

▼ Afectación cardiovascular en pacientes con condición post-COVID

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Cardiología clínica y Unidad de imagen cardiaca .

Servicio de cardiología HUGTiP



Barcelona, 21 Abril 2022

Condición **POST COVID-19** Un largo camino hacia la recuperación



CARE PEOPLE HEALTH Respiratory Return to work Shift patterns COVID FATIGUE Well-being

Long - COVID

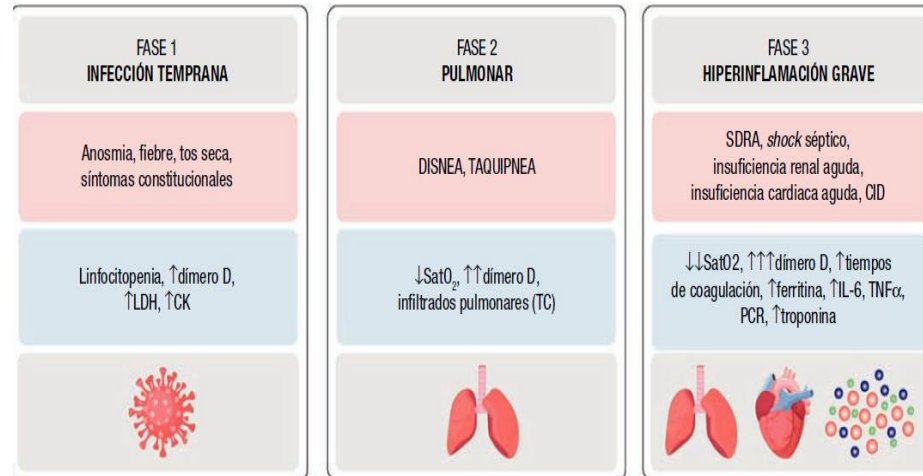
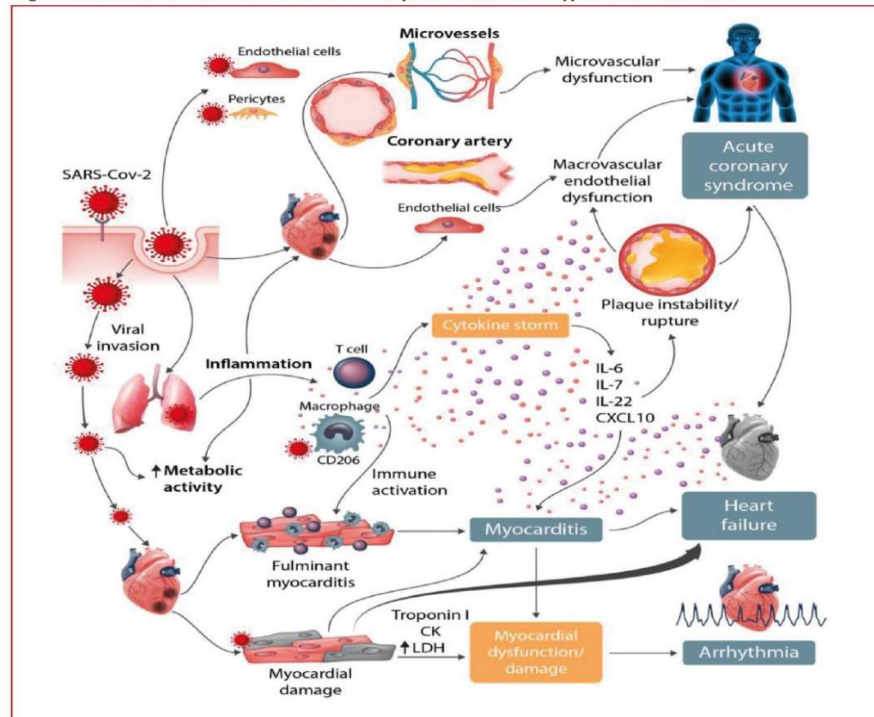


Figure 3 Cardiovascular involvement in COVID-19 – key manifestations and hypothetical mechanisms

