Technical Tips of Intracardiac Echo (ICE) for VT Ablation

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CONFLICT OF INTEREST
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In the past decade, ultrasound imaging has been introduced in cardiac electrophysiology as a tool that allows reproduction of the anatomy in real time during catheter navigation. A 3D ICE-facilitated electroanatomical imaging allows for the real-time creation of precise geometries of the cardiac chambers.
Accurate visualization of endocavitary structures:
- Papillary muscle
- Valvular annulus
- Sinus of Valsalva

Assessing the VT anatomical substrate:
- False-tendon
- Ventricular aneurysm
- Scarred myocardium
- Regional wall motion abnormalities

Improvement of the safety and feasibility:
- Monitoring of pericardial effusion
Detection of Ventricular Aneurysm in Various Diseases
Remote MI
Endocardial Voltage Map (0.1-1.5 mV)
Unipolar Voltage Map (0.7-3.4 mV)
Sarcoidosis
Voltage Map in Sarcoidosis Aneurysm
LAVA Became LP during VP and RVR
Entrainment during VT
“Idiopathic” Ventricular Aneurysm
Pseudo-tendon
Pseudo-tendon
Apical Aneurysm in HOCM
50M VT HOCM with LVA Aneurysm
Apical Aneurysm

Delayed Enhancement
Map in LV Aneurysm
RFCA in LV Aneurysm
Sinus of Valsalva
Reentrant Summit VT
Papillary Muscle VPC
Successful RFCA Site on PPM

Pacemap

PP

-20°

200 ms

400 ms

VPC

MW 63M 521659-0 07/14/2015
ABL#2 Site (Success) on PPM
Anterior Papillary Muscle VT
Anterior PAM-VT
RFCA at Anterior PM
Color Change during RFCA at PM
New Subtypes of Idiopathic Fascicular VT: Fascicular VT near PM

- Left Posterior Septal FVT (left-axis)
- Upper Septal FVT (narrow inferior axis)
- Left Anterior Septal FVT (Rs in V5-6)
- Anterior PM FVT (rS/QS in V5-6)
- Posterior PM FVT (superior right-axis)

ECG tracings and diagram illustrating the various forms of focal ventricular tachycardia (FVT) related to different axes and anatomical locations.
Left Posterior Type VT

Axis: -60°

I  V1
II V2
III V3
aVR V4
aVL V5
aVF V6

Axis: -90°

I  V1
II V2
III V3
aVR V4
aVL V5
aVF V6

Axis: -120°

I  V1
II V2
III V3
aVR V4
aVL V5
aVF V6

1 sec

Fascicular Tachycardia Originating near PPM
Epicardial Approach
56F NICM p/s CRTD implantation
Epi and Endo Images using CARTOSOUND
Epi and Endo-cardial Substrate Maps

LAO

LAD  MAP

RV  LV

0.1 mv  1.0 mv

RAO

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Epicardial RFCA

Previous endo RFCAs
Monitor of Pericardial Space
VF: Purkinje Trigger and Substrate
Polymorphic VT Storm in LV Noncompaction
LV Noncompaction
Delayed Purkinje Potential at RF9 Site
Paced QRS Morphology Change at RF9 Site

340 600 600
Tip of Catheter in the Non-compacted Layer
Multiple VPCs from “Disconnected” Purkinje Arborization
Patient 64M Ischemic VF Storm on ECMO Support for 16 days
VF on ECMO Support

I
II
III
aVR
aVL
aVF
V1
V2
V3
V4
V5
V6
LV Image during VF
VF Termination after RF3
VF Initiation by Trigger VPC
Trigger VPC Ablation at Left Anterior Fascicle
Conclusions

An echo-facilitated 3D electroanatomical mapping allows for real-time creation of precise geometries of cardiac chambers and endocavitary structures. This is useful during procedures such as catheter ablation of VAs originating from PMs, which require detailed representation of anatomical landmarks. ICE provides important information about the VT anatomical substrate and may have potential to identify areas of scarred myocardium. Routine adoption of this technique should be considered to improve outcomes of VA ablation.
Thank You

관심을 가져 주셔서 감사합니다.