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SOCIETÀ ITALIANA DI ECOGRAFIA CARDIOVASCOLARE SIEC

JOINT E.A.E/S.I.E.C TEACHING COURSE

UPDATE IN VALVULAR HEART DISEASES

FROM CLINICAL IMAGING TO THERAPEUTIC INNOVATIONS

Multimodality Clinical Imaging

Computed Tomography

Clinically guided use

José Juan Gómez de Diego

IdiPAZ Instituto de Investigación Hospital Universitario La Paz

SaludMadrid

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CARDIAC TC IN VALVULAR HEART DISEASES

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CT vs angio

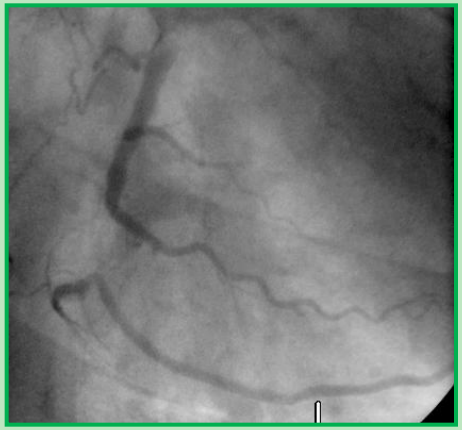

Table 2 Diagnostic performance of 64-slice computed tomography and dual-source computed tomography for the detection of significant coronary stenosis (luminal diameter >50%) on a per-patient basis

Author	Number of patients	Not evaluable (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Leschka *et al.*[53]	67	0	100 (47/47)	100 (20/20)	100 (47/47)	100 (20/20)
Leber *et al.*[44]	59[a]	23.7 (14/59)	88 (22/25)	85 (17/20)	88 (22/25)	85 (17/20)
Raff *et al.*[49]	70	0	95 (38/40)	90 (27/30)	93 (38/41)	93 (27/29)
Mollet *et al.*[46]	52	1.9 (1/52)	100 (38/38)	92 (12/13)	97 (38/39)	100 (12/12)
Ropers *et al.*[50]	84	3.6 (3/84)	96 (25/26)	91 (50/55)	83 (25/30)	98 (50/51)
Schuijf *et al.*[51]	61	1.6 (1/61)	94 (29/31)	97 (28/29)	97(29/30)	93 (27/29)
Ehara *et al.*[43]	69	2.9 (2/69)	98 (59/60)	86 (6/7)	98 (59/60)	86 (6/7)
Nikolaou *et al.*[47]	72	5.6 (4/72)	97 (38/39)	79 (23/29)	86 (38/44)	96 (23/24)
Weustink *et al.*[52]	77	0	99 (76/77)	87 (20/23)	96 (76/79)	95 (20/21)
Leber *et al.*[45]	90	2.2 (2/90)	95 (20/21)	90 (60/67)	74 (20/27)	99 (60/61)
Total	701	3.8 (27/701) (95% CI 2.6–5.6)	98 (394/404) (95% CI 95–99)	90 (263/293) (95% CI 86–93]	93 (394/424) (95% CI 90–95)	95 (263/273) (95% CI 93–98)

Schroeder et al. European Heart Journal 2008 29, 531–556

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Artículo original

Coronariografía mediante tomografía computarizada de 16 detectores antes de la cirugía de recambio valvular

Cardiac CT before non coronary surgery

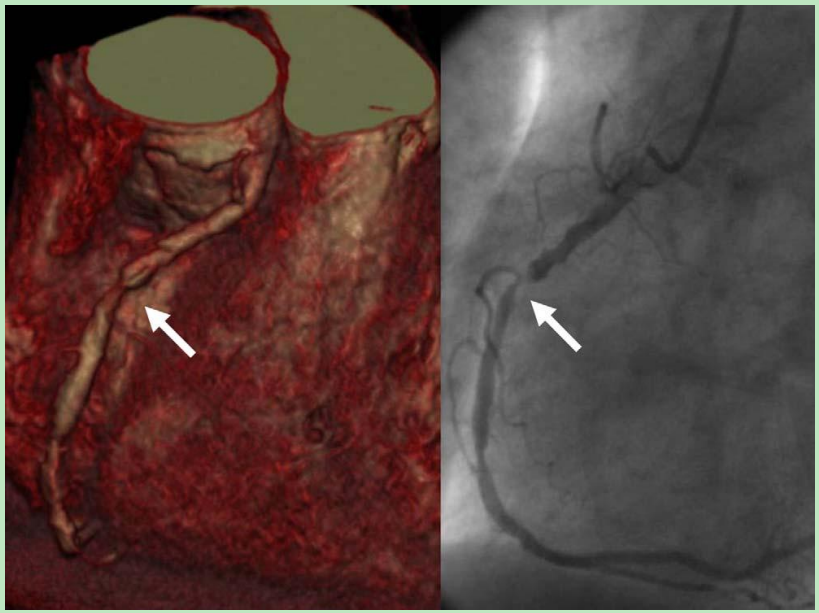
106 patients

CONSECUTIVE

Angio
Before valve replacement

Coronary scan

CT16



Feasible!!

VPN 98%

62%

avoidable angio studies

	n	VP	VN	FP	FN	Sensibilidad (95% IC)	Especificidad (95% IC)	VPP (95% IC)	VPN (95% IC)	Exactitud (95% IC)
Total[a]	106	27	69	5	5	84 (67-95)	93 (85-98)	84 (67-95)	93 (85-98)	91 (83-95)
Segmentos valorables[b]	87	21	61	4	1	95 (77-100)	94 (85-98)	84 (64-95)	98 (91-100)	94 (87-98)
Segmentos proximales y medios[c]	92	24	63	4	1	96 (80-100)	94 (85-98)	86 (67-96)	98 (92-100)	95 (88-98)

Rodríguez Palomares et al Rev Esp Cardiol 2011; 64:269-276

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APPROPRIATE USE CRITERIA

ACCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR 2010 Appropriate Use Criteria for Cardiac Computed Tomography

Table 3. Detection of CAD in Other Clinical Scenarios

Indication		Appropriate Use Score (1–9)		
New-Onset or Newly Diagnosed Clinical HF and No Prior CAD				
	Pretest Probability of CAD	**Low**	**Intermediate**	**High**
13.	• Reduced left ventricular ejection fraction	A (7)	A (7)	U (4)
14.	• Normal left ventricular ejection fraction	U (5)	U (5)	U (4)
Preoperative Coronary Assessment Prior to Noncoronary Cardiac Surgery				
	Pretest Probability of CAD	**Low**	**Intermediate**	**High**
15.	• Coronary evaluation before noncoronary cardiac surgery	U (6)	A (7)	I (3)
Arrhythmias—Etiology Unclear After Initial Evaluation				
16.	• New-onset atrial fibrillation (atrial fibrillation is underlying rhythm during imaging)	I (2)		
17.	• Nonsustained ventricular tachycardia	U (6)		
18.	• Syncope	U (4)		
Elevated Troponin of Uncertain Clinical Significance				
19.	• Elevated troponin without additional evidence of ACS or symptoms suggestive of CAD	U (6)		

Taylor et al Journal Am Coll Cardiol 2010;1864-94

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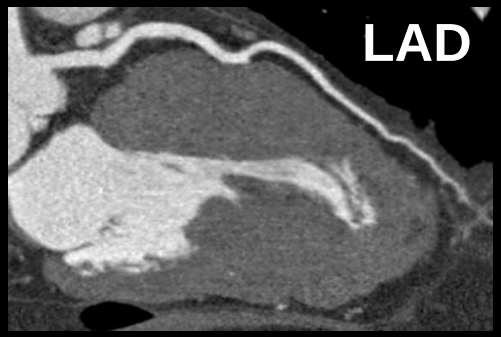

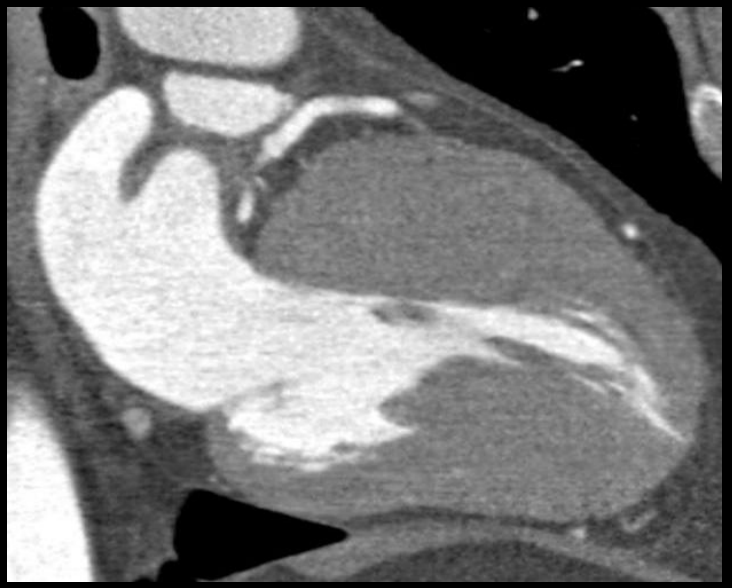

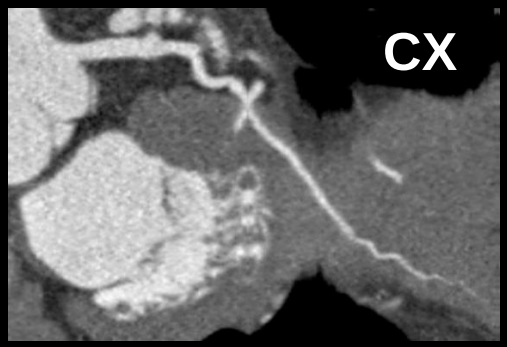

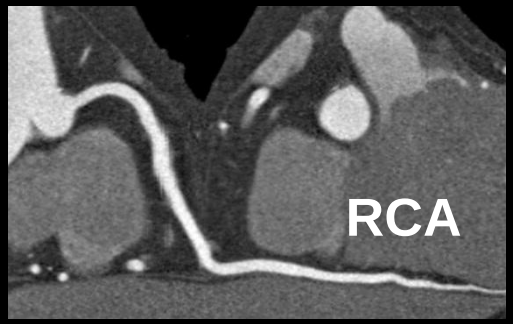

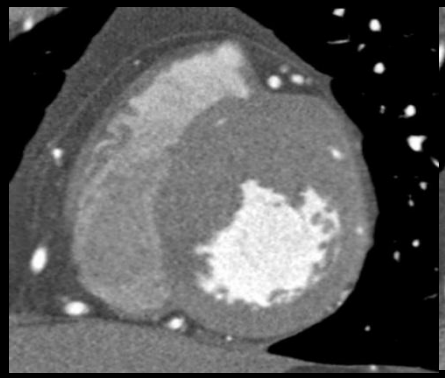

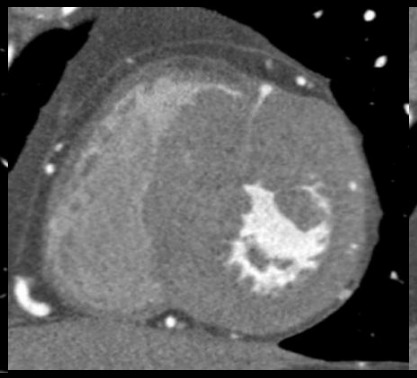

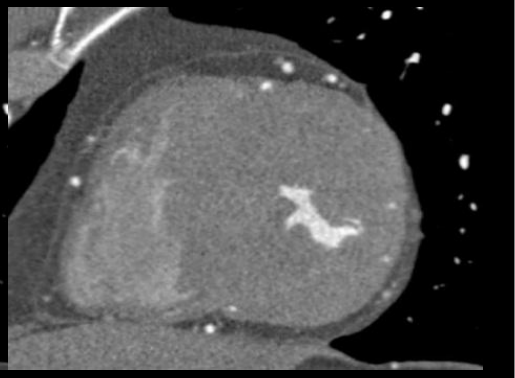

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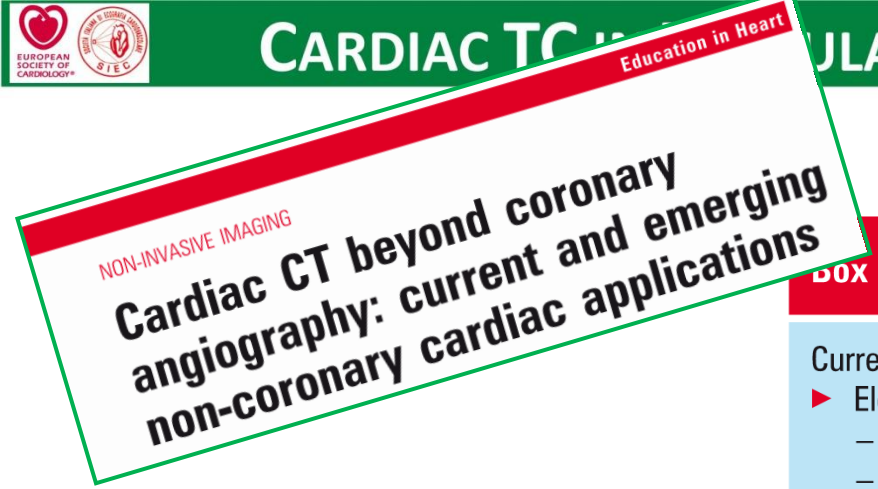

Box 1 Various non-coronary cardiac indications of CT

Current applications
- Electrophysiology applications
  - Atrial fibrillation and pulmonary venous anatomy
  - Cardiac resynchronisation therapy and coronary venous anatomy
- Reoperative cardiothoracic surgery
- Valvular heart disease
  - Aortic valve
  - Mitral valve
  - Prosthetic valves
- Transcatheter aortic valve implantation
- Left ventricular systolic function
- Pericardial diseases
  - Effusion
  - Constriction
- Cardiac masses
  - Benign
  - Malignant
- Non-ischaemic cardiomyopathies
- Congenital heart disease
  - Simple and complex

Emerging applications
- Rest and stress myocardial perfusion
- Viability assessment
  - Arterial phase
  - Delayed hyperenhancement
- Molecular imaging

Desai M.
Heart 2011; 97:417-424

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Cardiac CT: Tech specifications vs MRI and Echo

Table 1
Technical Parameters for Various Imaging Modalities in Cardiac Valve Evaluation

Parameter	Modality		
	64-Section CT Angiography	MR Imaging	Echocardiography
Temporal resolution (msec)	100–180	20–50	15–60
Spatial resolution (mm)	0.4–0.6	1.0–2.0	0.6–1.0
Acquisition time	8 sec	5–10 min	Operator dependent
Radiation dose (mSv)	13–15 (males); 18–21 (females)	None	None
Intravenous contrast material	Nonionic	None	None

CT: Second choice for VHD

Coronary angio → dose modulation + Prospective acquisition + FLASH acquisition → ≤ 1 mSv

Functional CT → DATA covering ALL cardiac cycle → 15 mSv

Chan et al. RadioGraphics 2009; 29: 1393-1412

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	Evaluation of Intra- and Extracardiac Structures	
53.	• Characterization of native cardiac valves • Suspected clinically significant valvular dysfunction • Inadequate images from other noninvasive methods	A (8)
54.	• Characterization of prosthetic cardiac valves • Suspected clinically significant valvular dysfunction • Inadequate images from other noninvasive methods	A (8)
55.	• Initial evaluation of cardiac mass (suspected tumor or thrombus)	I (3)
56.	• Evaluation of cardiac mass (suspected tumor or thrombus) • Inadequate images from other noninvasive methods	A (8)
57.	• Evaluation of pericardial anatomy	A (8)
58.	• Evaluation of pulmonary vein anatomy • Prior to radiofrequency ablation for atrial fibrillation	A (8)
59.	• Noninvasive coronary vein mapping • Prior to placement of biventricular pacemaker	A (8)
60.	• Localization of coronary bypass grafts and other retrosternal anatomy • Prior to reoperative chest or cardiac surgery	A (8)

Taylor et al. J Am Coll Cardiol 2010; 56(22): 1864-94.

