

Nuove tecniche e dispositivi in aritmologia

Riccardo Riccardi

Divisione di Cardiologia Ospedale Agnelli di Pinerolo

**CONFRONTO tra
CARDIOLOGI
OSPEDALIERI
e MEDICI di
MEDICINA GENERALE:**
nuovi aggiornamenti
e percorsi intorno a casi clinici

Responsabili Scientifici
Ferdinando Varbella
Maria Milano
Riccardo Riccardi

Sabato 13 ottobre 2018

Pianezza (TO)
Gallia Hotel
Via Torino 29/A



13 Ottobre 2018



L'ARITMOLOGIA non ha futuro

Conosciamo i meccanismi delle aritmie e dei disturbi di conduzione

I Pace Maker sono già di seconda generazione

Non verranno sviluppati nuovi farmaci antiaritmici





L'ARITMOLOGIA non ha futuro

Conosciamo i meccanismi delle aritmie e dei disturbi di conduzione

I Pace Maker sono già di seconda generazione

Non verranno sviluppati nuovi farmaci antiaritmici



Obiettivi della Terapia

- **CURARE:** Eliminare la malattia
- **MIGLIORARE LA QUALITA' DELLA VITA:** ridurre i sintomi e rallentare l'evoluzione della malattia
- **RIDURRE LA MORTALITA':** Interrompere gli eventi "Life Threatening" (Arresto Cardiaco)



Obiettivi della Terapia

● **CURARE:** Eliminare la malattia



● **MIGLIORARE LA QUALITA' DELLA VITA:**

ridurre
malattia

Ablazione Transcatetere

la

● **RIDURRE LA MORTALITA':** Interrompere gli eventi "Life Threatening" (Arresto Cardiaco)



Obiettivi della Terapia

● **CURARE:** Eliminare la malattia

● **MIGLIORARE LA QUALITA' DELLA VITA:**
ridurre i sintomi e rallentare l'evoluzione della
malattia



● **RIDURRE LA MORTALITA':** Interrompere gli

Resincronizzazione Cardiaca
Modulazione Inotropismo

Obiettivi della Terapia

● CU **Pace Maker (BAV)**

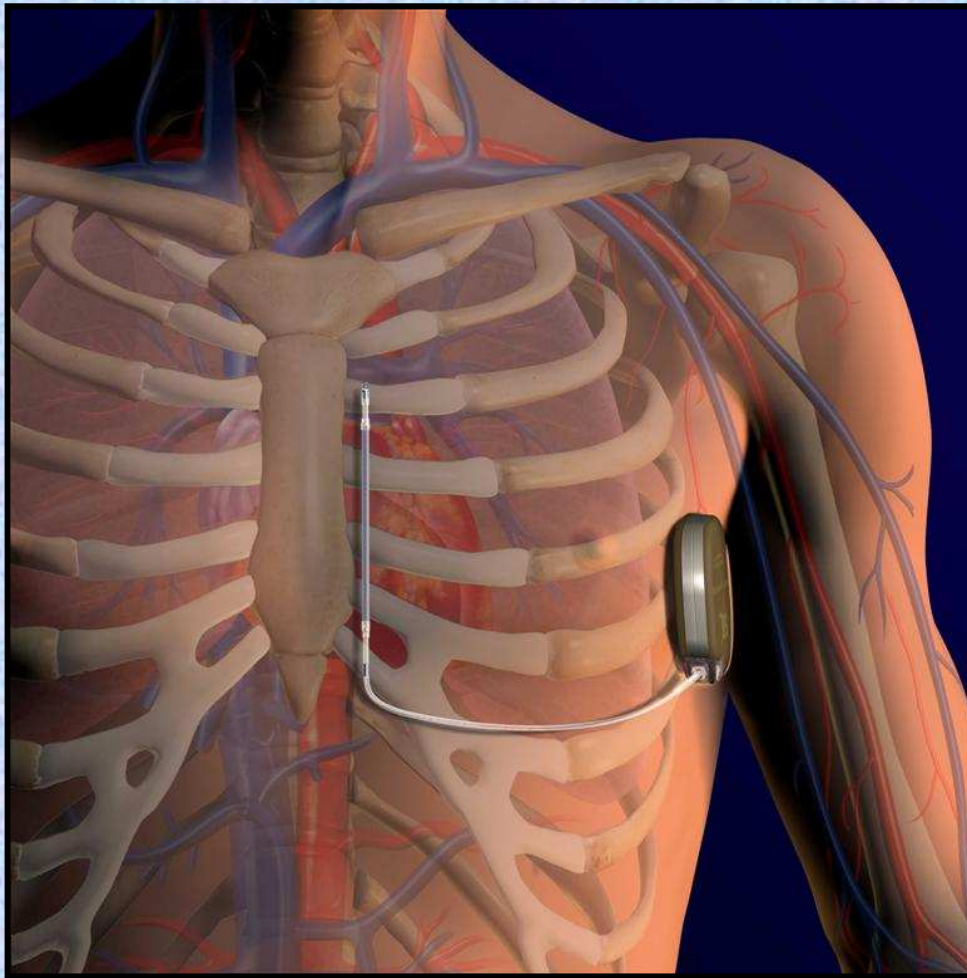
Defibrillatori (TV/FV)

● **MIGLIORARE LA QUALITA' DELLA VITA:**
ridurre i sintomi, rallentare l'evoluzione della
malattia

● **RIDURRE LA MORTALITA':** Interrompere gli
eventi "Life Threatening" (Arresto Cardiaco)



