

NOGA

Cell Therapy and CRT  
optimization

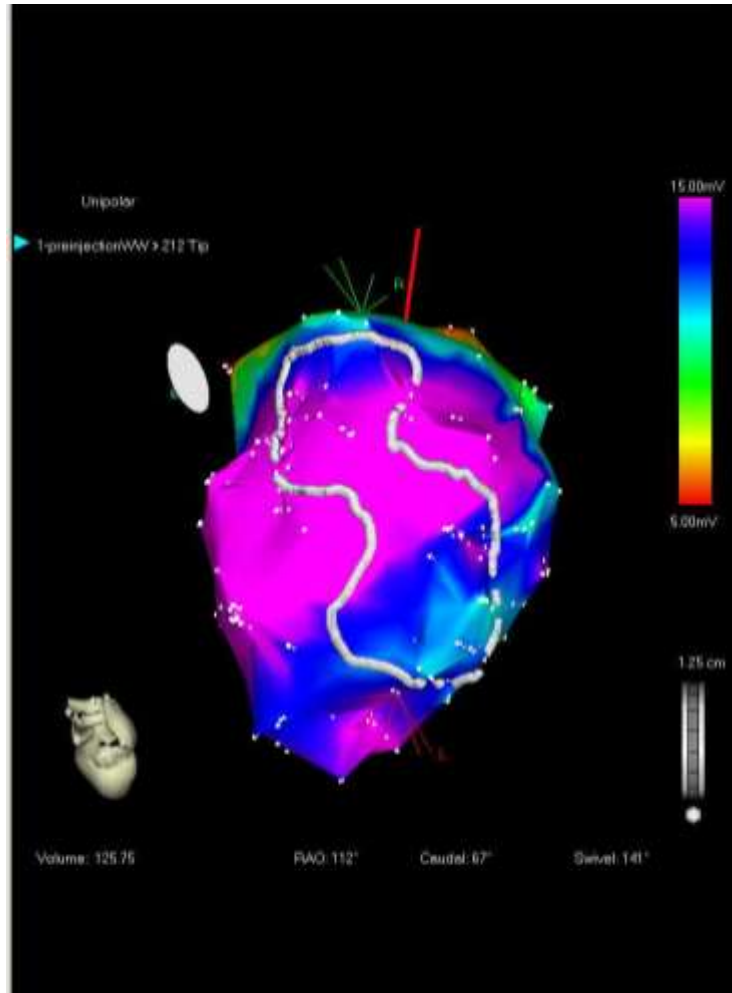
Wojciech Wojakowski MD  
Medical University of Silesia  
Katowice, Poland

# Electroanatomical mapping (NOGA<sup>®</sup>)

- ✓ Electrical and mechanical activity (Noga XP, Biosense Webster, CA)
  - ✓ Viability (viable, non viable, hibernating, stunning)
  - ✓ Local deformations
  - ✓ Validated vs. MRI, LV-angio i SPECT/PET
- ✓ 8F transfemoral or transseptal approach
- ✓ Procedure duration: map 45 mins
- ✓ Contraindicatins (severe AS, LV thrombus, bleeding diathesis)
- ✓ Use:
  - ✓ Endomyocardial Tx (CE)

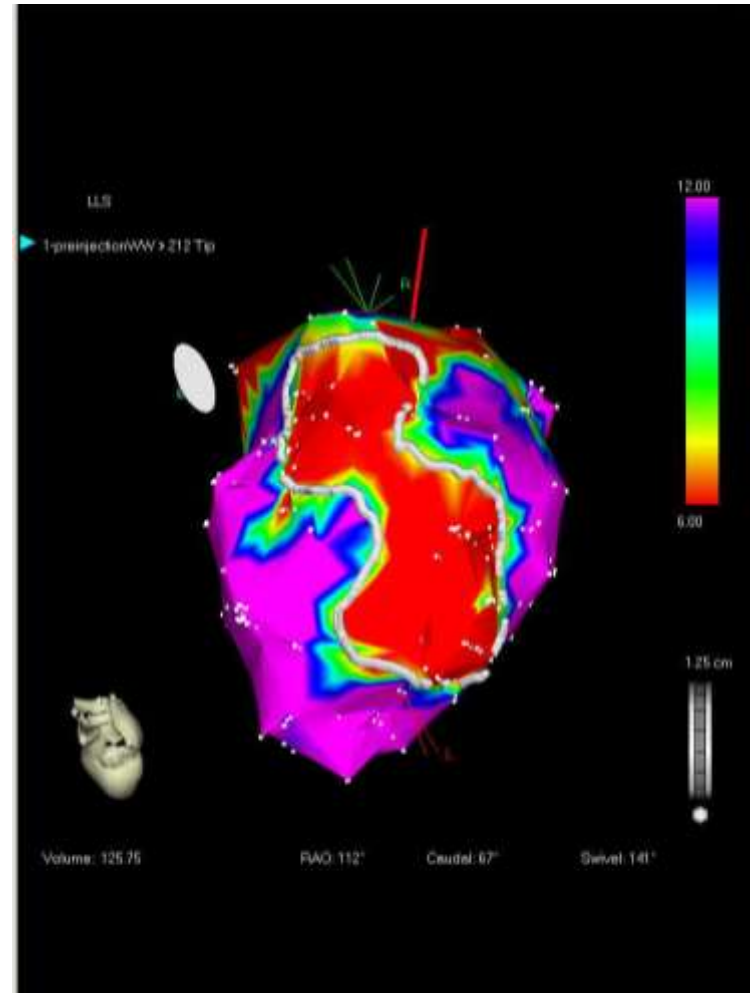
# Identification of Ischemic target areas

