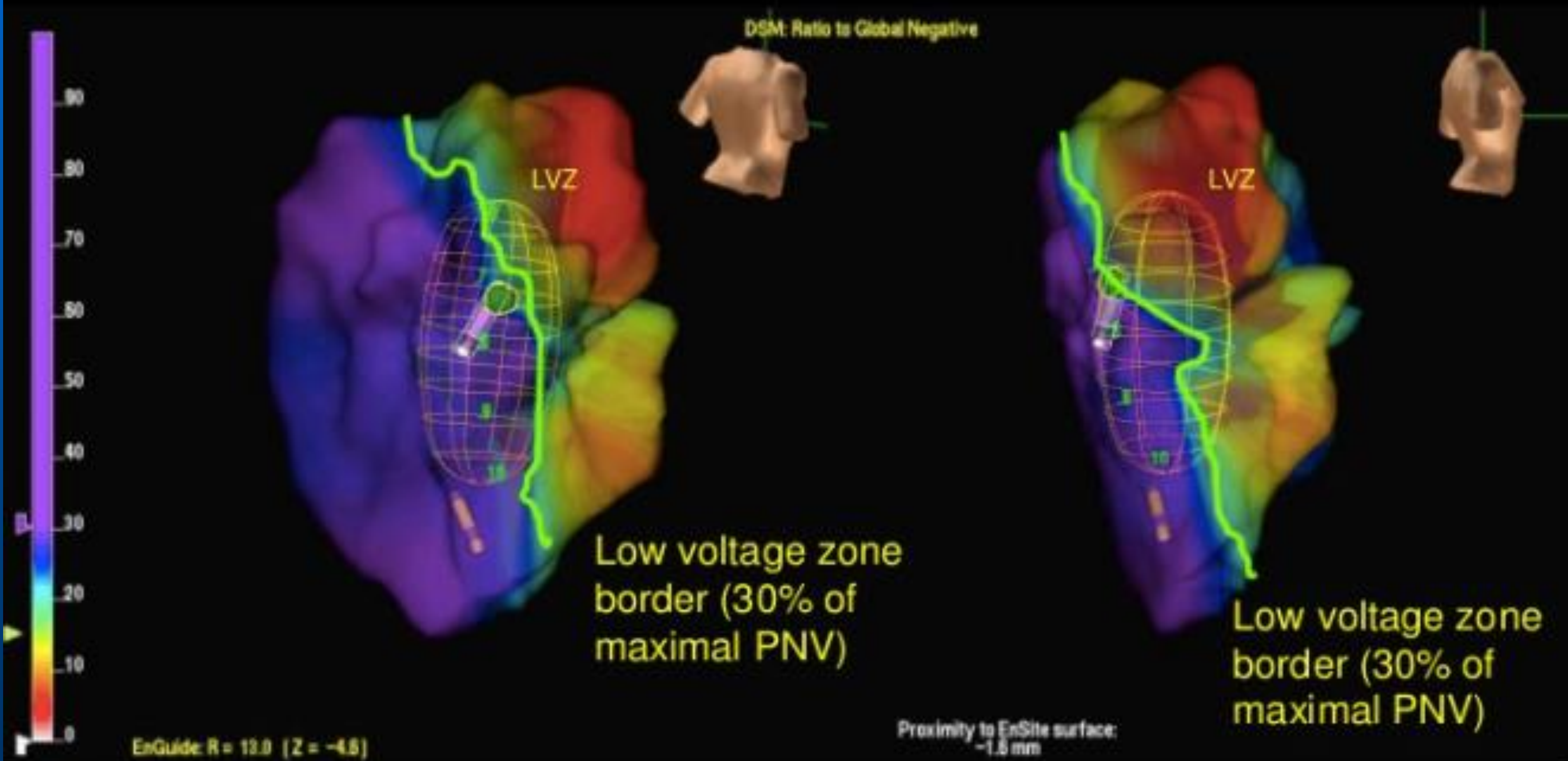
Önemli lokasyonlar farklı şekilde işaretlenebilir.