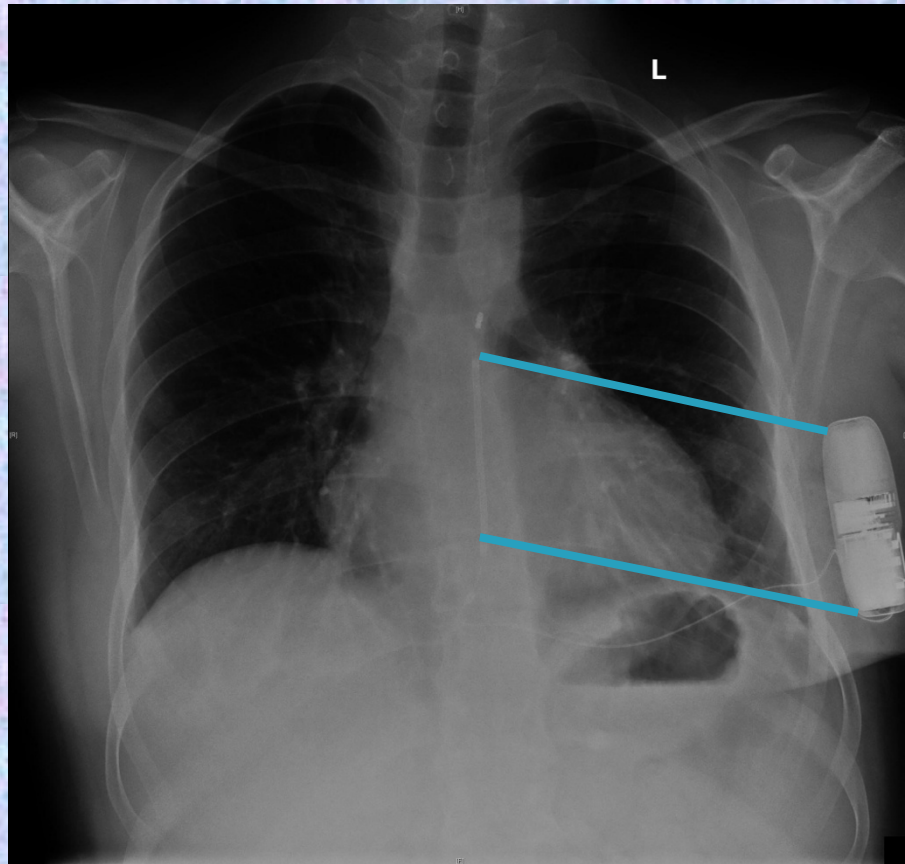
S-ICD



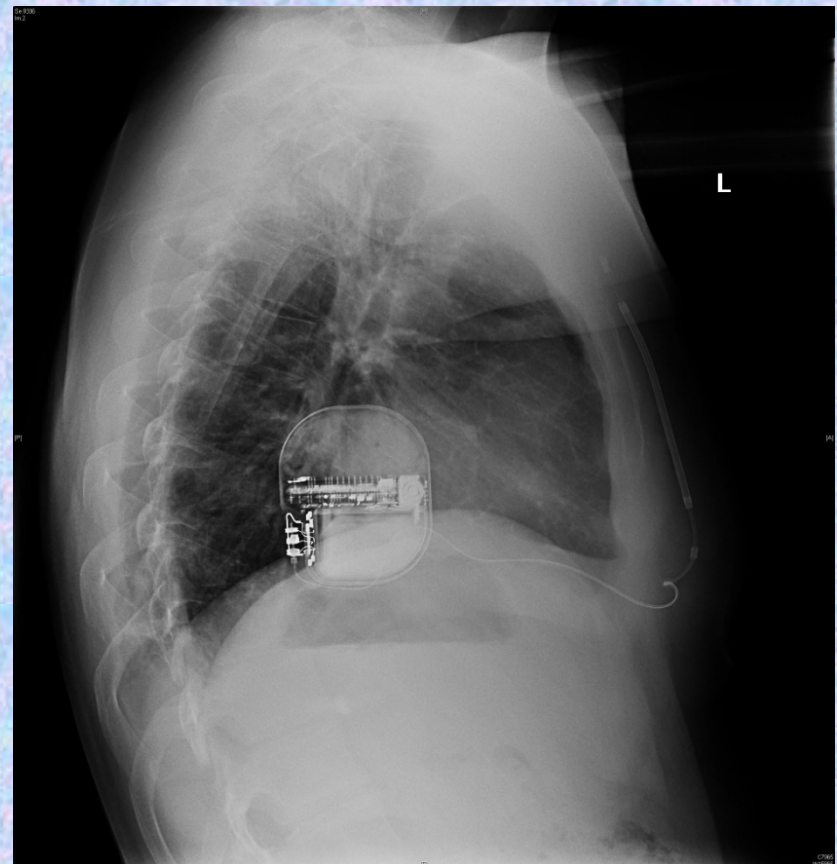
- Nessun catetere all'interno o sul cuore
 - Sistema venoso preservato
- Impianto semplice chirurgicamente
 - Puri riferimenti anatomici
 - In generale senza bisogno di fluoroscopia
 - Tempo di impianto prevedibile



Proiezione AP*



Proiezione LL*



Recommendation for EMBLEM™ S-ICD in 2017 AHA/ACC/HRS Guidelines

11.1. Subcutaneous Implantable Cardioverter-Defibrillator

Recommendations for Subcutaneous Implantable Cardioverter-Defibrillator

References that support the recommendations are summarized in Online Data Supplement 55.

COR	LOE	Recommendations
I	B-NR	1. In patients who meet criteria for an ICD who have inadequate vascular access or are at high risk for infection, and in whom pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated, a subcutaneous implantable cardioverter-defibrillator is recommended (1-5).
IIa	B-NR	2. In patients who meet indication for an ICD, implantation of a subcutaneous implantable cardioverter-defibrillator is reasonable if pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated (1-4).
III: Harm	B-NR	3. In patients with an indication for bradycardia pacing or CRT, or for whom antitachycardia pacing for VT termination is required, a subcutaneous implantable cardioverter-defibrillator should not be implanted (1-4, 6-8).



Recommendation for EMBLEM™ S-ICD in 2017 AHA/ACC/HRS Guidelines

11.1. Subcutaneous Implantable Cardioverter-Defibrillator

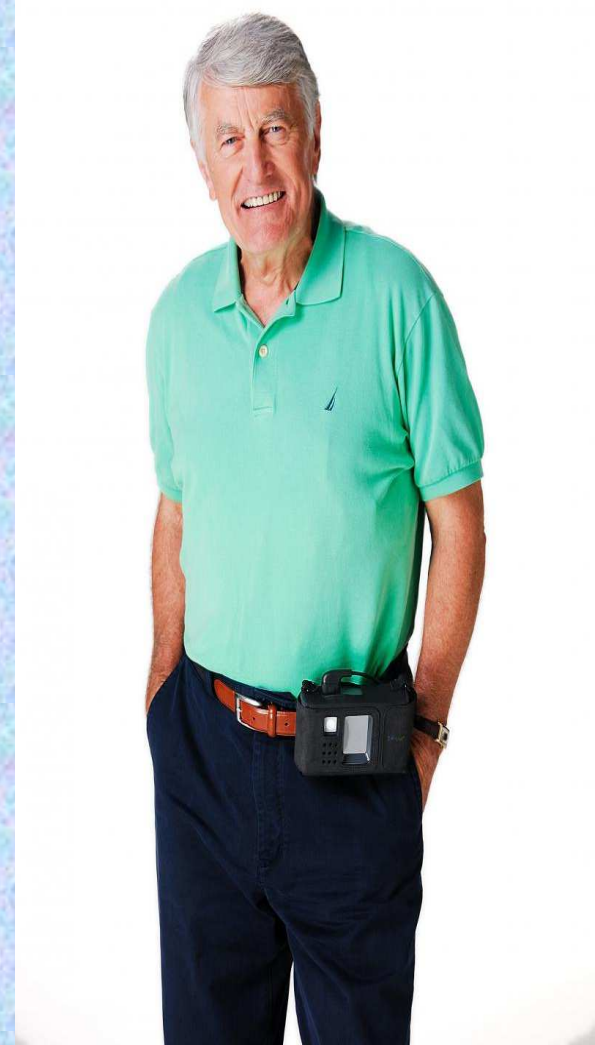
Recommendations for Subcutaneous Implantable Cardioverter-Defibrillator		
References that support the recommendations are summarized in Online Data Supplement 55.		
COR	LOE	Recommendations
I	B-NR	1. In patients who meet criteria for an ICD who have inadequate vascular access or are at high risk for infection, and in whom pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated, a subcutaneous implantable cardioverter-defibrillator is recommended (1-5).
IIa	B-NR	2. In patients who meet indication for an ICD, implantation of a subcutaneous implantable cardioverter-defibrillator is reasonable if pacing for bradycardia or VT termination or as part of CRT is neither needed nor anticipated (1-4).
		3. In patients with an indication for bradycardia pacing or CRT, or for whom

Recommendation-Specific Supportive Text

*“The risk of infection appears to be lower with subcutaneous implantable cardioverter-defibrillators than with transvenous ICDs (1-4). Therefore, a subcutaneous implantable cardioverter-defibrillator may be preferred in patients who are at high risk of infection, such as those with a prior device infection, ESRD, **diabetes mellitus**, or who are chronically immunosuppressed.”*

Al-Khatib, SM, Stevenson, WG, Ackerman, MJ, et al., 2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death. Heart Rhythm, 2017.

