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BEST OF CNCH

Imagerie Cardiovasculaire 2020

BERNARD Anne
MD, PhD

CHRU HÔPITAUX DE TOURS université de TOURS

Société Française de Cardiologie

Filiale d'Imagerie Cardiovasculaire de la Société Française de Cardiologie

Compte Twitter Orateur
@BernardAnne7

Avec le soutien institutionnel de

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National des
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Hôpitaux

Imagerie multimodalité et

- Insuffisance cardiaque
- Rythmologie
- Coronaires/ischémie
- Valvulopathies/endocardite infectieuse
- Cardiopathie emboligène
- Aorte
- Sportif
- Futur

Insuffisance cardiaque

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JACC: CARDIOVASCULAR IMAGING
VOL. 13, NO. 1, 2020

PUBLISHED BY ELSEVIER

Top *JACC Cardiovasc Imaging*

iREVIEW

SPECIAL ISSUE: NONINVASIVE ASSESSMENT OF LEFT VENTRICULAR DIASTOLIC FUNCTION

STATE-OF-THE-ART REVIEW

Left Ventricular Diastolic Function

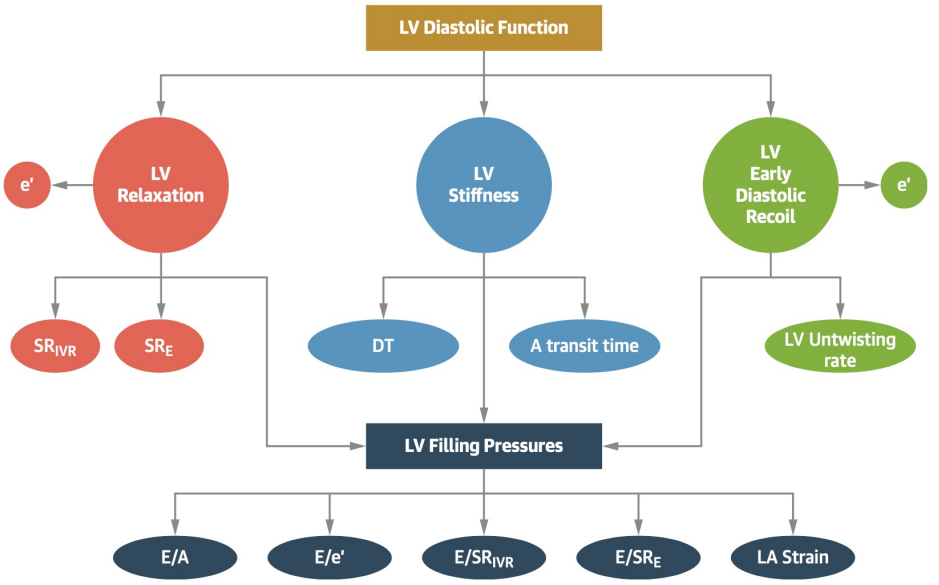
Understanding Pathophysiology, Diagnosis, and Prognosis With Echocardiography

Sherif F. Nagueh, MD

HIGHLIGHTS

- LV diastolic function determines symptoms and predicts outcome in patients with cardiovascular disease.
- Echocardiography is used to assess LV diastolic function, and estimate LV filling pressures.
- Recent American Society of Echocardiography/European Association of Cardiovascular Imaging guidelines were validated against invasive gold standard, with superior accuracy in predicting outcomes.
- LV and left atrial function novel indices and artificial intelligence have potential to advance this field.

CENTRAL ILLUSTRATION Hemodynamic Variables That Characterize LV Diastolic Function and Echocardiographic Surrogates



Nagueh, S.F. J Am Coll Cardiol Img. 2020;13(1):228-44.

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iREVIEW

SPECIAL ISSUE: NONINVASIVE ASSESSMENT OF LEFT VENTRICULAR DIASTOLIC FUNCTION

STATE-OF-THE-ART REVIEW

Diastolic Dysfunction and Heart Failure With Preserved Ejection Fraction

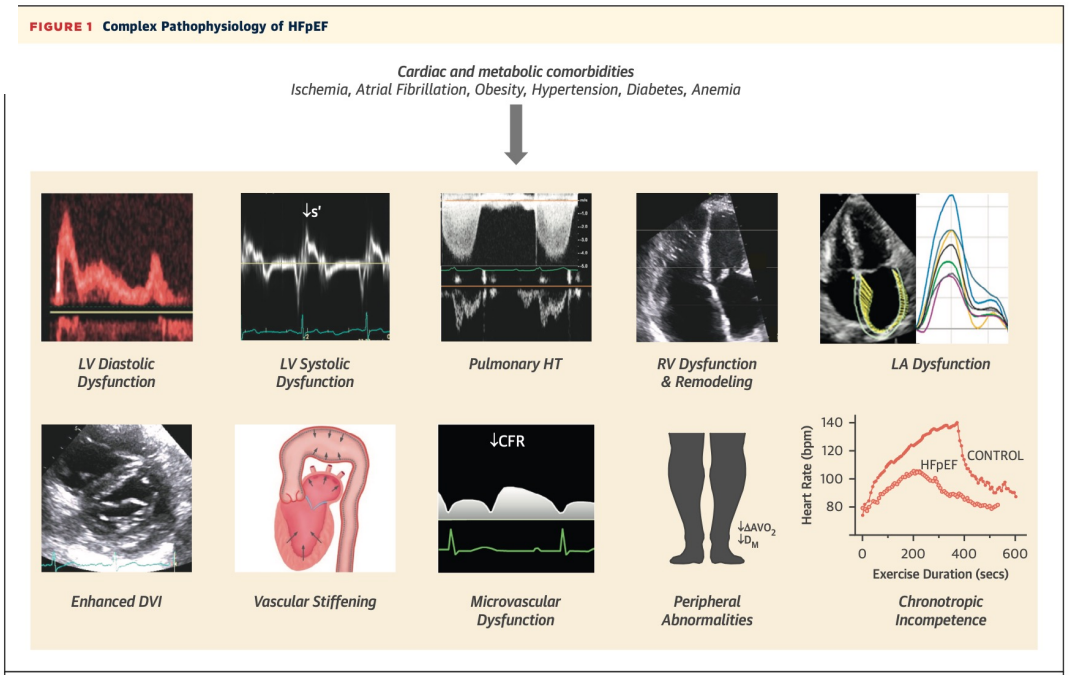
Understanding Mechanisms by Using Noninvasive Methods

Masaru Obokata, MD, PhD, Yogesh N.V. Reddy, MBBS, MSc, Barry A. Borlaug, MD

HIGHLIGHTS

- HFpEF is a heterogeneous syndrome, and categorizing patients based upon pathophysiology may provide phenotype-specific therapies.
- Echocardiography provides valuable information for assessing pathophysiological mechanisms, phenotyping, and diagnosis in cases of HFpEF.
- Further study is needed to establish the HFpEF phenotype and roles of noninvasive imaging in it.

FIGURE 1 Complex Pathophysiology of HFpEF



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ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2020) **21**, 715–717
doi:10.1093/ehjci/jeaa091

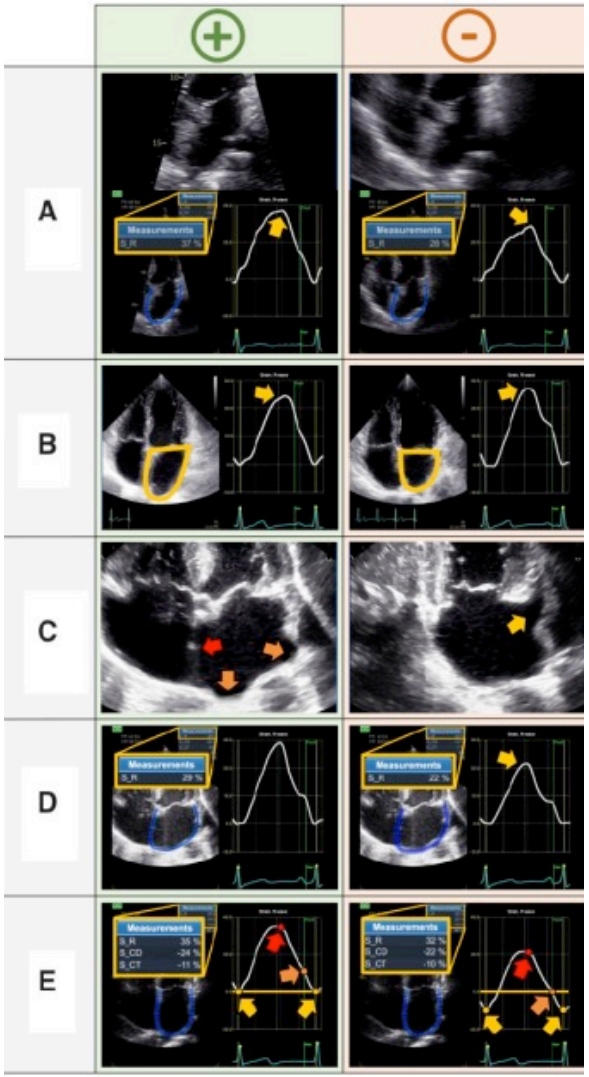
"HOW TO" PAPER

How to do LA strain

Jens-Uwe Voigt [1,2]*, Georgiana-Grațiela Mălăescu[1,2]†, Kristina Haugaa[3], and Luigi Badano[4,5]

Table 1 **Step-by-step approach to atrial strain assessment**

acquisition	select an LA focussed view (2CV or 4CV)
	narrow image sector
	check for artefact free visibility of all LA wall
	acquire 3 – 5 consecutive, regular beats
post-processing	contour LA using automatic features
	adapt contour and ROI width
	check tracking result, modify by adjusting contour if needed
	report LA strain for reservoir, conduit and/or contraction



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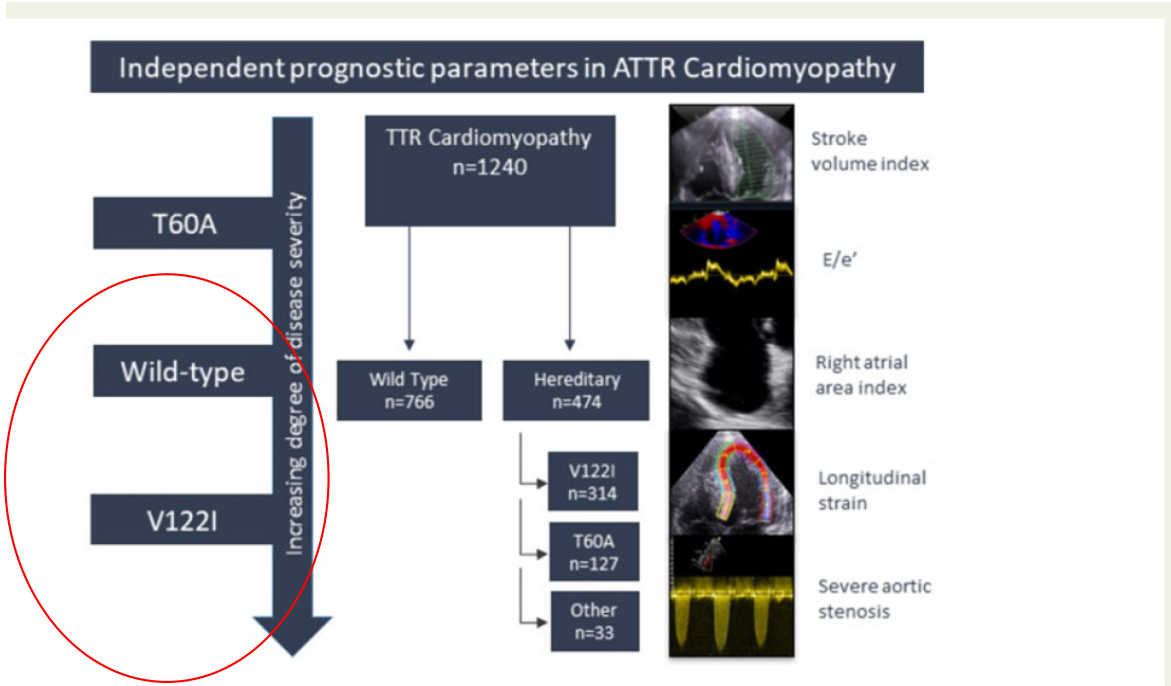
ESC European Society of Cardiology
European Heart Journal (2020) 41, 1439–1447
doi:10.1093/eurheartj/ehz905

CLINICAL RESEARCH
Heart failure/cardiomyopathy

Echocardiographic phenotype and prognosis in transthyretin cardiac amyloidosis

Liza Chacko [1†], Raffaele Martone [1,2†], Francesco Bandera [3,4], Thirusha Lane[1], Ana Martinez-Naharro [1], Michele Boldrini[1], Tamer Rezk[1], Carol Whelan[1], Cristina Quarta[1], Dorota Rowczenio[1], Janet A. Gilbertson[1], Tanakal Wongwarawipat [1], Helen Lachmann[1], Ashutosh Wechalekar[1], Sajitha Sachchithanantham[1], Shameem Mahmood[1], Rossella Marcucci [5], Daniel Knight[1], David Hutt [1], James Moon [6,7], Aviva Petrie [8], Francesco Cappelli [2], Marco Guazzi[3,4], Philip N. Hawkins[1], Julian D. Gillmore[1†], and Marianna Fontana [1*†]



Take home figure This study characterizes the structural and functional echocardiographic phenotype of 1240 patients with ATTR cardiomyopathy, demonstrating varying degrees of disease severity across different genotypes. Stroke volume index, right atrial area index, longitudinal strain and severe aortic stenosis were independently associated with patient survival in the overall population. E/e' became independently associated with patient survival when patients with aortic stenosis were excluded.