Fontan lı hastada aktivasyon mapping ve ablasyon

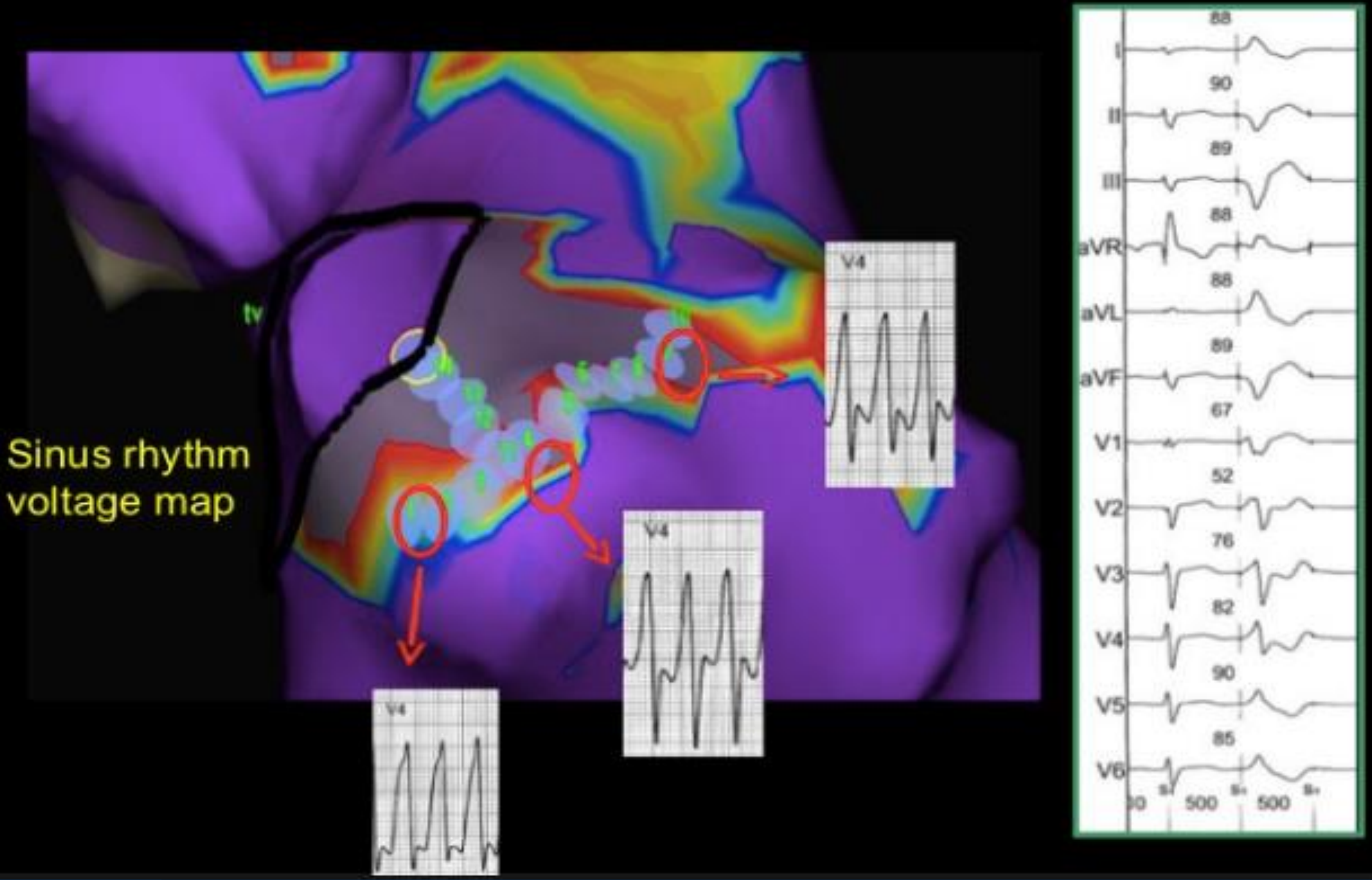
Voltage Map during SR

Dynamic substrate map (DSM)



