Echocardiography in EP & Cath lab for the Cardiac Anaesthetist

Dr Martin Kim
Monash Medical Centre, Melbourne
Times they are a changing…

- Advances in technology now allow increasingly complex procedures by cardiologists
- Often obliterate need for open cardiac surgery
- Newer procedures continue to show increasing success
- Minimally invasive catheter-based procedures are here to stay
Changing Role of the Cardiac Anaesthetist

- New SCA recognition
- Hybrid labs
- Cardiac vs. General Anaesthetist?
- GA plus TOE...
‘Interventional TOE’

• TOE performed during Interventional Cardiology procedures
• Unique position
• ‘Co-proceduralist’
• Some training and knowledge required
• ‘Next evolutionary stage of TOE’

Differences from TOE in cardiac OT

• Constant communication essential
• Different time pressure
• Fluoro vs TOE images?
• Greater use of Real-Time 3D Echo
• Alternate 2D and 3D quickly

Interventional TOE: Echo Roadmap

1. Baseline Echo
2. Procedure Echo
3. Post-Procedure Echo
Use of Real Time Three-Dimensional Transesophageal Echocardiography in Intracardiac Catheter Based Interventions

Gila Perk, MD, Roberto M. Lang, MD, Miguel Angel Garcia-Fernandez, MD, Joe Lodato, MD,
Interventional TOE

- Catheter ablation for Atrial fibrillation
- Left Atrial Appendage Exclusion Therapy (Watchman Device)
- Transapical Mitral Valve Implantation (TAMI)
Technical Aspects of AF Catheter Ablation

- Achieve vascular access
- Place catheters
- Induce arrhythmia to confirm diagnosis
- Locate the source by mapping
- Perform the ablation
- Test to confirm results of ablation
- Anaesthetic considerations…

Anesthesia for Catheter Ablation Procedures

Alina Nicoara, MD, FASE,*  Fredrik Holmquist, MD, PhD, FESC,† Chad Raggains, MSN, CRNA,* and Joseph P. Mathew, MD, MHSc*
TOE for AF Catheter Ablation

1. Baseline Echo Assessment

2. Procedure Echo Assessment
   a. Safe/optimal IAS crossing ✓
   b. Pulm Veins – Mapping, Ostial ablation ✓
   c. Avoidance of critical structures eg LAA ✓
   d. Early detection of Pericardial effusion ✓

3. Post-Procedure Echo Assessment
Emerging Applications for Transseptal Left Heart Catheterization

Old Techniques for New Procedures

Vasilis C. Babaliaros, MD, Jacob T. Green, MD, Stamatios Lerakis, MD, FACC, Michael Lloyd, MD, Peter C. Block, MD, FACC
Getting the TSP right: Fossa Ovalis

Muscular rim

Superior vena cava

Aorta

Interatrial septum (fossa ovalis)

Coronary sinus ostium

Inferior vena cava
TOE guidance for TSP: More than just tenting the Septum!

- **Ideal site:** Middle FO (Not bad: Low, Posterior)
- **Worst:** High, Anterior

**Bicaval (110°):** Superior/Inferior  
**AV SAX (45°):** Anterior/Posterior
Other tips for TSP

• Alternate between 2DE & RT3DE
• Avoid anterior TSP
• Is a PFO present?
• Identify High-risk TSP?…
High-Risk TSP?
Imaging the Atrial Septum Using Real-Time Three-Dimensional Transesophageal Echocardiography: Technical Tips, Normal Anatomy, and Its Role in Transseptal Puncture

Francesco F. Faletra, MD, Gaetano Nucifora, MD, and Siew Yen Ho, PhD, Lugano, Switzerland; London, United Kingdom

Faletra F, Nucifora, G. Imaging the Atrial Septum Using Real-Time 3D TEE. JASE 2011; 24: 593 - 599.
Right Atrium
En Face

Left Atrium
En Face

High Puncture 🔴

Low Puncture ✓
After TSP – is TOE still useful?

- Pulm Veins - Precise mapping
  - Ostial ablation
- Avoidance of critical structures eg Left Atrial Appendage
- Early detection of Pericardial effusion
Intraoperative Pulmonary Vein Examination by Transesophageal Echocardiography: An Anatomic Update and Review of Utility

Bruce Lloyd Cartwright, MBBS, FANZCA, PGDipEcho, PTEeXAM,*
Andrew Jackson, MBBS, FANZCA, PTEeXAM,† and Jeremy Cooper, MBChB, FANZCA‡
Identifying the ‘The Ridge’
Spot Diagnosis?
WATCHMAN DEVICE: Overview
Watchman Device: Evidence?

Boston Scientific Receives FDA Approval for WATCHMAN™ Left Atrial Appendage Closure Device

First-Of-Its-Kind Alternative to Long-Term Warfarin Therapy for Stroke Risk Reduction in Patients with Non-Valvular Atrial Fibrillation

Mar 13, 2015
Baseline Echo: LAA type

WIND SOCK

CHICKEN WING

BROCCOLI TYPE
Baseline Echo: LAA Dimensions

2.33cm

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<th>Maximum LAA Ostium (mm)</th>
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Real-Time Three-Dimensional Transesophageal Echocardiography of the Left Atrial Appendage: Initial Experience in the Clinical Setting

Sanjiv J. Shah, MD, Dianna M. E. Bardo, MD, Lissa Sugeng, MD, Lynn Weinert, BS, Joseph A. Lodato, MD, Bradley P. Knight, MD, John J. Lopez, MD, and Roberto M. Lang, MD, Chicago, IL
Procedural Echo: IAS crossing

- Bicaval view: Mid-Inferior
- AV SAX view: Posterior
Procedural Echo: Sheath Navigation
Device Position: Sub-optimal

Too Distal

Too Proximal
Device Position: Optimal

Plane of maximum diameter distal to ostium

Fixation barbs engage LAA wall
Post-procedure Echo Assessment
Transapical Mitral Valve Implantation (TAMI)

• Proof of concept
• Revolutionise treatment?
• High-risk patients
• True ‘game changer?’
TAMI: Overview
Patient X
Patient X
Pre-Deployment
Deployment
Post-deployment
Post-deployment
Transcatheter Mitral Valve Replacement
The Next Revolution?*

Anelechi C. Anyanwu, MD, David H. Adams, MD

• Technically FEASIBLE…
• Still has a long way to come
• Percutaneous repair techniques
• Watch this space…!
Interventional TOE for Cardiac Anaesthetists

• ‘Next evolution of TOE’
• Different but same
• Collaborate relationships
• What is our role?
• Training/scope practice?
• More opportunity in private practice
Thank You