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Rythmologie

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ESC European Society of Cardiology
European Heart Journal (2020) **41**, 3813–3823
doi:10.1093/eurheartj/ehaa603

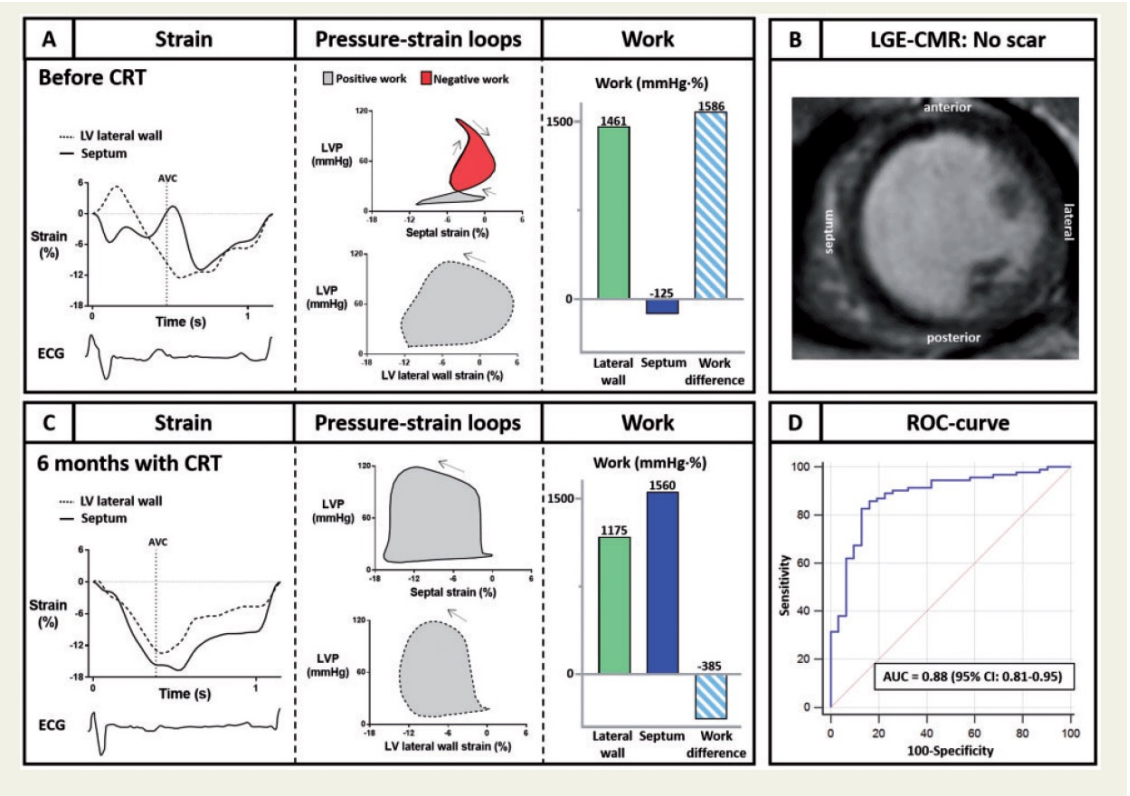
CLINICAL RESEARCH
Heart failure

Imaging predictors of response to cardiac resynchronization therapy: left ventricular work asymmetry by echocardiography and septal viability by cardiac magnetic resonance

John M. Aalen [1,2,3], Erwan Donal [4], Camilla K. Larsen [1,2,3], Jürgen Duchenne[5,6], Mathieu Lederlin[3], Marta Cvijic [5,6], Arnaud Hubert[3], Gabor Voros[5,6], Christophe Leclercq[3], Jan Bogaert [7,8], Einar Hopp [9], Jan Gunnar Fjeld [9,10], Martin Penicka[11], Cecilia Linde [12], Odd O. Aalen [13], Erik Kongsgård[1,2,3], Elena Galli[3], Jens-Uwe Voigt [5,6,†], and Otto A. Smiseth[1,2,3,*,†]

Travail myocardique = courbes pression-volume (PAS brassard et strain longitudinal)

Différence de travail myocardique entre paroi septale et latérale
ET
absence de viabilité septale prédisent la réponse à la CRT



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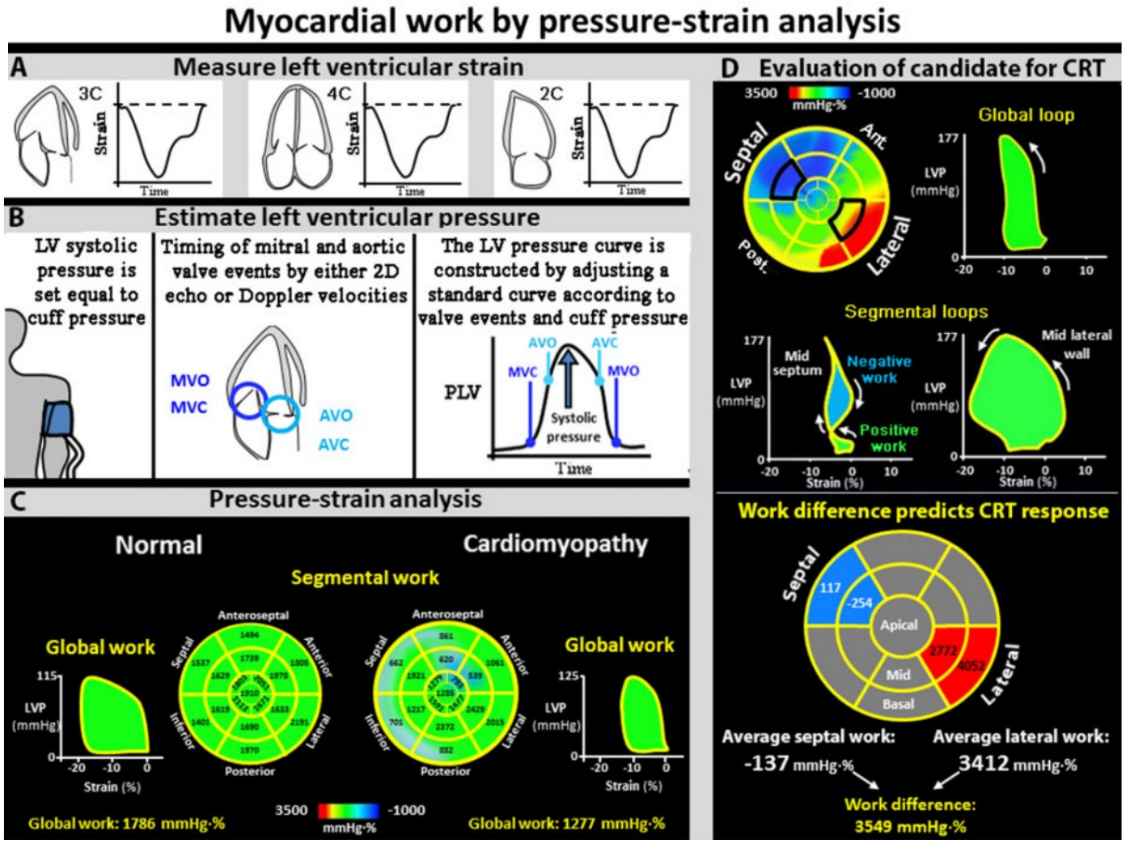
ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2021) **22**, 259–261
doi:10.1093/ehjci/jeaa301

How to measure left ventricular myocardial work by pressure–strain loops

Otto A. Smiseth [1]*, Erwan Donal [2], Martin Penicka[3], and Ole Jakob Sletten[1]

[1]Institute for Surgical Research and Department of Cardiology, Oslo University Hospital and University of Oslo, Rikshospitalet, N-0027 Oslo, Norway; [2]Department of Cardiology, CHU Rennes and Inserm, LTSI, University of Rennes, Rennes, France; and [3]Cardiovascular Center Aalst, OLV Clinic, Moorselbaan 164, 9300 Aalst, Belgium

Online publish-ahead-of-print 30 November 2020



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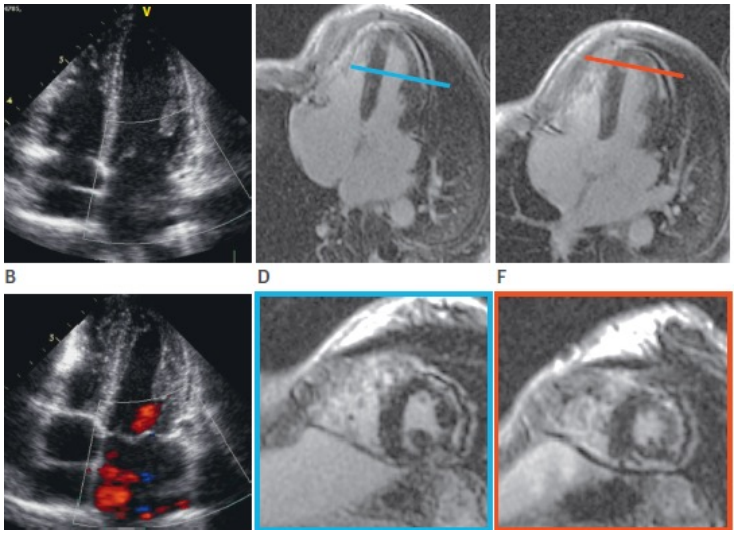
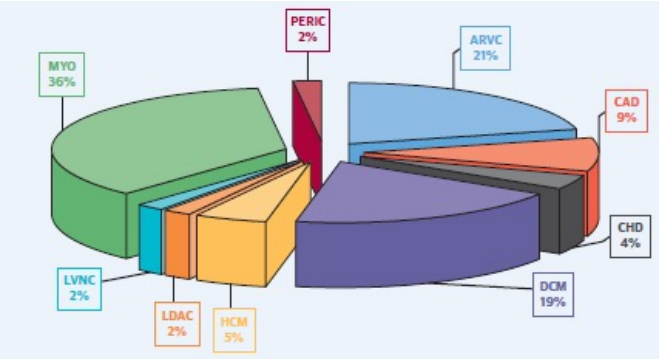
JACC Cardiovasc Imaging. 2020 Feb;13(2 Pt 1):410-421. doi: 10.1016/j.jcmg.2019.04.023. Epub 2019 Jul 17.

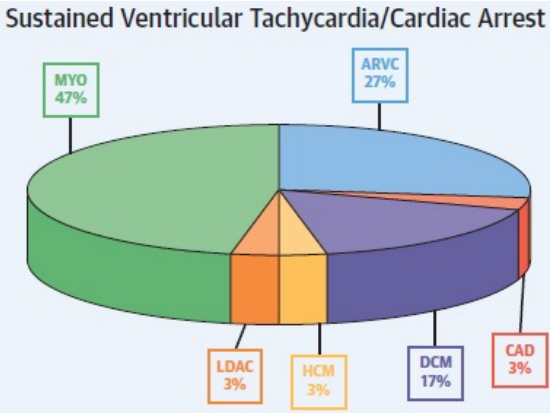
CMR for Identifying the Substrate of Ventricular Arrhythmia in Patients With Normal Echocardiography

Daniele Andreini, MD, PhD,[a,b] Antonio Dello Russo, MD, PhD,[a] Gianluca Pontone, MD, PhD,[a] Saima Mushtaq, MD,[a] Edoardo Conte, MD,[a] Marco Perchinunno, MD,[c] Marco Guglielmo, MD,[a] Ana Coutinho Santos, MD,[d] Marco Magatelli, MD,[e] Andrea Baggiano, MD,[a] Simone Zanchi, MD,[a] Eleonora Melotti, MD,[a] Laura Fusini, MD,[a] Paola Gripari, MD,[a] Michela Casella, MD, PhD,[a] Corrado Carbucicchio, MD,[a] Stefania Riva, MD,[a] Gaetano Fassini, MD,[a] Letizia Li Piani, MD,[a] Cesare Fiorentini, MD,[a,b] Antonio L. Bartorelli, MD,[a,f] Claudio Tondo, MD, PhD,[a,b] Mauro Pepi, MD[a]



- 946 patients (mean 41 ± 16 years) with normal echo
- 241 patients (25.5%) with abnormal CMR





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Coronaires/Ischémie

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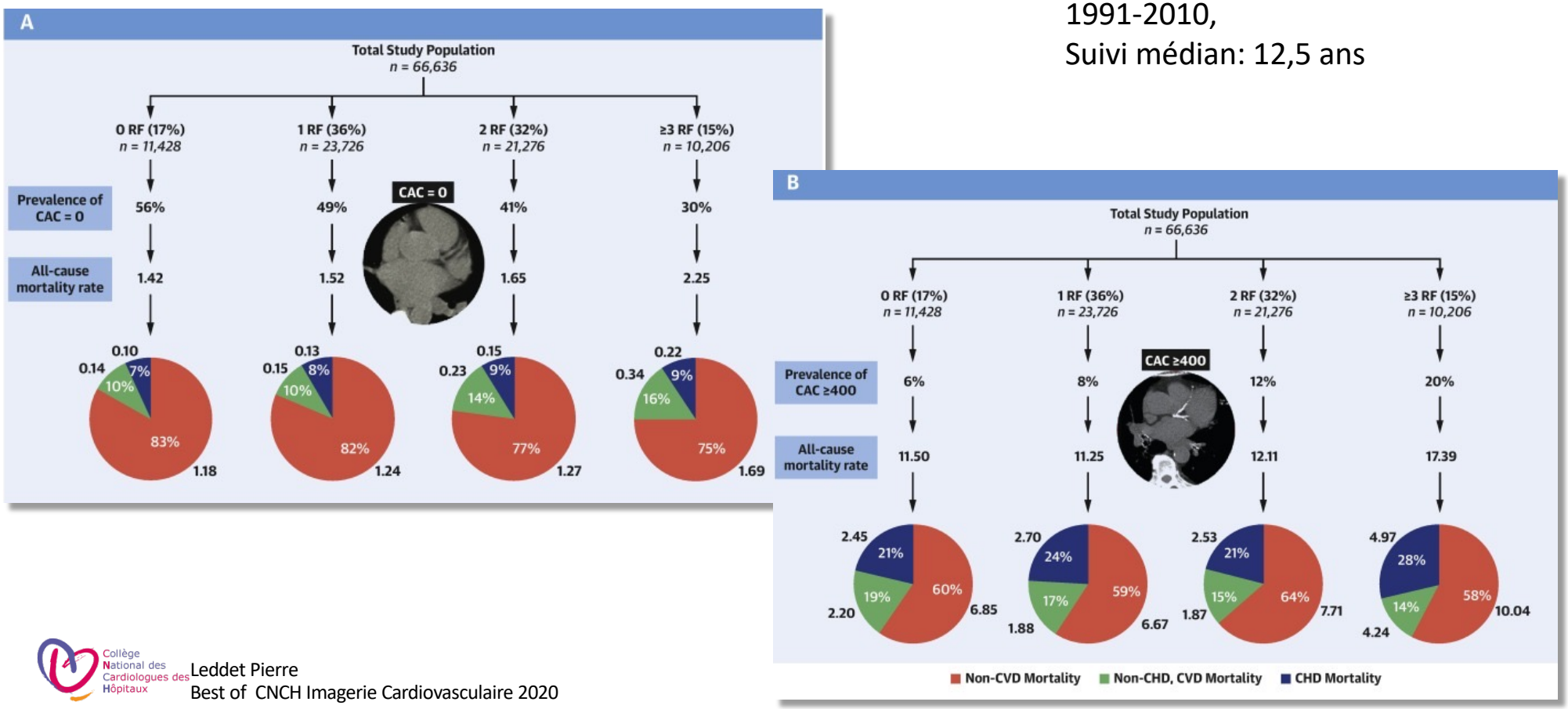
CAC-CONSORTIUM