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Conventional
CT64 system for data acquisition

Research
Post processing system

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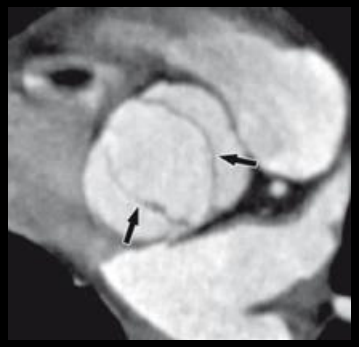
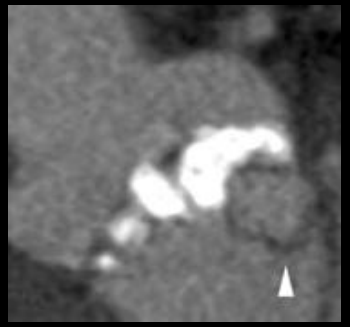
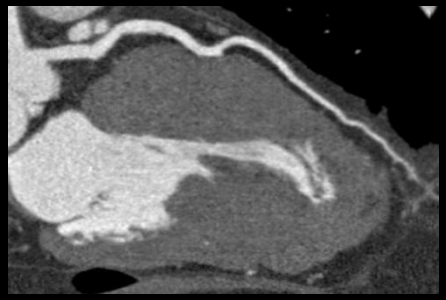
Aortic stenosis

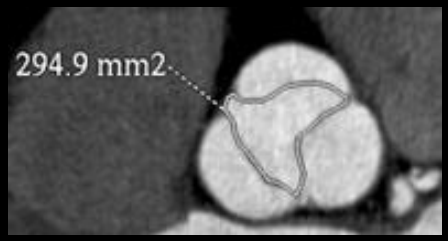
Anatomy evaluation

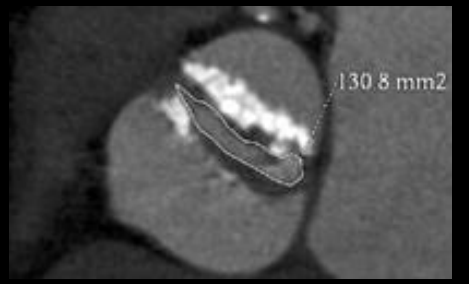
- Cusps
- Area (normal 2.5 - 4 cm^2)
- Calcification
- Sub/supravalvular stenosis
- LV hypertrophy
- Ascending aorta dilatation

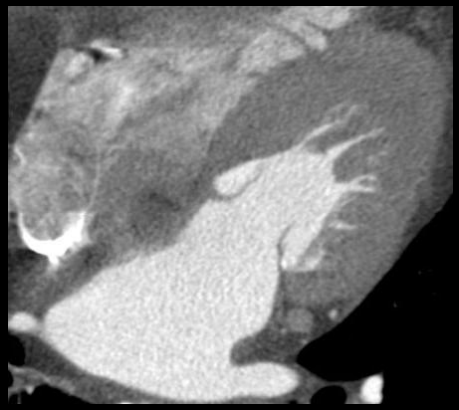












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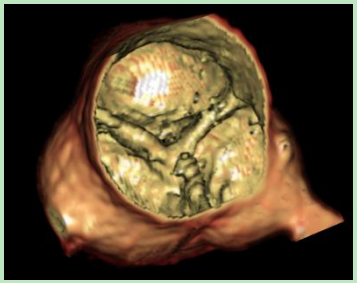
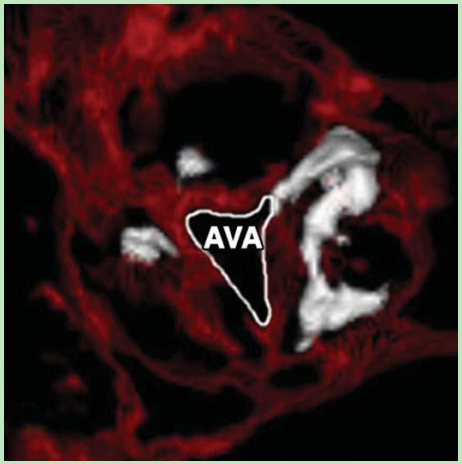
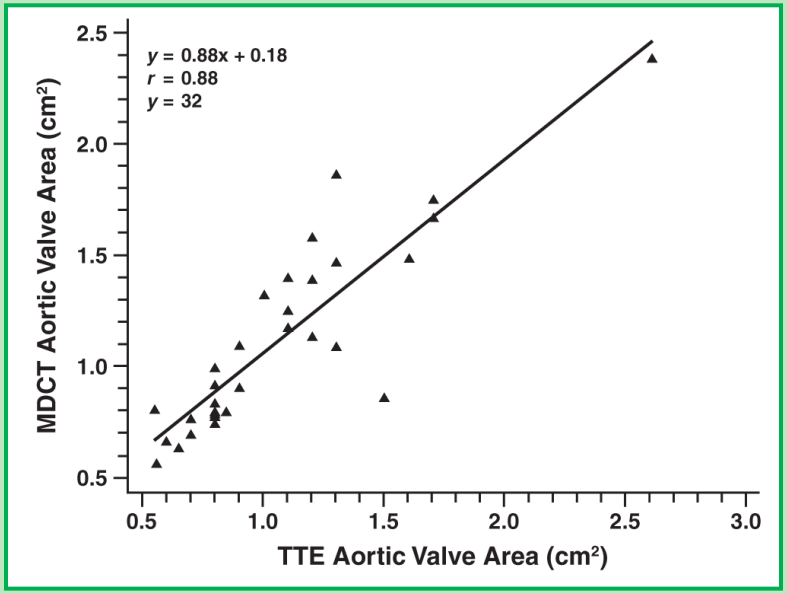
Sixty-Four Slice CT Evaluation of Aortic Stenosis Using Planimetry of the Aortic Valve Area

43 patients with aortic valve disease referred for CT 64 study

Aortic valve area CT64







TTE/TEE

TTE: Continuity equation

TEE: Area planimetry

r = 0.88 *for TTE*

r = 0.99 *for TEE*

Feutchner et al. AJR 2007; 189: 197-203

Cardiac TC in Valvular Heart Diseases

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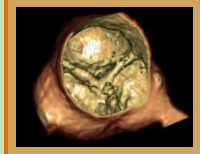
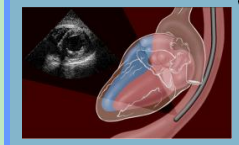


Valve area CT64

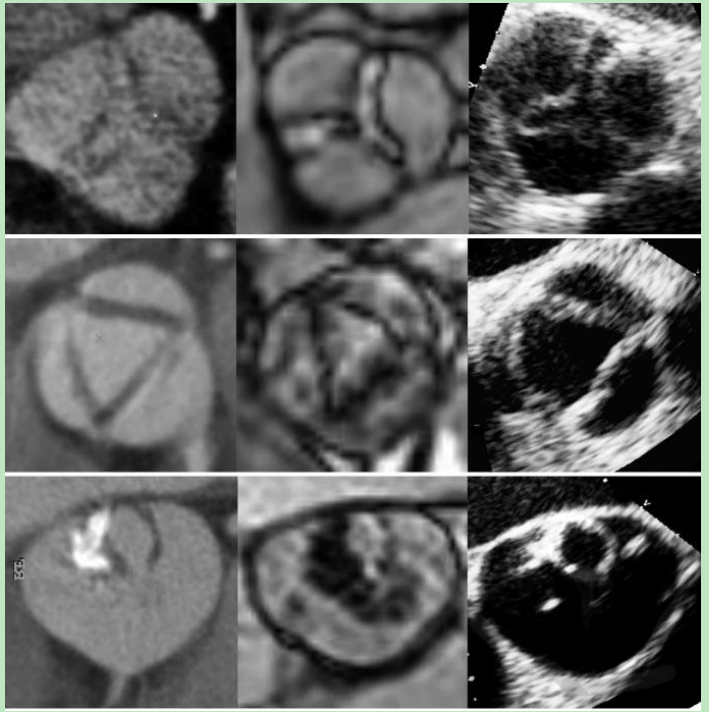


Valve area ETE

Continuity ETT

Valve area CRM

48 patients w/wo disease



Aortic Valve Area Assessment:

Multidetector CT Compared with Cine MR Imaging and Transthoracic and Transesophageal Echocardiography[1]

Table 2

Comparisons of AVA Values Measured with Multidetector CT, MR Imaging, TEE, and TTE

Modality	AVA (cm^2)*	Comparison with TTE			Comparison with TEE			Comparison with MR		
		r Value	Bias (cm^2)*	*P* Value	*r* Value	Bias (cm^2)*	*P* Value	*r* Value	Bias (cm^2)*	*P* Value
Multidetector CT	2.5 ± 1.7 (0.5–6.3)	0.96	0.4 ± 0.5	<.001	0.98	0.1 ± 0.3	.21†	0.98	0.0 ± 0.3	>.99†
MR	2.4 ± 1.8 (0.4–6.1)	0.96	0.4 ± 0.5	<.001	0.99	0.1 ± 0.3	.94†	. . .	. . .	. . .
TEE	2.5 ± 1.7 (0.5–6.4)	0.97	0.4 ± 0.4	<.001	. . .	. . .	. . .	0.99	−0.1 ± 0.3	.94†
TTE	2.0 ± 1.5 (0.5–6.1)	. . .	. . .	. . .	0.97	−0.4 ± 0.4	<.001	0.96	−0.4 ± 0.5	<.001

Pouleur et al. Radiology 2007; 244: 745-754

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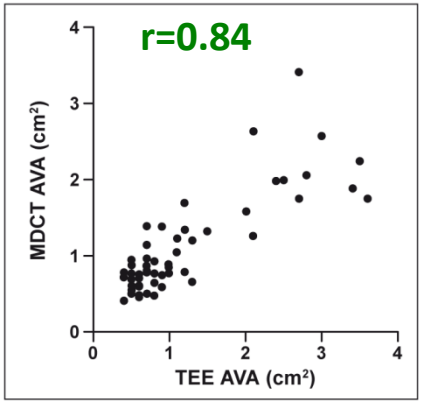
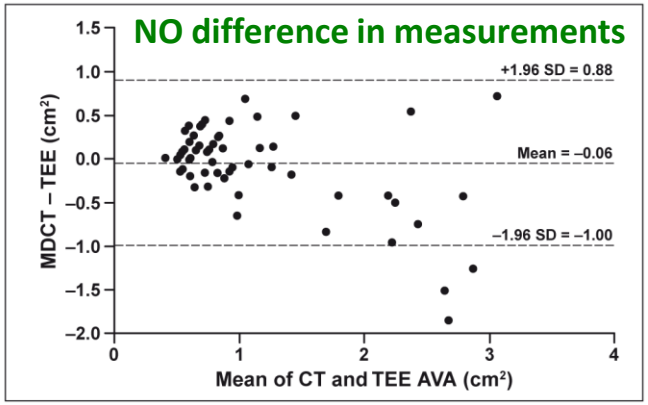
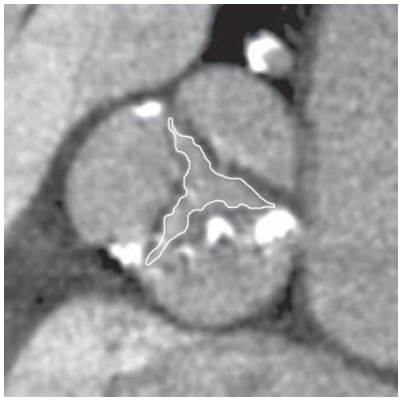
Aortic Valve Area on 64-MDCT Correlates with Transesophageal Echocardiography in Aortic Stenosis

80 patients with aortic valve disease referred for CT 64 study

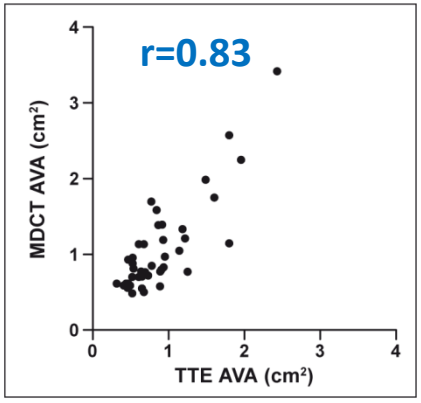
CT vs TEE

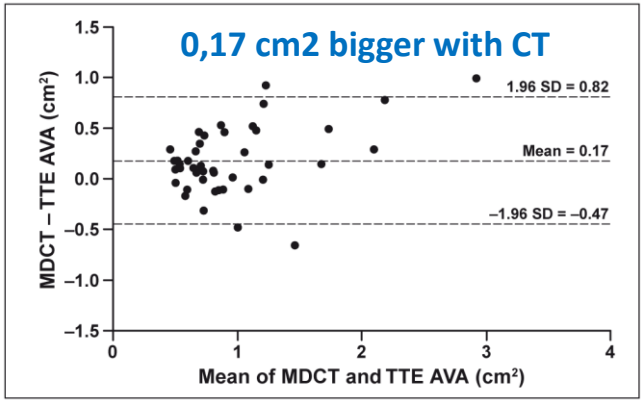






CT vs TTE





La Bounty et al. AJR 2008; 191: 1652-1658

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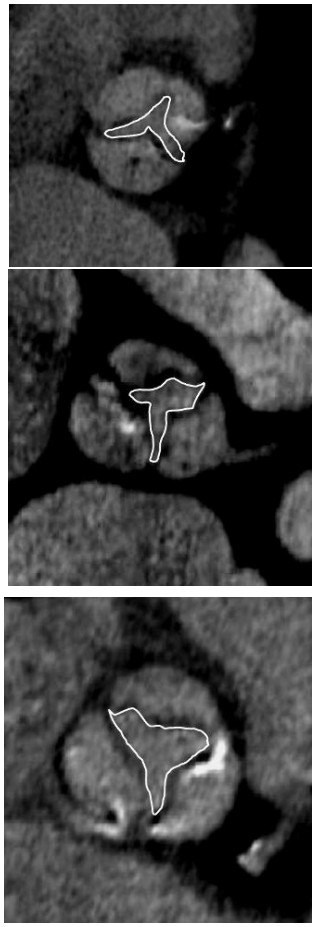
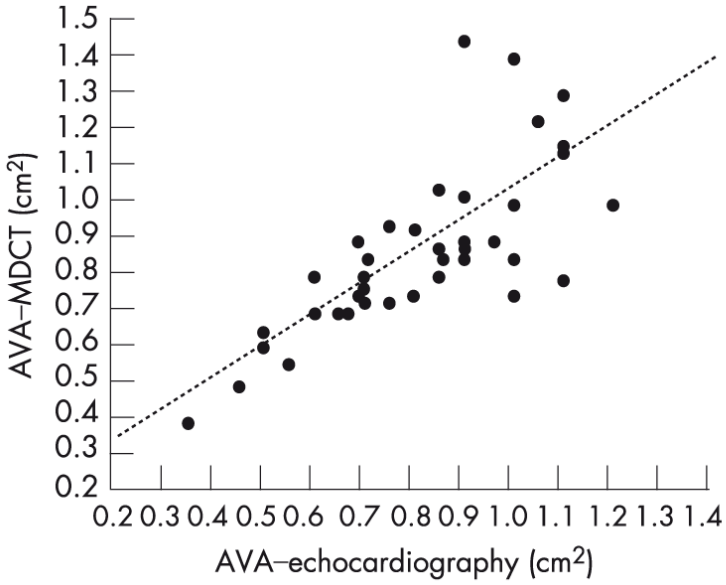
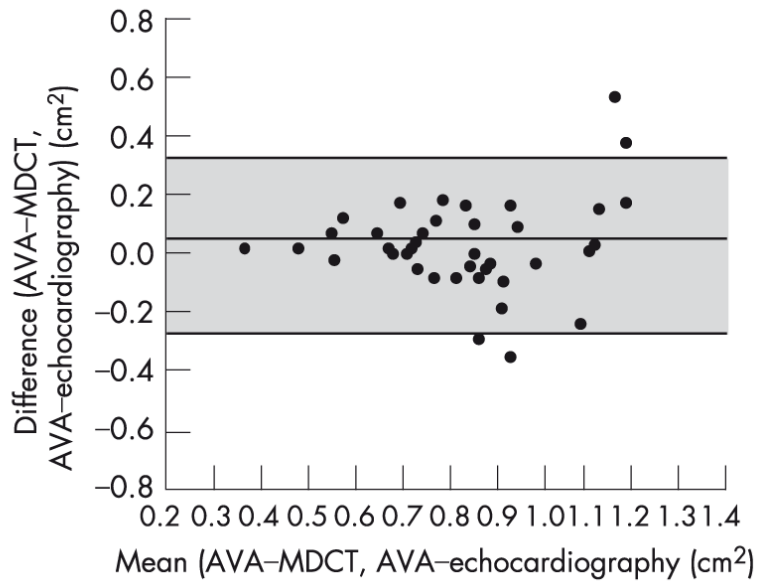
VALVULAR HEART DISEASE

Comprehensive evaluation of preoperative patients with aortic valve stenosis: usefulness of cardiac multidetector computed tomography

