Αξονική και μαγνητική
tομογραφία καρδιάς: Πότε και σε ποιους ασθενείς;

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Conflicts of interest

None
Imaging

Imaging of congenital heart disease in adults

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ACHD Imaging – Where echo runs short...

- Right ventricle
- RV outflow tract – pulmonary regurgitation
- Pulmonary arteries and aorta
- Pulmonary and systemic veins
- Collaterals and AV malformations
- Coronary anomalies
- Myocardial mass
- Myocardial fibrosis/tissue characterization
- Poor acoustic windows (multiple thoracotomies)
CMR - Advantages

• Accurate and reproducible quantification of right and left ventricular (LV) volumes, mass, and function

• Degree of valvar dysfunction, especially pulmonary regurgitation

• multi-level outflow tract obstruction

• shunt quantification (from pulmonary and systemic flows) differential branch PA flow

• non-invasive tissue characterization
ACHD Imaging – Where CMR runs short...

- (Right ventricle)
- (RV outflow tract – pulmonary regurgitation)
- (Pulmonary arteries and aorta)
- (Pulmonary and systemic veins)
- Collaterals and AV malformations
- Coronary anomalies
- (Myocardial mass)
- (Myocardial fibrosis/tissue characterization)
- Poor acoustic windows (foreign bodies)
CMR - Limitations

• Availability
• Cost
• Artefacts in pts with many devices and stainless steel implants
• Relative contraindication in patients with pacemakers or ICDs
CT - Advantages

• Excellent 3D spatial resolution
• Acquisition time is rapid (<2 min) allowing patients who are unable to lie still or flat for long to be imaged
• evaluation of small blood vessels such as coronary arteries, pulmonary veins, collaterals, arteriovenous malformations, distal PA branches, and in situ pulmonary thrombosis
• Pulmonary parenchyma imaging is also provided
• Mechanical heart valve dysfunction
• 3D visualization of abscess formation in endocarditis
CT - Limitations

- ionizing radiation and iodinated contrast agents
- no information on haemodynamics, flow rate, or velocity
- tends to overestimate ventricular volumes and is clearly unattractive for serial measurements (radiation)
Sinus venosus defect

52 year-old female with palpitations and dilated right heart
Anomalous R Pveins drainage
Scimitar syndrome

35 year-old female with mesocardia

Echo showed dilation of the right heart chambers
Coarctation of the aorta

28 year-old male with arterial hypertension and systolic murmur
Multislice computed tomography after stent implantation for aortic coarctation

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ALCAPA syndrome

27 year-old male with dilated cardiomyopathy and severe MR

Echo shows aneurysmal RCA ostium
PDA Eisenmenger

23 year-old male Iraqi refugee with severe pulmonary hypertension and differential cyanosis
PDA Eisenmenger
PDA Eisenmenger
Right ventricle in TOF
PVR in Tetralogy of Fallot
From the courtesy of Prof M. Gatzoulis.
In collaboration with Dr Sabine Ernst
RV–PA conduit and anomalous coros
Systemic RV
Congenitally corrected transposition of the great arteries
29 year-old male with TGA- palliative Mustard severe pulmonary hypertension
TGA - arterial switch
12-year-old patient, arterial switch operation for TGA, severe supravalvular pulmonary stenosis

Ebstein’s Anomaly with ASD
26 year-old female with severe Ebstein anomaly of the tricuspid valve
Ebstein’s Anomaly with Atrialized RV

- The septal leaflet in the four chamber view is apically displaced by 55mm.
- The antero-superior leaflet is tethered.
- Severe TR with an orifice measuring about 15x16mm.
Apical Displacement of Tricuspid Valve

- The septal leaflet in the four chamber view is apically displaced by 55mm.
- The anterosuperior leaflet is tethered.
- Severe TR with an orifice measuring about 15x16mm.
Atrial Septal Defect

• Moderately large ASD measuring 11x17mm with bidirectional shunting at rest
Fontan circulation
Double chambered RV - subAS

Young male with syncope and a history of subaortic repair
LEFT LUNG

RAO 80° view

LAO 80° view

52 year-old female with CTEPH

† OCCLUSION

→ STENOSIS
52 year-old female with CTEPH
Future challenges in Greece

• Availability of scanners in key hospitals, financial issues

• Centers of excellence in CHD (including imaging), role of health authorities

• Training of young cardiologists in ACHD and advanced imaging
CHALLENGE data
October 2018
30000 patients missing!!

N=2520
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- Ass. Prof Theo Karamitsos, Cardiologist
Pregnant female with shortness of breath and a murmur

History of DORV-VSD repair
BAV
Take home message - CMR

• Serial imaging in borderline cases of RV overload, esp pulmonary regurgitation (as suggested by the expert physician but not too often)

• Not prefered in single VSD or other small lesions (echo is better)

• Should be used by experts, it is not a last resort examination for cases where the physician cannot offer more to a patient
Take home message - CT

• Can replace (mainly preoperative) coronary angio in patients with few comorbidities

• Not for serial imaging! Radiation is an issue in CHD

• More and more used in structural heart disease – percutaneous valvular and vascular interventions