Grandhi, JACC Cardiovascular Imaging, Vol 13-5, 2020; 1175-1186

66 636 patients,
1991-2010,
Suivi médian: 12,5 ans



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Leddet Pierre
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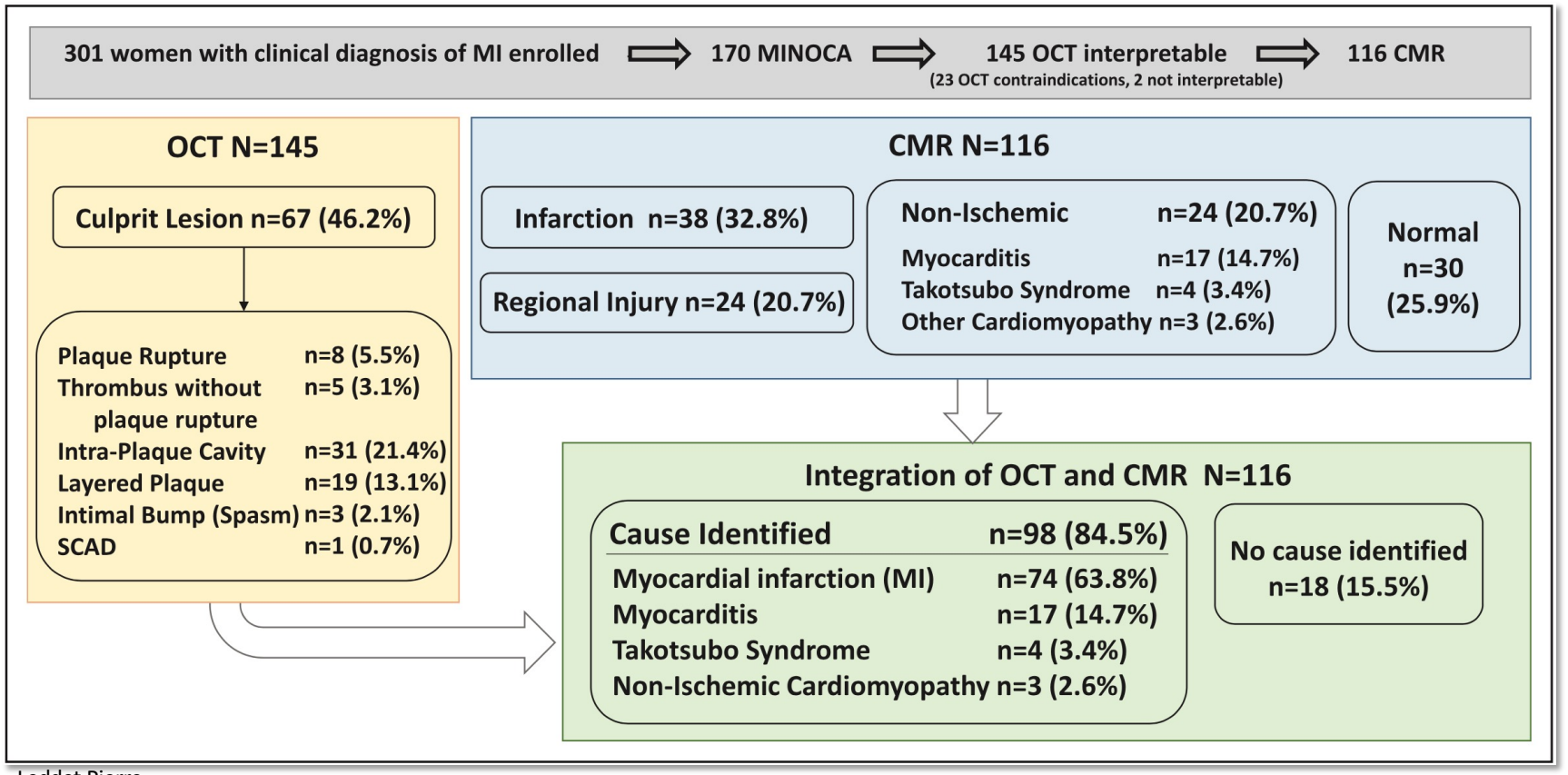
HARP-MINOCA

Reynolds, Circulation. 2021;143:624–640

American Heart Association. Scientific Sessions

40% des IRM normales: lésion en OCT



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Leddet Pierre

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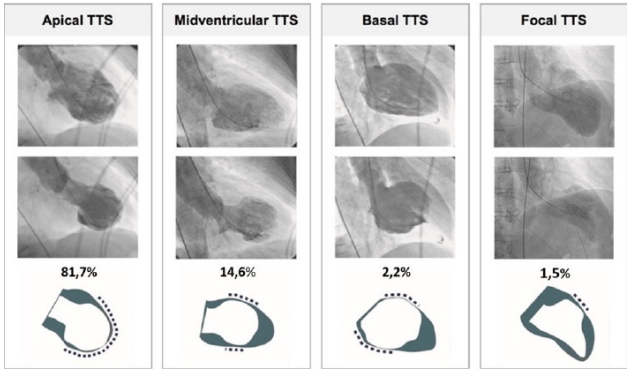
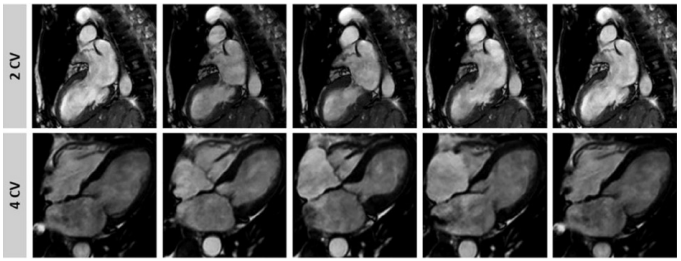
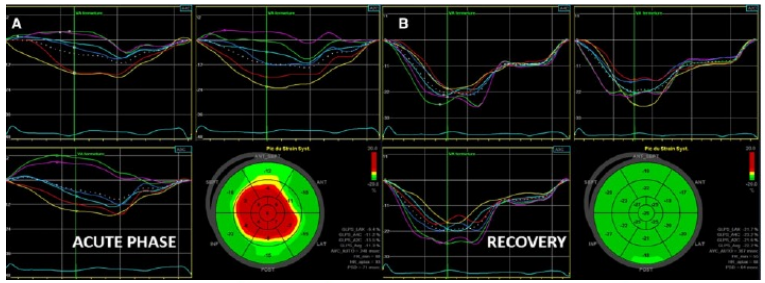
ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2020) 21, 1184–1207 EACVI CONSENSUS DOCUMENT
doi:10.1093/ehjci/jeaa149

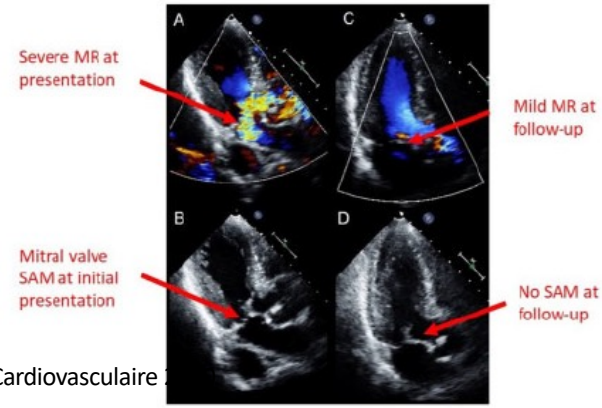
Multimodality imaging in takotsubo syndrome: a joint consensus document of the European Association of Cardiovascular Imaging (EACVI) and the Japanese Society of Echocardiography (JSE)

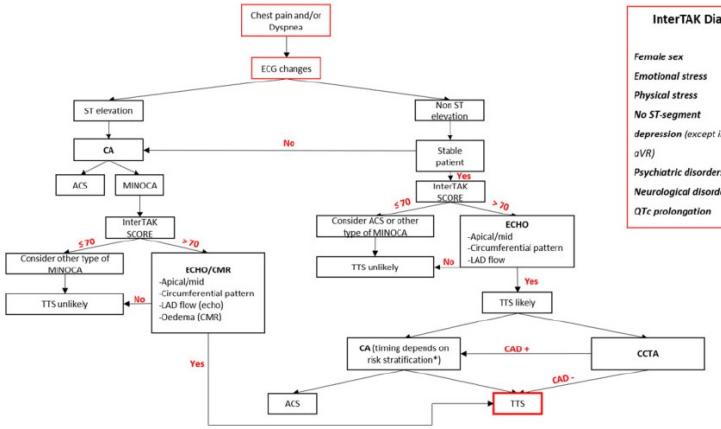
Rodolfo Citro (Chair)[1]*, Hiroyuki Okura (Co-Chair)[2], Jelena R. Ghadri[3], Chisato Izumi[4], Patrick Meimoun[5], Masaki Izumo[6], Dana Dawson[7], Shuichiro Kaji[8], Ingo Eitel[9,10], Nobuyuki Kagiyama[11], Yukari Kobayashi[12], Christian Templin[3], Victoria Delgado[13], Satoshi Nakatani[14], and Bogdan A. Popescu[15,16]











InterTAK Diagnostic Score	points
Female sex	25
Emotional stress	24
Physical stress	13
No ST-segment depression (except in lead aVR)	12
Psychiatric disorders	11
Neurological disorders	9
QTc prolongation	6

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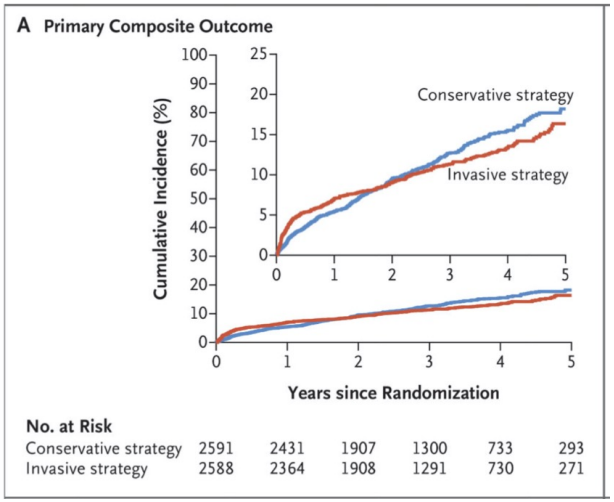
The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Initial Invasive or Conservative Strategy for Stable Coronary Disease

D.J. Maron, J.S. Hochman, H.R. Reynolds, S. Bangalore, S.M. O'Brien, W.E. Boden, B.R. Chaitman, R. Senior, J. López-Sendón, K.P. Alexander, R.D. Lopes, L.J. Shaw, J.S. Berger, J.D. Newman, M.S. Sidhu, S.G. Goodman, W. Ruzyllo, G. Gosselin, A.P. Maggioni, H.D. White, B. Bhargava, J.K. Min, G.B.J. Mancini, D.S. Berman, M.H. Picard, R.Y. Kwong, Z.A. Ali, D.B. Mark, J.A. Spertus, M.N. Krishnan, A. Elghamaz, N. Moorthy, W.A. Hueb, M. Demkow, K. Mavromatis, O. Bockeria, J. Peteiro, T.D. Miller, H. Szwed, R. Doerr, M. Keltai, J.B. Selvanayagam, P.G. Steg, C. Held, S. Kohsaka, S. Mavromichalis, R. Kirby, N.O. Jeffries, F.E. Harrell, Jr., F.W. Rockhold, S. Broderick, T.B. Ferguson, Jr., D.O. Williams, R.A. Harrington, G.W. Stone, and Y. Rosenberg, for the ISCHEMIA Research Group*



CONCLUSIONS—Among patients with stable coronary disease and moderate or severe ischemia, we did not find evidence that an initial invasive strategy, as compared with an initial conservative strategy, reduced the risk of ischemic cardiovascular events or death from any cause over a median of 3.2 years. The trial findings were sensitive to the definition of myocardial infarction that was used. (Funded by the National Heart, Lung, and Blood Institute and others; ISCHEMIA ClinicalTrials.gov number, NCT01471522.)

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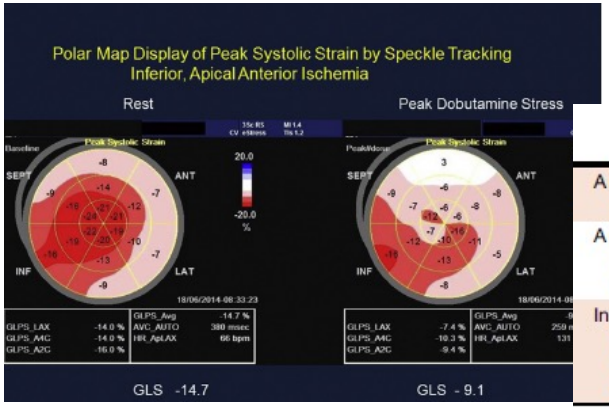
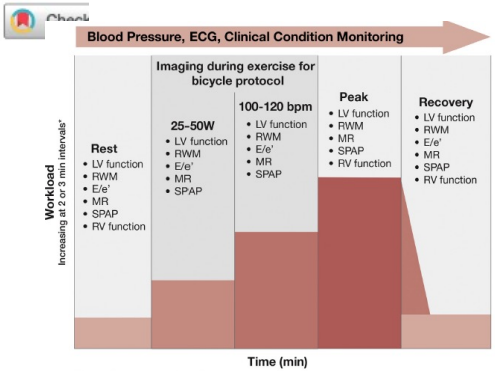
J Am Soc Echocardiogr. 2020 Jan;33(1):1-41.e8. doi: 10.1016/j.echo.2019.07.001.
Epub 2019 Nov 15.