40 patients with AS scheduled for aortic valve replacement







r=0.77

AVA 0,06 cm2 bigger with CT

Laissy et al. Heart 2007; 93: 1121 - 1125

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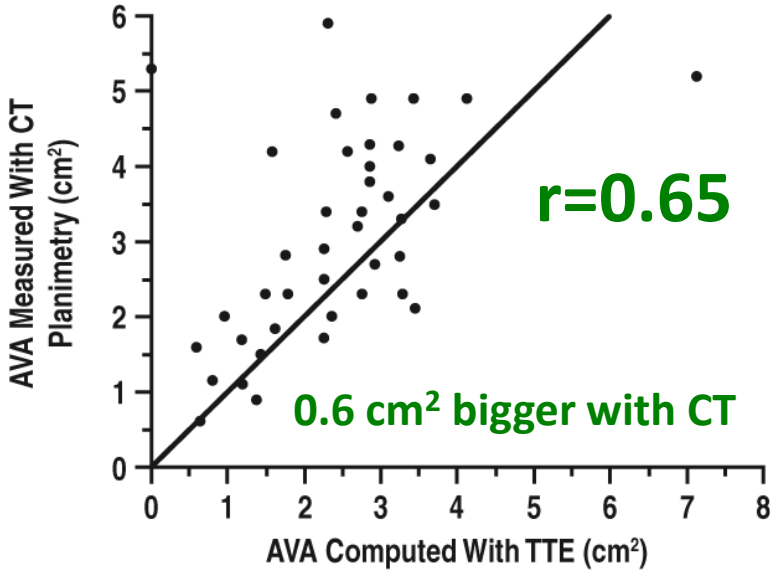
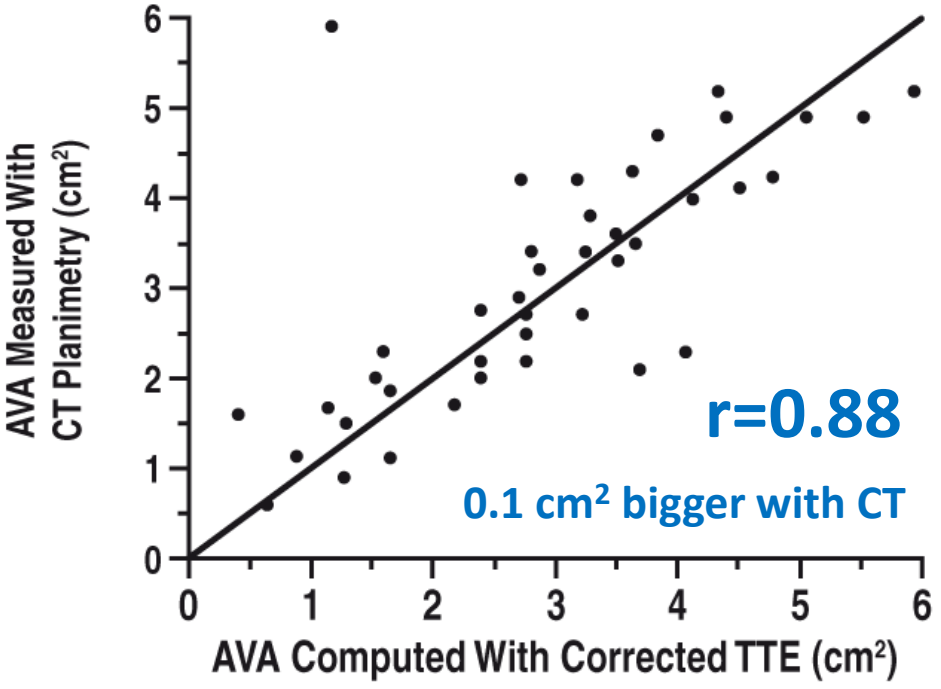
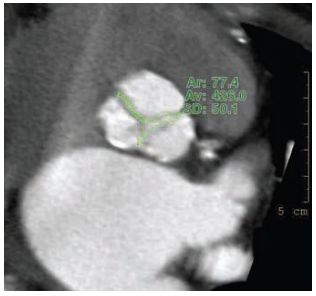
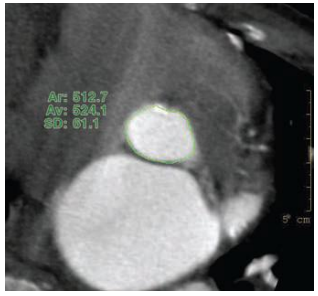
Differences in Aortic Valve Area Measured with CT Planimetry and Echocardiography (Continuity Equation) Are Related to Divergent Estimates of Left Ventricular Outflow Tract Area

41 patients with aortic valve disease with CT 64 study









Halpern et al
AJR 2008; 192: 1668-1673

CARDIAC TC IN VALVULAR HEART DISEASES

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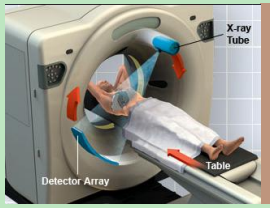
SaludMadrid

Measurement of aortic valve calcification using multislice computed tomography: correlation with haemodynamic severity of aortic stenosis and clinical implication for patients with low ejection fraction

Correlation of calcification with severity

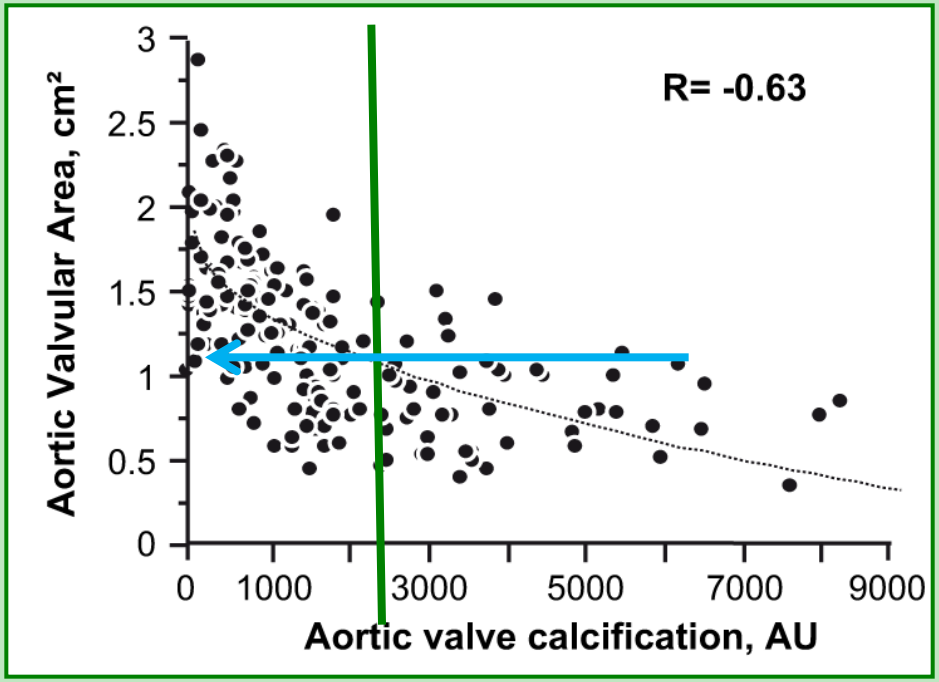
222 mild-severe AS

TTE echo



CT **16**

Calcium scoring



LOW EF patients **1650 UA**

S82% E 80% for severe AS

Cueff et al. Heart 2011 ; 97: 721-726

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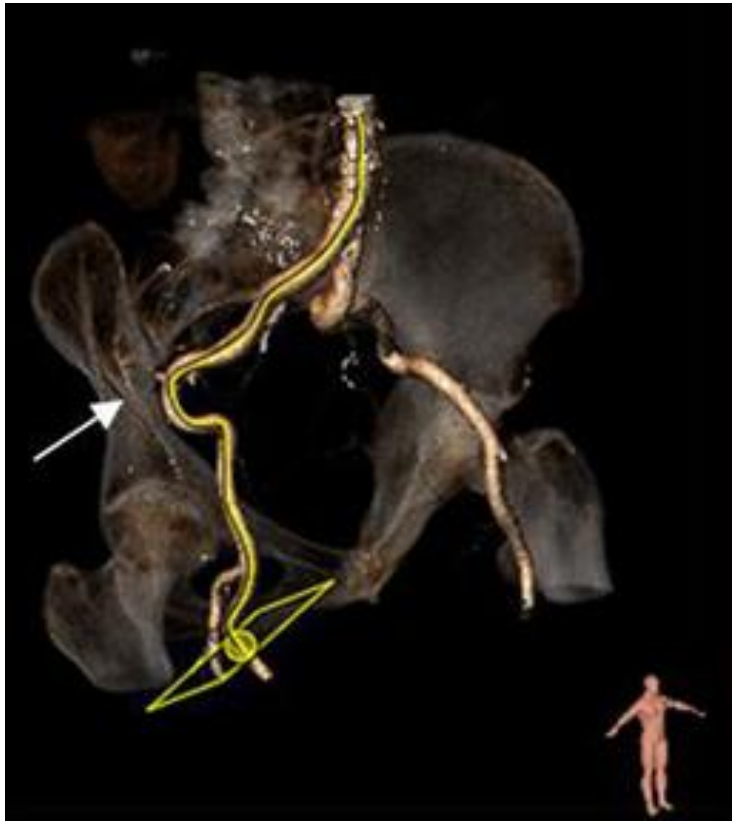
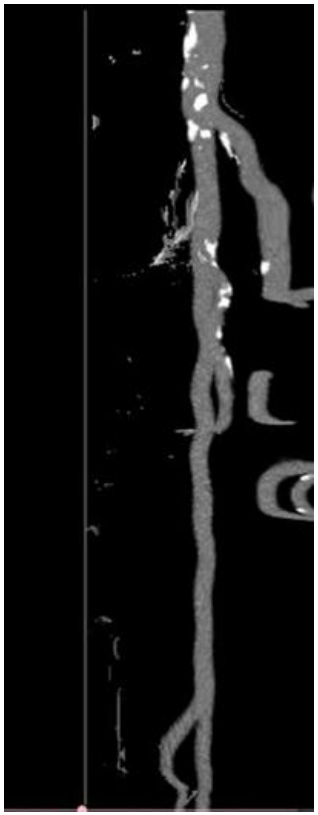
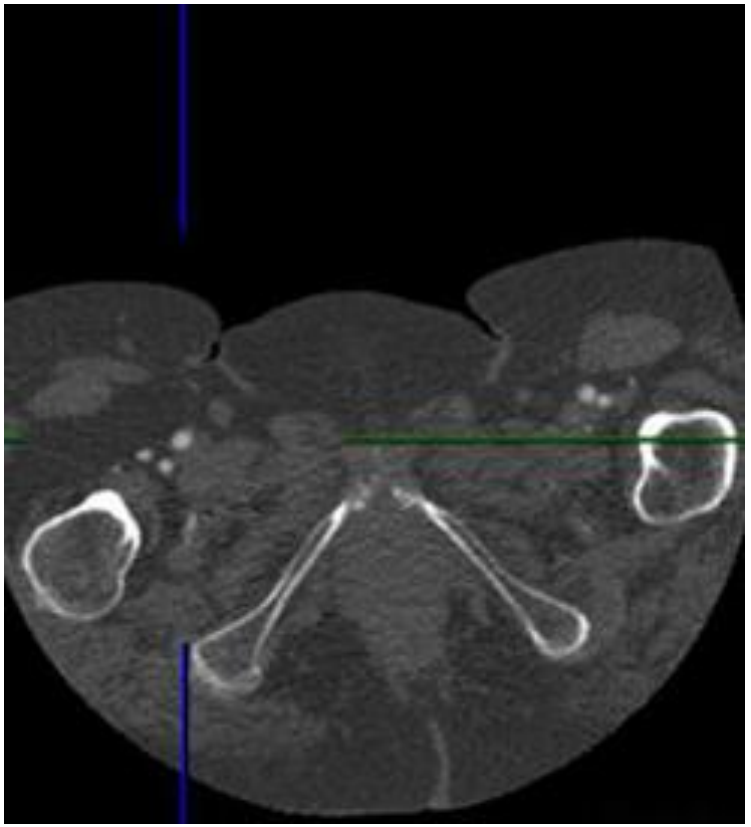
Transcatheter aortic valve implantation: implications of multimodality imaging in patient selection, procedural guidance, and outcomes

Delgado et al. Heart 2012 ; 98: 743-754

PRE procedural | **GUIDE procedural** | **POST procedural**







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Transcatheter aortic valve implantation: implications of multimodality imaging in patient selection, procedural guidance, and outcomes

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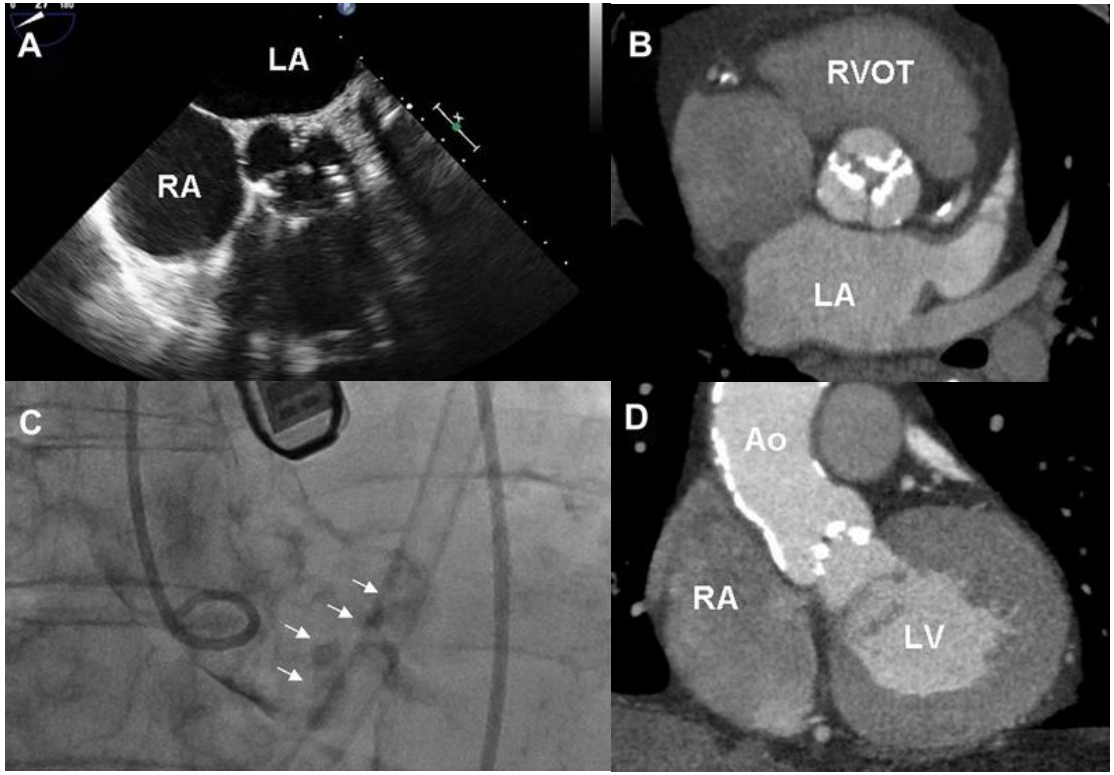

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Transcatheter aortic valve implantation: implications of multimodality imaging in patient selection, procedural guidance, and outcomes

Delgado et al. Heart 2012 ; 98: 743-754

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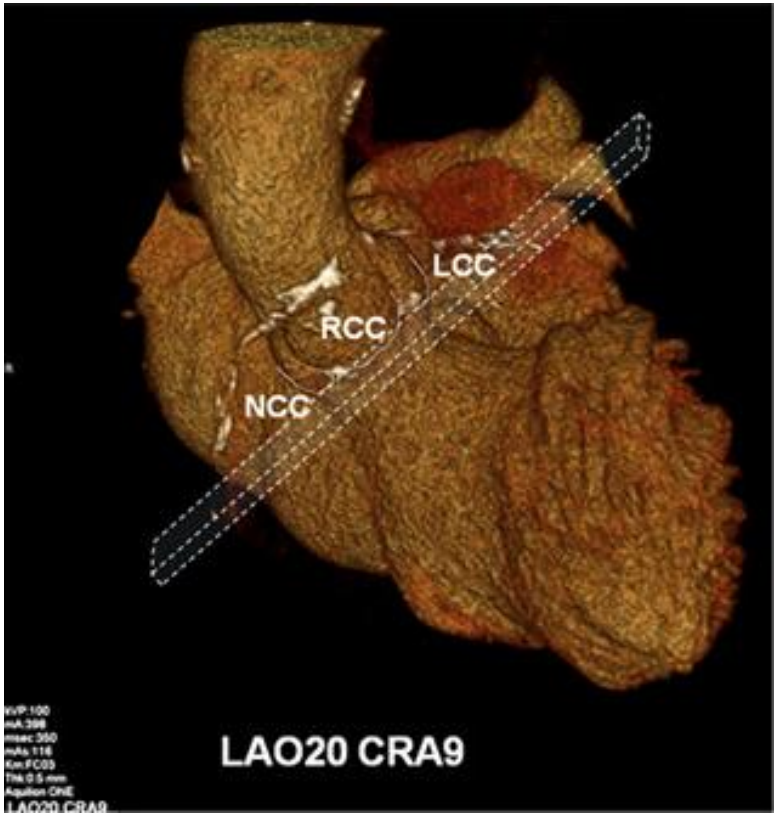