"LifeVest" Defibrillatore Indossabile



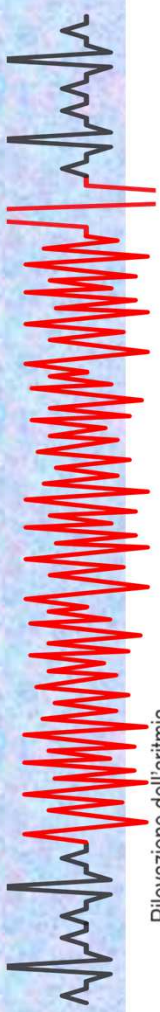
4 ELETTRODI DI
SENSING
(2 CANALI)

3 PIASTRE DI
DEFIBRILLAZIONE

MONITOR
DEFIBRILLA
TORE

CARICA
BATTERIE
TRASMETTITORE





Ritmo sinusale Aritmia ventricolare Ritmo sinusale

Allarme a vibrazione

Sirena

Allarme con sirena ad alta intensità

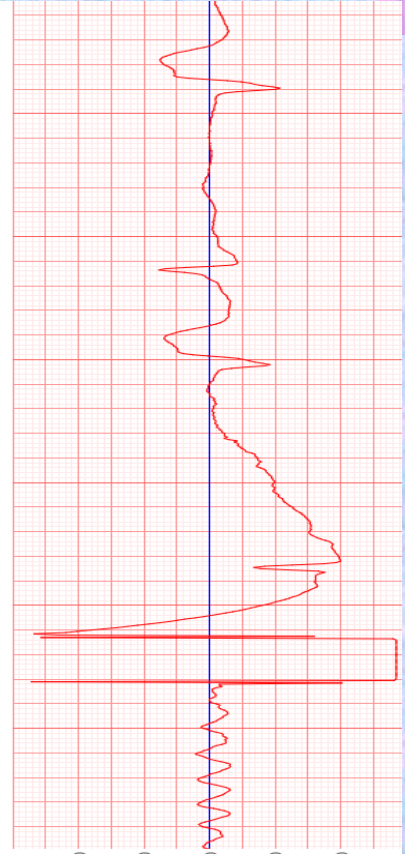
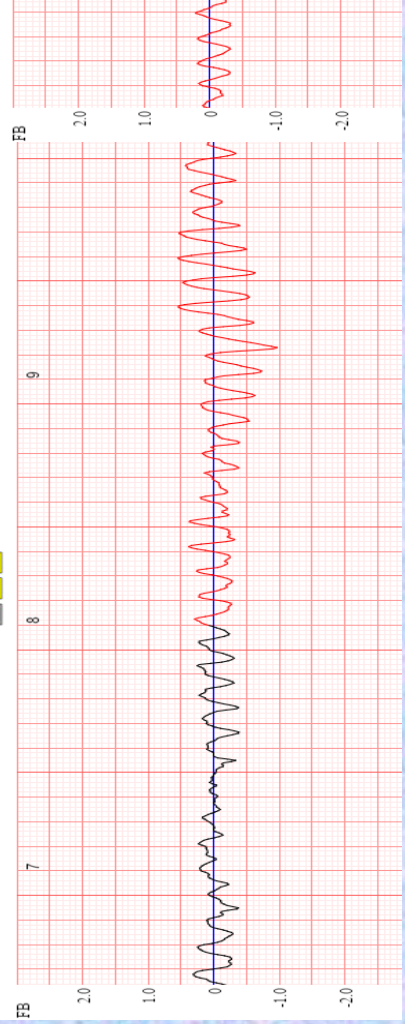
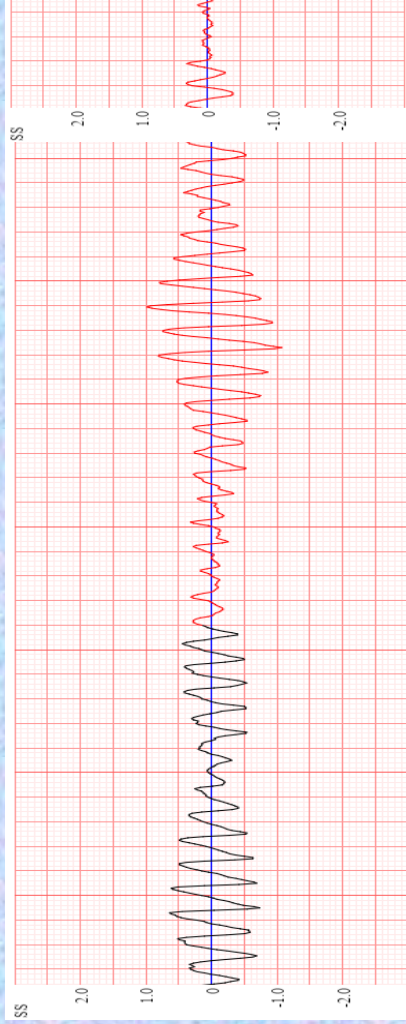
Istruzioni udibili dal paziente

Gel


Allarme per i presenti

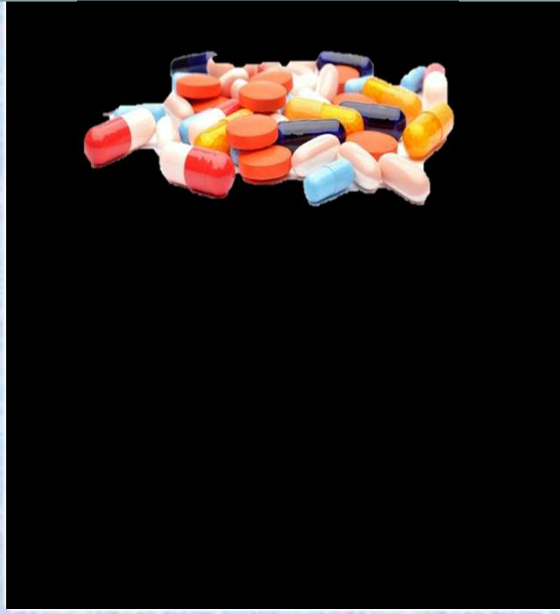
Erogazione dello shock





Continuum of care del paziente a rischio SCD

Evento cardiaco acuto	Evoluzione e recupero	Condizione cronica
Rischio SCD		



Linee guida ESC 2015 per VA e SCD

Linee guida AHA/ACC/HRS 2017 per VA e SCD

Reccomendation	Class	Level	Reccomendation	Class	Level
A wearable defibrillator should be considered for bridging until full recovery or ICD implantation in patients <u>after inflammatory heart diseases</u> with residual severe LV dysfunction and/or ventricular electrical instability.	Ila	C	1. In patients with an ICD and a history of SCA or sustained VA in <u>whom removal of the ICD is required</u> (as with infection), the wearable cardioverter-defibrillator is reasonable for the prevention of SCD (1-4).	Ila	B-NR
The WCD may be considered for adult <u>patients with poor LV systolic function who are at risk of sudden arrhythmic death for a limited period, but are not candidates for an implantable defibrillator</u> (e.g. bridge to transplant, bridge to transvenous implant, peripartum cardiomyopathy, active myocarditis and arrhythmias in the early post-myocardial infarction phase).	Ilb	C	2. In <u>patients at an increased risk of SCD but who are not ineligible for an ICD</u> , such as awaiting cardiac transplant, having an LVEF of 35% or less and are within 40 days from an MI, or have newly diagnosed NICM, revascularization within the past 90 days, myocarditis or secondary cardiomyopathy or a systemic infection, wearable cardioverter-defibrillator may be reasonable (1- 5).	Ilb	B-NR
ICD implantation or temporary use of	Ilb	C			



- 41% dei pazienti ha mostrato un miglioramento della FE a seguito dell'utilizzo di LifeVest [WEARIT-II]
- 42% dei pazienti ha ricevuto un ICD dopo la dismissione del WCD [WEARIT-II]
- 40% dei pazienti ha recuperato la FE dopo 3 mesi di terapia farmacologica + WCD e un ulteriore 20% dei pazienti ha recuperato la FE tra il 3° e il 6° mese [PROLONG]



Cardiac Pacing Milestones

Size
Volume: 0.8 cc
Length: 2.5 cm
Width: 20 Fr

➤ **MICRA**



**External
Pacemaker**

1958



**Implantable
Pacemaker**

1960



**Rate
Responsive
Pacemaker**

1986



**MRI
Conditional
Pacemaker**

2011



**Intracardiac
Pacemaker**

Today



Early Intracardiac Pacemaker Concepts

J. ELECTROCARDIOLOGY, 3 (3-4) 325-331, 1970

Special Article

Totally Self-Contained Intracardiac Pacemaker*

J. WILLIAM SPICKLER, PH.D., NED S. RASOR, PH.D., PAUL KEZDI, M.D.
S. N. MISRA, M.D., K. E. ROBINS, P.E., AND CHARLES LeBOEUF, P.E.