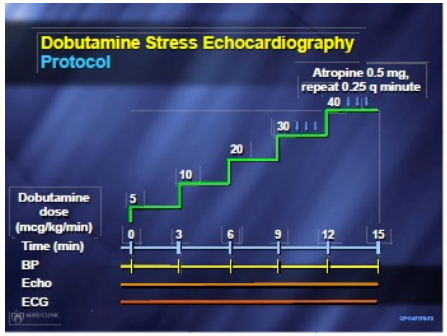
GUIDELINES AND STANDARDS

Guidelines for Performance, Interpretation, and Application of Stress Echocardiography in Ischemic Heart Disease: From the American Society of Echocardiography

Patricia A. Pellikka, MD, FASE, Chair, Adelaide Arruda-Olson, MD, PhD, FASE, Farooq A. Chaudhry, MD, FASE,* Ming Hui Chen, MD, MMSc, FASE, Jane E. Marshall, RDCS, FASE, Thomas R. Porter, MD, FASE, and Stephen G. Sawada, MD, *Rochester, Minnesota; New York, New York; Boston, Massachusetts; Omaha, Nebraska; Indianapolis, Indiana*







Recommendations for risk stratification using ischemia testing	Class of recommendation	Level of evidence
A stress imaging test such as stress echocardiography for risk stratification is recommended in patients with an inconclusive exercise ECG	I	B
A stress imaging test, such as stress echocardiography, is recommended for risk stratification in patients with known stable CAD and a deterioration in symptoms if the site and extent of ischemia would influence clinical decision making	I	B
In asymptomatic adults with diabetes, peripheral vascular disease, or a strong family history of CAD, or when previous risk assessment testing suggests high risk of CAD, such as a coronary artery calcium score of ≥400, a stress imaging test, such as stress echocardiography, may be considered for advanced cardiovascular risk assessment.[208]	IIb	B

Recommendation for re-assessment in patients with stable CAD	Class of recommendation	Level of evidence
An exercise ECG or stress imaging test such as stress echocardiography is recommended in the presence of recurrent or new symptoms once instability has been ruled out.	I	C
In symptomatic patients with revascularized stable CAD, a stress imaging test, such as stress echocardiography, is indicated rather than stress ECG.	I	C
Reassessment of prognosis using a stress test, such as stress echocardiography, may be considered in asymptomatic patients after the expiration of the period for which the previous test was felt to be valid	IIb	B

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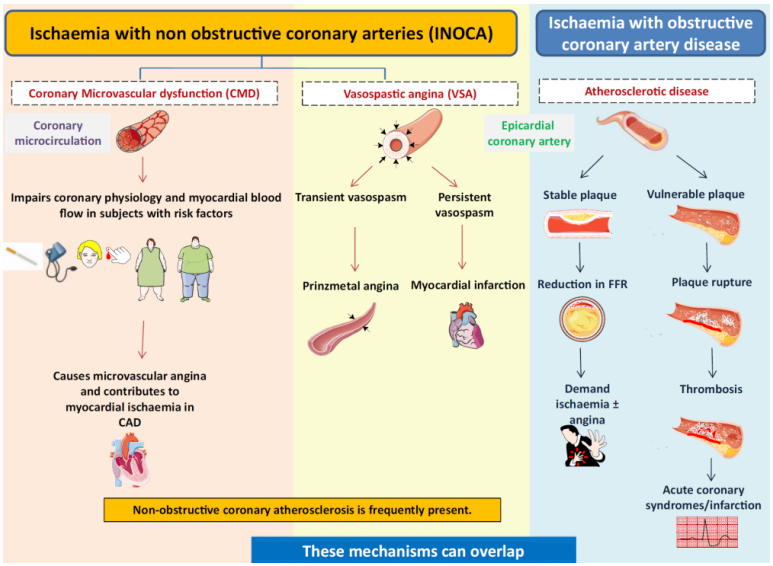
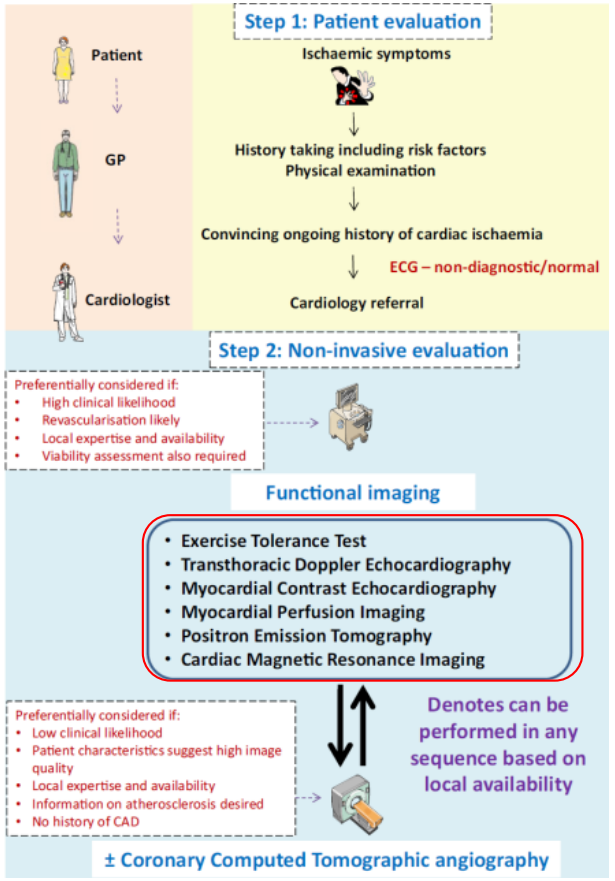
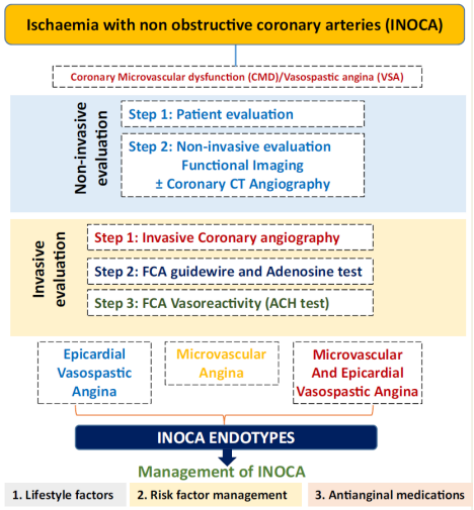
ESC European Society of Cardiology
European Heart Journal (2020) 41, 3504–3520
doi:10.1093/eurheartj/ehaa503

SPECIAL ARTICLE
Ischaemic heart disease

An EAPCI Expert Consensus Document on Ischaemia with Non-Obstructive Coronary Arteries in Collaboration with European Society of Cardiology Working Group on Coronary Pathophysiology & Microcirculation Endorsed by Coronary Vasomotor Disorders International Study Group







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Valvulopathies/Endocardite infectieuse

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Endocardite infectieuse : diagnostic

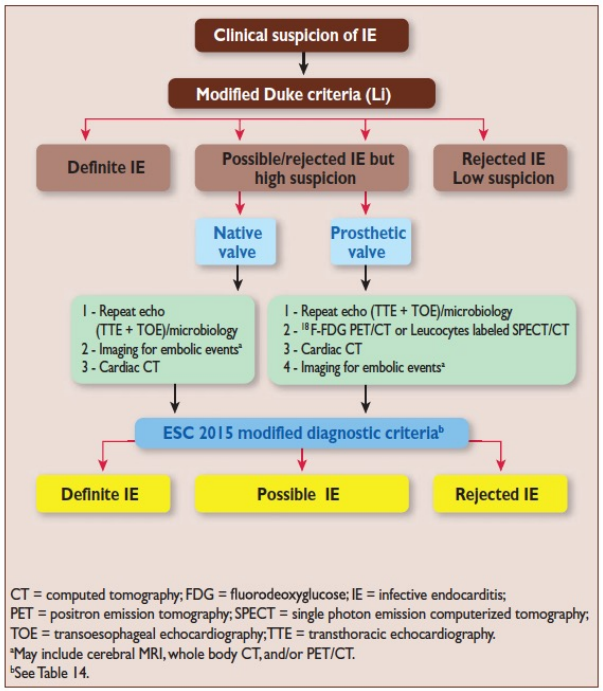

Figure 3 European Society of Cardiology 2015 algorithm for diagnosis of infective endocarditis.

In the setting of the suspicion of endocarditis on a prosthetic valve, abnormal activity around the site of implantation detected by ^{18}F-FDG PET/CT (only if the prosthesis was implanted for >3 months) or radiolabelled leucocyte SPECT/CT should be considered a major criterion.

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ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2020) **21**, 24–33
doi:10.1093/ehjci/jez222

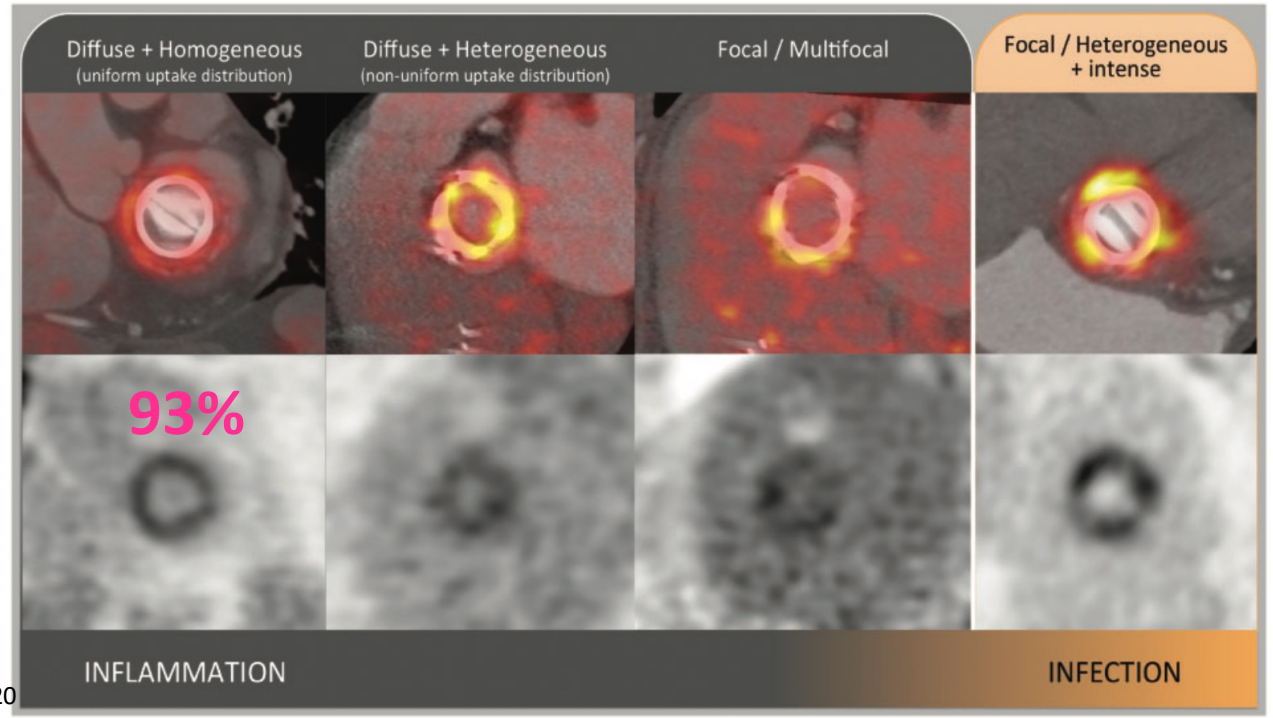
Morpho-metabolic post-surgical patterns of non-infected prosthetic heart valves by [^{18}F]FDG PET/CTA: "normality" is a possible diagnosis

**Albert Roque [1,2,3,4]*, María N. Pizzi[3,4,5], Nuria Fernández-Hidalg
Eduard Permanyer[7], Hug Cuellar-Calabria[1,2,3,4], Guillermo Romer
Remedios Ríos[3,8], Benito Almirante[3,6], Joan Castell-Conesa[2,3,9], M
Ignacio Ferreira-González[3,5,10], Pilar Tornos[3,11], and Santiago Agu**

79% patients ont une fixation visuellement détectable

98% des cas : diffuse et homogène

Mean max SUV = 4.46 ± 1.50



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Cardiopathie emboligène

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JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY VOL. 75, NO. 18, 2020

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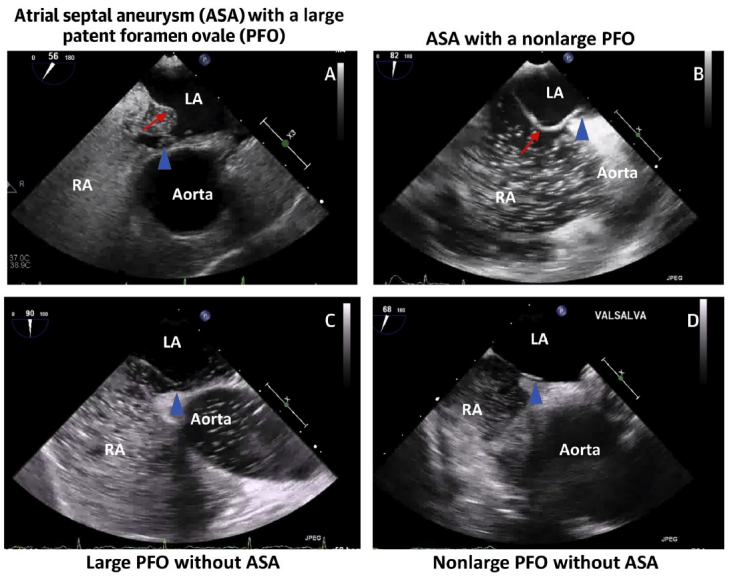
Atrial Septal Aneurysm, Shunt Size, and Recurrent Stroke Risk in Patients With Patent Foramen Ovale

Guillaume Turc, MD, PhD,[a] Jong-Young Lee, MD,[b] Eric Brochet, MD,[c] Jong S. Kim, MD, PhD,[d] Jae-Kwan Song, MD, PhD,[e,*] Jean-Louis Mas, MD,[a,*] on behalf of the CLOSE and DEFENSE-PFO Trial Investigators

CENTRAL ILLUSTRATION Representative Transesophageal Echocardiographic Images of 4 Different Anatomical Features of Patent Foramen Ovale in Terms of Hypermobility of the Atrial Septum or Atrial Septal Aneurysm and Patent Foramen Ovale Size



Turc, G. et al. J Am Coll Cardiol. 2020;75(18):2312-20.