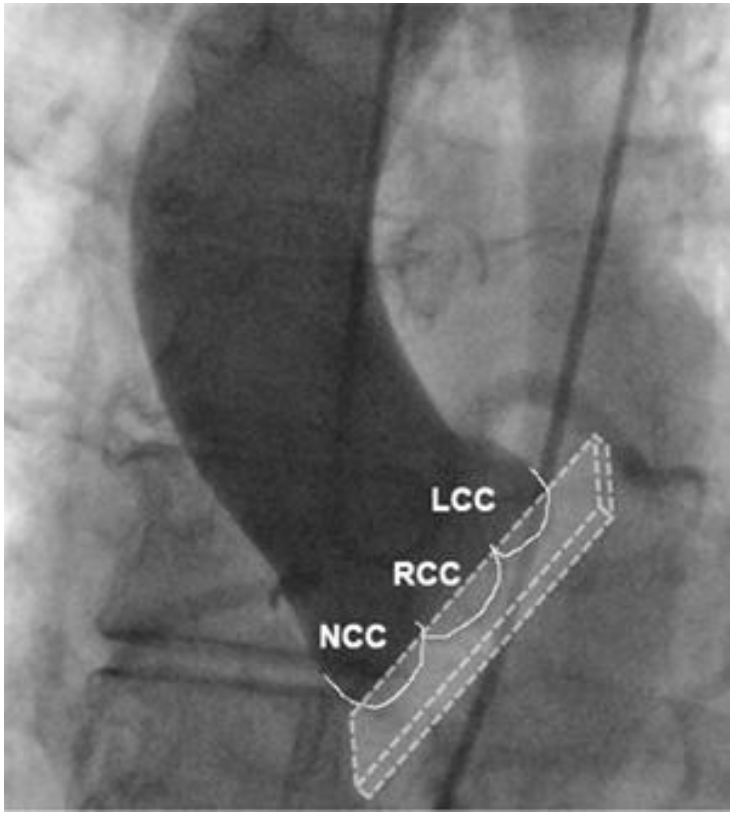

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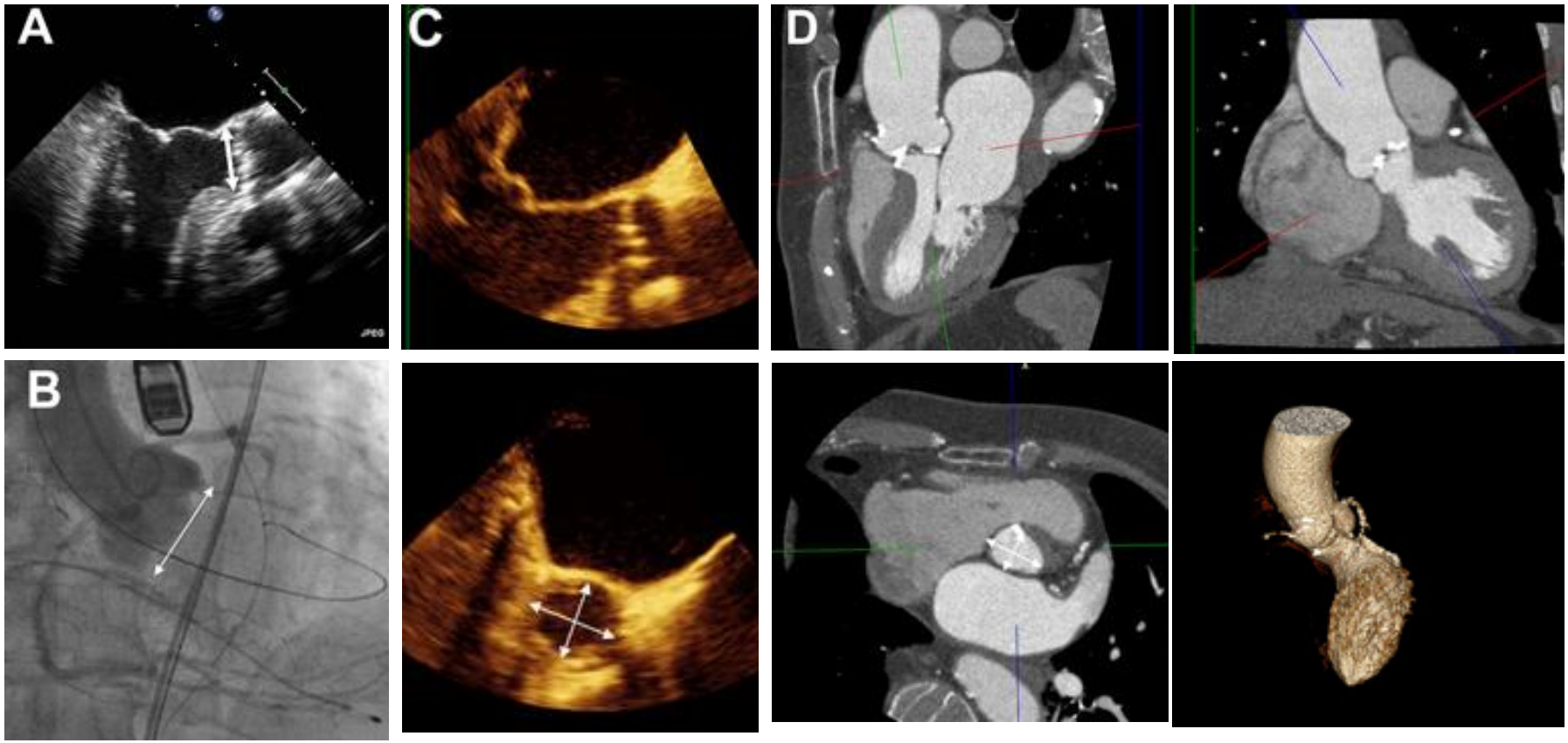
Transcatheter aortic valve implantation: implications of multimodality imaging in patient selection, procedural guidance, and outcomes

Delgado et al. Heart 2012 ; 98: 743-754

PRE procedural	GUIDE procedural	POST procedural



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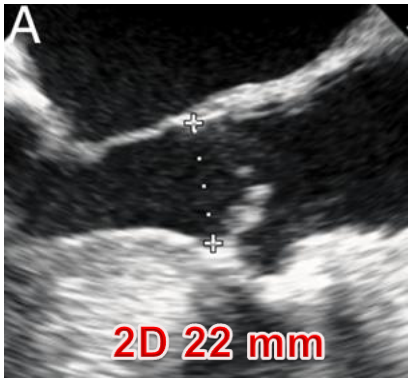
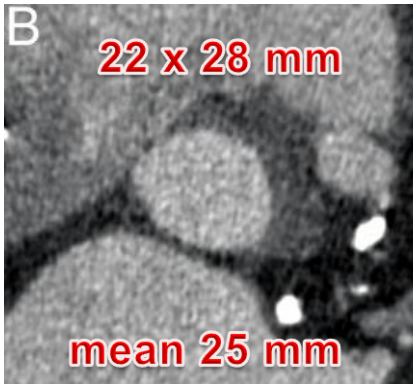
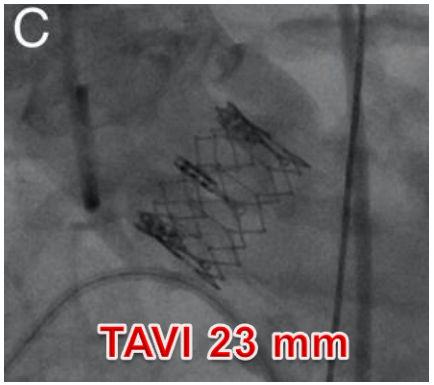
Wilson et al.
JACC 2012;
59:1287-94

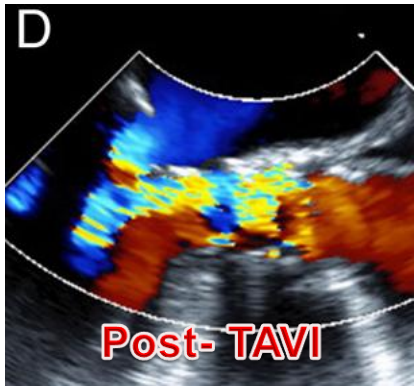
3-Dimensional Aortic Annular Assessment by Multidetector Computed Tomography Predicts Moderate or Severe Paravalvular Regurgitation After Transcatheter Aortic Valve Replacement

PRE procedural | **GUIDE procedural** | **POST procedural**





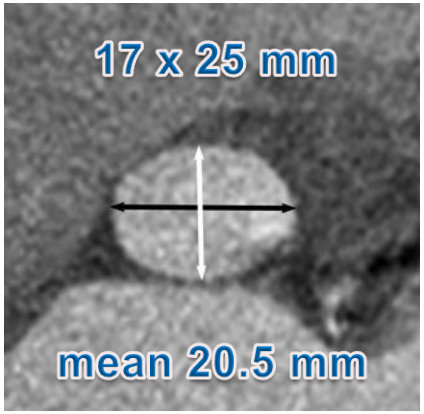


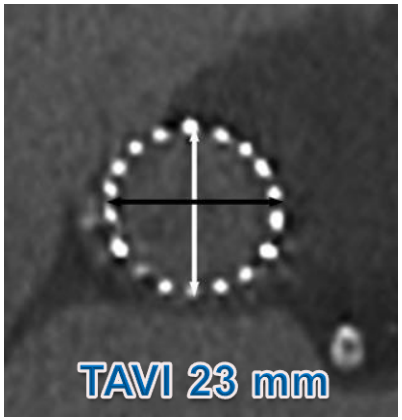


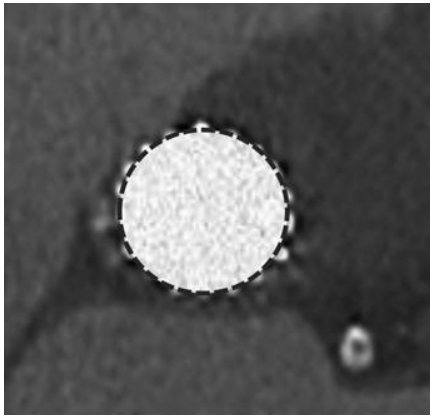
Oversized TAVI

CT-guided

reduce the risk of moderate - severe paravalvular regurgitation







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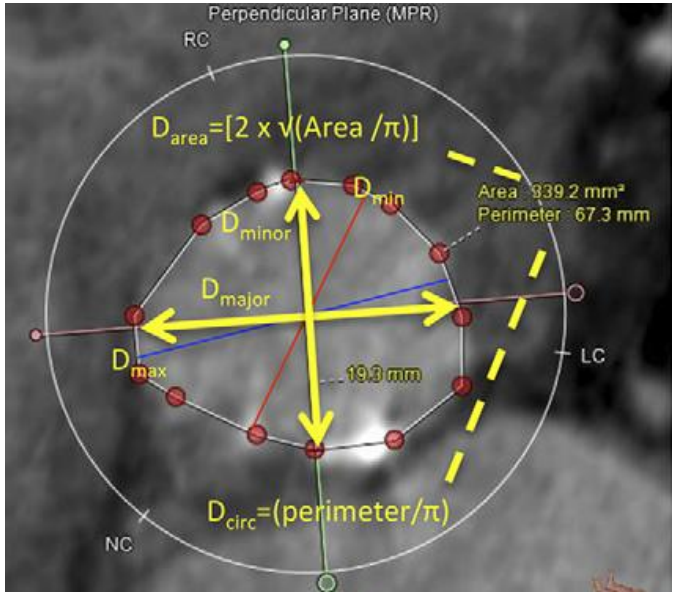
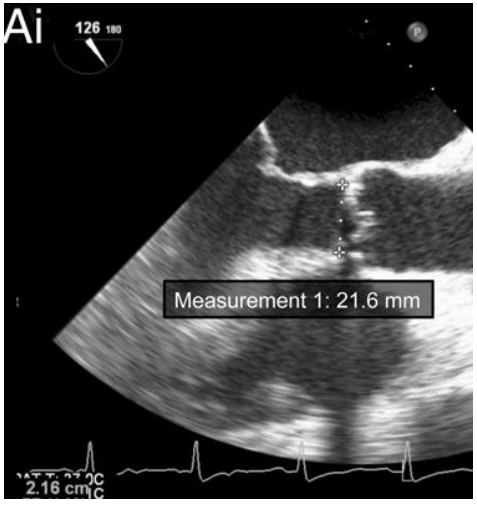
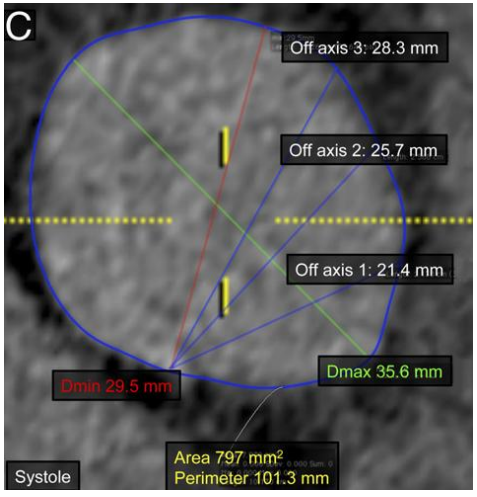
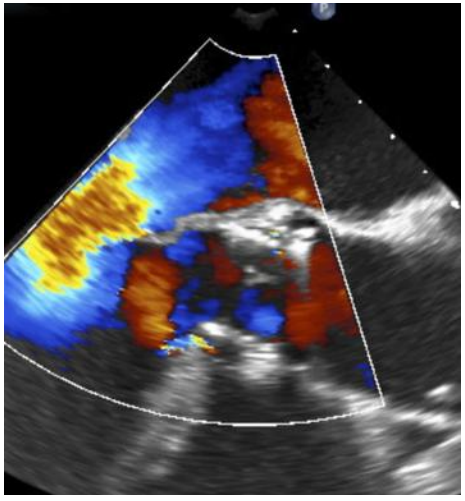
Jilaihavi et al.
JACC 2012;
59:1275-86

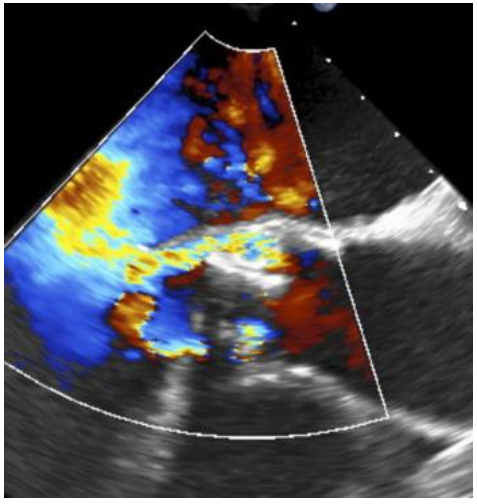
Cross-Sectional Computed Tomographic Assessment Improves Accuracy of Aortic Annular Sizing for Transcatheter Aortic Valve Replacement and Reduces the Incidence of Paravalvular Aortic Regurgitation











Jilaihavi et al.
JACC 2012;
59:1275-86

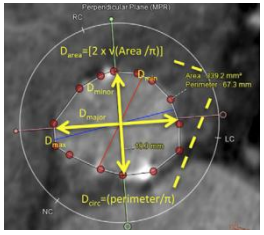
Cross-Sectional Computed Tomographic Assessment Improves Accuracy of Aortic Annular Sizing for Transcatheter Aortic Valve Replacement and Reduces the Incidence of Paravalvular Aortic Regurgitation

Table 5 Comparison of Outcomes Related to Prosthesis Sizing With TEE- and CT-Guided Approaches

Outcomes	All Studied Patients (n = 136)	2D TEE-Guided Annular Sizing (n = 96)	Cross-Sectional CT-Guided Annular Sizing (n = 40)	p Value
PV AR				0.001
None	41 (30.1)	23 (24)	18 (45)	
Trivial or mild	71 (52.2)	52 (54.1)	19 (47.5)	
Mild-moderate	9 (6.6)	8 (8.3)	1 (2.5)	
Moderate	12 (8.8)	1 (1.0.4)	2 (5)	
Moderate-severe	3 (2.2)	3 (3.1)	0	
Severe		0	0	
PV AR > mild	24 (17.6)	21 (21.9)	3 (7.5)	0.045
Need for bail-out valve-in-valve	1 (0.7)	1 (1)	0	0.52
Annular rupture	1 (0.7)	1 (1)	0	0.52
Prosthesis instability (rocking)	1 (0.7)	1 (1)	0	0.52
Peri-procedural mortality	4 (3)	3 (3.2)	1 (2.5)	0.82

38/96 patients would have received a bigger prosthesis

Cardiac CT



TEE
AR>mild
21%

CT
AR>mild
7,5%

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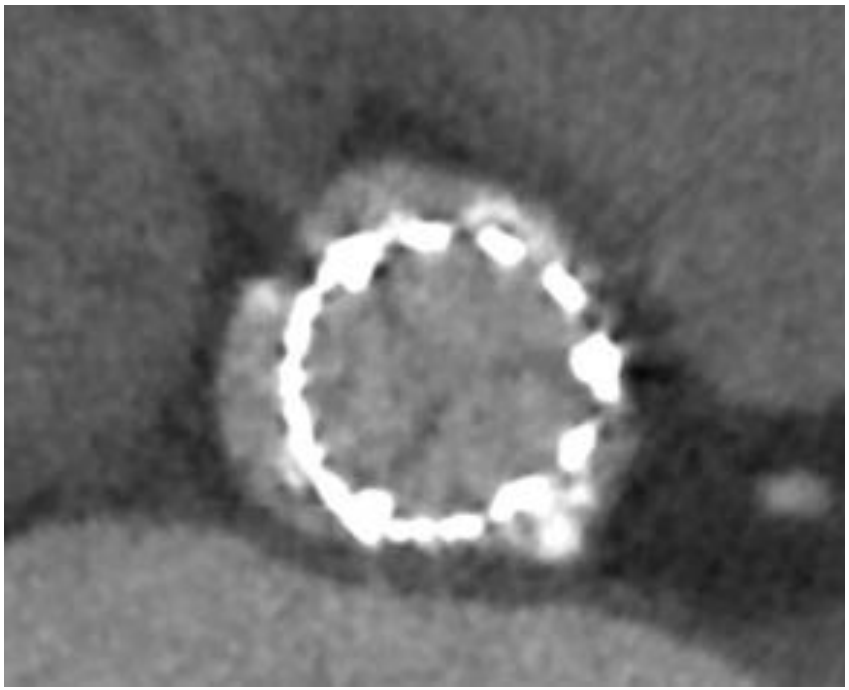
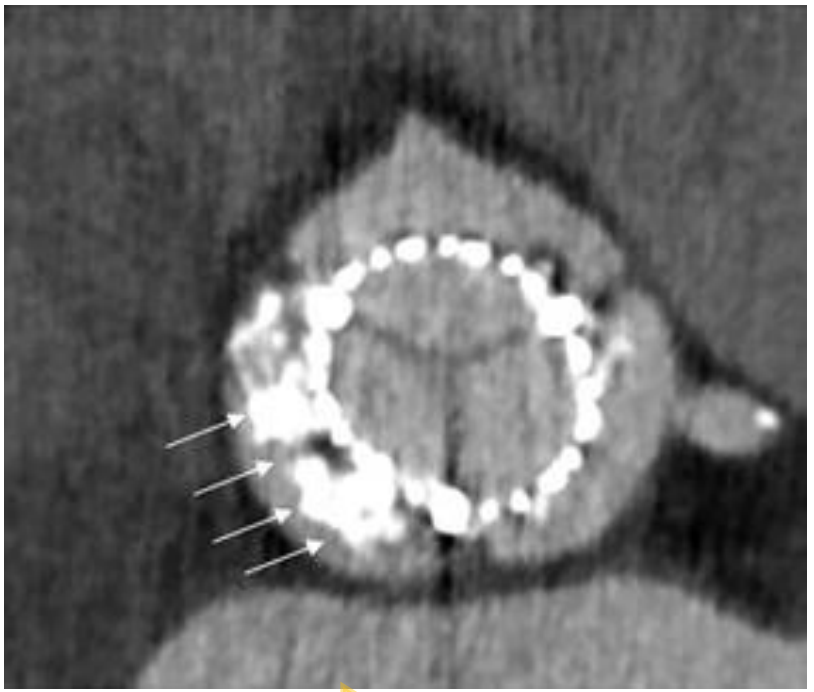
Delgado et al.
EHJ 2010 ;
31: 1114-1123