Taipei VGH

Multiple VT morphology in ARVC/D



Ling Yenn-Jiang et al

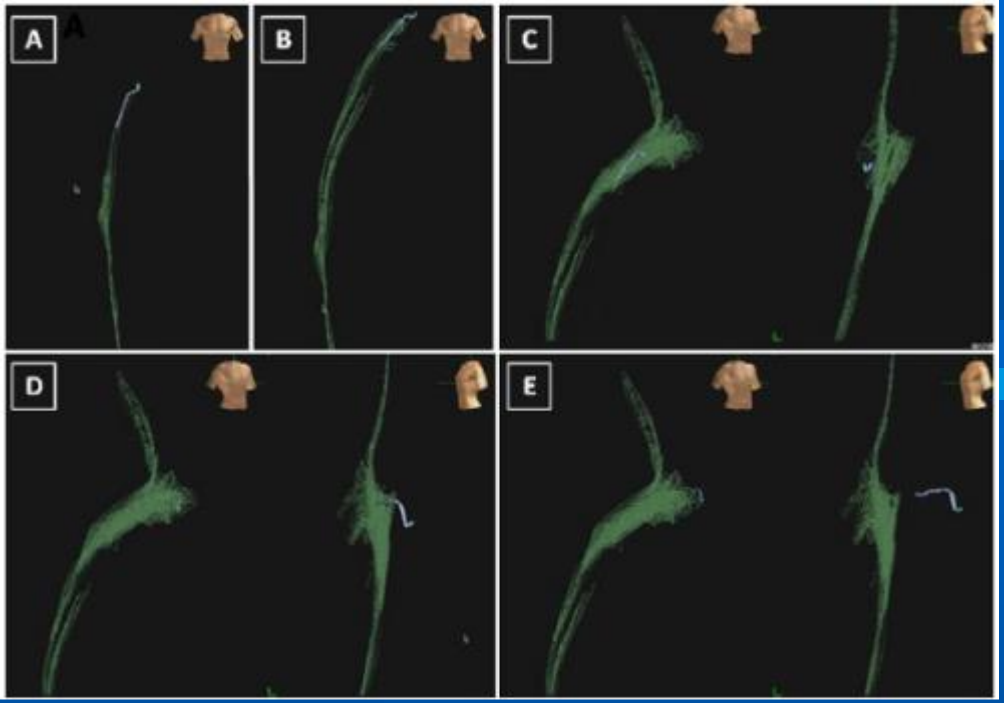
IART

FAT LAT Isochronal Map
Electrode spacing: | Distal | D – 2 | 2 – 3 | 3 – 4 |
Nominal (mm) 4.0 2.0 5.0 2.0
Rate 159 bpm
LAT -82 ms

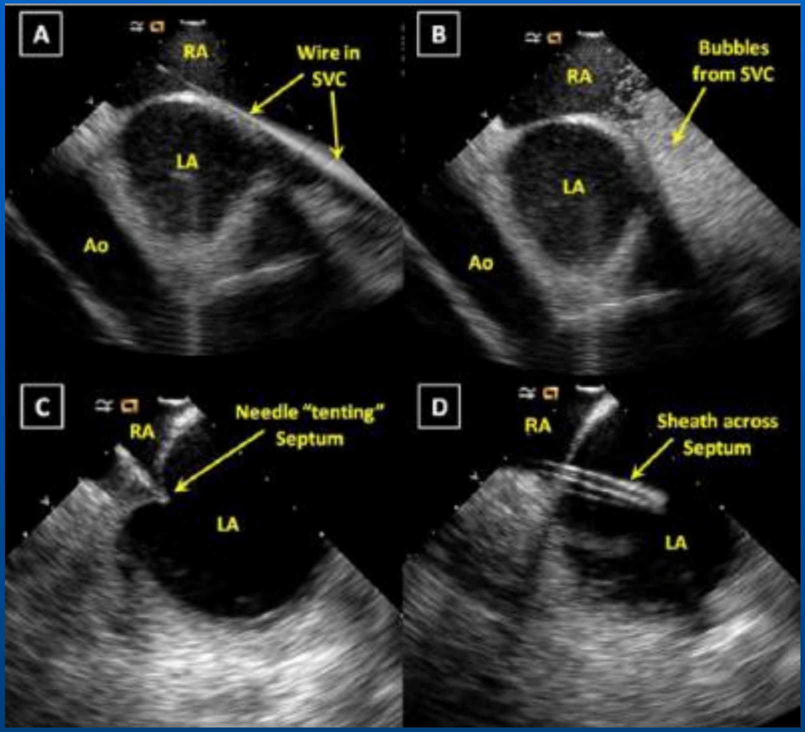
Transseptal Girişimler

- EAM sistmleri ile florosuz veya sınırlı floroskopili transseptal yapılabilir.
- ICE ek olarak kullanılabilrir.
- MediGuide sistemi.