## Unipolar voltage map (mV):



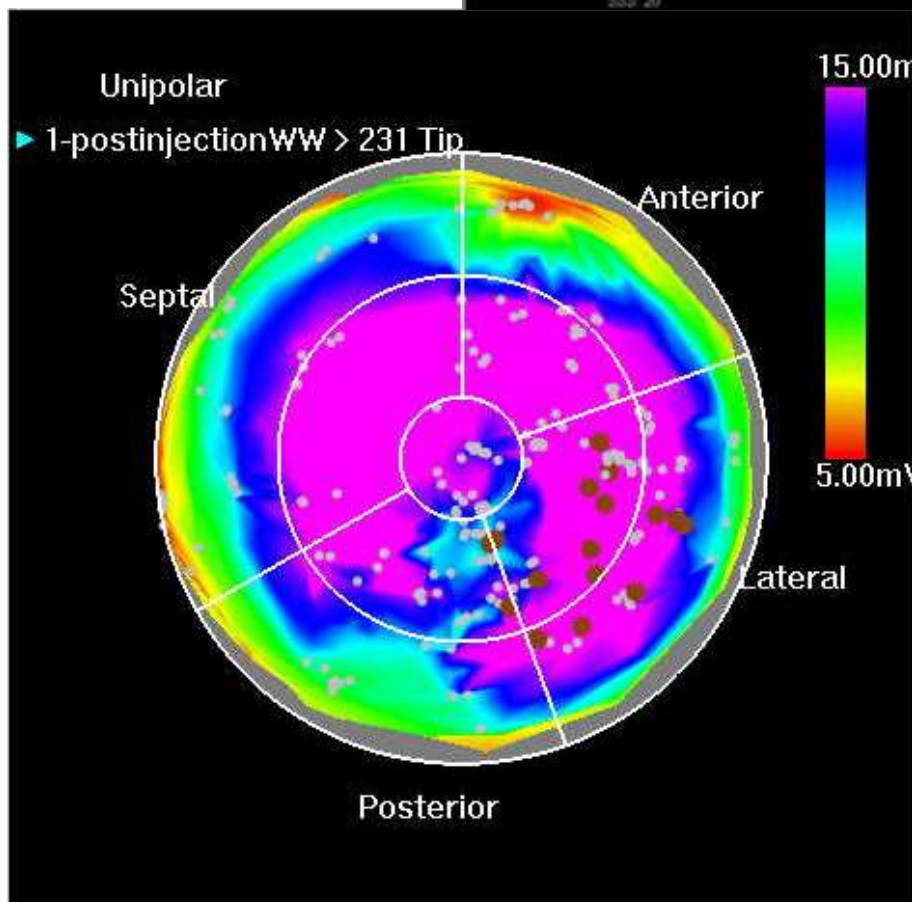
Viable area

## Wall movement map (LLS%):

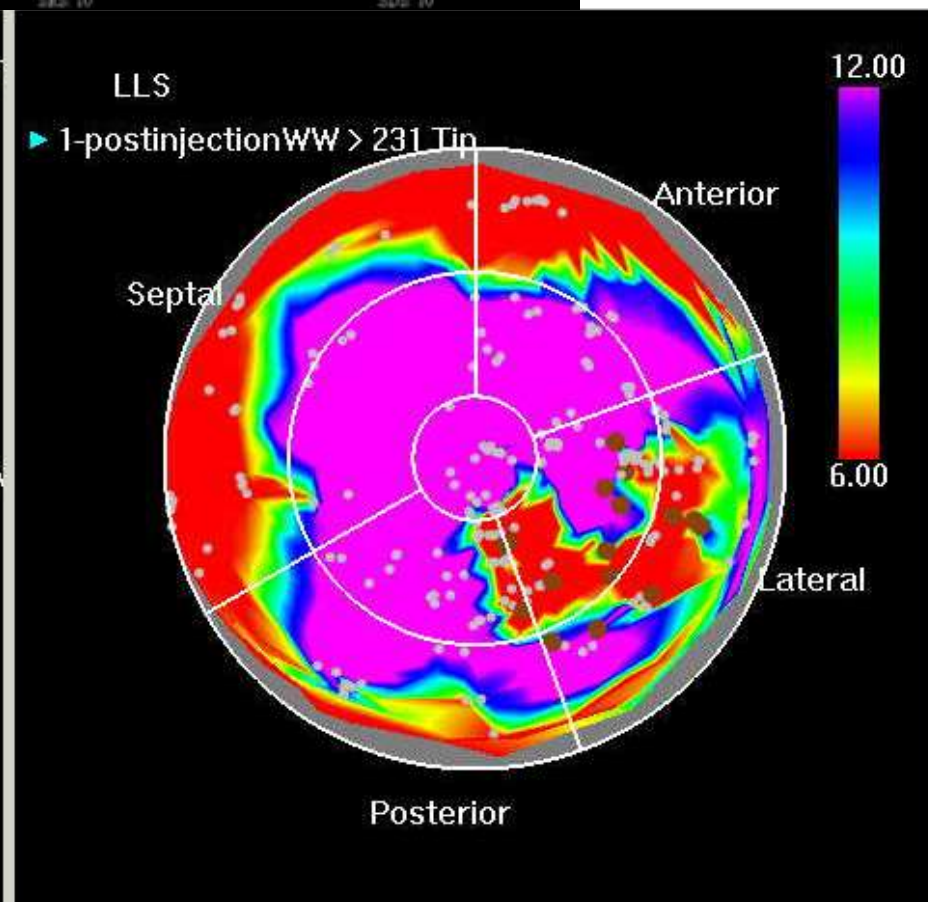


...overlapping with low wall movement areas.