Transcatheter aortic valve implantation: role of multi-detector row computed tomography to evaluate prosthesis positioning and deployment in relation to valve function

PRE procedural	GUIDE procedural	POST procedural





Cardiac CT → **NON CIRCULAR valve deployment** → **AR**

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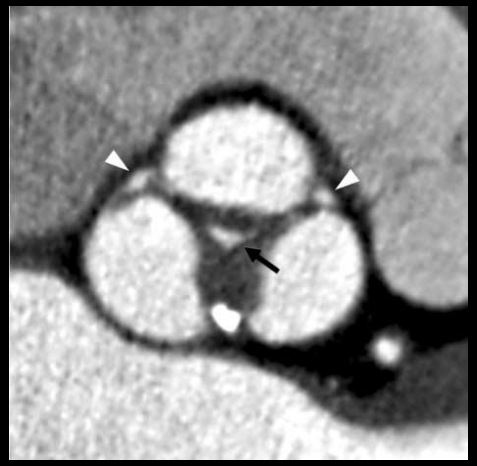
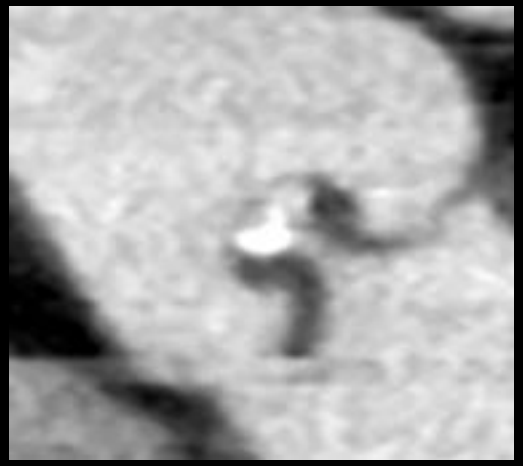
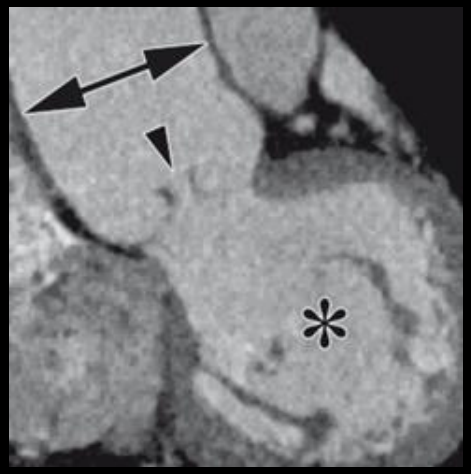
Aortic regurgitation

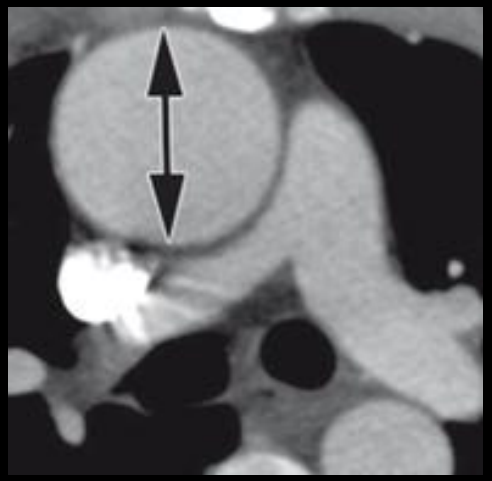
Anatomy evaluation

- Leaflet morphology
- Coaptation defects
- Calcification
- Aortic root dilatation
- LV chambers size









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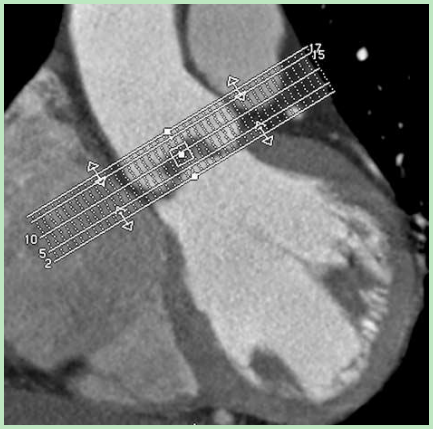
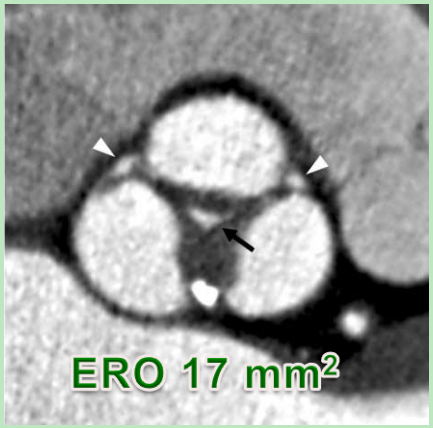
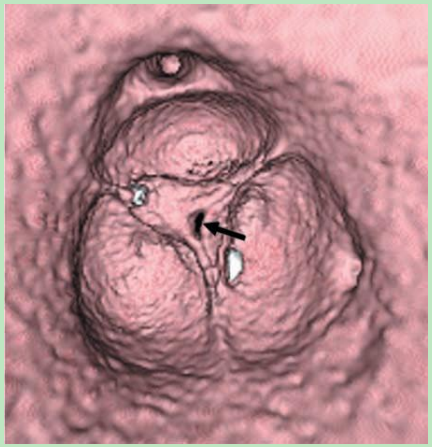


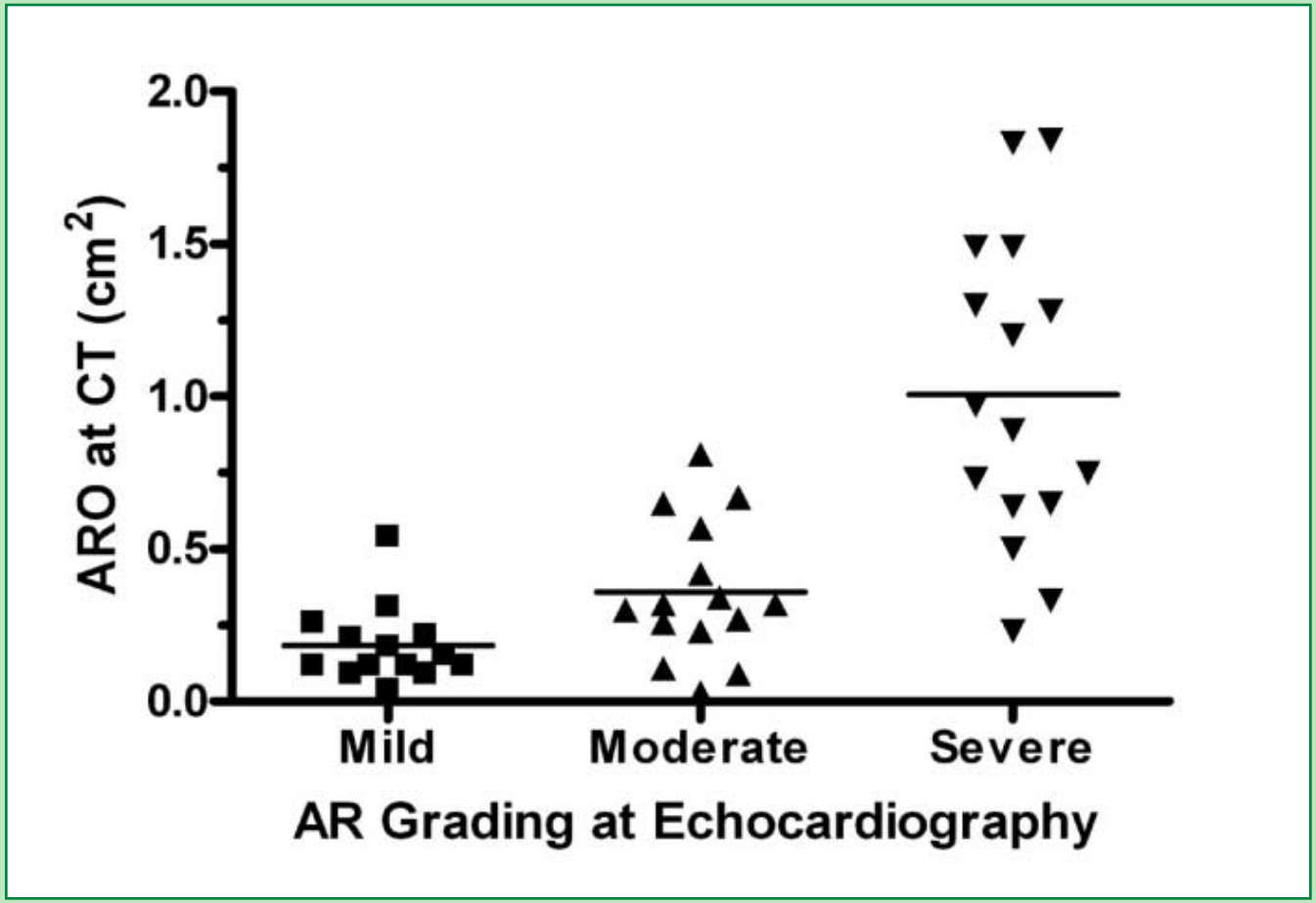




Planimetric Measurement of the Regurgitant Orifice Area Using Multidetector CT for Aortic Regurgitation: a Comparison with the Use of Echocardiography

Jeon et al.
K Rad 2010;
11:169-167

43 patients with aortic valve disease referred for CT study



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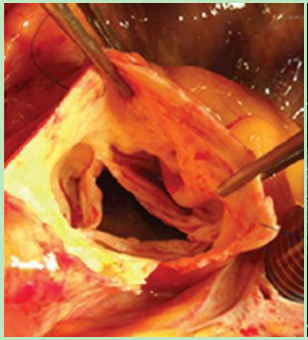
64-MDCT for Diagnosis of Aortic Regurgitation in Patients Referred to CT Coronary Angiography

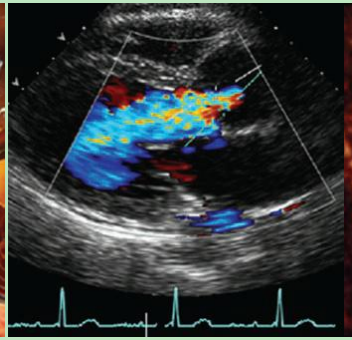
Feuchtner et al
AJR 2008; 191: W1-W7

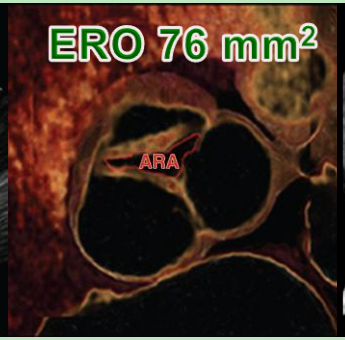
CT 64 for diagnosis of aortic regurgitation

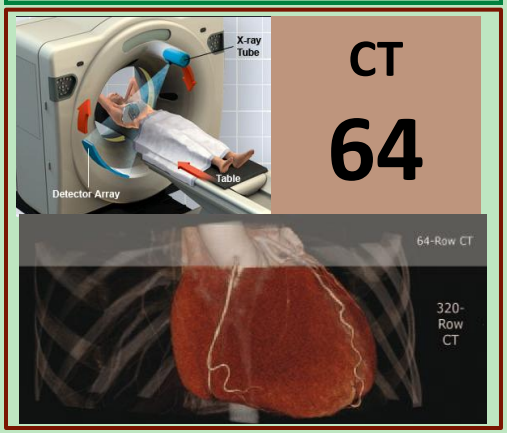
81 consecutive patients

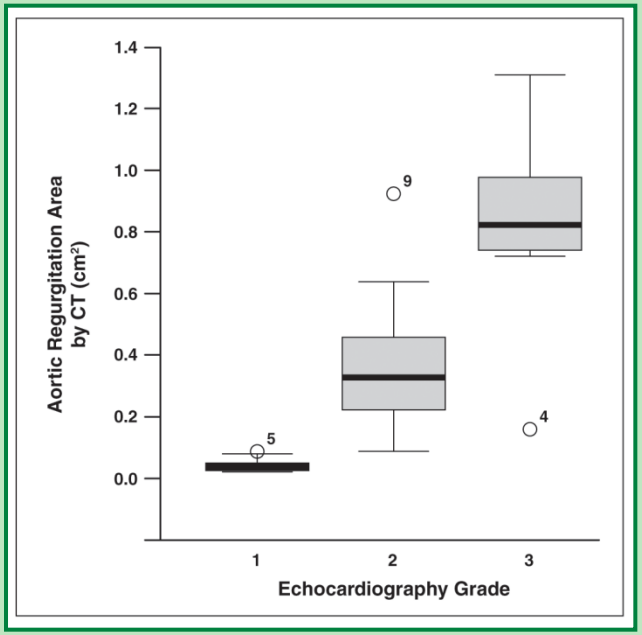
Coronary study before AV replacement











45 p with AR

Mild AR

12 p not detected with CT

Moderate - severe AR

Sensitivity	95%
Specifity	100%
PPV	100%
NVP	98%

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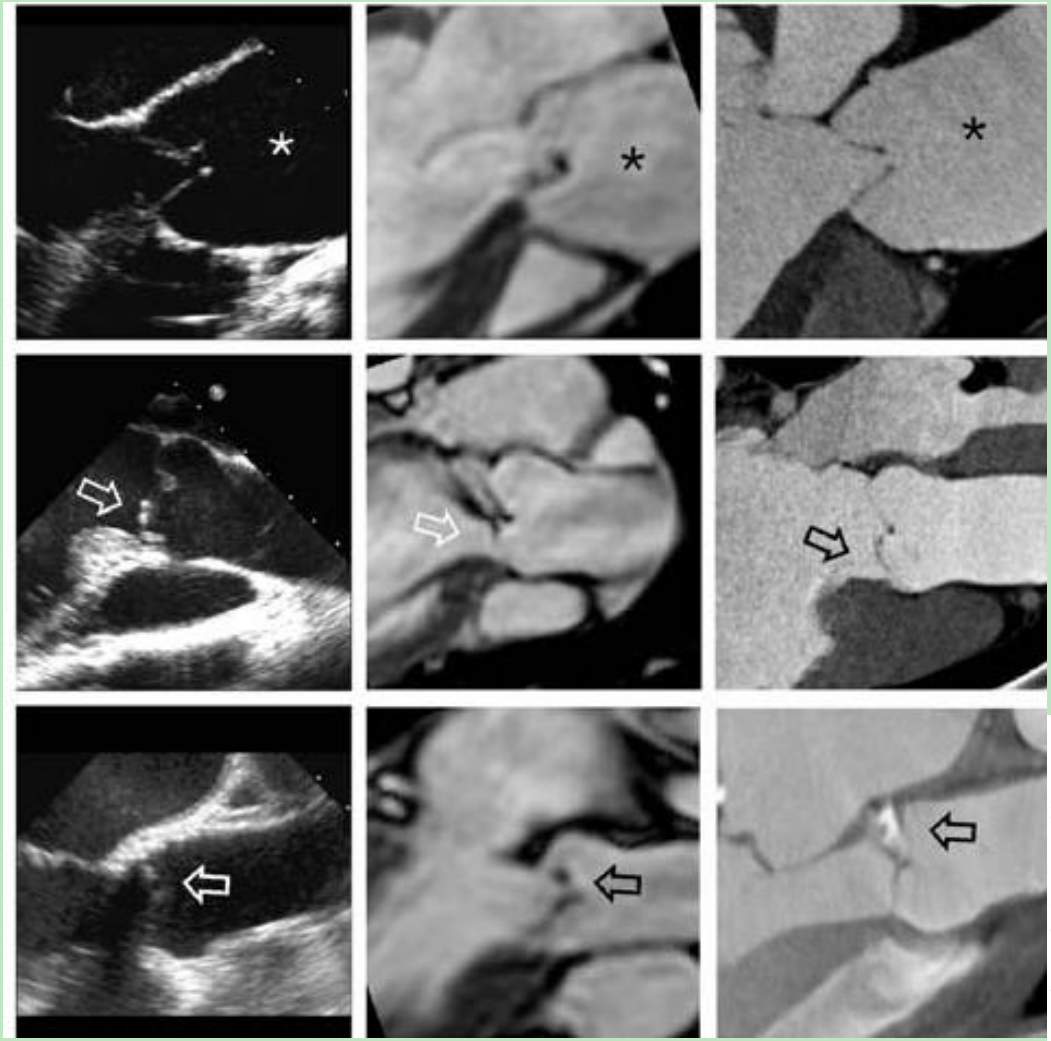
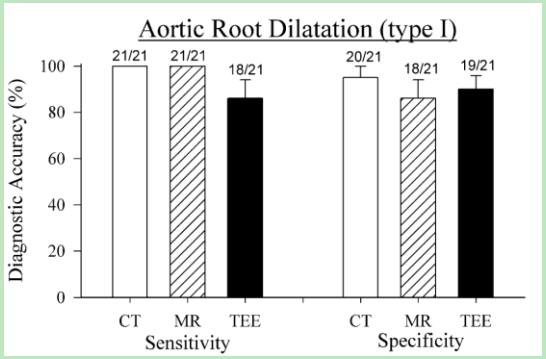
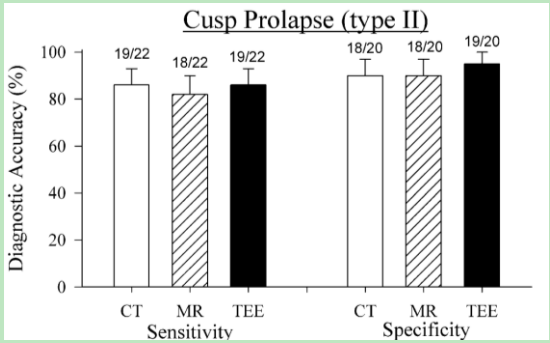
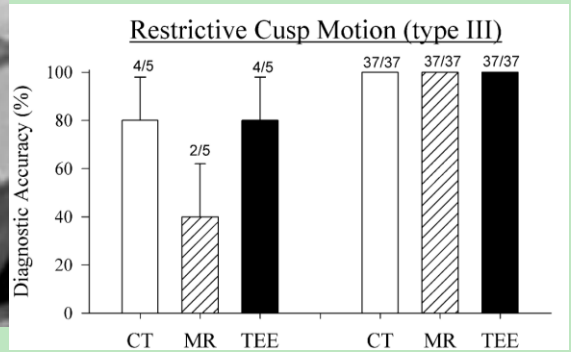
Goffinet et al.
Eur Radiol 2010
20: 326-336