Clark et al. Pacing Clin Electrophysiol 2008
Reddy et al. Heart Rhythm 2010
Mansour et al. Pacing Clin Electrophysiol 2015



Clark J. Pacing Clin Electrophysiol 2008



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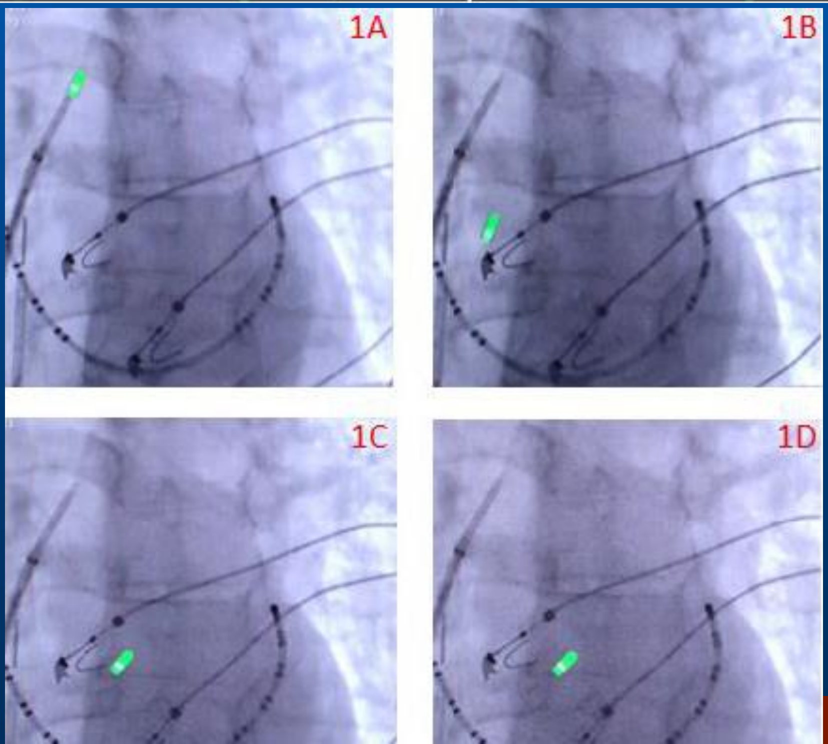

Mansour et al. Pacing Clin Electrophysiol 2015

EAM Sistemleri Sadece Belli Populasyonda mı ?

Exclusion of Fluoroscopy Use in Catheter Ablation Procedures: Six Years of Experience at a Single Center

JUAN M. FERNÁNDEZ-GÓMEZ, PH.D., PABLO MORIÑA-VÁZQUEZ, PH.D., ELENA DEL RIO MORALES, PH.D., JOSÉ VENEGAS-GAMERO, PH.D., RAFAEL BARBA-PICHARDO, PH.D., and MANUEL HERRERA CARRANZA, M.D.

From the Arrhythmia and Pacing Unit, Hospital Juan Ramón Jimenez, Huelva, Spain

Exclusion of Fluoroscopy Use in Catheter Ablation Procedures. *Background:* Nonfluoroscopic mapping systems have demonstrated significant reduction of radiation exposure in radiofrequency (RF) catheter ablation procedures. However, their use as only imaging guide is still limited.

Objective: To evaluate the usefulness of a completely nonfluoroscopic approach to catheter ablation of supraventricular arrhythmias using the Ensite-NavX™ electroanatomical navigation system.

Methods: During 6 years, all consecutive patients referred for RF catheter ablation of regular supraventricular tachycardia (SVT) were admitted for a "zero-fluoroscopy" approach and studied prospectively. The only exclusion criterion was the need to perform a transseptal puncture.