# Patient #1



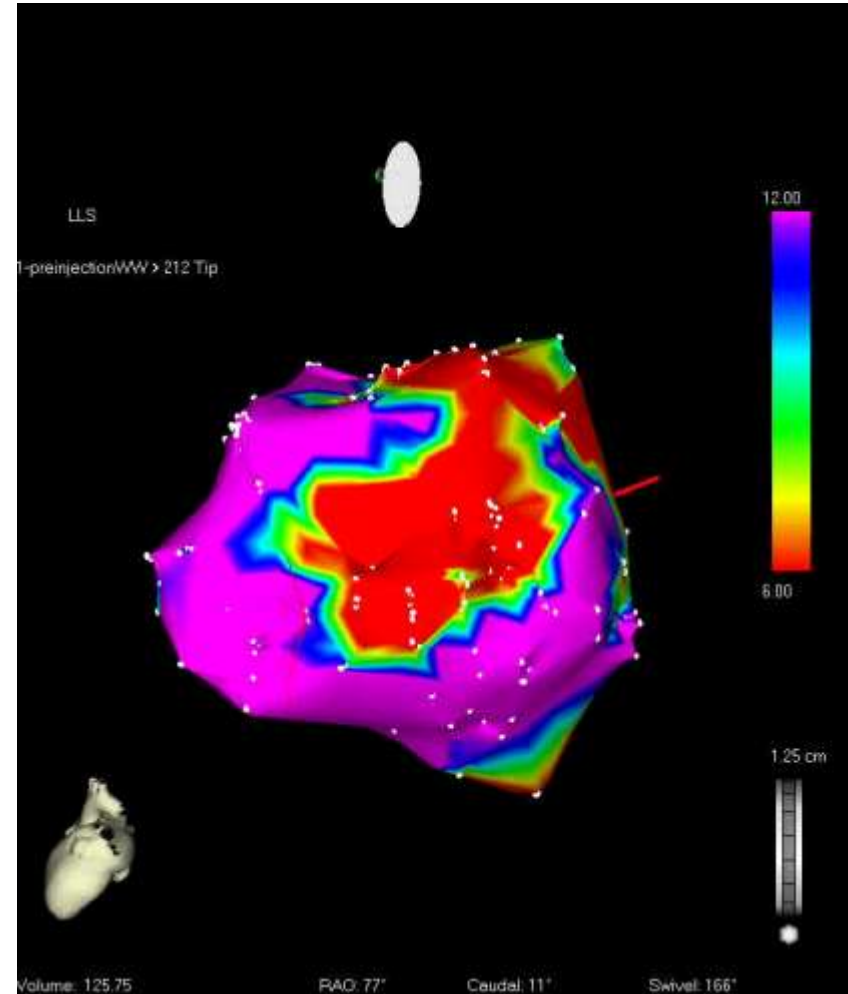
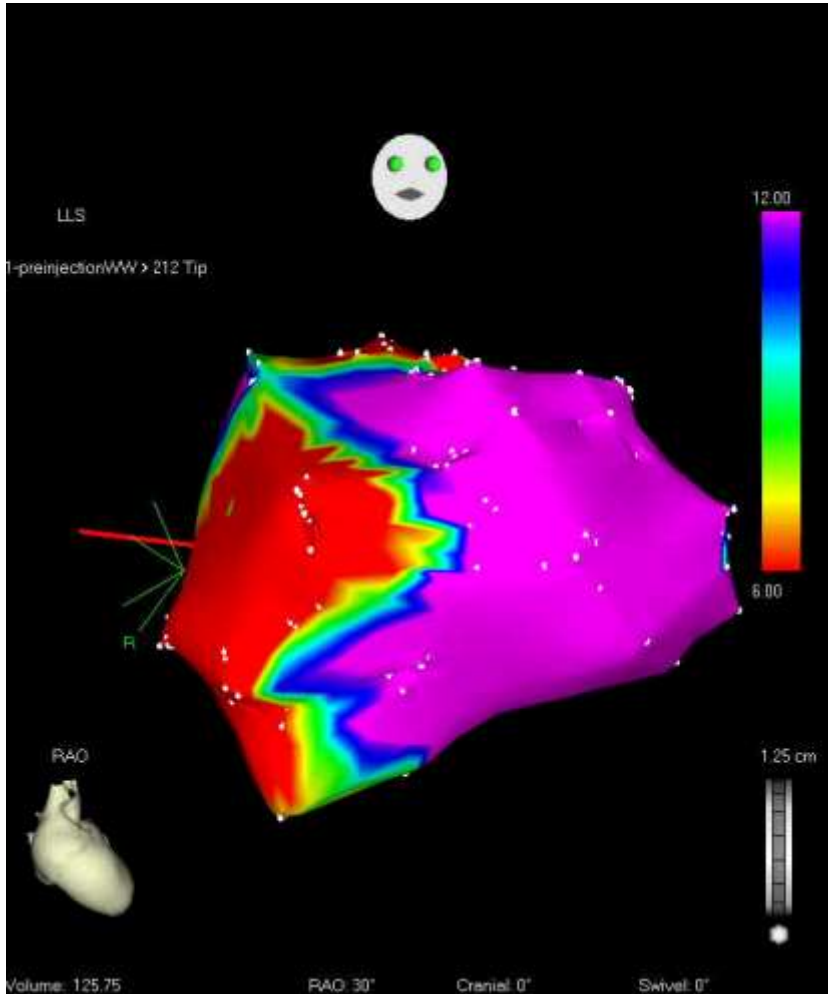
Unipolar voltage map