SUMMARY

Recent developments in miniature long-life power sources and electronics, such as nuclear batteries and integrated circuits make feasible a new generation of pacemakers, the intracardiac pacemaker (IC), i.e., a completely self-contained pacemaker implanted inside

circuits have been improved substantially. In addition, the development of the endocardial catheter electrode has broadened the choice of operative procedures to include a larger portion of the patient population. Two major problems that still exist with conventional pacemakers are perforation or dislocation of the transvenous electrode and the fact that

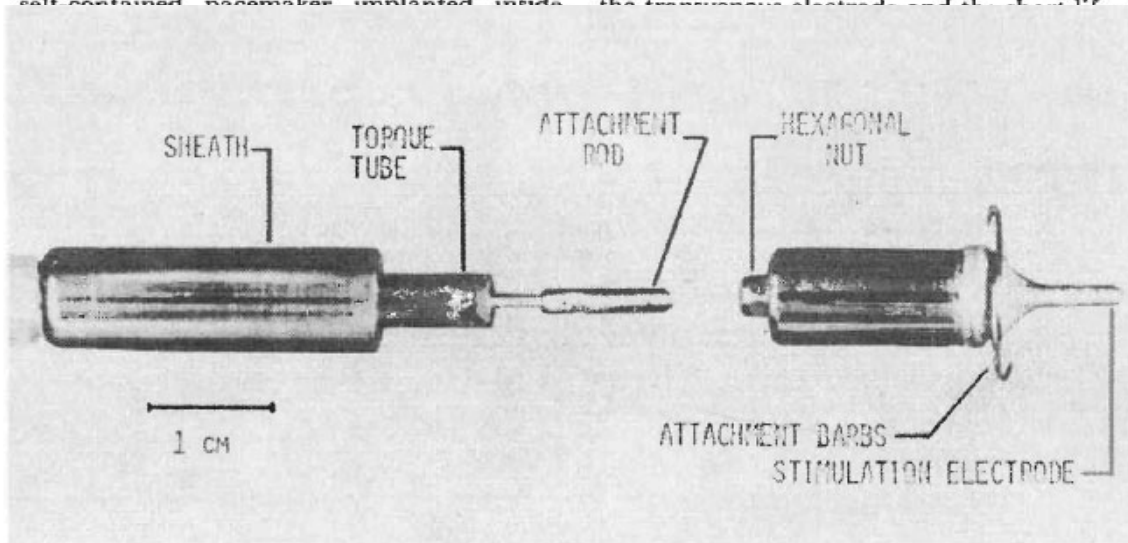


Fig. 4. Intracardiac pacemaker with catheter for transvenous insertion.