Comprehensive assessment of the severity and mechanism of aortic regurgitation using multidetector CT and MR









42 patients scheduled for VAo replacement due to AR

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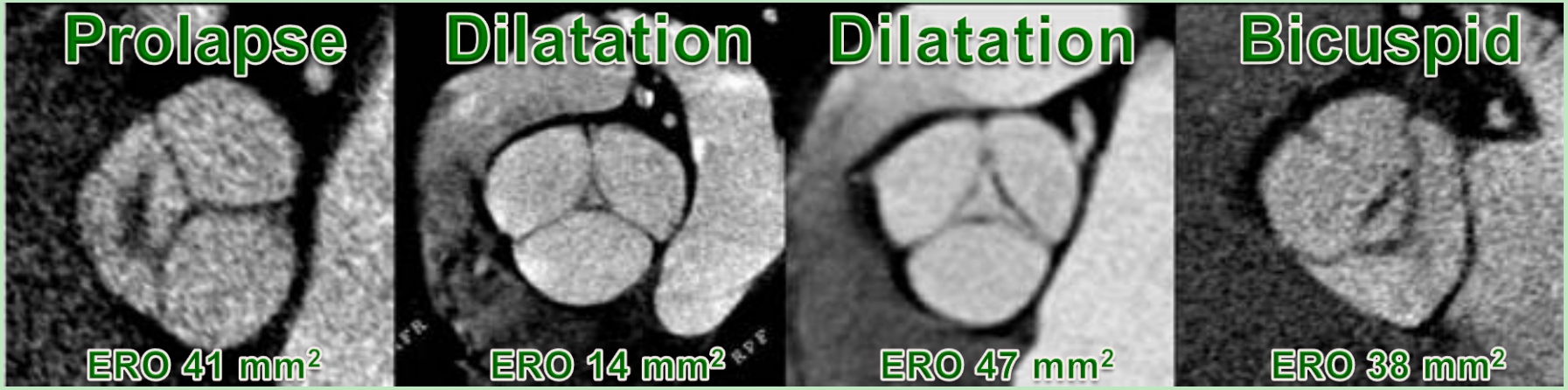
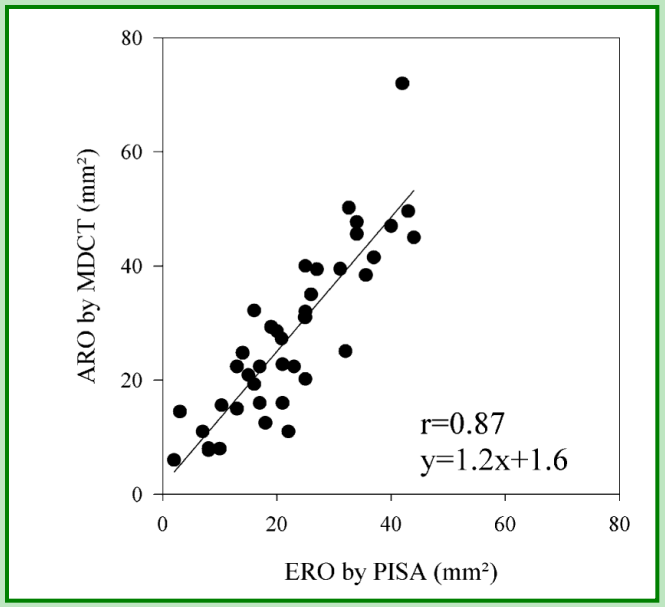
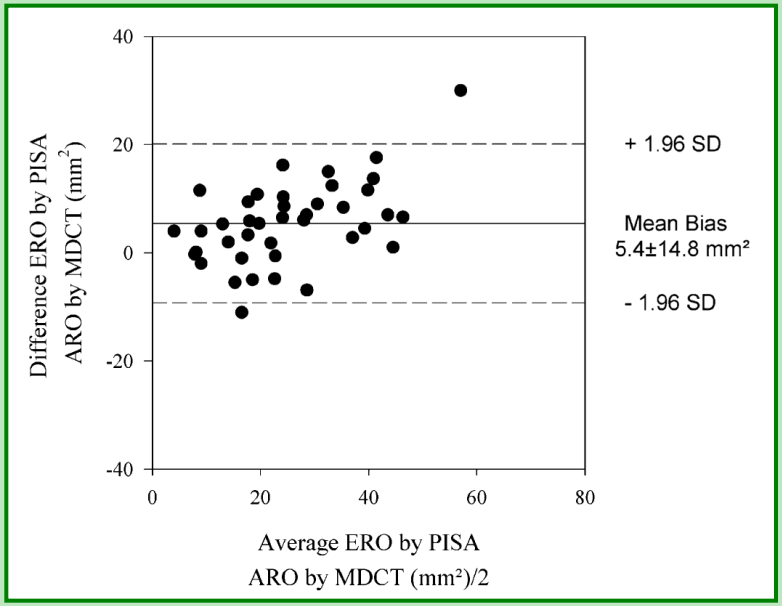
Goffinet et al.
Eur Radiol 2010
20: 326-336

Comprehensive assessment of the severity and mechanism of aortic regurgitation using multidetector CT and MR







ERO
0,05 cm²
bigger
with CT

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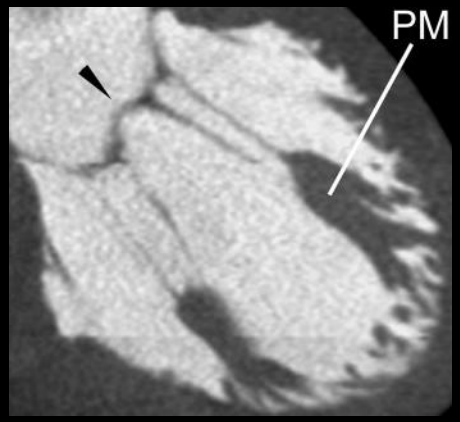
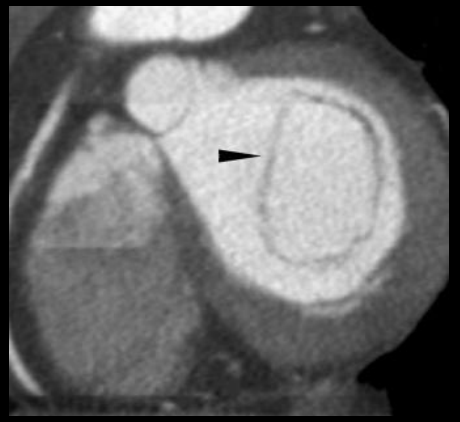
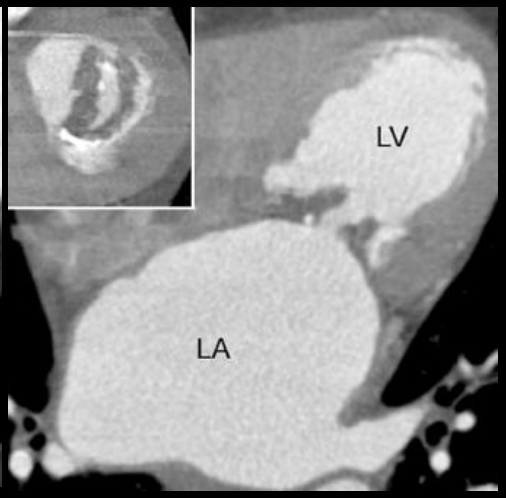
Mitral valve

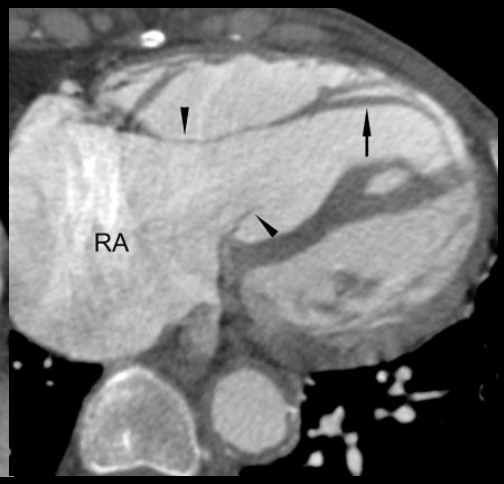
Anatomy evaluation

- Leaflets, chordae, papillary
- Area (normal 4-6 cm^2)
- Coaptation defects
- Calcification
- Chamber size evaluation









CARDIAC TC IN VALVULAR HEART DISEASES

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Mitral Valve Prolapse: Evaluation With ECG-Gated Cardiac CT Angiography

Cardiac CT Angiography for the Diagnosis of Mitral Valve Prolapse

Evaluation of MVP vs echo for MVP diagnosis

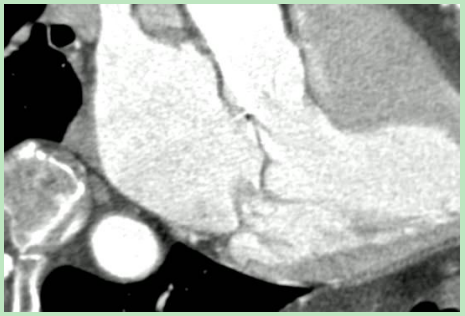

TABLE 6: CT Versus Transthoracic Echocardiographic Detection of Mitral Valve Prolapse (Observer 1, Set 2)

CT Finding	Transthoracic Echocardiographic Finding	
	Present	Absent
Present	11	0
Absent	2	27

Sn 84.6% Sp 100% VPP 100% VPN 93%

Diagnostic Performance of Coronary CT Angiography Compared with TTE for Diagnosis of MVP

CT Plane	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Accuracy (%)
Four-CH view	94 (50/53; 85, 98)	90 (53/59; 79, 95)	89 (50/56; 78, 95)	95 (53/56; 85, 98)	92 (103/112; 86, 96)
Three-CH view	81 (43/53; 69, 89)	98 (58/59; 91, 99)	98 (58/59; 88, 99)	85 (58/68; 75, 91)	90 (101/112; 83, 94)
Three- and/or two-CH view	96 (51/53; 87, 99)	93 (55/59; 84, 97)	93 (51/55; 83, 97)	96 (55/57; 88, 99)	95 (106/112; 89, 98)
Either three- or two-CH and four-CH views	91 (48/53; 79, 96)	93 (55/59; 83, 97)	92 (48/52; 81, 97)	92 (55/60; 82, 97)	92 (103/112; 85, 95)
At least one view with positive findings	98 (52/53; 90, 99)	90 (53/59; 80, 96)	90 (52/58; 79, 95)	98 (53/54; 90, 99)	94 (105/112; 88, 97)

Sn 98% Sp 90% VPP 90% VPN 98%

Feuchtner et al Radiology 2010; 254: 374-383
Shah et al AJR 2010; 194:579-584

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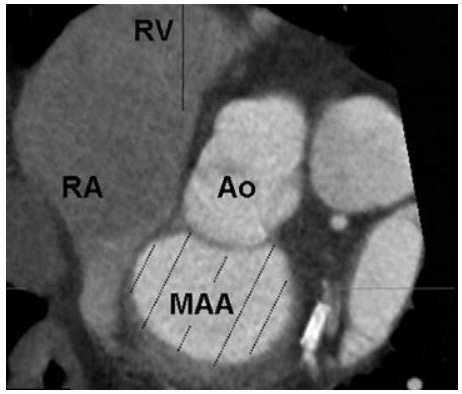
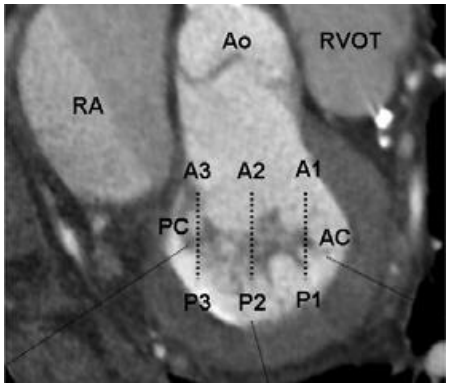
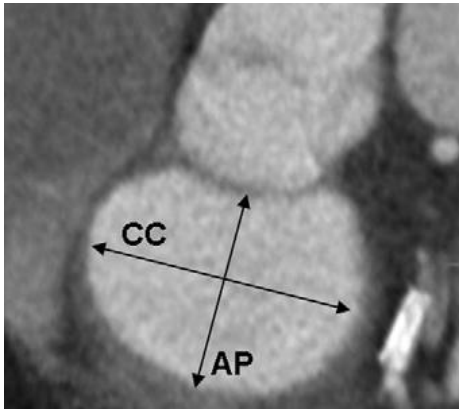
Assessment of Mitral Valve Anatomy and Geometry With Multislice Computed Tomography

CT 64 in 151 for mitral valve regurgitation







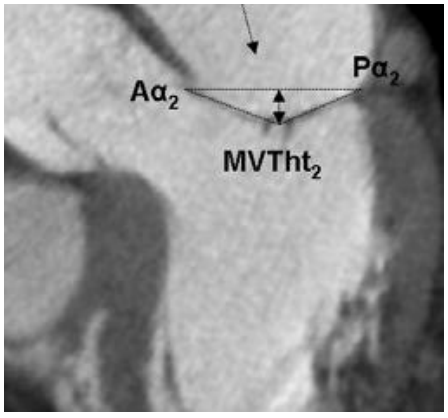


Table 6. MSCT Parameters Determinants of Effective Regurgitant Orifice Area: Univariate and Multivariate Analyses

	Univariate		Multivariate
	r	p Value	p Value
Anterior leaflet angle, °			
Anterolateral	0.19	0.02	0.7
Central	0.31	<0.0001	0.3
Posteromedial	0.26	0.001	—
Posterior leaflet angle, °			
Anterolateral	0.25	0.002	0.3
Central	0.32	<0.0001	0.9
Posteromedial	0.25	0.002	—
MVTHt index, mm/m^2			
Anterolateral	0.36	<0.0001	0.5
Central	0.53	<0.0001	<0.0001
Posteromedial	0.43	<0.0001	—
Mitral valve sphericity index	0.36	<0.0001	<0.0001

Functional MR

bigger tenting heights at central and posterior levels

Delgado et al J Am Coll Cardiol Img 2009; 2:556-65

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Assessment of Changes in Mitral Valve Configuration With Multidetector Computed Tomography

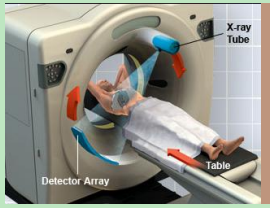
Impact of Papillary Muscle Imbrication and Ring Annuloplasty

Evaluation of MF after two different surgical techniques for functional MR

26 Functional MR 3+ to 4+

Annuloplasty

Annuloplasty +
papillary muscle imbrication



CT 64

Before surgery

Early after surgery

Shudo et al.
Circulation 2010
122:S29-36

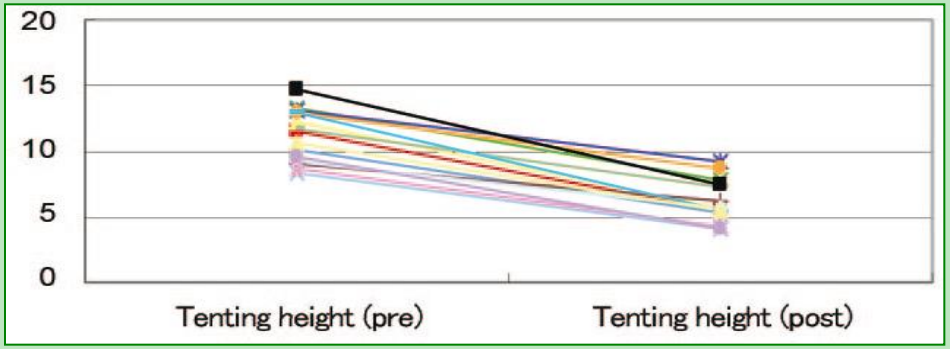
Annuloplasty +
papillary muscle imbrication