LLS, mid- and basolateral segments

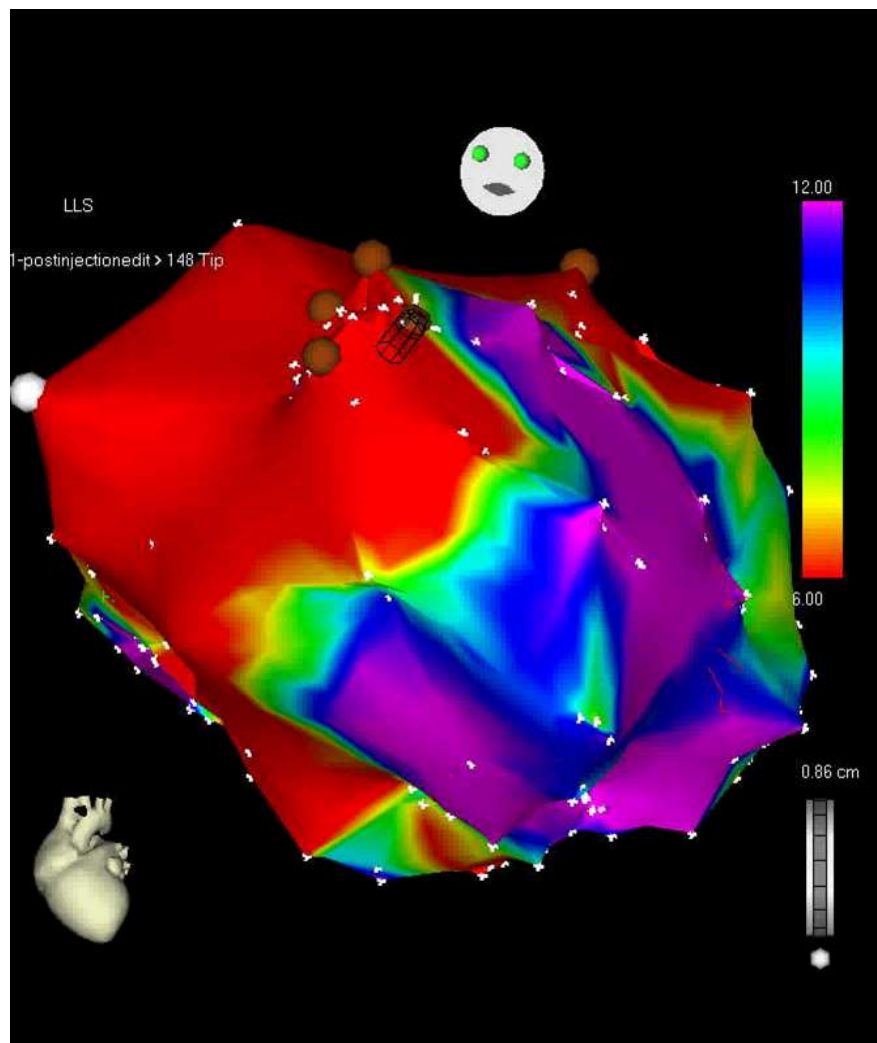
# LLS maps and visualization of wall movement

Low contraction areas in septal and antero-lateral region

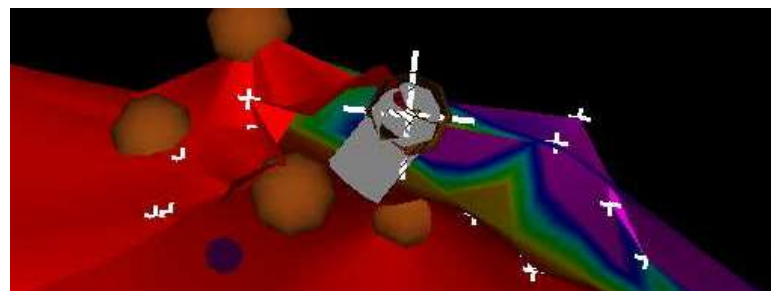


# Continuous control of catheter stability and needle position

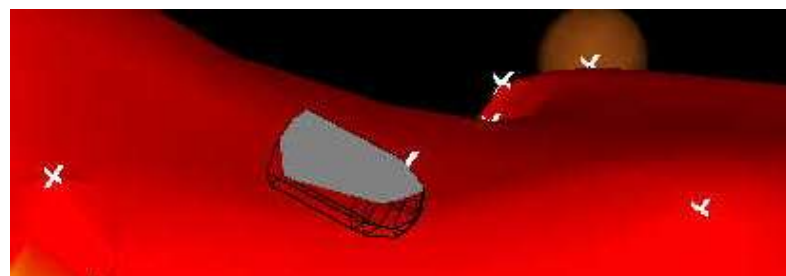
Visualization of catheter tip



Perpendicular catheter orientation relative to the wall



Parallel catheter orientation



Stable needle position  
**Injection OK**



Instable needle position  
**NO Injection !**



# Mapping in HF before CRT

## Impaired E-M coupling

- ✓ Ischemia
- ✓ Abnormal intracellular  $\text{Ca}^{2+}$  flux
- ✓ Mechanical dyssynchrony is more prominent than electrical
- ✓ Parameters of E-M coupling necessary for CRT optimization not fully understood