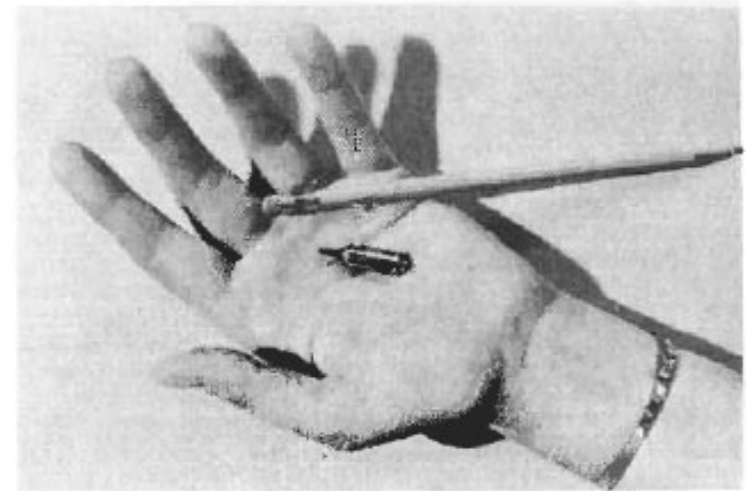
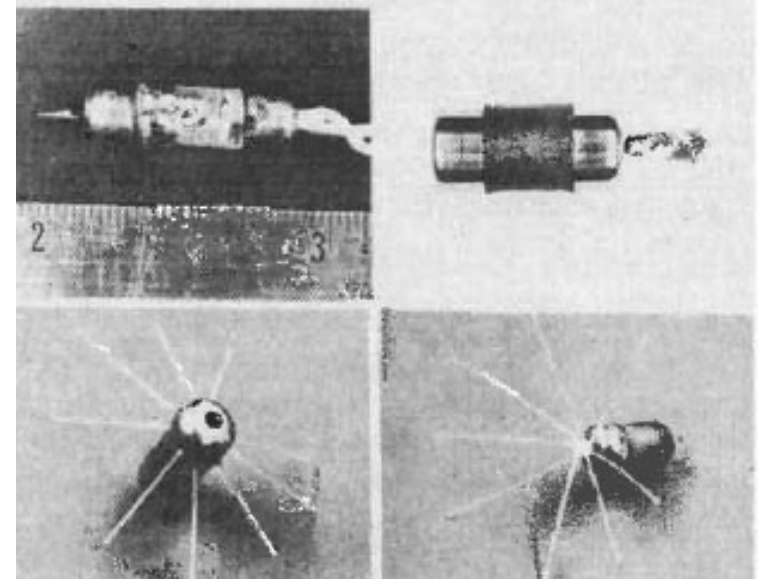
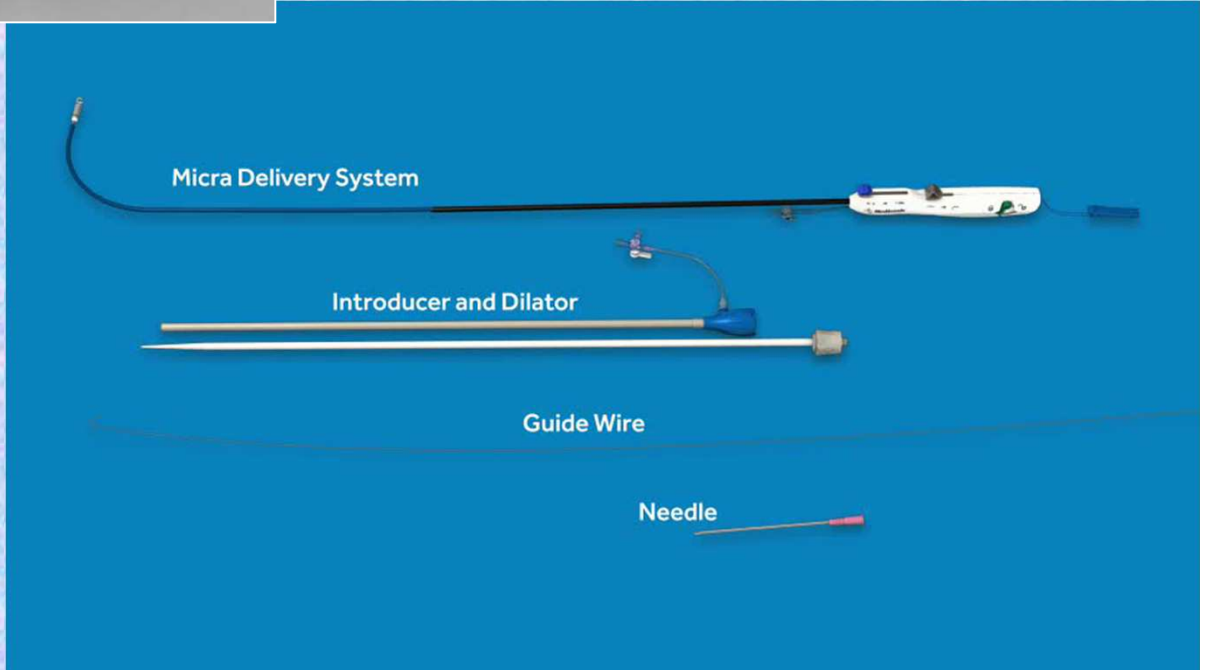
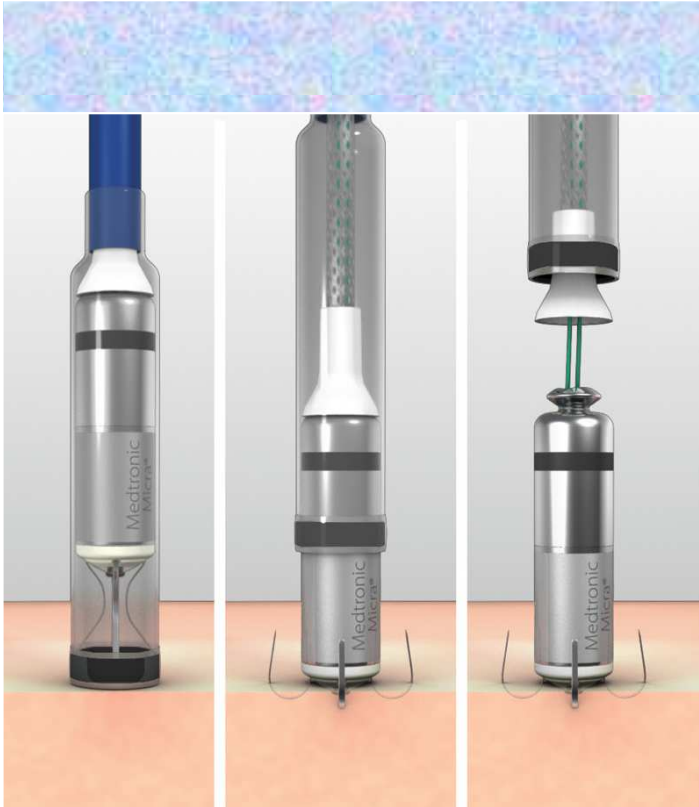
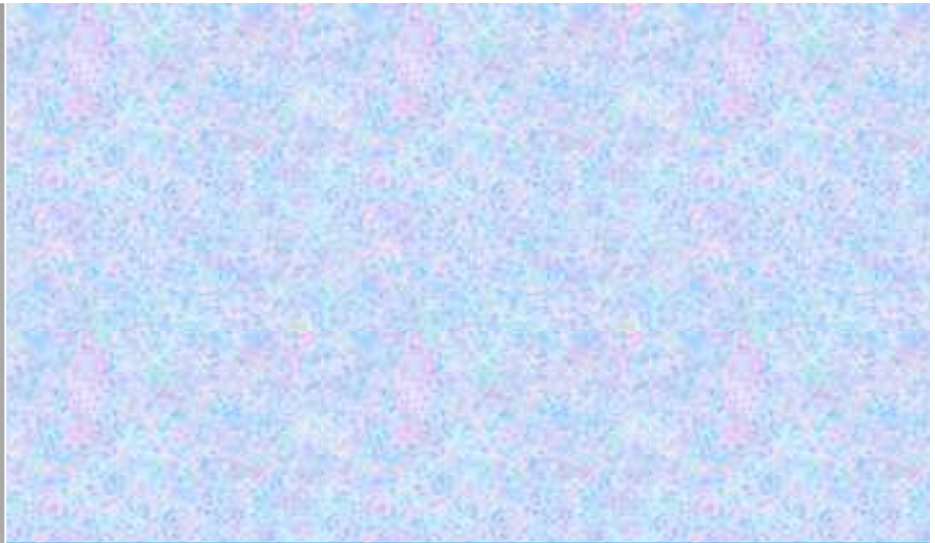
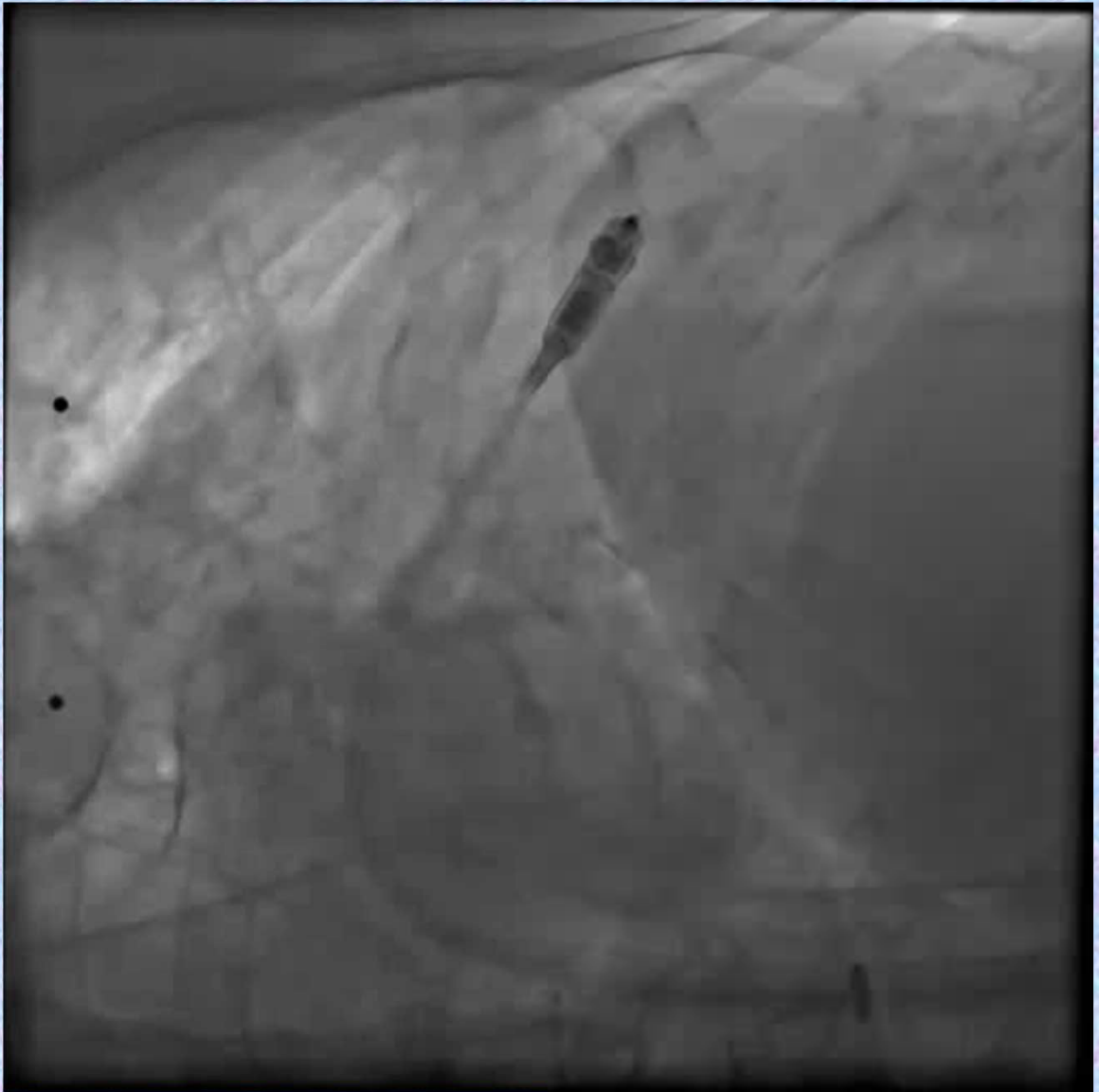


Fig. 8. Nuclear-powered intracardiac pacemaker.