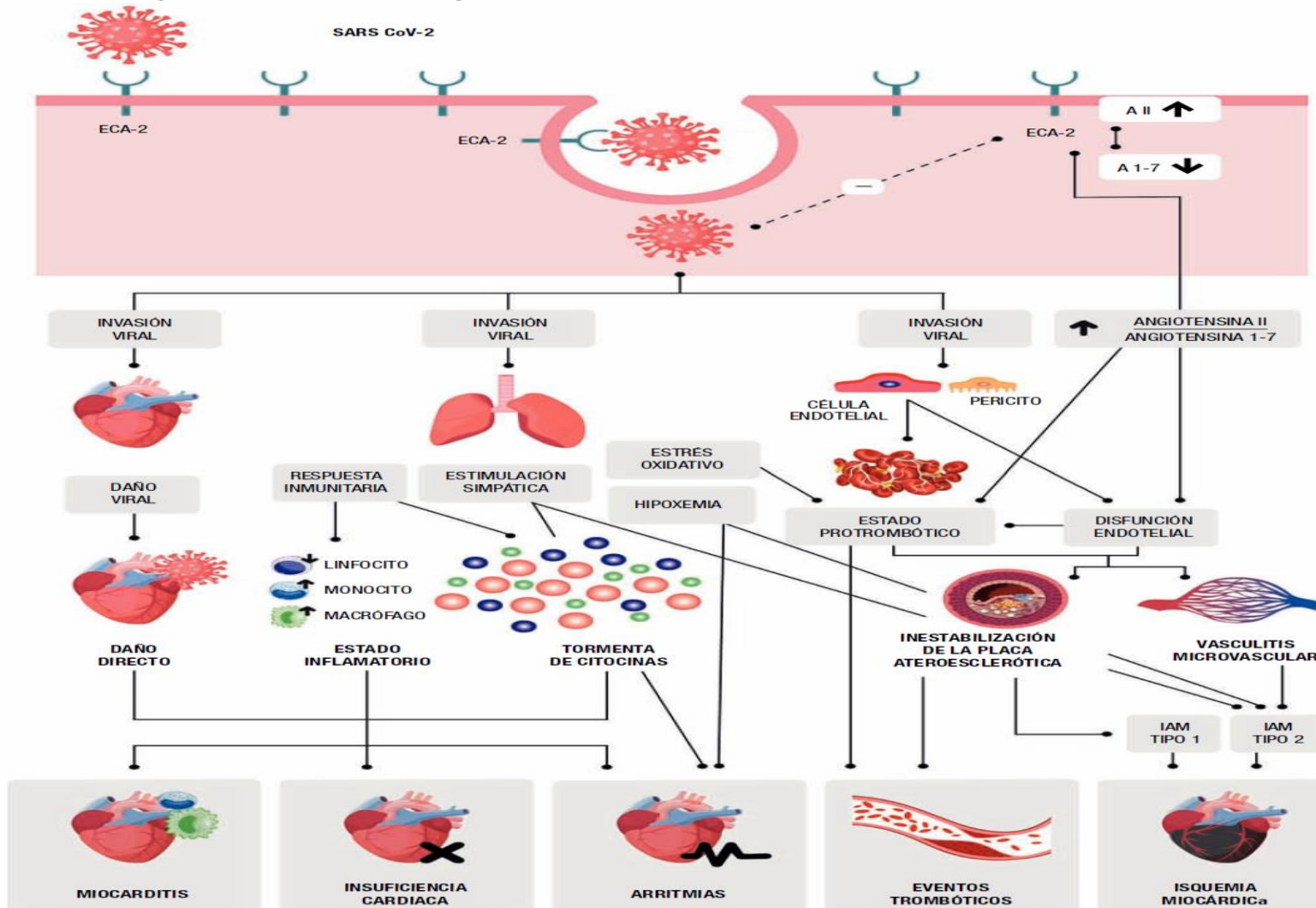


- Casi 50% A cardiovasculares
- Controversia IECAS/ARA II
- FA, bradiarritmias, TV (QT largo SARS +HCQ)
- Miocarditis/IC
- IAM /DAT/Tropos altas
- TEP
- Derrame pericardico