TABLE 3 Association Between ASA and Time to Recurrent Ischemic Stroke, Adjusted for Shunt Size and Other Potential Confounders (Multivariable Analysis, Mixed Effects Cox Regression Model*)

	Adjusted HR (95% CI)	p Value
ASA	3.27 (1.82-5.86)	<0.0001
Large PFO (>30 microbubbles)	1.43 (0.50-4.03)†	0.50
Age, per 10-yr increase	1.29 (0.99-1.69)	0.06
High blood pressure	2.27 (1.16-4.46)	0.02
Anticoagulation (vs. antiplatelets)	0.17 (0.06-0.48)	0.0008

PERSPECTIVES

COMPETENCY IN MEDICAL KNOWLEDGE: Based on pooled patient-level data from randomized trials and observational studies of patients with PFO-related stroke, the presence of atrial septal aneurysm was a more important correlate of stroke recurrence than shunt size.

TRANSLATIONAL OUTLOOK: Further studies are needed to clarify the pathophysiological mechanisms underlying stroke recurrence in patients with PFO and atrial septal aneurysm and better identify those who benefit most from PFO closure.

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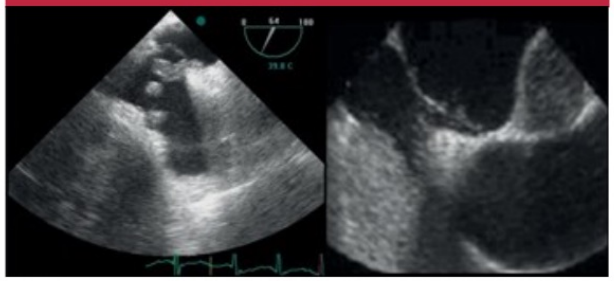
BILAN ÉCHOCARDIOGRAPHIQUE DU FOP : DU DIAGNOSTIC À LA PRISE EN CHARGE



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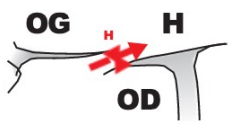
COMPTE-RENDU TYPE



- VISIBLE :

Taille (H) mm

- SHUNT DOPPLER COULEUR :

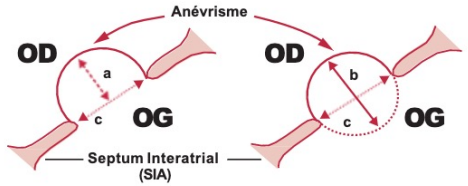
Absent ☐ Droit-Gauche ☐ Gauche-Droit ☐

- IMPORTANCE DU SHUNT :

→ **Respiration spontanée**
- Négative (<3 mb) ☐
- Shunt minime (3 à 10 mb) ☐
- Shunt modéré (10 à 20 mb) ☐
- Shunt important (> 20 mb) ☐

→ **Manœuvre de Valsalva**
- Négative (<3 mb) ☐
- Shunt minime (3 à 10 mb) ☐
- Shunt modéré (10 à 20 mb) ☐
- Shunt important (> 20 mb) ☐

COMPTE-RENDU TYPE



ANÉVRISME DU SIA :

Immobile ☐ Phasique ☐

→ Si ASIA fixe: a = mm

→ Si excursion phasique : b = mm

→ Base : c = mm

AUTRES :

→ CIA ☐

→ Valve d'Eustachi proéminente ☐

→ Dilatation de l'aorte ascendante ☐

Infarctus cérébral et Foramen Ovale Perméable
Préconisations de la SFNV et de la SFC, Déc 2018

ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2021) **00**, 1–34
doi:10.1093/ehjci/jeab008

EACVI Document

EACVI recommendations on cardiovascular imaging for the detection of embolic sources: endorsed by the Canadian Society of Echocardiography

(Chair) Ariel Cohen[1,2]*, (Co-Chair) Erwan Donal[3], Victoria Delgado[4], Mauro Pepi[5], Teresa Tsang[6], Bernhard Gerber[7], Laurie Soulat-Dufour[1,2], Gilbert Habib[8], Patrizio Lancellotti[9,10], Arturo Evangelista[11], Bibiana Cujec[12], Nowell Fine[13], Maria Joao Andrade[14], Muriel Sprynger[15], Marc Dweck[16], Thor Edvardsen[17], and Bogdan A. Popescu[18]

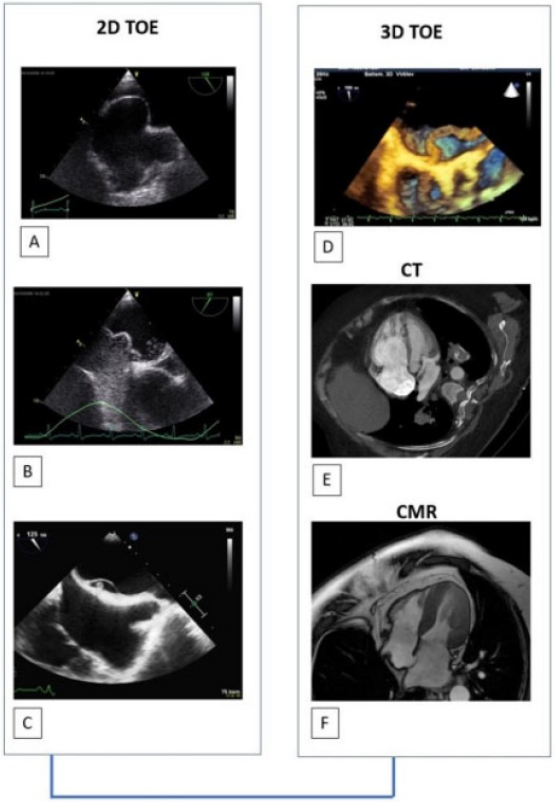


Figure 11 Multimodality evaluation of atrial septal abnormalities.

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Aorte

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VOL. 76, NO. 2, 2020

Discrepancies in Measurement of the Thoracic Aorta

JACC Review Topic of the Week

John A. Elefteriades, MD, PhD (hon),[a] Sandip

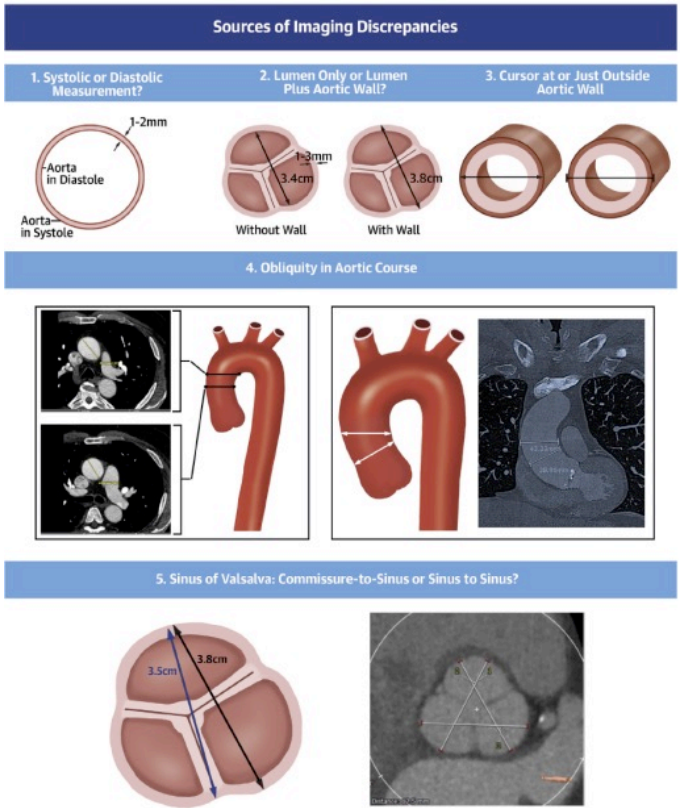
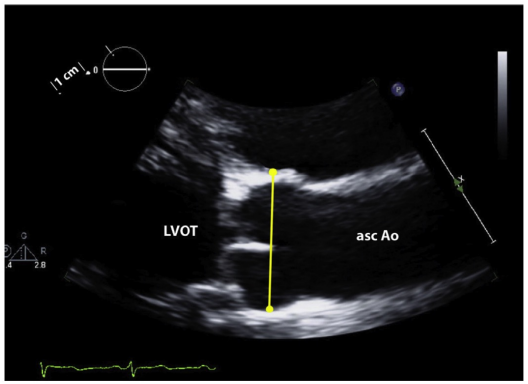
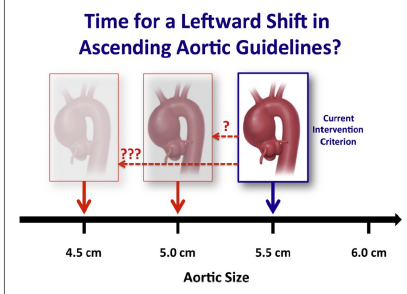


FIGURE 16 Echocardiographic Measurement of Sinuses of Valsalva



Transthoracic echocardiogram in the parasternal long-axis view illustrating measurement of the aortic root diameter at sinus of Valsalva level at end-diastole using the leading edge-to-leading edge method. asc Ao = ascending aorta; LVOT = left ventricular outflow tract. Reproduced with permission from Goldstein et al. (13).

FIGURE 20 "Left-Shift" in Surgical Criteria?



Is it time for a leftward shift in ascending aortic intervention guidelines? Underestimation of aortic diameter, compared with traditional hand measurements, on which guidelines are based, can be offset by a "left shift" of our criteria, to smaller dimensions than previously recommended. Reproduced with permission from Ziganshin et al. (16).

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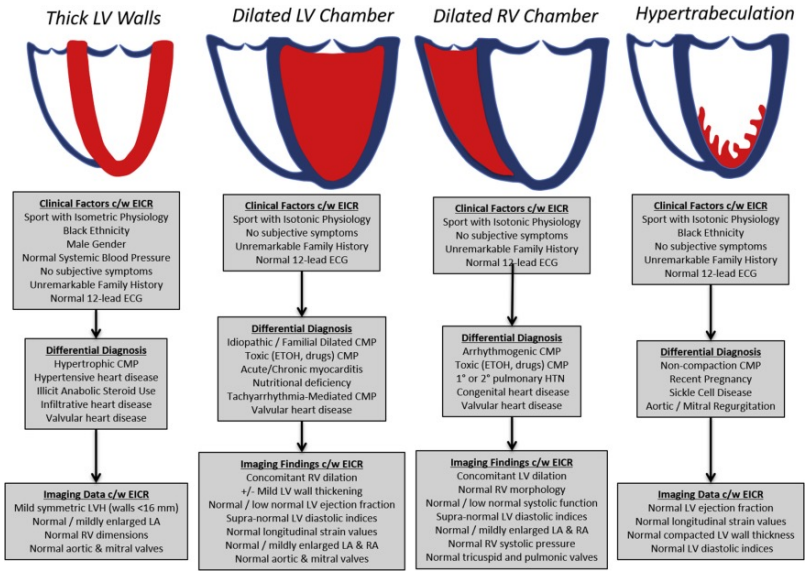
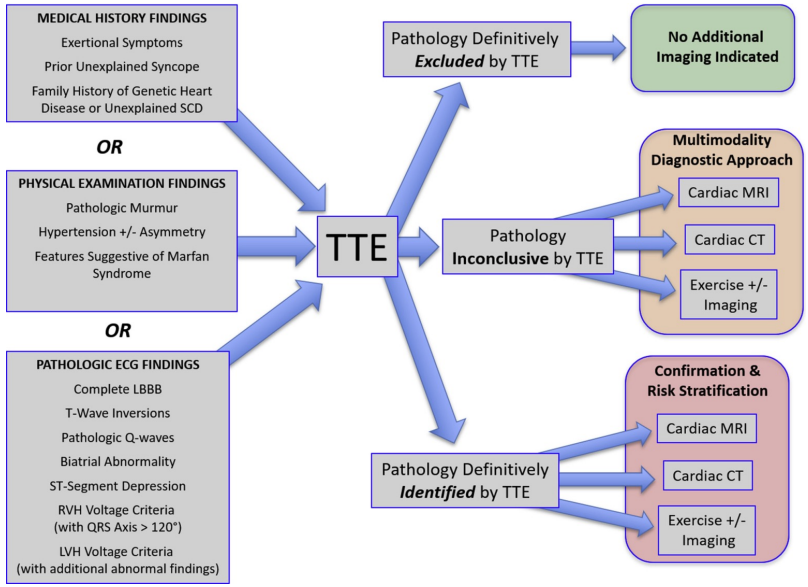
GUIDELINES AND STANDARDS

Recommendations on the Use of Multimodality Cardiovascular Imaging in Young Adult Competitive Athletes: A Report from the American Society of Echocardiography in Collaboration with the Society of Cardiovascular Computed Tomography and the Society for Cardiovascular Magnetic Resonance

Aaron L. Baggish, MD, (Chair), Robert W. Battle, MD, Timothy A. Beaver, MD, FASE, William L. Border, MBChB, MH, FASE, Pamela S. Douglas, MD, FASE, Christopher M. Kramer, MD, Matthew W. Martinez, MD, Jennifer H. Mercandetti, BS, RDCS (AE/PE), ACS, FASE, Dermot Phelan, MD, PhD, FASE, Tamanna K. Singh, MD, Rory B. Weiner, MD, FASE, and Eric Williamson, MD, *Boston, Massachusetts; Charlottesville, Virginia; Kansas City, Kansas; Atlanta, Georgia; Durham and Charlotte, North Carolina;*

Practice Guideline › J Am Soc Echocardiogr. 2020 May;33(5):523-549.
doi: 10.1016/j.echo.2020.02.009.