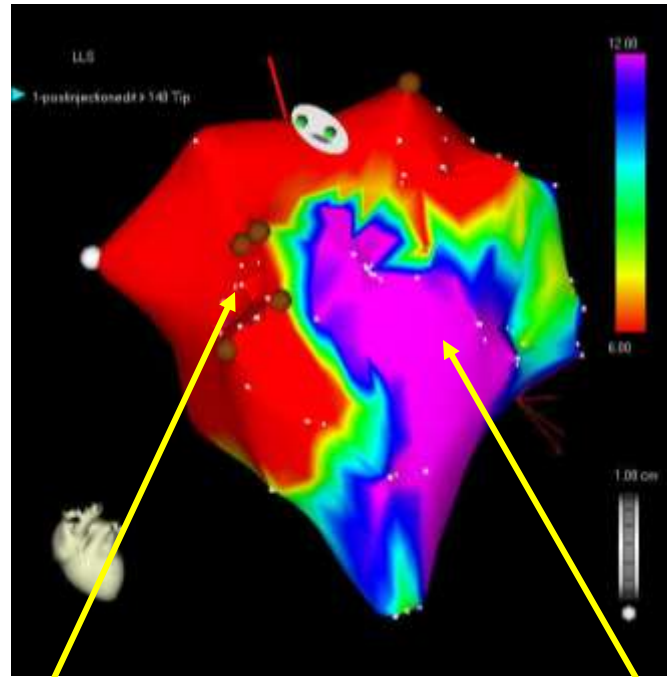
### NOGA + Intraprocedural ECG

Transeptal time  
Total activation time  
Deflection time  
QR slope  
Notch/Slurring  
Activation site location  
Single/multiple activation



- Mechanical activity patterns in LBBB
- Responders vs. Non-responders

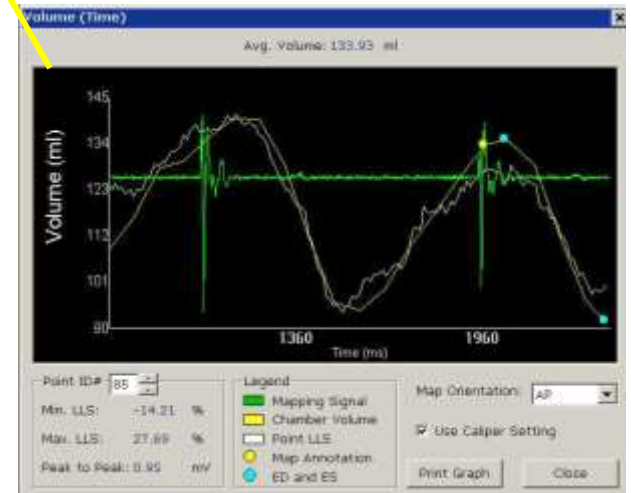
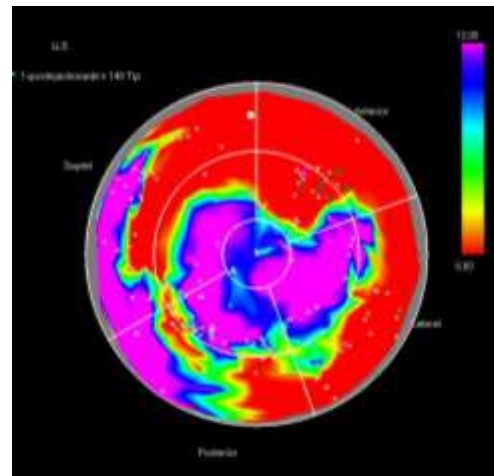
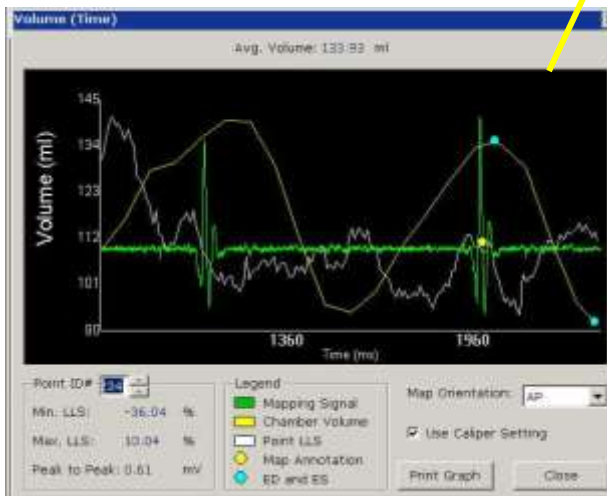
# “Volume-Time Graph” and local wall movement in pat. B



The “volume-time graph” allows to understand the local wall movement of each point (white line) and its correlation to the overall LV chamber volume (yellow line) and local intracardiac electrical activation (green line).