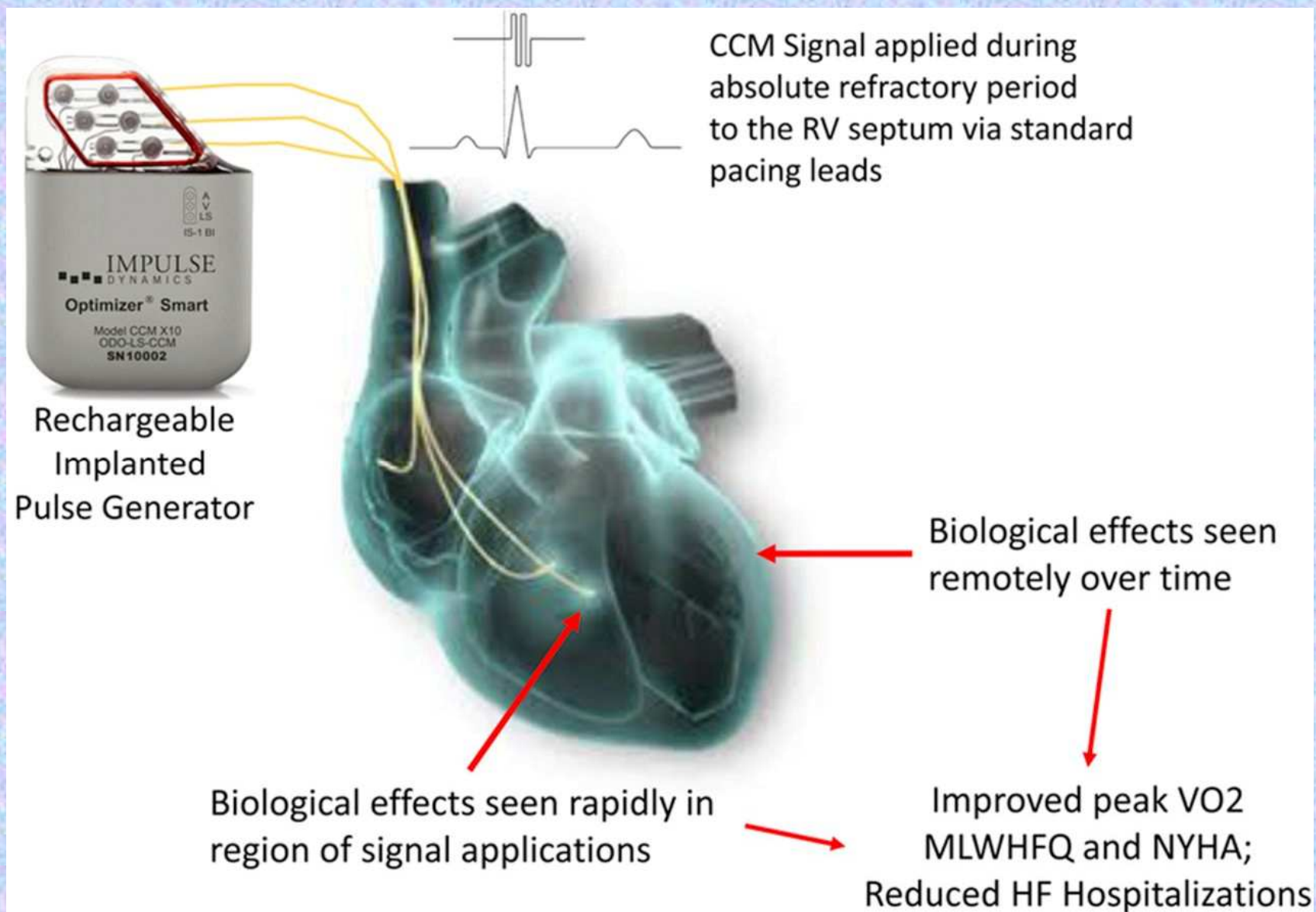




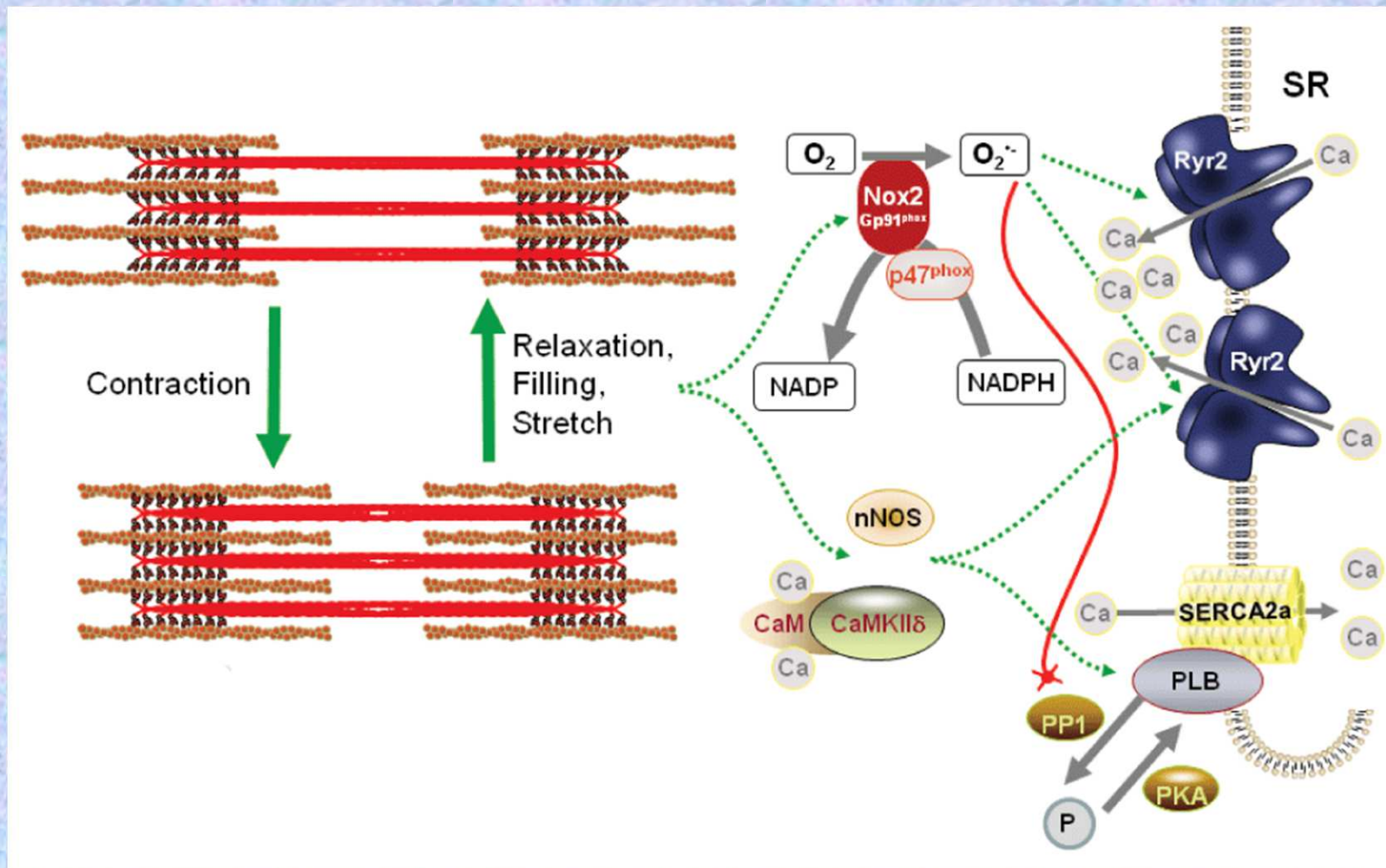
Loop Recorder (Monitoraggio continuo Ecg)