↓

Bigger reduction
tenting area

↑

Reduction of distance
between papillary muscles



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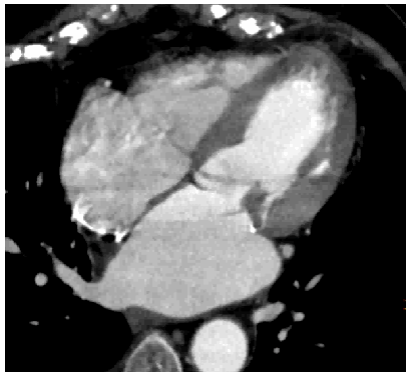
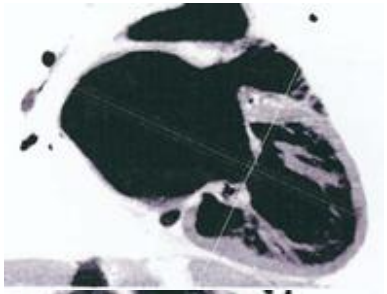
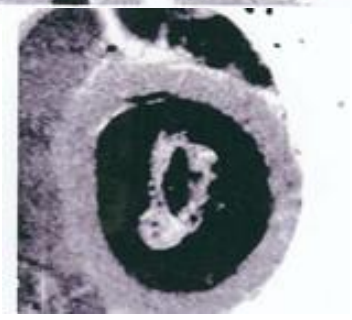
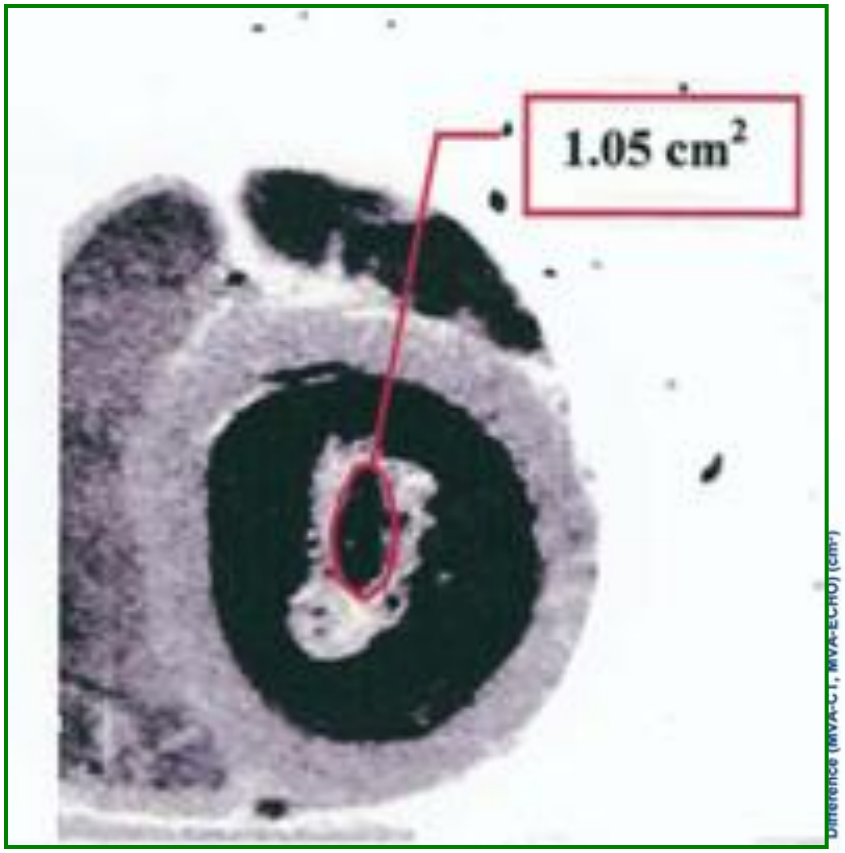
Assessment of the Mitral Valve Area in Patients With Mitral Stenosis by Multislice Computed Tomography

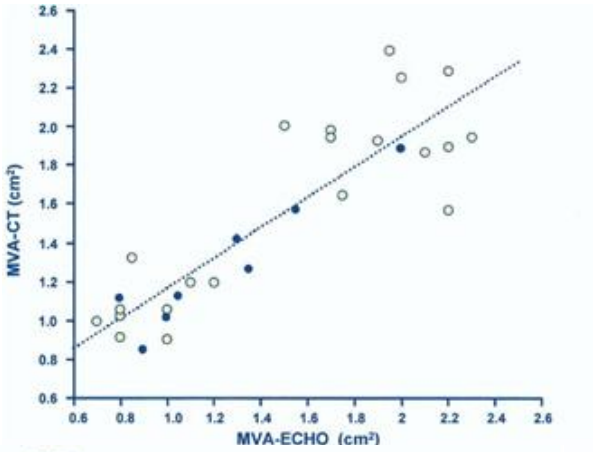
CT 16 in 29 patients with mitral stenosis

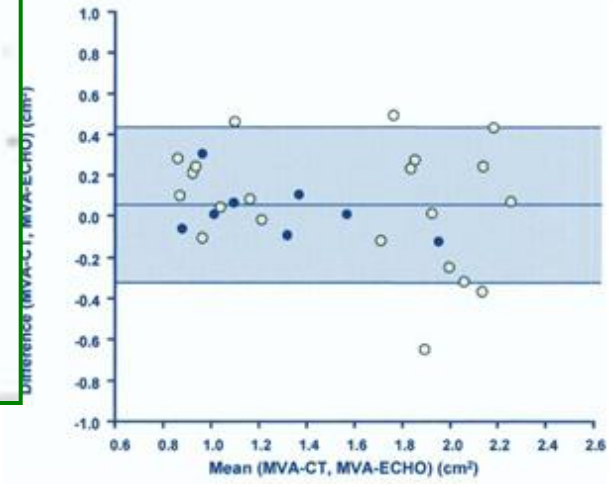












Messika - Zeitoun et al. J Am Coll Cardol 2006; 48:411-413

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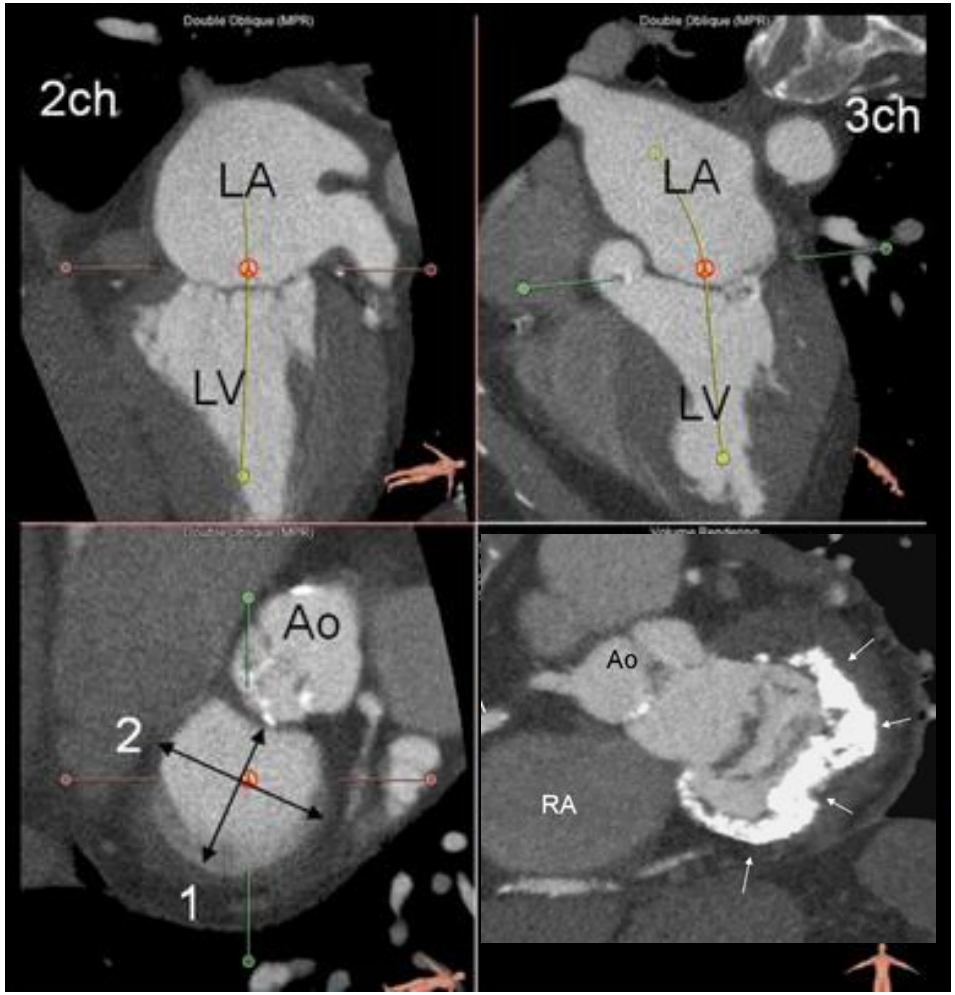
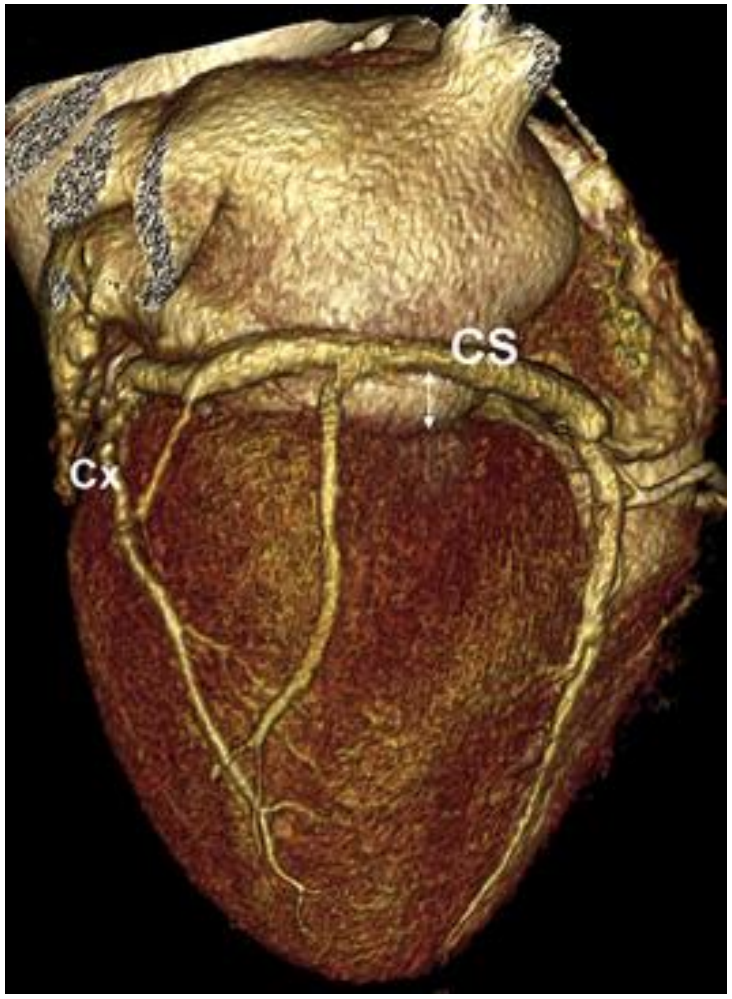
VALVULAR HEART DISEASE

Multimodality imaging before, during, and after percutaneous mitral valve repair

Delgado et al. Heart 2011 ; 97: 1705-1714





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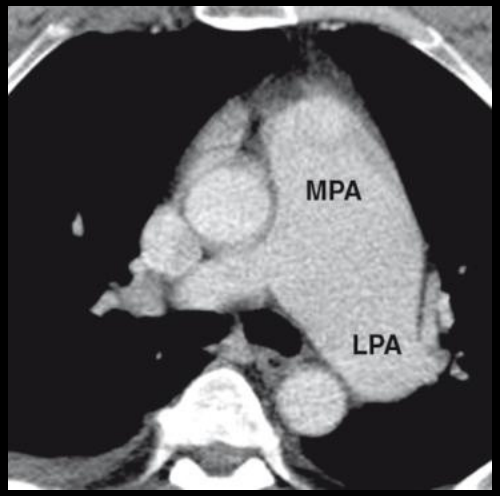
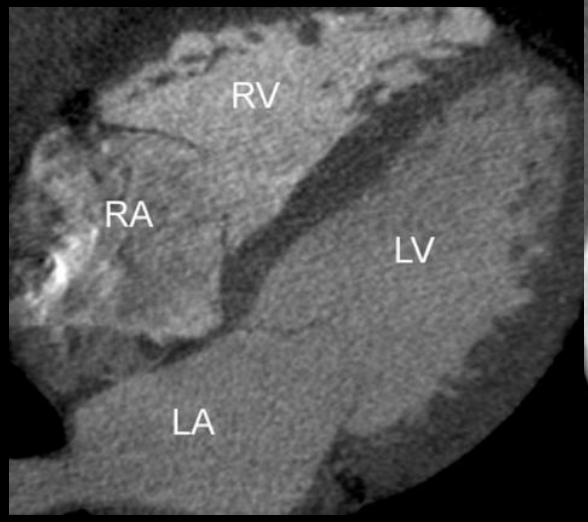
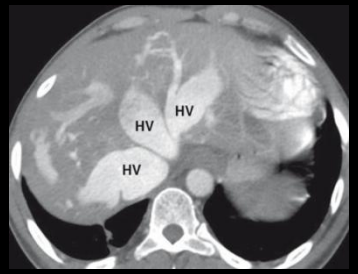
Right valves

Anatomy evaluation

- Leaflets morphology
- Valve Area
- Coaptation defects
- Calcification
- Chamber size evaluation







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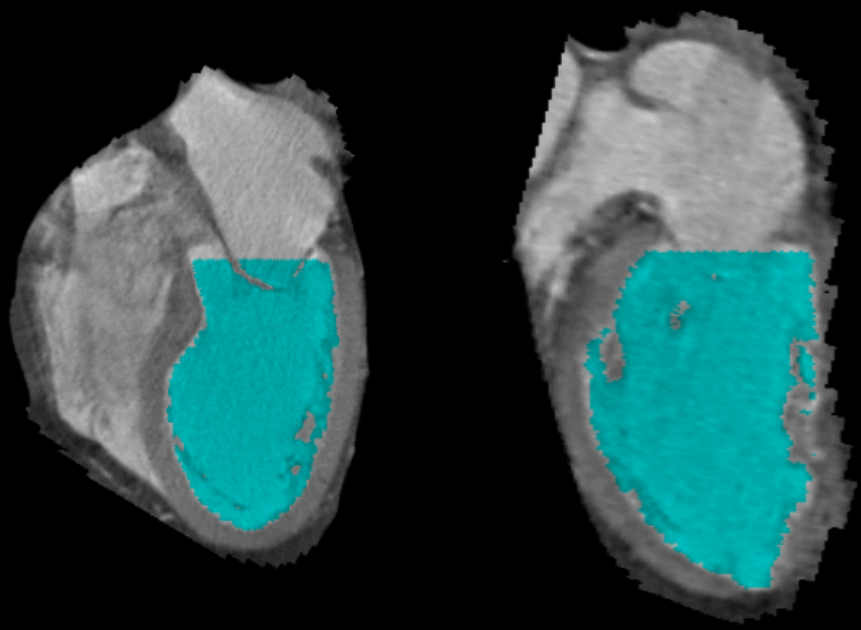
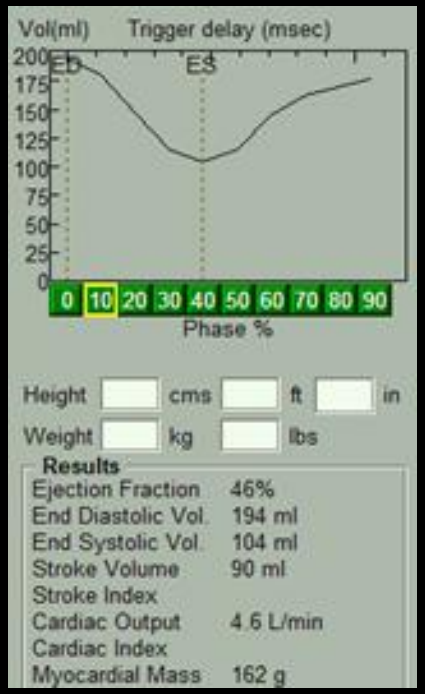
Ventricular function



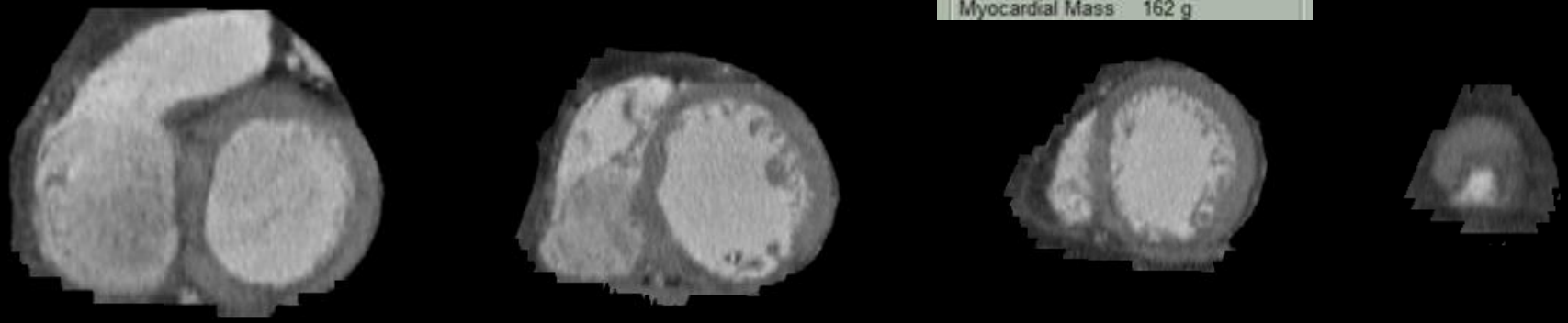


FEVI

46%

VTD

196 ml



APPROPRIATE USE CRITERIA

ACCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR 2010 Appropriate Use Criteria for Cardiac Computed Tomography

	Indication	Appropriate Use Score (1–9)
	Adult Congenital Heart Disease	
46.	• Assessment of anomalies of coronary arterial and other thoracic arteriovenous vessels	A (9)
47.	• Assessment of complex adult congenital heart disease	A (8)
	Evaluation of Ventricular Morphology and Systolic Function	
48.	• Initial evaluation of left ventricular function • Following acute MI or in HF patients	I (2)
49.	• Evaluation of left ventricular function • Following acute MI or in HF patients • Inadequate images from other noninvasive methods	A (7)
50.	• Quantitative evaluation of right ventricular function	A (7)
51.	• Assessment of right ventricular morphology • Suspected arrhythmogenic right ventricular dysplasia	A (7)
52.	• Assessment of myocardial viability • Prior to myocardial revascularization for ischemic left ventricular systolic dysfunction • Other imaging modalities are inadequate or contraindicated	U (5)

Taylor et al. J Am Coll Cardiol 2010; 56(22): 1864-94.