Fisiopatología de la enfermedad cardiovascular en pacientes con COVID-19. Isquemia, trombosis y disfunción cardíaca

José Rozado^{a,ϕ}, Ana Ayesta^{a,ϕ}, César Morís^{a,b,c} y Pablo Avanzas^{a,b,c,*}

Dic 2020



- Invasión viral musc liso vascular y endotelio(receptores ECA -2) con activación de macrófagos que liberan citocinas (IL-6)activación endotelial-**vasculitis**.
- Liberación de sustancias procoagulantes en endotelio,**microtrombosis**.
- Expresion ECA-2 en pericito,disfunción endotelial y **microangiopatía y microtrombos**.
- Alteración de la función endotelial **con interrupción de la microcirculación coronaria ???**

Endothelial cell infection and endotheliitis in COVID-19

www.thelancet.com Vol 395 May 2, 2020

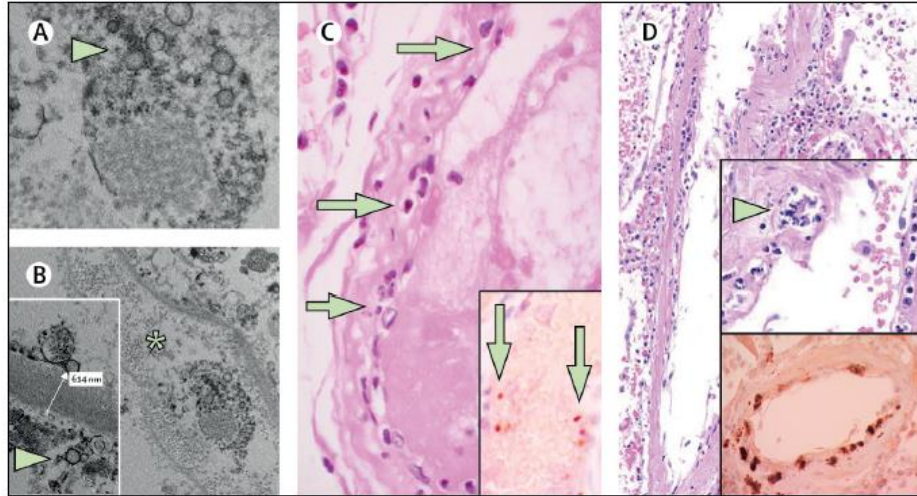


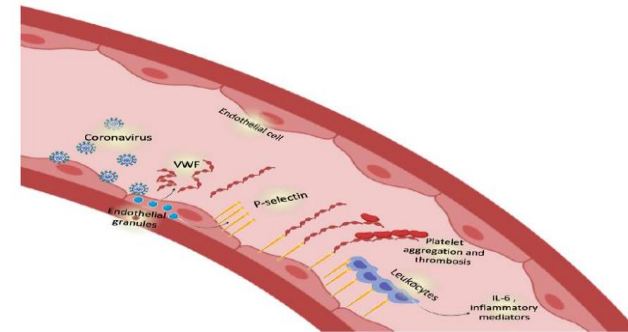
Figure: Pathology of endothelial cell dysfunction in COVID-19

Circulation

ON MY MIND

Severe COVID-19 Is a Microvascular Disease

October 27, 2020 1



ESC

European Society of Cardiology

European Heart Journal (2020) 41, 3038–3044

doi:10.1093/eurheartj/ehaa623

VIEWPOINT

Disease management

COVID-19 is, in the end, an endothelial disease

Peter Libby ^{1*} and Thomas Lüscher ²

Endothelial functions as a therapeutic target

¹Division of Cardiovascular Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA; and ²Heart Division, Royal Brompton & Harefield Hospital and National Heart and Lung Institute, Imperial College, London, UK

AG-SET 2020



DIC 2020



ENERO 2021



DD secuelas
ingreso/sintomatología
persistente(3 meses)