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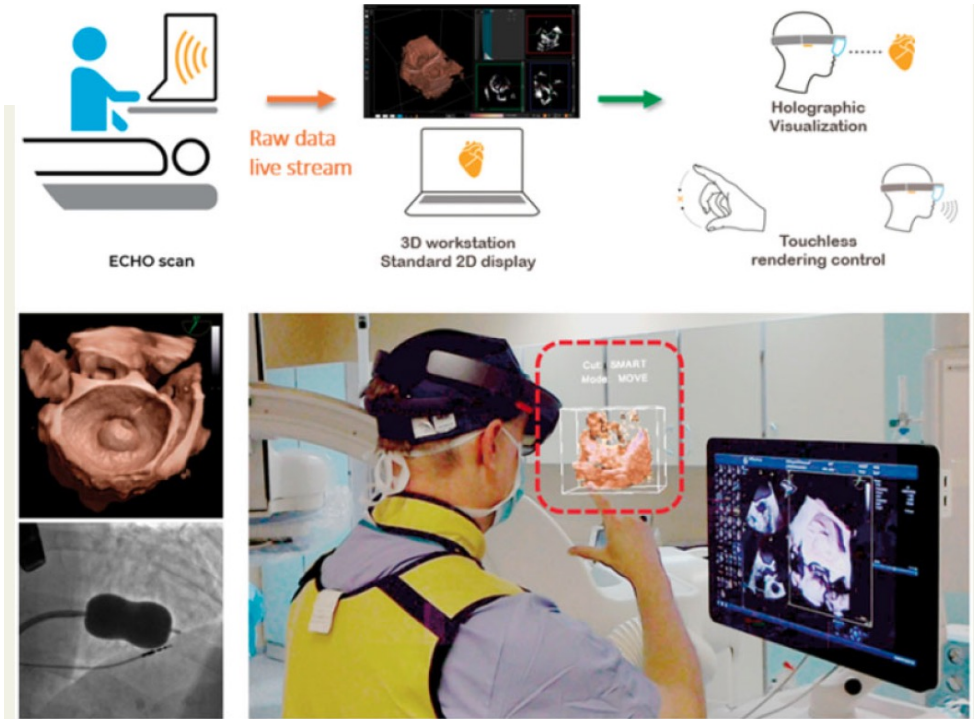
Futur

First-in-man experience with real-time holographic mixed reality display of three-dimensional echocardiography during structural intervention: balloon mitral commissurotomy

Jaroslaw D Kasprzak ✉, Jaroslaw Pawlowski, Jan Z Peruga, Jakub Kaminski, Piotr Lipiec

European Heart Journal, Volume 41, Issue 6, 7 February 2020, Page 801,



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iREVIEW

SPECIAL ISSUE: NONINVASIVE ASSESSMENT OF LEFT VENTRICULAR DIASTOLIC FUNCTION

STATE-OF-THE-ART REVIEW

Left Ventricular Diastolic Function

Understanding Pathophysiology, Diagnosis, and Prognosis With Echocardiography

Sherif F. Nagueh, MD

JACC: CARDIOVASCULAR IMAGING VOL. 13, NO. 1, 2020

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iREVIEW

SPECIAL ISSUE: NONINVASIVE ASSESSMENT OF LEFT VENTRICULAR DIASTOLIC FUNCTION

STATE-OF-THE-ART REVIEW

Diastolic Dysfunction and Heart Failure With Preserved Ejection Fraction

Understanding Mechanisms by Using Noninvasive Methods

Masaru Obokata, MD, PhD, Yogesh N.V. Reddy, MBBS, MSc, Barry A. Borlaug, MD

JACC: CARDIOVASCULAR IMAGING VOL. 13, NO. 1, 2020

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ESC European Society of Cardiology European Heart Journal - Cardiovascular Imaging (2020) 21, 715–717 doi:10.1093/ehjci/jeaa091

"HOW TO" PAPER

How to do LA strain

Jens-Uwe Voigt [1,2*], Georgiana-Grațiela Mălăescu[1,2†], Kristina Haugaa[3], and Luigi Badano[4,5]

ESC European Society of Cardiology European Heart Journal (2020) 41, 1439–1447 doi:10.1093/eurheartj/ehz905

CLINICAL RESEARCH
Heart failure/cardiomyopathy

Echocardiographic phenotype and prognosis in transthyretin cardiac amyloidosis

Liza Chacko [1†], Raffaele Martone [1,2†], Francesco Bandera [3,4], Thirusha Lane[1], Ana Martinez-Naharro [1], Michele Boldrini[1], Tamer Rezk[1], Carol Whelan[1], Cristina Quarta[1], Dorota Rowczenio[1], Janet A. Gilbertson[1], Tanakal Wongwarawipat [1], Helen Lachmann[1], Ashutosh Wechalekar[1], Sajitha Sachchithanantham[1], Shameem Mahmood[1], Rossella Marcucci [5], Daniel Knight[1], David Hutt [1], James Moon [6,7], Aviva Petrie [8], Francesco Cappelli [2], Marco Guazzi[3,4], Philip N. Hawkins[1], Julian D. Gillmore[1†], and Marianna Fontana [1*†]

ESC European Society of Cardiology European Heart Journal (2020) 41, 3813–3823 doi:10.1093/eurheartj/ehaa603

CLINICAL RESEARCH
Heart failure

Imaging predictors of response to cardiac resynchronization therapy: left ventricular work asymmetry by echocardiography and septal viability by cardiac magnetic resonance

John M. Aalen [1,2,3], Erwan Donal [4], Camilla K. Larsen [1,2,3], Jürgen Duchenne[5,6], Mathieu Lederlin[3], Marta Cvijic [5,6], Arnaud Hubert[3], Gabor Voros[5,6], Christophe Leclercq[3], Jan Bogaert [7,8], Einar Hopp [9], Jan Gunnar Fjeld [9,10], Martin Penicka[11], Cecilia Linde [12], Odd O. Aalen [13], Erik Kongsgård[1,2,3], Elena Galli[3], Jens-Uwe Voigt [5,6,†], and Otto A. Smiseth[1,2,3,*,†]

ESC European Society of Cardiology European Heart Journal - Cardiovascular Imaging (2021) 22, 259–261 doi:10.1093/ehjci/jeaa301

How to measure left ventricular myocardial work by pressure–strain loops

Otto A. Smiseth [1*], Erwan Donal [2], Martin Penicka[3], and Ole Jakob Sletten[1]

[1]Institute for Surgical Research and Department of Cardiology, Oslo University Hospital and University of Oslo, Rikshospitalet, N-0027 Oslo, Norway; [2]Department of Cardiology, CHU Rennes and Inserm, LTSI, University of Rennes, Rennes, France; and [3]Cardiovascular Center Aalst, OLV Clinic, Moorselbaan 164, 9300 Aalst, Belgium

Online publish-ahead-of-print 30 November 2020

› JACC Cardiovasc Imaging. 2020 Feb;13(2 Pt 1):410-421. doi: 10.1016/j.jcmg.2019.04.023. Epub 2019 Jul 17.

CMR for Identifying the Substrate of Ventricular Arrhythmia in Patients With Normal Echocardiography

Daniele Andreini, MD, PhD,[a,b] Antonio Dello Russo, MD, PhD,[a] Gianluca Pontone, MD, PhD,[a] Saima Mushtaq, MD,[a] Edoardo Conte, MD,[a] Marco Perchinunno, MD,[c] Marco Guglielmo, MD,[a] Ana Coutinho Santos, MD,[d] Marco Magatelli, MD,[e] Andrea Baggiano, MD,[a] Simone Zanchi, MD,[a] Eleonora Melotti, MD,[a] Laura Fusini, MD,[a] Paola Gripari, MD,[a] Michela Casella, MD, PhD,[a] Corrado Carbucicchio, MD,[a] Stefania Riva, MD,[a] Gaetano Fassini, MD,[a] Letizia Li Piani, MD,[a] Cesare Fiorentini, MD,[a,b] Antonio L. Bartorelli, MD,[a,f] Claudio Tondo, MD, PhD,[a,b] Mauro Pepi, MD[a]

CAC-CONSORTIUM

Grandhi, JACC Cardiovascular Imaging, Vol 13-5, 2020; 1175-1186

HARP-MINOCA

Reynolds, Circulation. 2021;143:624–640

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Initial Invasive or Conservative Strategy for Stable Coronary Disease

D.J. Maron, J.S. Hochman, H.R. Reynolds, S. Bangalore, S.M. O'Brien, W.E. Boden, B.R. Chaitman, R. Senior, J. López-Sendón, K.P. Alexander, R.D. Lopes, L.J. Shaw, J.S. Berger, J.D. Newman, M.S. Sidhu, S.G. Goodman, W. Ruzyllo, G. Gosselin, A.P. Maggioni, H.D. White, B. Bhargava, J.K. Min, G.B.J. Mancini, D.S. Berman, M.H. Picard, R.Y. Kwong, Z.A. Ali, D.B. Mark, J.A. Spertus, M.N. Krishnan, A. Elghamaz, N. Moorthy, W.A. Hueb, M. Demkow, K. Mavromatis, O. Bockeria, J. Peteiro, T.D. Miller, H. Szwed, R. Doerr, M. Keltai, J.B. Selvanayagam, P.G. Steg, C. Held, S. Kohsaka, S. Mavromichalis, R. Kirby, N.O. Jeffries, F.E. Harrell, Jr., F.W. Rockhold, S. Broderick, T.B. Ferguson, Jr., D.O. Williams, R.A. Harrington, G.W. Stone, and Y. Rosenberg, for the ISCHEMIA Research Group*

› J Am Soc Echocardiogr. 2020 Jan;33(1):1-41.e8. doi: 10.1016/j.echo.2019.07.001. Epub 2019 Nov 15.

GUIDELINES AND STANDARDS

Guidelines for Performance, Interpretation, and Application of Stress Echocardiography in Ischemic Heart Disease: From the American Society of Echocardiography

ESC European Society of Cardiology European Heart Journal (2020) 41, 3504–3520 doi:10.1093/eurheartj/ehaa503

SPECIAL ARTICLE
Ischaemic heart disease

An EAPCI Expert Consensus Document on Ischaemia with Non-Obstructive Coronary Arteries in Collaboration with European Society of Cardiology Working Group on Coronary Pathophysiology & Microcirculation Endorsed by Coronary Vasomotor Disorders International Study Group

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ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2020) 21, 1184–1207 EACVI CONSENSUS DOCUMENT
doi:10.1093/ehjci/jeaa149

Multimodality imaging in takotsubo syndrome: a joint consensus document of the European Association of Cardiovascular Imaging (EACVI) and the Japanese Society of Echocardiography (JSE)

Rodolfo Citro (Chair)[1]*, Hiroyuki Okura (Co-Chair)[2], Jelena R. Ghadri[3], Chisato Izumi[4], Patrick Meimoun[5], Masaki Izumo[6], Dana Dawson[7], Shuichiro Kaji[8], Ingo Eitel[9,10], Nobuyuki Kagiyama[11], Yukari Kobayashi[12], Christian Templin[3], Victoria Delgado[13], Satoshi Nakatani[14], and Bogdan A. Popescu[15,16]

ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2020) 21, 24–33
doi:10.1093/ehjci/jez222

Morpho-metabolic post-surgical patterns of non-infected prosthetic heart valves by [^{18}F]FDG PET/CTA: "normality" is a possible diagnosis

Albert Roque[1,2,3,4]*, María N. Pizzi[3,4,5], Nuria Fernández-Hidalgo[3,4,6], Eduard Permanyer[7], Hug Cuellar-Calabria[1,2,3,4], Guillermo Romero-Farina[4,5], Remedios Rios[3,8], Benito Almirante[3,4], Joan Castell-Conesa[2,3,9], Manuel Escobar[1,2], Ignacio Ferreira-González[3,5,10], Pilar Tornos[3,11], and Santiago Aguadé-Bruix[3,9]

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Atrial Septal Aneurysm, Shunt Size, and Recurrent Stroke Risk in Patients With Patent Foramen Ovale

Guillaume Turc, MD, PhD,[a] Jong-Young Lee, MD,[b] Eric Brochet, MD,[c] Jong S. Kim, MD, PhD,[d] Jae-Kwan Song, MD, PhD,[e,*] Jean-Louis Mas, MD,[a,*] on behalf of the CLOSE and DEFENSE-PFO Trial Investigators

ESC European Society of Cardiology
European Heart Journal - Cardiovascular Imaging (2021) 00, 1–34
doi:10.1093/ehjci/jeab008
EACVI Document

EACVI recommendations on cardiovascular imaging for the detection of embolic sources: endorsed by the Canadian Society of Echocardiography

(Chair) Ariel Cohen[1,2]*, (Co-Chair) Erwan Donal[3], Victoria Delgado[4], Mauro Pepi[5], Teresa Tsang[6], Bernhard Gerber[7], Laurie Soulat-Dufour[1,2], Gilbert Habib[8], Patrizio Lancellotti[9,10], Arturo Evangelista[11], Bibiana Cujec[12], Nowell Fine[13], Maria Joao Andrade[14], Muriel Sprynger[15], Marc Dweck[16], Thor Edvardsen[17], and Bogdan A. Popescu[18]

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Discrepancies in Measurement of the Thoracic Aorta

JACC Review Topic of the Week

John A. Elefteriades, MD, PhD (hon),[a] Sandip K. Mukherjee, MD,[a,b] Hamid Mojibian, MD[b,c]

GUIDELINES AND STANDARDS

Recommendations on the Use of Multimodality Cardiovascular Imaging in Young Adult Competitive Athletes: A Report from the American Society of Echocardiography in Collaboration with the Society of Cardiovascular Computed Tomography and the Society for Cardiovascular Magnetic Resonance

Aaron L. Baggish, MD, (Chair), Robert W. Battle, MD, Timothy A. Beaver, MD, FASE, William L. Border, MBChB, MH, FASE, Pamela S. Douglas, MD, FASE, Christopher M. Kramer, MD, Matthew W. Martinez, MD, Jennifer H. Mercandetti, BS, RDCS (AE/PE), ACS, FASE, Dermot Phelan, MD, PhD, FASE, Tamanna K. Singh, MD, Rory B. Weiner, MD, FASE, and Eric Williamson, MD, *Boston, Massachusetts; Charlottesville, Virginia; Kansas City, Kansas; Atlanta, Georgia; Durham and Charlotte, North Carolina; Morristown, New Jersey; Denver, Colorado; Cleveland, Ohio; Rochester, Minnesota*

Practice Guideline > J Am Soc Echocardiogr. 2020 May;33(5):523-549.
doi: 10.1016/j.echo.2020.02.009.