Cardiac Contraction Modulation

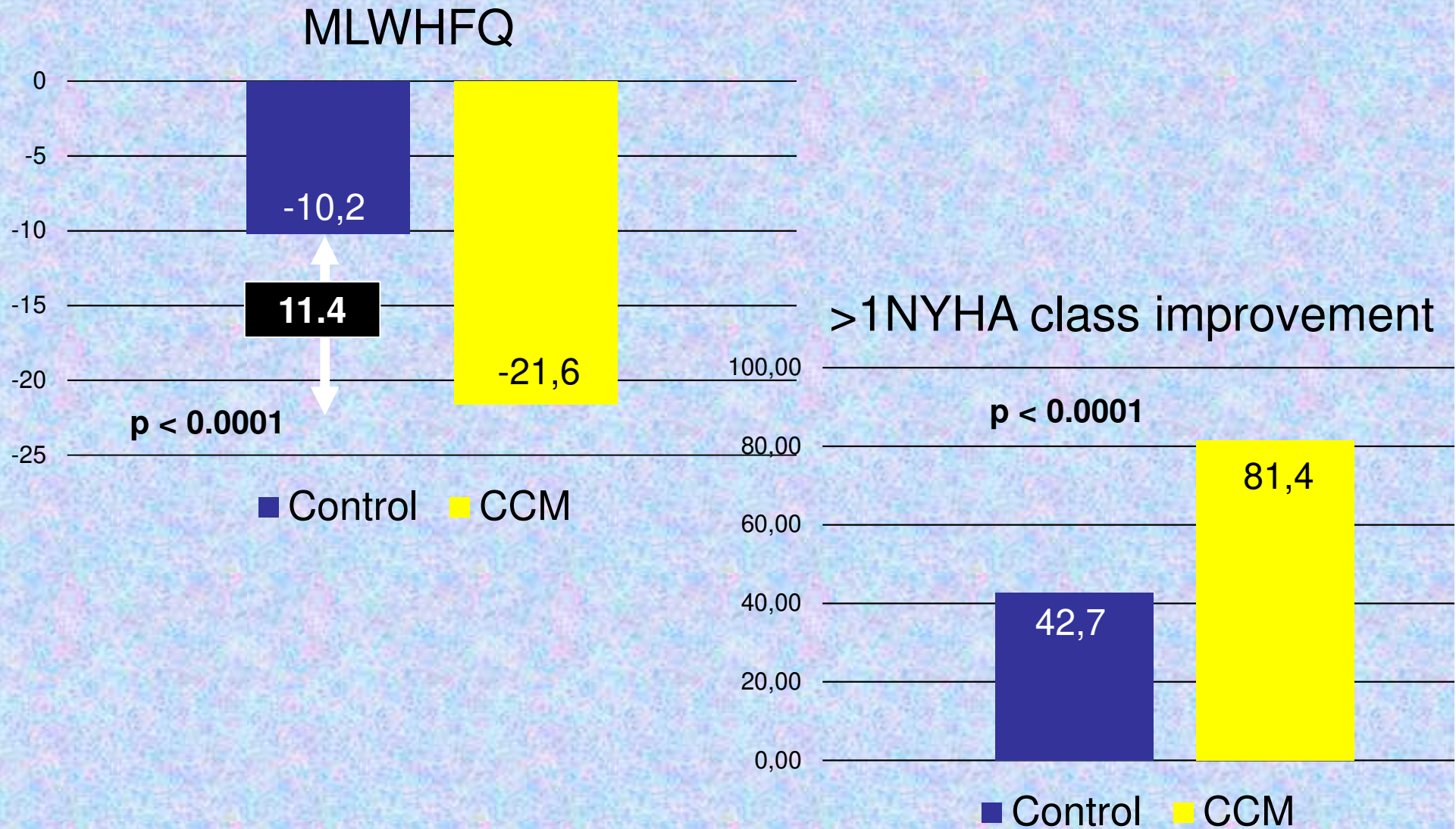


Modulazione Ca Intracellulare

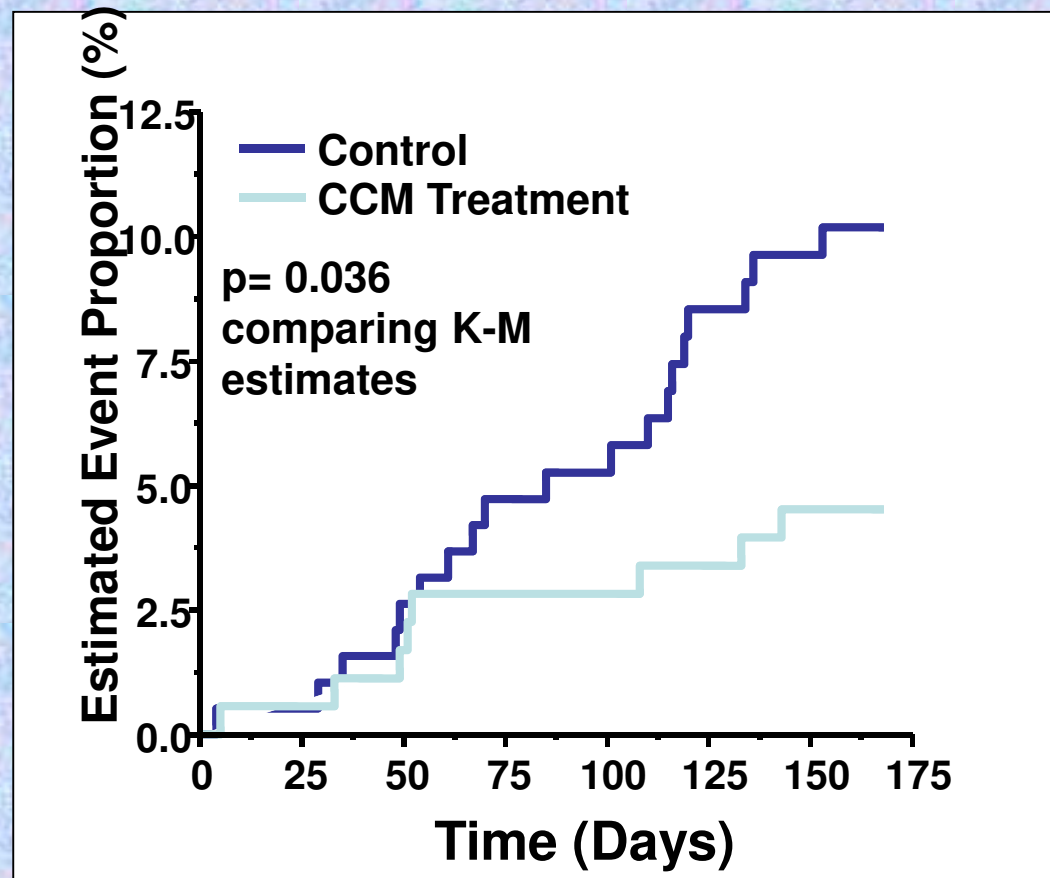


FIX-HF-5C: Secondary Efficacy Endpoints Met

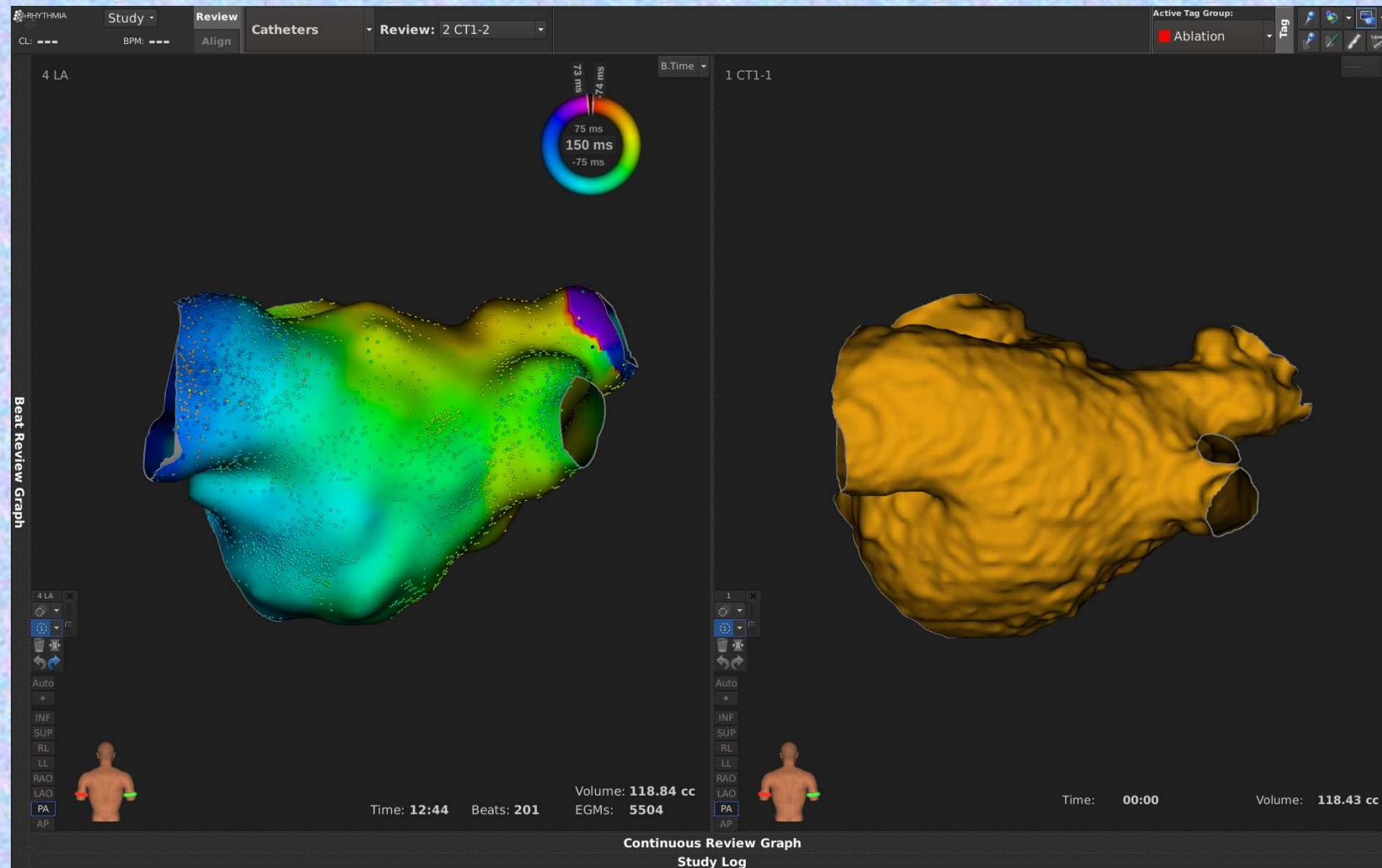