NICE National Institute for
Health and Care Excellence



Centro de Coordinación de Alertas y
Emergencias Sanitarias

PRACTICE POINTER

Management of post-acute covid-19 in primary care

Trisha Greenhalgh,¹ Matthew Knight,² Christine A'Court,¹ Maria Buxton,³ Laiba Husain¹

Facing up to long COVID

www.thelancet.com Vol 396 December 12,

COVID-19 rapid guideline:
managing the long-term
effects of COVID-19

NICE guideline
Published: 18 December 2020
www.nice.org.uk/guidance/ng188

INFORMACIÓN CIENTÍFICA-TÉCNICA

Enfermedad por coronavirus, COVID-19

Actualización, 15 de enero 2021

Curso clínico: [Reinfecciones](#); [COVID persistente o Long COVID](#)

AFECTACION CARDIOVASCULAR EN PACS

Letter to the Editor

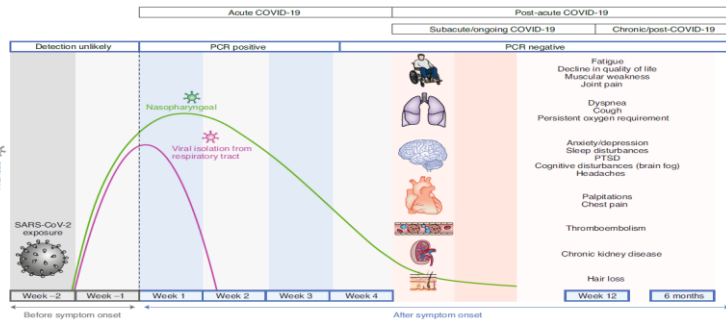
September 9, 2020;13:21]

Post-discharge persistent symptoms and health-of life after hospitalization for COVID-19



nature medicine FOCUS | REVIEW ARTICLE
<https://doi.org/10.1038/s41591-021-01283-z>
 Check for updates