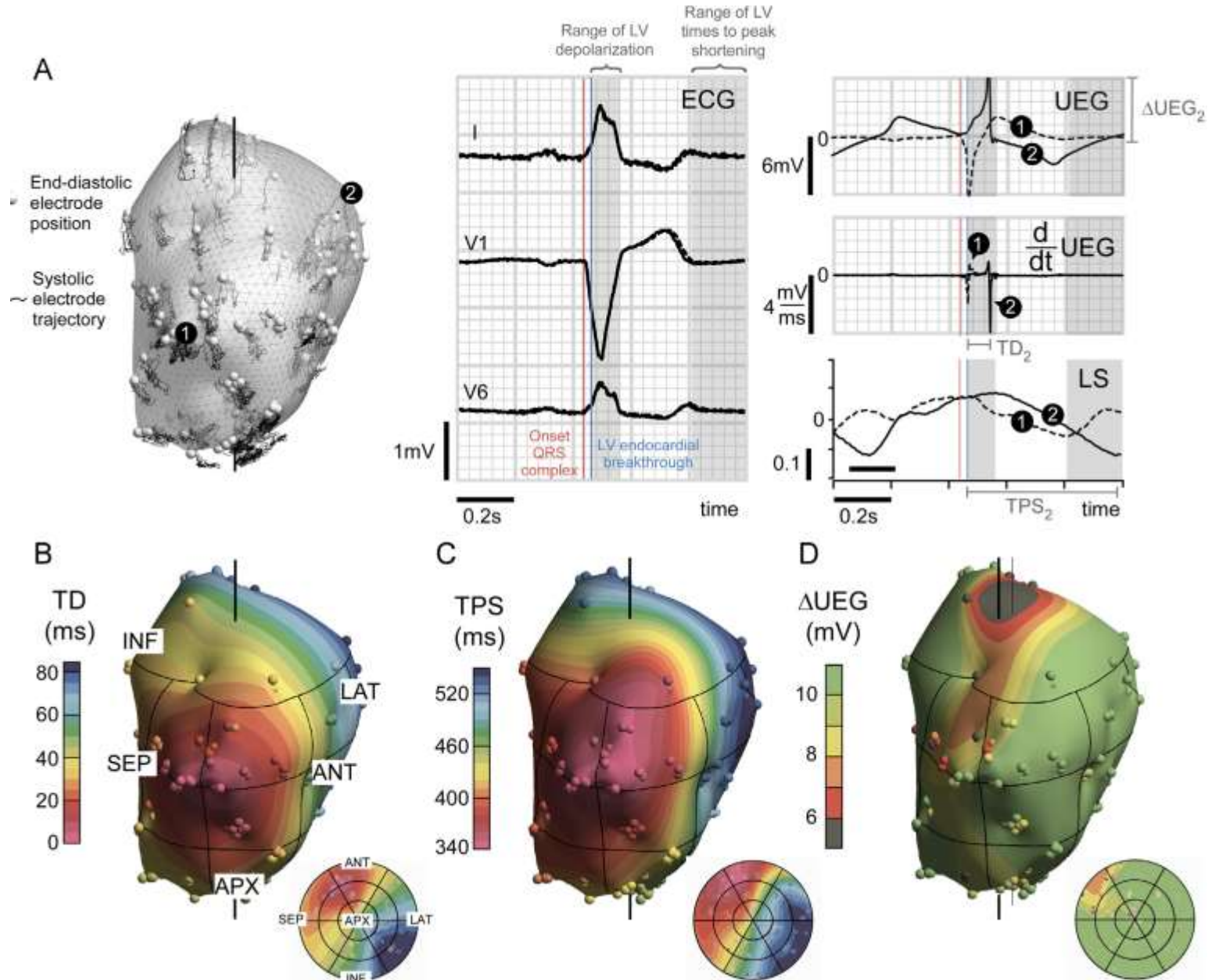
Septum and anterior regions

lateral wall

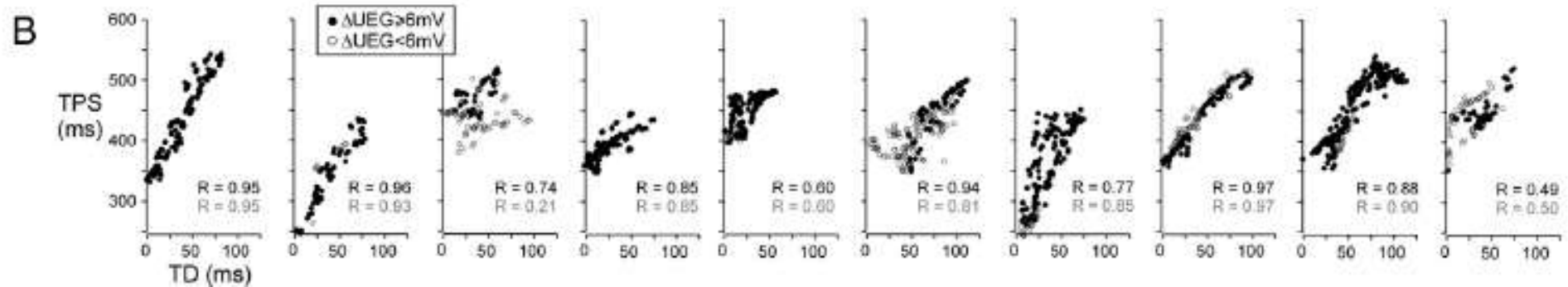
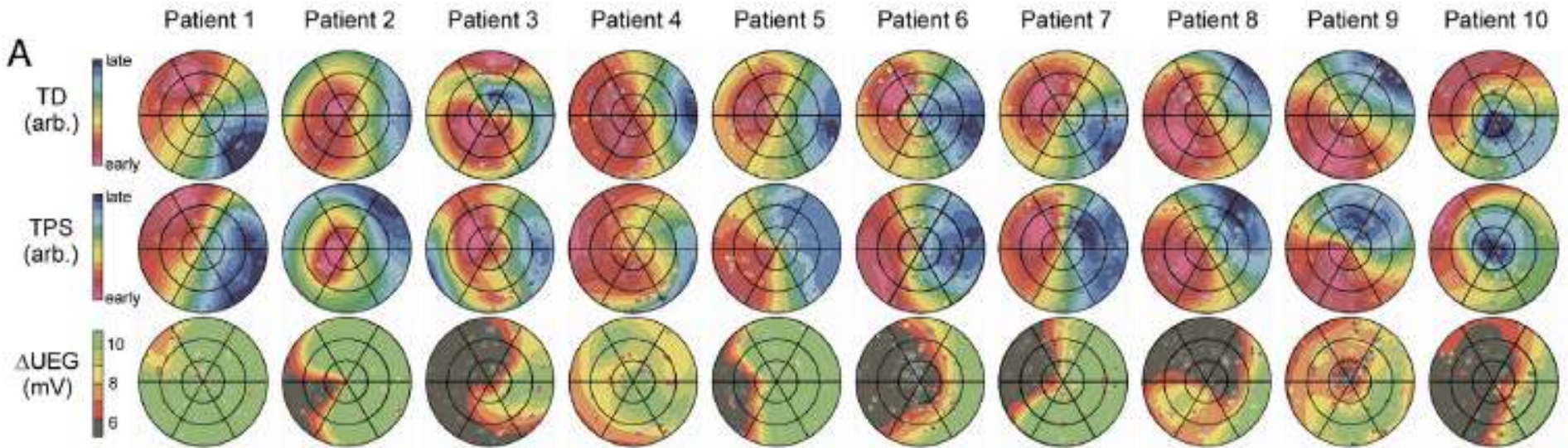