Results: A total of 340 procedures were performed on 328 patients (179 men, age 55.7 ± 18.6 years). One hundred fifty-three patients had typical atrial flutter (AFL), 146 had AV nodal reentrant tachycardia (AVNRT), 35 had AV reciprocating tachycardia (AVRT), 4 patients had incisional atrial flutter (IAF), and 2 had focal atrial tachycardia (AT). Procedural success was achieved in 337 of the cases (99.1%). In 322 (94.7%), the procedure was completed without any fluoroscopy use. Mean procedure time was 110.5 ± 51.8 minutes. Mean RF application time was 9.8 ± 12.8 minutes and the number of RF lesions was 16.43 ± 15.8. Only 1 major complication related to vascular access was recorded. During follow-up, there were 12 recurrences (3.5%) (8 patients from the AVNRT group, 4 patients from the AP group).

Conclusion: RF catheter ablation of SVT with an approach completely guided by the NavX system and without use of fluoroscopy is feasible, safe, and effective. *(J Cardiovasc Electrophysiol, Vol. 25, pp. 638-644, June 2014)*

Nonfluoroscopic Catheter Ablation of Cardiac Arrhythmias in Adults: Feasibility, Safety, and Efficacy

MANSOUR RAZMINIA, M.D., F.A.C.C., MARIAN F. MANANKIL, M.D., PAULA L.S. ERYAZICI, M.D., CARLOS ARRIETA-GARCIA, M.D., THEODORE WANG, M.D., F.A.C.C., OLIVER J. D'SILVA, M.D., CHRISTIAN S. LOPEZ, M.D., GEORGE J. CRYSTAL, PH.D., F.A.H.A., SABA KHAN, M.D., MIHAELA M. STANCU, M.D., MARIANNE TURNER, R.N., JOSEPH ANTHONY, R.N., TERRY A. ZHEUTLIN, M.D., F.A.C.C., and RICHARD F. KEHOE, M.D., F.A.C.C.

From the Section of Cardiology, Advocate Illinois Masonic Medical Center, Chicago, Illinois, USA

Nonfluoroscopic Catheter Ablation of Cardiac Arrhythmias in Adults. *Background:* Catheter ablations are traditionally performed using fluoroscopic guidance, exposing both patients and medical staff to the risks of radiation. Nonfluoroscopic catheter ablation has been used successfully to treat limited types of arrhythmias in children, but whether this approach has broad application in adults is uncertain. The purpose of this study was to evaluate the feasibility, safety, and efficacy of fluoroless catheter ablation in adults being treated for a range of arrhythmias.

Methods and Results: Retrospective analysis was performed in 2 patient groups (both n = 60): (1) the nonfluoroscopy (NF) group consisting of consecutive adult patients, in which catheter positioning was accomplished exclusively with intracardiac electrograms (IE), electroanatomic mapping (EAM), and intracardiac echocardiography (ICE); and (2) the fluoroscopy (F) group, in which catheter positioning was additionally guided by fluoroscopy. The patients in the F group were selected to match the types of arrhythmias in the NF group. All ablation procedures were performed by one operator. The total procedure time did not differ between groups for any specific type of arrhythmia ablated. Acute procedural success was similar in both groups (NF, 59/60 [98%] and F, 60/60 [100%]). The complications were limited to a groin pseudoaneurysm in the NF group, and pericardial effusion and groin hematoma in the F group.

Conclusion: Catheter ablations were efficiently and effectively performed in adults with a variety of arrhythmias using only IE, EAM, and ICE for catheter guidance. This nonfluoroscopic technique was feasible, posed no additional safety concerns, and should be readily implementable in most electrophysiology laboratories. *(J Cardiovasc Electrophysiol, Vol. pp. 1-9)*

The fluoroless approach should be considered not only for certain populations, such as pregnant, obese, or pediatric patients, but for all patients, as we know that the method is safe, effective and feasible.

With courtesy of Enes E. Gul

Sonuçlar

- Hem hasta hem de hekim için güvenli
- İşlemi kolaylaştırır
- Kısa ve uzun vadeli prosedür başarısı özellikle bazı aritmilerde artar
- Hem çocuk hem de erişkinde faydalı
- Zor vakalarda (AF, iskemik VT) ICE da birlikte kullanılabilir