Post-acute COVID-19 syndrome

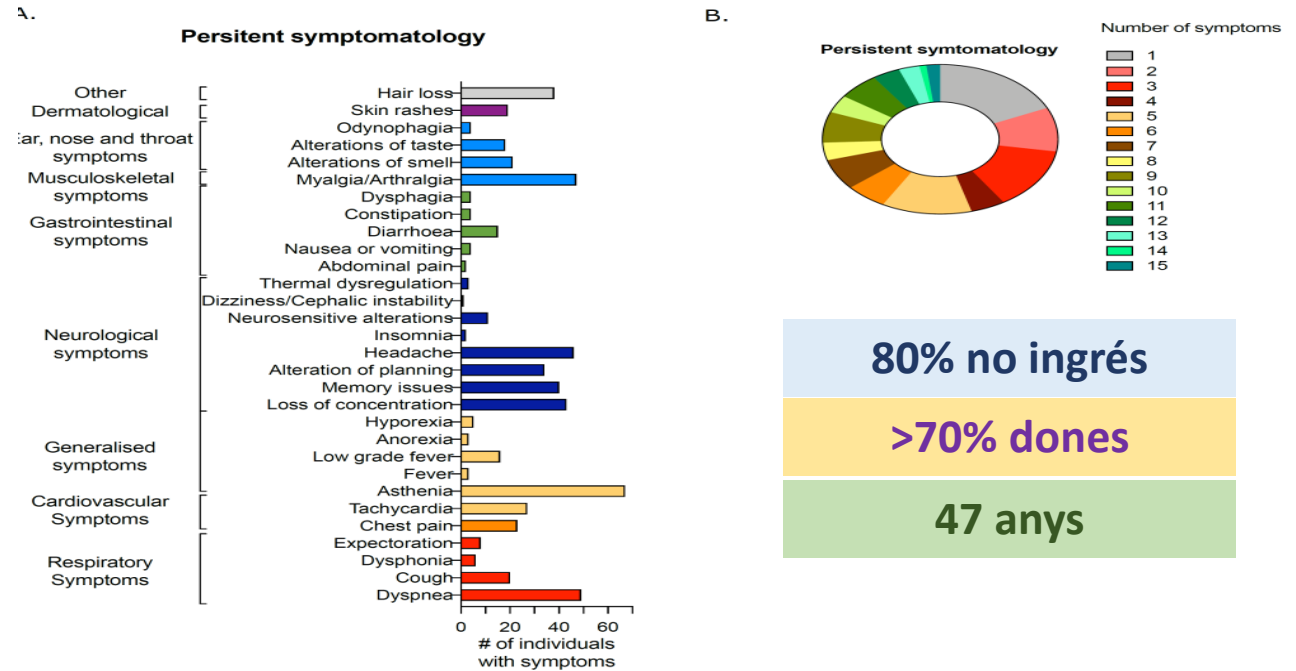


Clinical Microbiology and Infection

journal homepage: www.clinicalmicrobiologyandinfection.com



Figure 1: Characterization of Symptomatology from Long-CoVid



80% no ingrès
 >70% dones
 47 anys

Fig 1: A. Most common persistent symptoms observed in the individuals suffering from Long-Covid KING cohort (n=111). B. Pie chart indicating the frequency of individuals suffering concomitantly nnt symptoms described in panel A, ranging from a single symptom to 15 symptoms.

Original article

Follow-up of adults with noncritical COVID-19 two months after symptom onset

Claudia Carvalho-Schneider ^{1,*}, Emeline Laurent ^{2,10}, Adrien Lemaigen ¹, Emilie Beaufile ³, Céline Bourbao-Tournois ⁴, Saïd Laribi ⁵, Thomas Flament ⁶, Nicole Ferreira-Maldent ⁷, Franck Bruyère ⁸, Karl Stefic ^{9,11}, Catherine Gaudy-Griffin ^{9,11}, Leslie Grammatico-Guillon ^{2,11}, Louis Bernard ¹

Julio 2020

~20% DOLOR TORACICO.....



Persistent chest pain after recovery of COVID-19: microvascular disease-related angina?

Nuria Vallejo^{1*}, Albert Teis¹, Lourdes Mateu^{2,3}, and Antoni Bayés-Genís^{1,3}

¹Heart Institute, Hospital Universitari Germans Trias i Pujol, Badalona, Carretera de Canyet sn 08916 Badalona (Barcelona), Spain; ²Infectious Diseases Department, Hospital Universitari Germans Trias i Pujol, Carretera de Canyet sn 08916 Badalona (Barcelona), Spain; and ³Universitat Autònoma de Barcelona, Campus de la UAB, Plaza Cívica, 08193 Bellaterra (Barcelona), Spain