First-in-man experience with real-time holographic mixed reality display of three-dimensional echocardiography during structural intervention: balloon mitral commissurotomy

Jaroslaw D Kasprzak ✉, Jaroslaw Pawlowski, Jan Z Peruga, Jakub Kaminski, Piotr Lipiec

European Heart Journal, Volume 41, Issue 6, 7 February 2020, Page 801,

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Value of Echocardiographic Right Ventricular and Pulmonary Pressure Assessment in Predicting Transcatheter Tricuspid Repair Outcome

Nicole Karam, MD, PhD,[a,b,*] Michael Mehr, MD,[a,*] Maurizio Taramasso, MD,[c,*] Christian Besler, MD,[d] Tobias Ruf, MD,[e] Kim A. Connelly, MD,[f] Marcel Weber, MD,[g] Ezmela Yzeiraj, MD,[h] Davide Schiavi, MD,[i] Antonio Mangieri, MD,[i] Laura Vaskelyte, MD,[i] Hannes Alessandrini, MD,[h] Florian Deuschl, MD,[j] Nicolas Brugger, MD,[k] Hasan Ahmad, MD,[l] Edwin Ho, MD,[l] Luigi Biasco, MD,[b] Mathias Orban, MD,[a] Simon Deseive, MD,[a] Daniel Braun, MD,[a] Mara Gavazzoni, MD,[c] Karl-Philipp Rommel, MD,[d] Alberto Pozzoli, MD,[c] Christian Frerker, MD,[h] Michael Näbauer, MD,[a] Steffen Massberg, MD,[a] Giovanni Pedrazzini, MD,[o] Gilbert H.L. Tang, MD, MSc, MBA,[p] Stephan Windecker, MD,[m] Ulrich Schäfer, MD,[j] Karl-Heinz Kuck, MD,[k] Horst Sievert, MD,[j] Paolo Denti, MD,[q] Azeem Latib, MD,[i,r] Joachim Schofer, MD,[h] Georg Nickenig, MD,[d] Neil Fam, MD,[f] Stephan von Bardeleben, MD,[s] Philipp Lurz, MD,[d] Francesco Maisano, MD,[c,†] Jörg Hausleiter, MD[a,*,†]

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ORIGINAL RESEARCH

Right Ventricular Abnormalities on Cardiovascular Magnetic Resonance Imaging in Patients With Sarcoidosis

Pratik S. Velangi, MD,[a] Ko-Hsuan Amy Chen, MBChB,[b] Felipe Kazmirczak, MD,[a] Osama Okasha, MD,[a] Lisa von Wald, BSN, CNP, MSN,[a] Henri Roukoz, MD,[a] Afshin Farzaneh-Far, MD, PhD,[b] Jeremy Markowitz, MD,[a] Prabhjot S. Nijjar, MD,[a] Maneesh Bhargava, MD,[c] David Perlman, MD,[c] Mehmet Akçakaya, PhD,[d] Chetan Shenoy, MBBS[a]

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ORIGINAL RESEARCH

A Cardiac Computed Tomography–Based Score to Categorize Mitral Annular Calcification Severity and Predict Valve Embolization

Mayra Guerrero, MD,[a] Dee Dee Wang, MD,[b] Amit Pursnani, MD,[c] Mackram Eleid, MD,[a] Omar Khalique, MD,[d] Marina Urena, MD,[e] Michael Salinger, MD,[c] Susheel Kodali, MD,[d] Tatiana Kaptzan, PhD,[f] Bradley Lewis, MS,[g] Nahoko Kato, MD,[a] Hector M. Cajigas, BA,[a] Olaf Wendler, MD,[c] David Holzhey, MD,[c] Ashish Pershad, MD,[h] Christian Witzke, MD,[i] Sami Alnasser, MD,[m,n] Gilbert H.L. Tang, MD, MSc, MBA,[a] Kendra Grubb, MD,[a] Mark Reisman, MD,[a] Philipp Blanke, MD,[i] Jonathon Leipsic, MD,[i] Eric Williamson, MD,[j] Patricia A. Pellikka, MD,[a] Sorin Pislaru, MD,[a] Juan Crestanello, MD,[j] Dominique Himbert, MD,[e] Alec Vahanian, MD,[e] John Webb, MD,[b] Rebecca T. Hahn, MD,[d] Martin Leon, MD,[d] Isaac George, MD,[c] Vinayak Bapat, MD,[c] William O'Neill, MD,[b] Charanjit Rihal, MD[a]

Circulation: Cardiovascular Imaging

ORIGINAL ARTICLE

Dimensionless Index in Patients With Low-Gradient Severe Aortic Stenosis and Preserved Ejection Fraction

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VIEW

STATE-OF-THE-ART REVIEW

Imaging-Guided Therapies for Pericardial Diseases

Michael Chetrit, MD,[a,b,*] Bo Xu, MD,[a,b,*] Deborah H. Kwon,[a,b] Jay Ramchand, MD,[a,b] Rene E. Rodriguez, MD,[c] Carmela D. Tan, MD,[c] Christine L. Jellis, MD,[a,b] Douglas R. Johnston, MD,[a,d] Rahul D. Renapurkar, MD,[a,e] Paul C. Cremer, MD,[a,b] Allan L. Klein, MD[a,b]

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ORIGINAL RESEARCH

A Deep Learning Approach for Assessment of Regional Wall Motion Abnormality From Echocardiographic Images

Kenya Kusunose, MD, PhD,[a] Takashi Abe, MD, PhD,[b] Akihiro Haga, PhD,[c] Daiju Fukuda, MD, PhD,[a] Hirotsugu Yamada, MD, PhD,[c] Masafumi Harada, MD, PhD,[c] Masataka Sata, MD, PhD[a]

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Structural Deterioration of Transcatheter Versus Surgical Aortic Valve Bioprostheses in the PARTNER-2 Trial

Philippe Pibarot, DVM, PhD,[a] Julien Ternacle, MD, PhD,[a] Wael A. Jaber, MD,[b] Erwan Salaun, MD, PhD,[a] Abdellaziz Dahou, MD, PhD,[c,d] Federico M. Asch, MD,[e] Neil J. Weissman, MD,[e] Leonardo Rodriguez, MD,[b] Ke Xu, PhD,[f] Mohamed-Salah Annabi, MD, MS,[a] Ezequiel Guzzetti, MD,[a] Jonathan Beaudoin, MD,[a] Mathieu Bernier, MD,[a] Jonathon Leipsic, MD,[g] Philipp Blanke, MD,[g] Marie-Annick Clavel, DVM, PhD,[a] Erin Rogers, MEng,[i] Maria C. Alu, MS,[c,d] Pamela S. Douglas, MD,[h] Raj Makkar, MD,[i] D. Craig Miller, MD,[j] Samir R. Kapadia, MD,[k] Michael J. Mack, MD,[k] John G. Webb, MD,[g] Susheel K. Kodali, MD,[c,d] Craig R. Smith, MD,[c,d] Howard C. Herrmann, MD,[i] Vinod H. Thourani, MD,[m] Martin B. Leon, MD,[c,d] Rebecca T. Hahn, MD,[c,d] for the PARTNER 2 Investigators

The role of 99mTc-HMPAO-labelled white blood cell scintigraphy in the diagnosis of cardiac device-related infective endocarditis

Katarzyna Holcman ✉, Barbara Małecka, Paweł Rubiś, Andrzej Ząbek, Wojciech Szot, Krzysztof Boczar, Agata Leśniak-Sobelga, Marta Hlawaty, Sylwia Wiśniowska-Śmiałek, Agnieszka Stępień ... Show more

European Heart Journal - Cardiovascular Imaging, Volume 21, Issue 9, September 2020, Pages 1022–1030, https://doi.org/10.1093/ehjci/jez257
Published: 12 October 2019 **Article history** ▾

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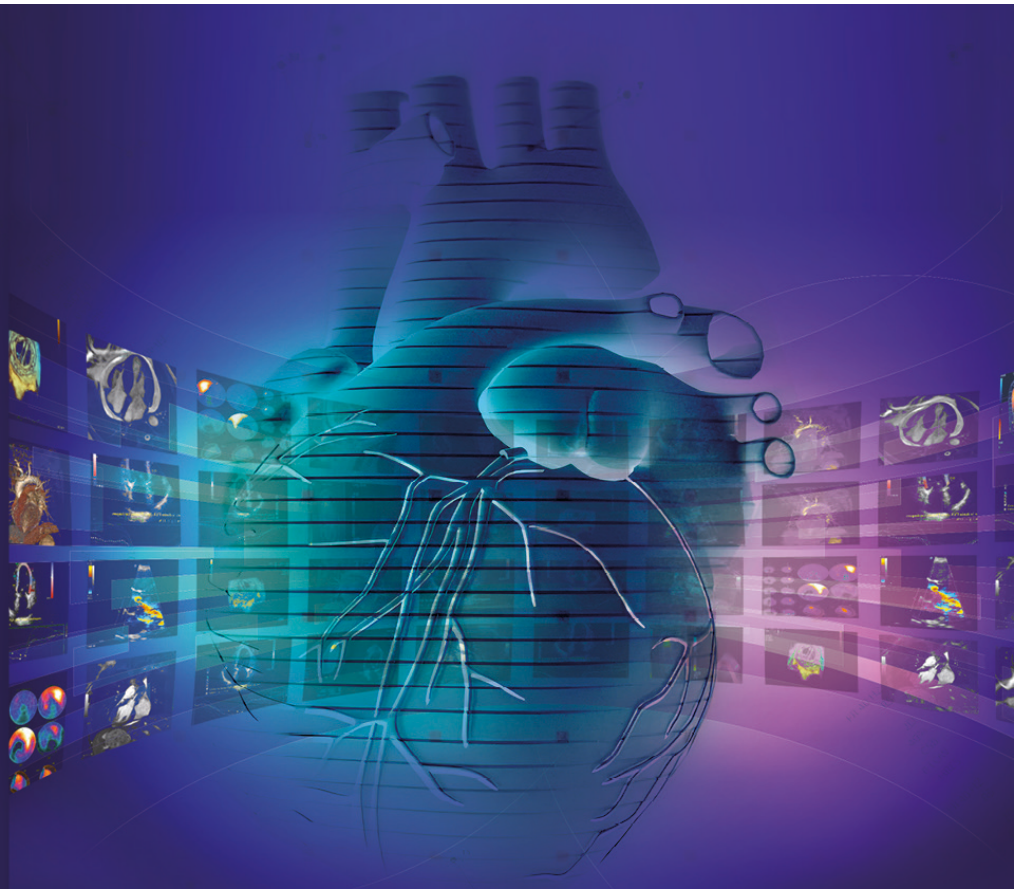

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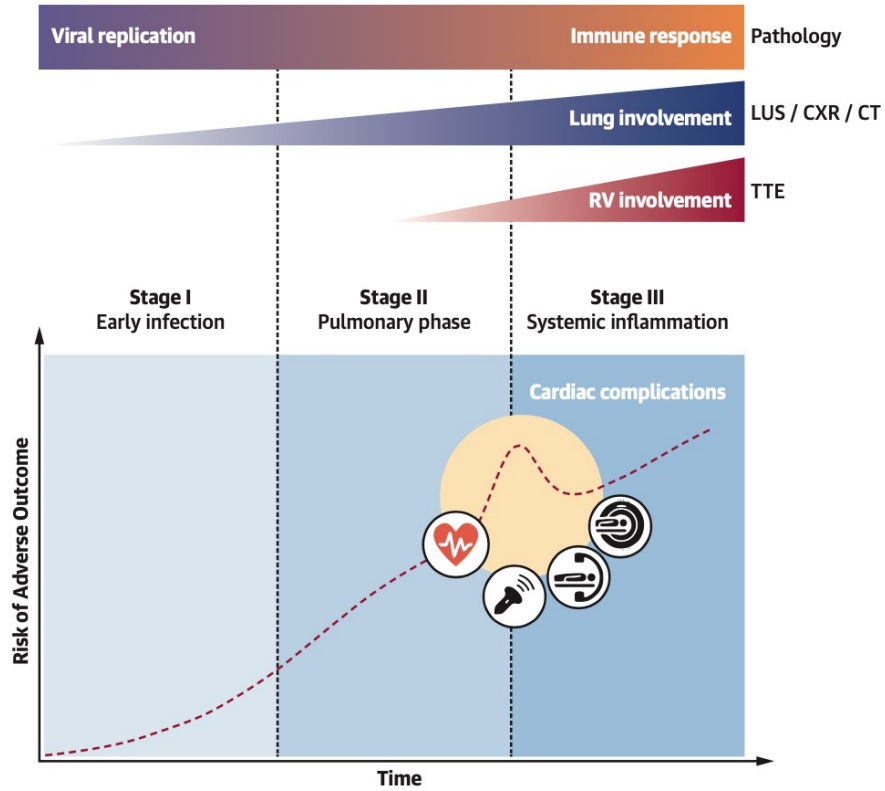
iREVIEW

STATE-OF-THE-ART REVIEW

Heart and Lung Multimodality Imaging in COVID-19

Eustachio Agricola, MD,[a,b] Alessandro Beneduce, MD,[b,c] Antonio Esposito, MD,[b,d] Giacomo Ingallina, MD,[a,b] Diego Palumbo, MD,[b,d] Anna Palmisano, MD,[b,d] Francesco Ancona, MD,[a,b] Luca Baldetti, MD,[b,e] Matteo Pagnesi, MD,[b,e] Giulio Melisurgo, MD,[b,f] Alberto Zangrillo, MD,[b,g] Francesco De Cobelli, MD[b,d]

CENTRAL ILLUSTRATION Pathogenesis, Imaging, and Clinical Progression of Coronavirus Disease 2019



Agricola, E. et al. J Am Coll Cardiol Img. 2020;13(8):1792-808.