# E-M mapping in HF with LBBB



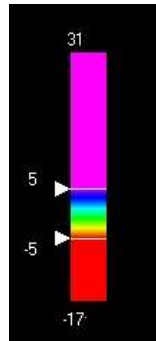
# E-M coupling



# Strain

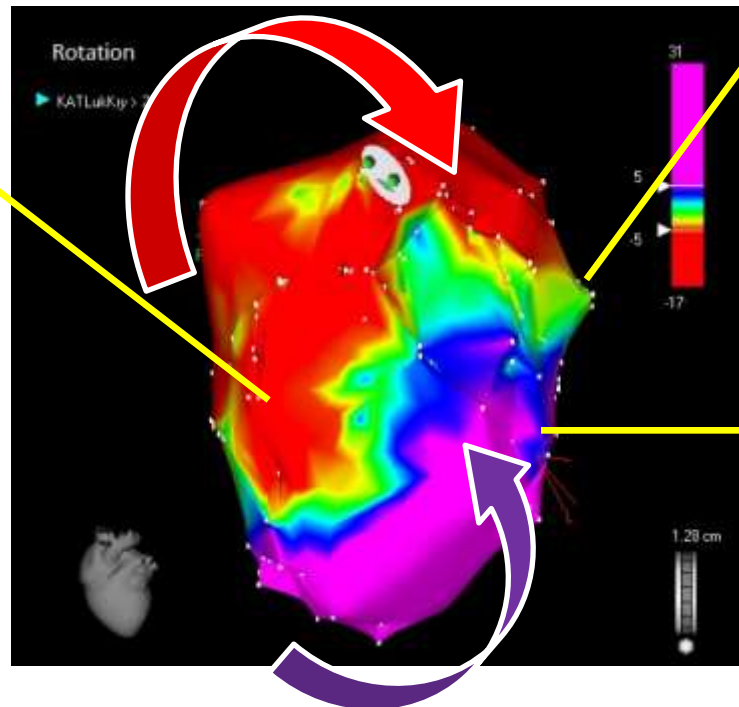
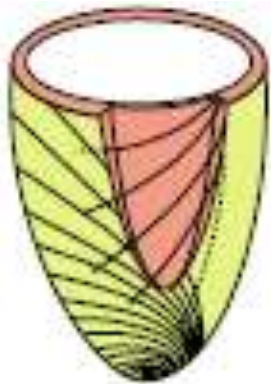
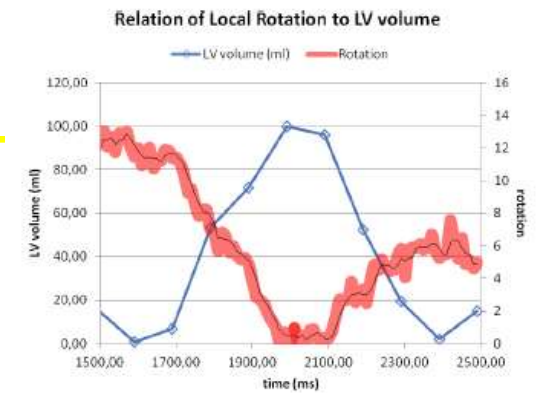
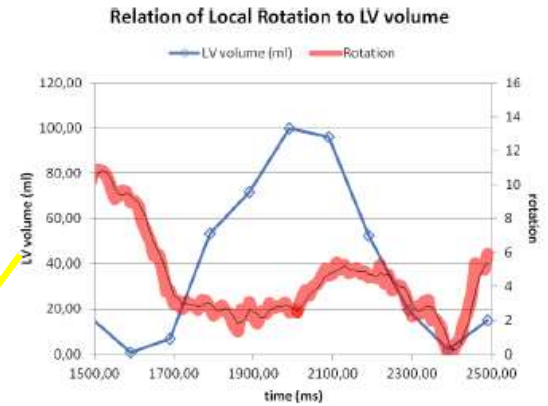
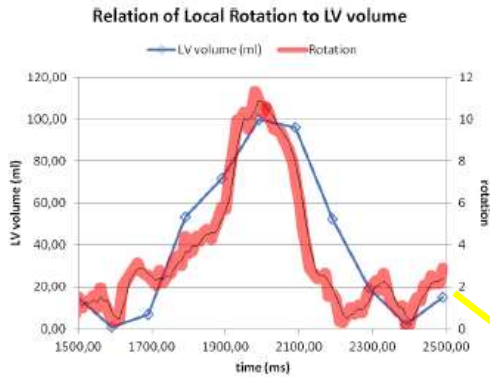


# Regional Rotation during Systole



Purple: anticlockwise rotation (> 5 degrees)