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Gahide et al.
AJR 2010; 194:574-578

Preoperative Evaluation in Aortic Endocarditis: Findings on Cardiac CT

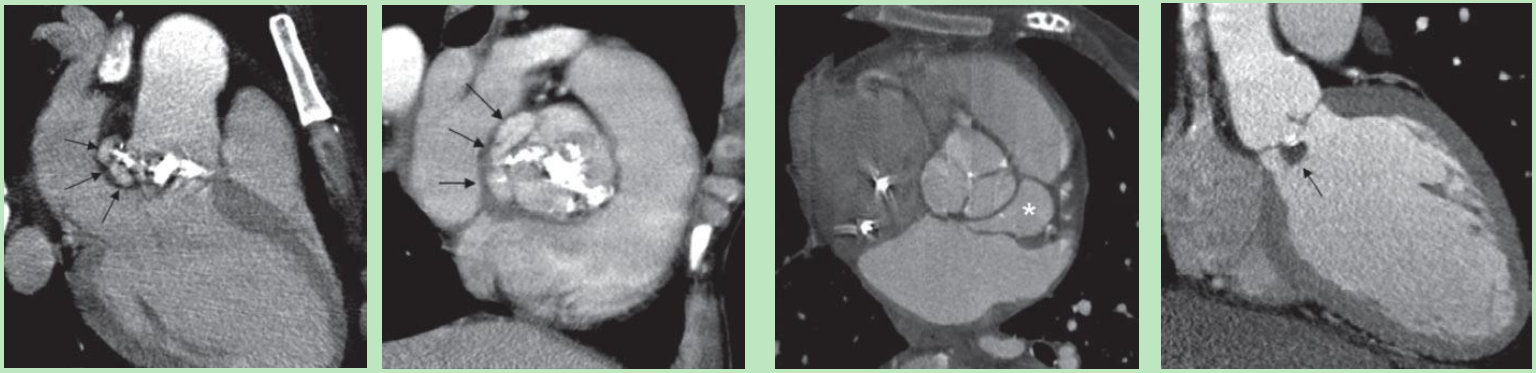

TABLE 2: CT Capability for Depicting Aortic Valve Anomalies in Aortic Endocarditis

Finding	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)
Pseudoaneurysm	100	87.5	91.7	100
Aortomitral trigone	100	100	100	100
Valve vegetations	71.4	100	100	55.5
Large valve vegetations, > 10 mm	100	100	100	100

Note—All data were calculated on a per-patient basis.

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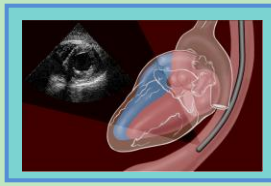
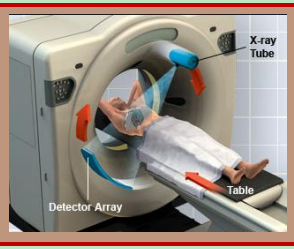
Multislice Computed Tomography in Infective Endocarditis

CT vs TEE and surgical findings in evaluation of infective endocarditis

33 Clinical EI suspicion



TEE



CT 64

Direct Surg

Table 3 Diagnostic Performance of CT

	Percent	95% CI
For the Detection of Vegetations, Paravalvular Abscesses, and Pseudoaneurysms (37 Patients, 73 Valves) in Patients With Possible and Definite IE: Comparison With TEE		
Per-patient–based analysis		
Sensitivity (28/29)	97	82%–100%
Specificity (7/8)	88	47%–100%
Positive predictive value (28/29)	97	82%–100%
Negative predictive value (7/8)	88	47%–100%
Diagnostic accuracy (35/37)	95	82%–100%
Per-valve–based analysis		
Sensitivity (28/29)	97	82%–100%
Specificity (42/44)	95	85%–99%
Positive predictive value (28/30)	93	78%–99%
Negative predictive value (41/42)	98	88%–100%
Diagnostic accuracy (70/73)	96	88%–99%

96% vegetations

100% abscesses/pseudo

Feuchtner et al J Am Coll Cardiol 2009;53:436–44

CARDIAC TC IN VALVULAR HEART DISEASES

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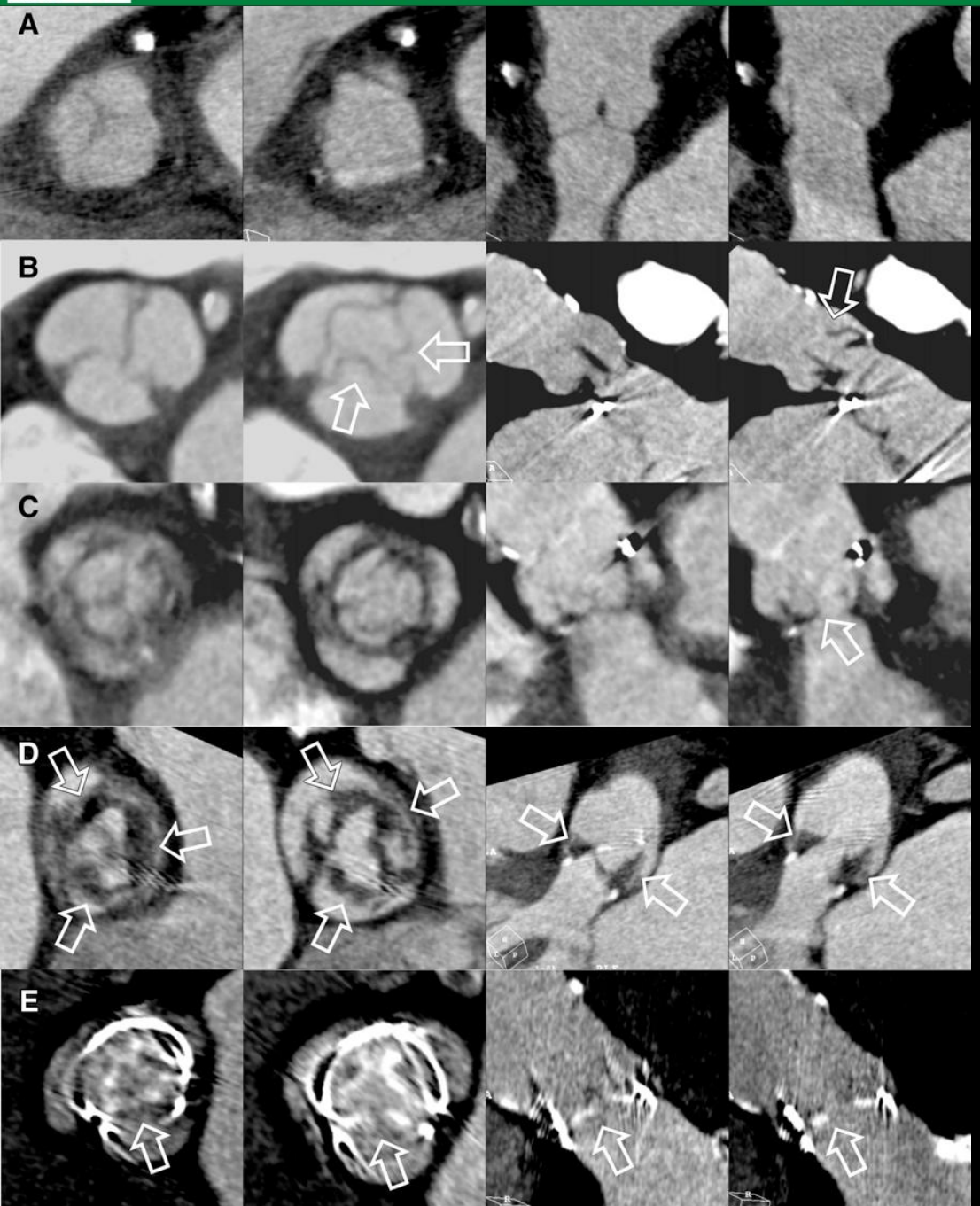
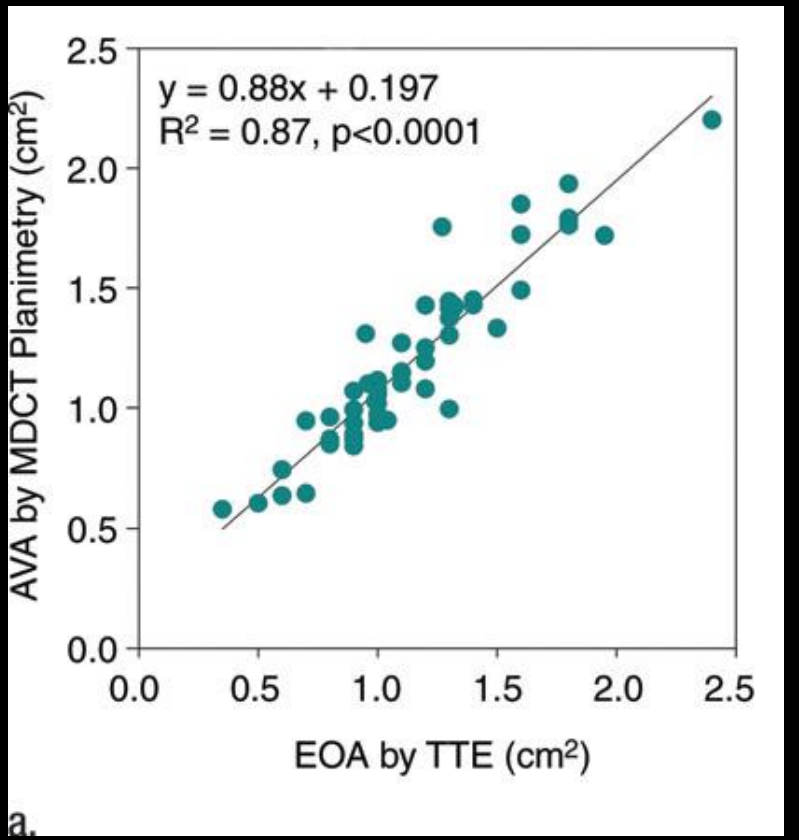
Evaluation of Anatomic Valve Opening and Leaflet Morphology in Aortic Valve Bioprosthesis by Using Multidetector CT:





Chenot et al.
Radiology 2010; 255: 355-785

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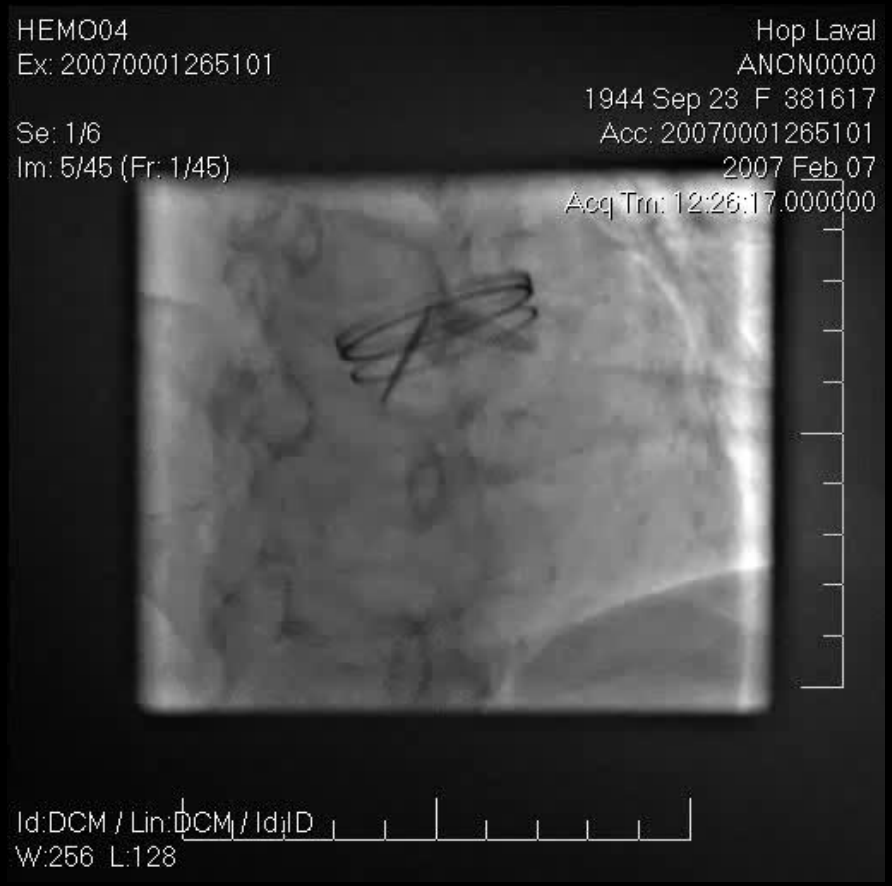
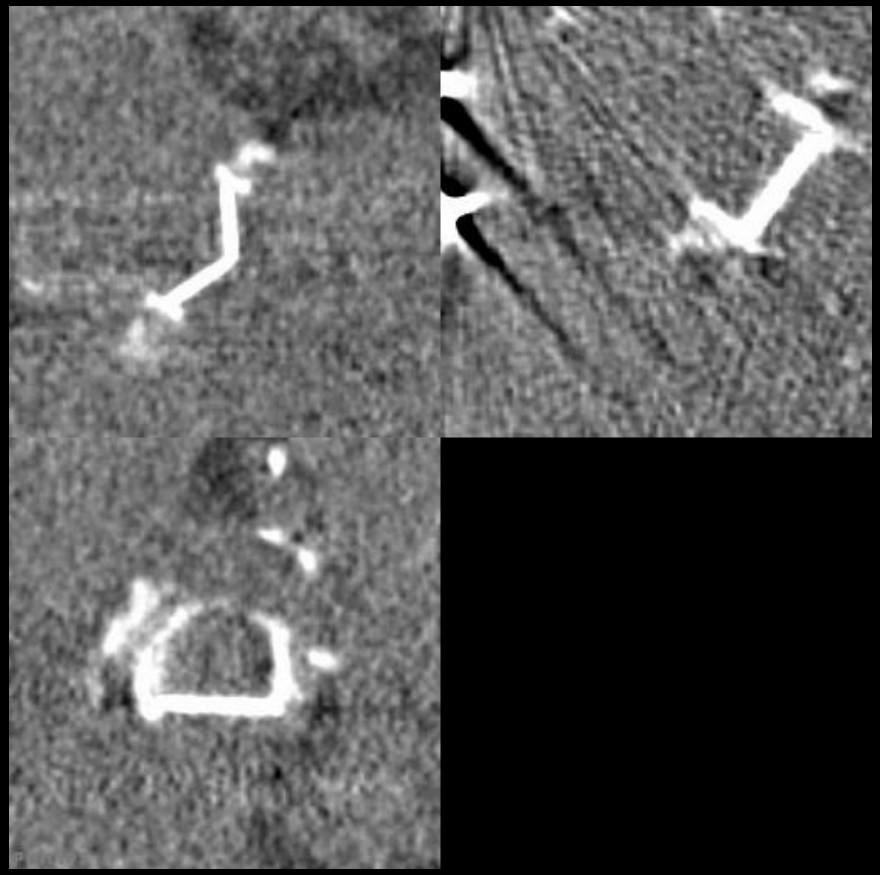
GUIDELINES AND STANDARDS

Recommendations for Evaluation of Prosthetic Valves With Echocardiography and Doppler Ultrasound





Zoghbi et al
J Am Soc Echocardiogr 2009; 22:975-1014

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Conclusions

NO DOUBT echo is the first choice to study VHD

- echo is also (TEE) the second choice for challenging cases

NO DOUBT Cardiac CT is the best choice to study coronary arteries when valve surgery is scheduled

➢ Join Dr. Spagnolo 8th 14:15

Cardiac CT has a increasing role in **TAVI** evaluation

➢ Join Dr. Piazza 9th 09:15

Cardiac CT can be useful in **selected cases** for

- Aortic/Mitral valve disease
- Prosthesis evaluation
- Endocarditis

Thank you!!!


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