CCM Significantly Improves QoL and Functional Status



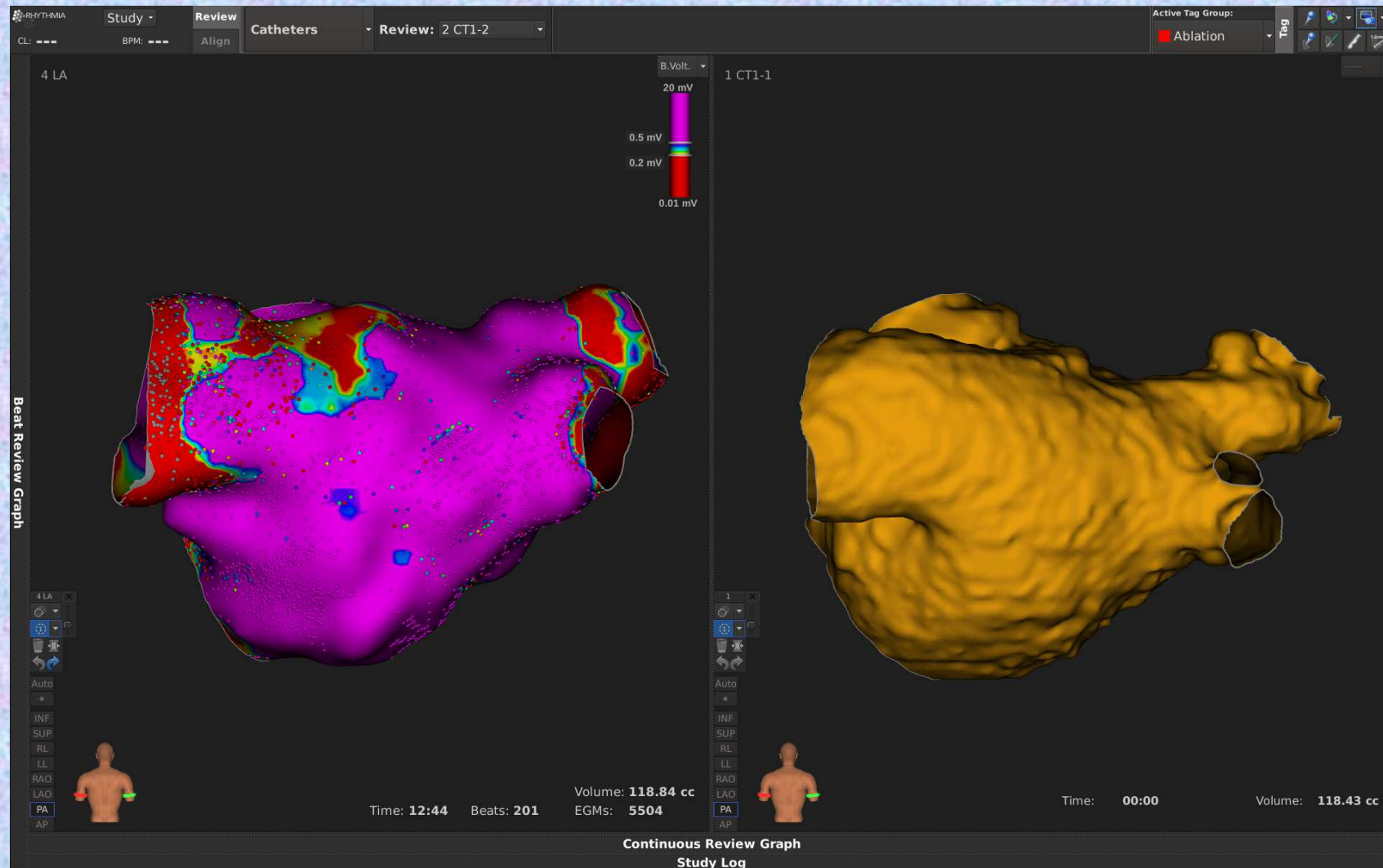
FIX-HF-5 & FIX-HF-5C: Cardiovascular Death & HF Hospitalizations



Electroanatomic Reconstruction



Electroanatomic Reconstruction



Electroanatomic Reconstruction