Red: clockwise rotation (< -5 degrees)

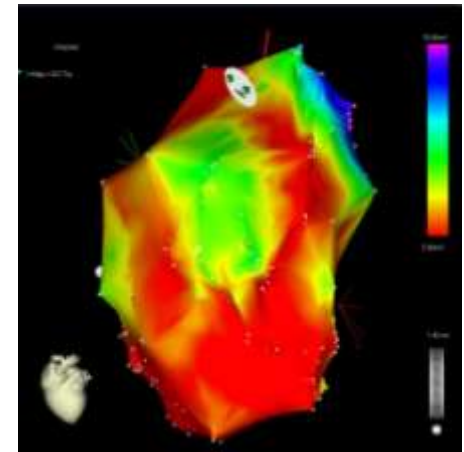
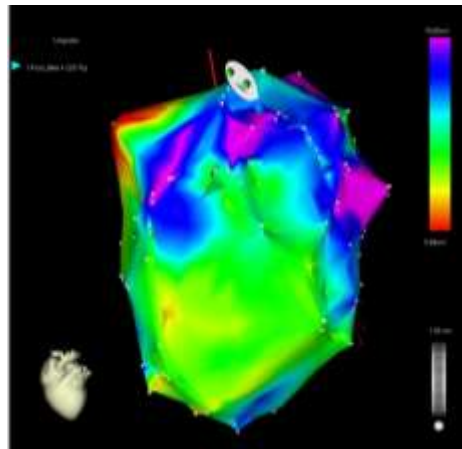
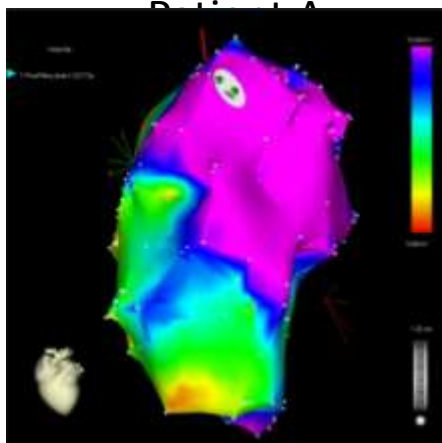
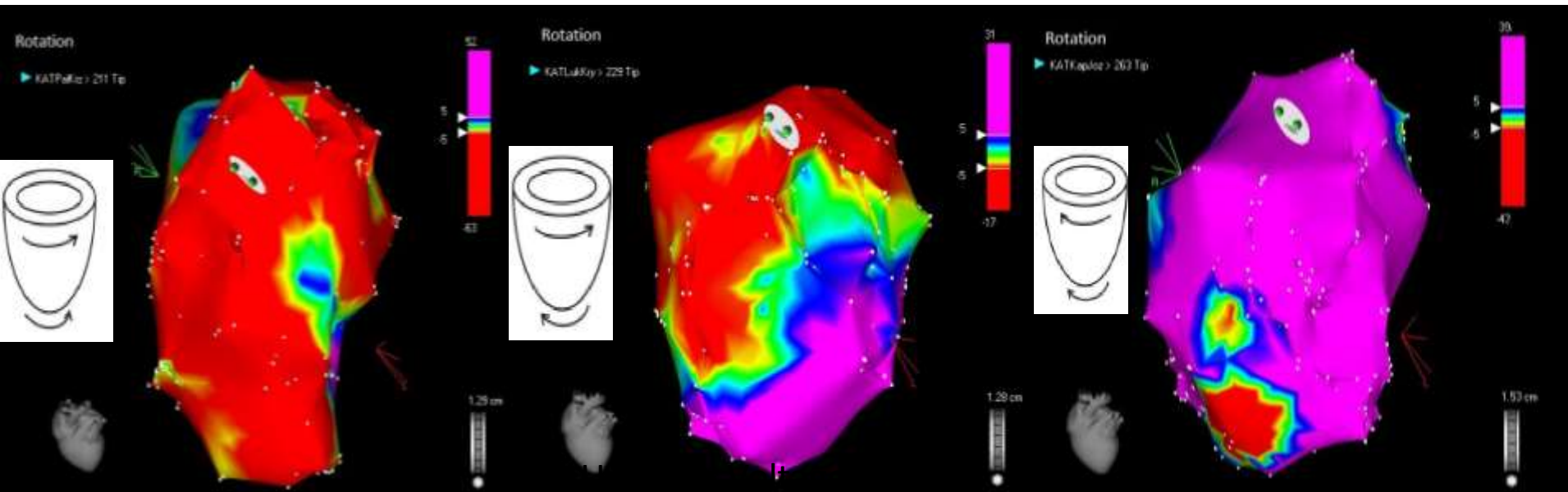


# Rotation maps

“Rigid body rotation”  
Predominantly  
clockwise rotation

Retained torsional  
“wringing” motion

“Rigid body rotation”  
Predominantly  
anticlockwise rotation



# Summary

- Useful tool for assessment of myocardial viability and hibernation
- Experimental Tx using biologics and cells
- Quantifies relations between myocardial perfusion and mechanical activity
- Novel approach in CRT optimization

# Team

- III Division of Cardiology

Dr Tomasz Jadczyk, dr Zofia Parma, dr Wiesław Cybulski

- Department of Electrophysiology and Heart Failure

Prof. Krzysztof S. Gołba, dr Jacek Wilczek, dr Jolanta Biernat

- CCM Cardiocentro Ticino

Angelo Auricchio, Rolf Krause, Francesco Maffessano

- BDS

Hanspeter Fisher



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# „Innovative use of stem cells in medicine”

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