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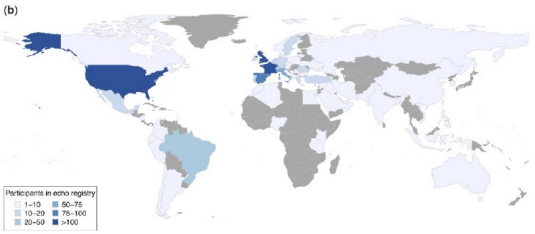
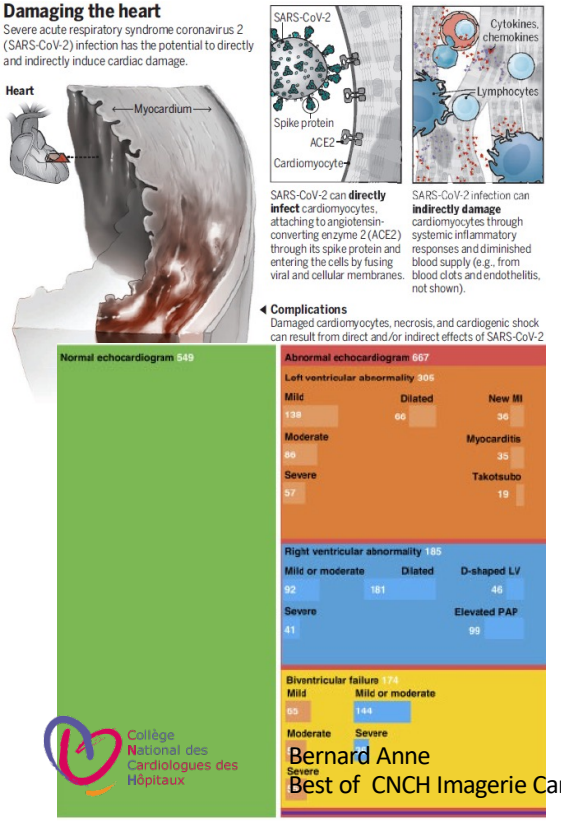
European Heart Journal - Cardiovascular Imaging (2020) **21**, 949–958
doi:10.1093/ehjci/jeaa178





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Global evaluation of echocardiography in patients with COVID-19

Marc R. Dweck [1]*, Anda Bularga[1], Rebecca T. Hahn [2], Rong Bing [1], Kuan Ken Lee[1], Andrew R. Chapman [1], Audrey White[1], Giovanni Di Salvo[3], Leyla Elif Sade[4], Keith Pearce[5], David E. Newby [1], Bogdan A. Popescu [6], Erwan Donal[7], Bernard Cosyns [8], Thor Edvardsen [9,10], Nicholas L. Mills[1,11†], and Kristina Haugaa [9,10†]

- 1216 patients: 667 (55%) had an abnormal echo
- LV and RV abnormalities were reported in 479 (39%) and 397 (33%) patients
- Evidence of new myocardial infarction in 3%, myocarditis in 3%, and takotsubo cardiomyopathy in 2%
- Severe cardiac disease (severe ventricular dysfunction or tamponade) was observed in 15% patients
- Echocardiography changed management in 33% of patients

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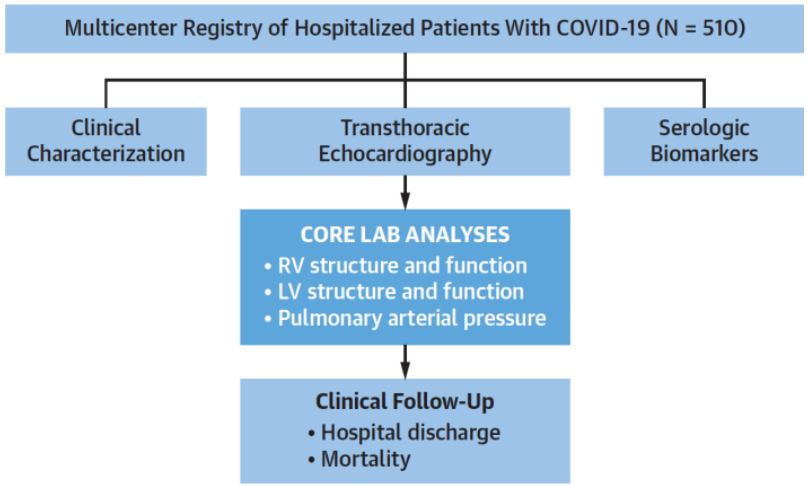
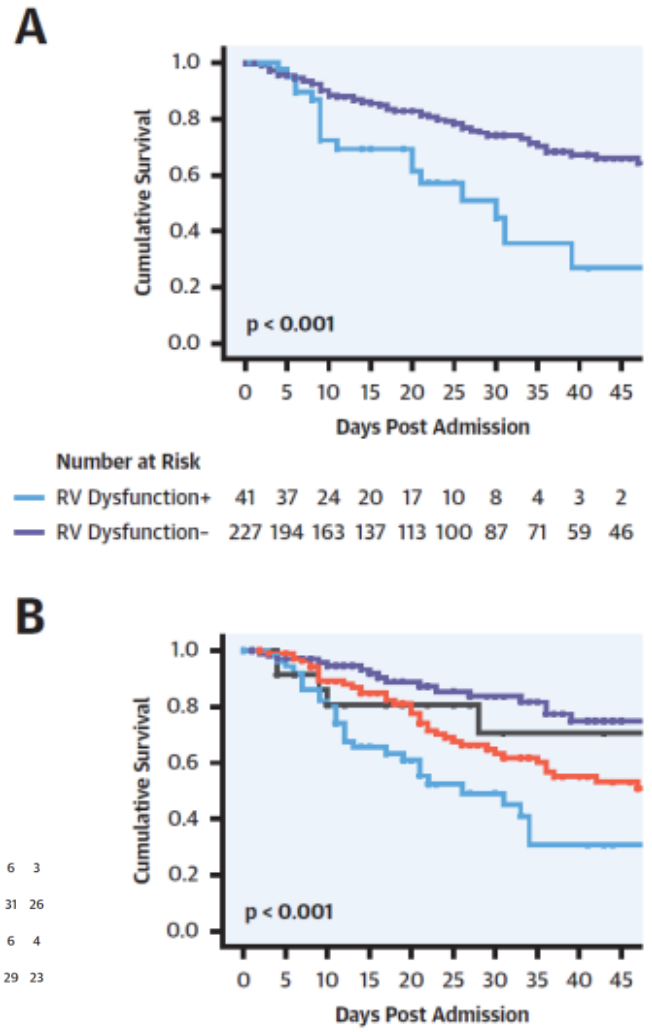
VOL. 76, NO. 17, 2020

Prognostic Utility of Right Ventricular Remodeling Over Conventional Risk Stratification in Patients With COVID-19

Jiwon Kim, MD,[a,b] Alexander Volodarskiy, MD,[c] Razia Sultana, BA,[a] Meridith P. Pollie, BS,[a] Brian Yum, MD,[a] Lakshmi Nambiar, MD,[a] Romina Tafreshi, BA,[a] Hannah W. Mitlak, BA,[a] Arindam RoyChoudhury, PhD,[d] Evelyn M. Horn, MD,[a] Ingrid Hriljac, MD,[a] Nupoor Narula, MD,[a] Sijun Kim, DO,[c] Lishomwa Ndhlovu, MD,[e] Parag Goyal, MD,[a,f] Monika M. Safford, MD,[f] Leslee Shaw, PhD,[b] Richard B. Devereux, MD,[a] Jonathan W. Weinsaft, MD[a,b]





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JAMA Cardiology
View Article

JAMA Cardiol. 2020 Jul 27 : e203557. PMCID: PMC7385689
doi: 10.1001/jamacardio.2020.3557: 10.1001/jamacardio.2020.3557 [Epub ahead of print] PMID: 32730619

Outcomes of Cardiovascular Magnetic Resonance Imaging in Patients Recently Recovered From Coronavirus Disease 2019 (COVID-19)

100 asymptomatic patients recovered from COVID : 78% had abnormal CMR findings
Raised native T1, T2 and presence of myocardial LGE

Key Points

Question

What are the cardiovascular effects in unselected patients with recent coronavirus disease 2019 (COVID-19)?

Findings

In this cohort study including 100 patients recently recovered from COVID-19 identified from a COVID-19 test center, cardiac magnetic resonance imaging revealed cardiac involvement in 78 patients (78%) and ongoing myocardial inflammation in 60 patients (60%), which was independent of preexisting conditions, severity and overall course of the acute illness, and the time from the original diagnosis.

Meaning

These findings indicate the need for ongoing investigation of the long-term cardiovascular consequences of COVID-19.

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VOL. 13, NO. 11, 2020

ORIGINAL RESEARCH

Cardiac Involvement in Patients Recovered From COVID-2019 Identified Using Magnetic Resonance Imaging

Lu Huang, MD, PhD,[a,*] Peijun Zhao, MD,[a,*] Dazhong Tang, MS,[a] Tong Zhu, MD,[a] Rui Han, MD,[b] Chenao Zhan, MD, PhD,[a] Weiyong Liu, MD, PhD,[c] Hesong Zeng, MD, PhD,[d] Qian Tao, PhD,[e] Liming Xia, MD, PhD[a]

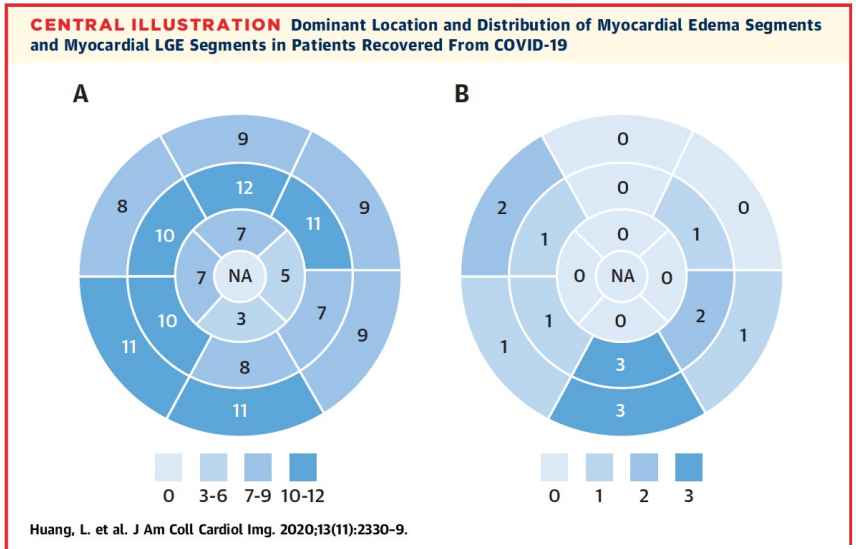
PERSPECTIVES

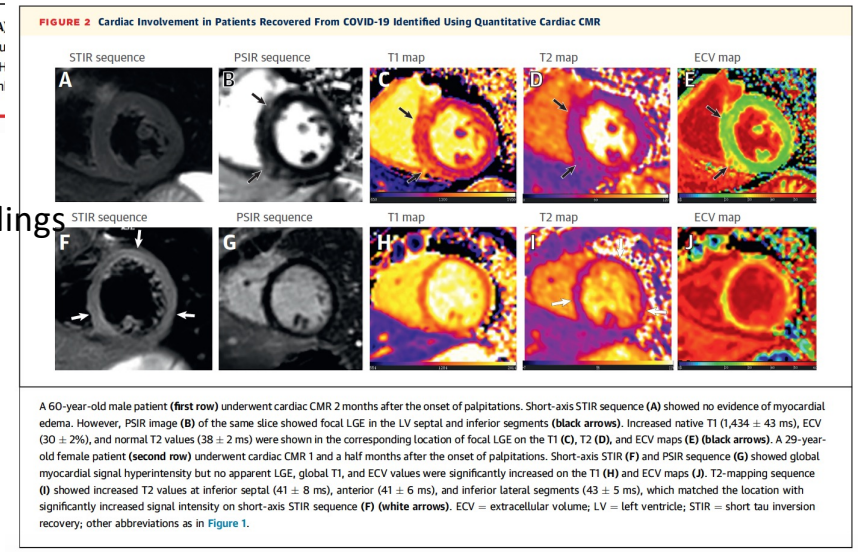
COMPETENCY IN MEDICAL KNOWLEDGE: CMR is a sensitive and quantitative imaging tool to study early cardiac involvement. Our results showed that CMR was able to identify fibrosis and edema on the myocardium in a proportion of the patients recovered from COVID-19. Impaired RV function was also observed this patient subgroup.

TRANSLATIONAL OUTLOOK: Attention needs to be paid to the potential cardiac involvement and negative consequences in patients recovered from COVID-19. This is a relatively short-term small-cohort study; longitudinal follow-ups in a larger cohort are needed to confirm the prognosis value of cardiac CMR for patients recovered from COVID-19.

Top JACC Cardiovasc Imaging

58% abnormal cardiac findings





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VOL. 13, NO. 12, 2020

iREVIEW

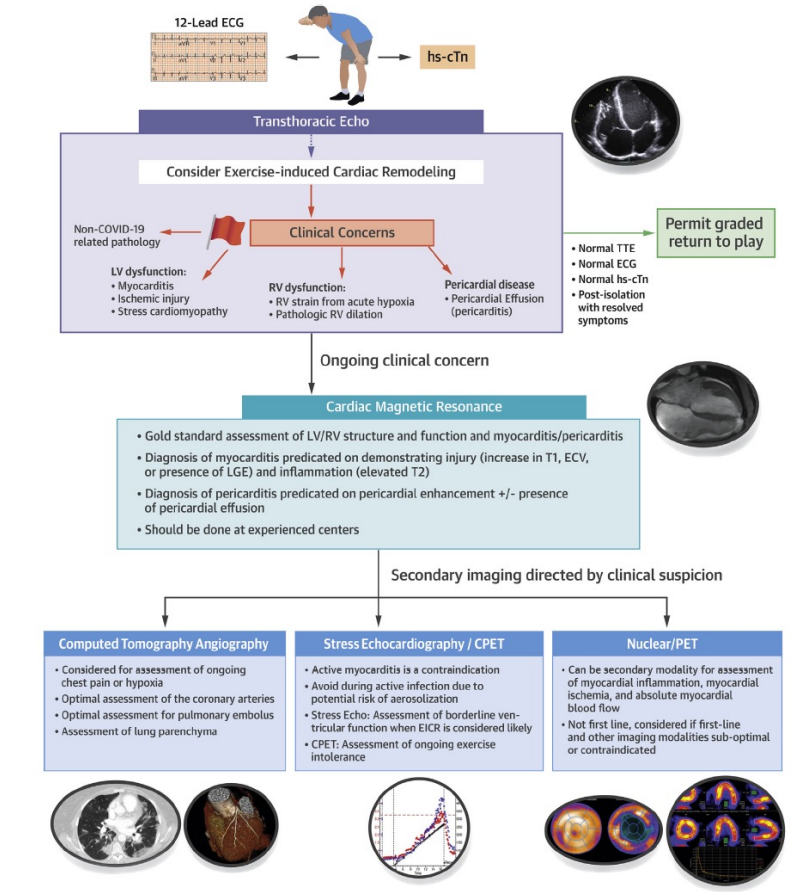
STATE-OF-THE-ART REVIEW

Screening of Potential Cardiac Involvement in Competitive Athletes Recovering From COVID-19

An Expert Consensus Statement

Dermot Phelan, MD, PHD,[a] Jonathan H. Kim, MD, MSc,[b] Michael D. Elliott, MD,[a] Meagan M. Wasfy, MD,[c] Paul Cremer, MD,[d] Amer M. Johri, MD, MSc,[e] Michael S. Emery, MD, MS,[d] Partho P. Sengupta, MD,[f] Sanjay Sharma, BSc, MD,[g] Matthew W. Martinez, MD,[h] Andre La Gerche, MBBS, PHD[i]

CENTRAL ILLUSTRATION Imaging Evaluation of the Athlete After COVID-19



Phelan, D. et al. J Am Coll Cardiol Img. 2020;13(12):2635-52.

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