Received 18 January 2021; first decision 29 January 2021; accepted 8 March 2021

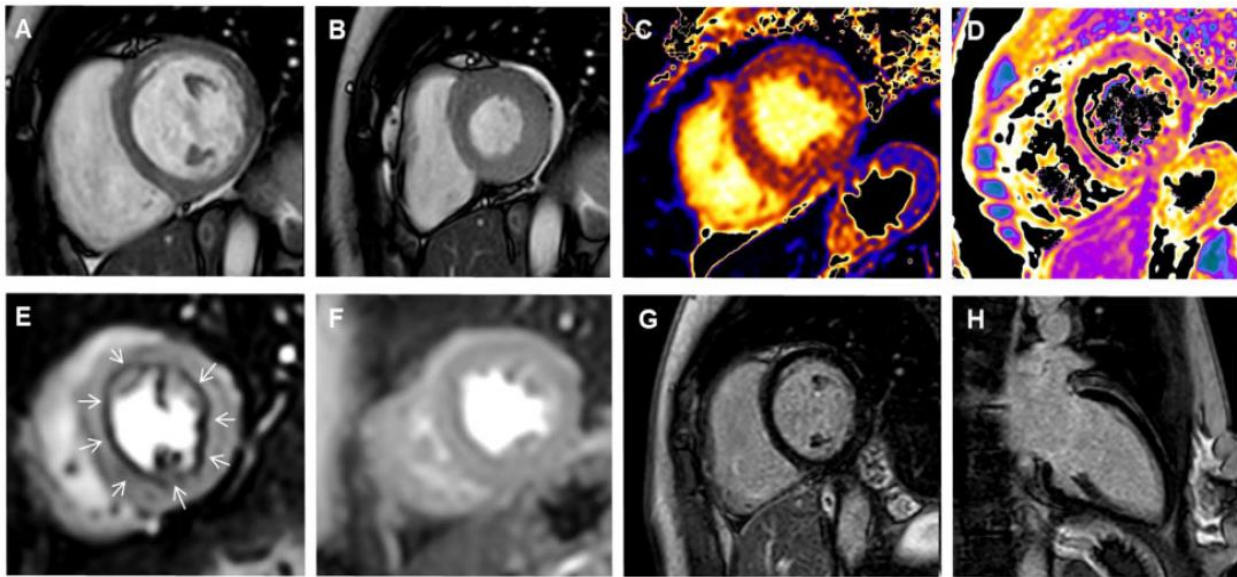


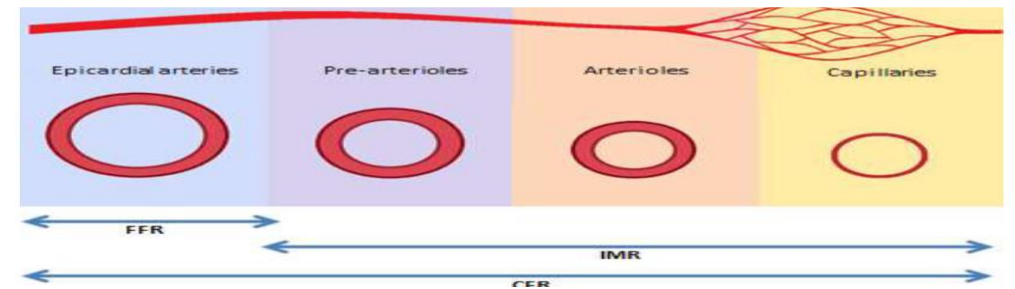
Figure 1 Mid short-axis cine slices in (A) diastole and (B) systole. Myocardial native T1 mapping (C) and T2 mapping (D) showed normal values. First-pass stress perfusion magnetic resonance imaging (E) with a significant circumferential subendocardial perfusion defect (arrows). Rest perfusion magnetic resonance imaging (F). No late gadolinium enhancement was detected (G and H).

COVID-19 is, in the end, an endothelial disease

Peter Libby^{1*} and Thomas Lüscher²

¹Division of Cardiovascular Medicine, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA; and ²Heart Division, Royal Brompton & Harefield Hospital and National Heart and Lung Institute, Imperial College, London, UK


Alteración de microvasculatura con **incapacidad vasodilatadora** para responder a demanda o **vasoespasmos** normalmente endotelio dependiente



-Dx: (no invasivo en pacientes con RCV bajo)
-Tto dirigido

Review

Coronary Microvascular Dysfunction and the Noninvasive Cardiovascular Imaging

Muhammad Talha Ayub and Dinesh Kalra * 

Division of Cardiology, Rush University Medical Center, Chicago, IL 60612, USA;

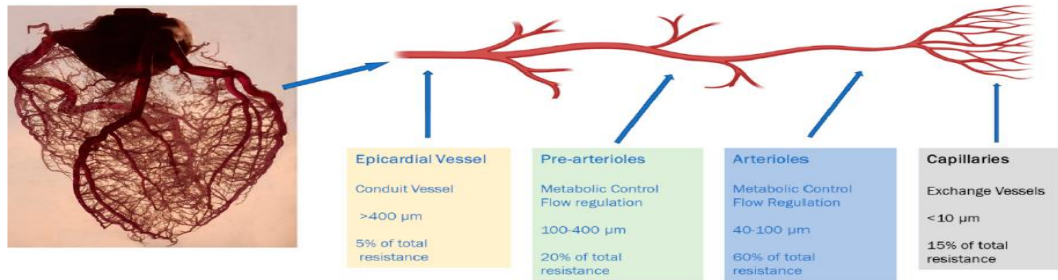


Figure 1. Anatomical and functional classification of the coronary macro and micro-arterial system.

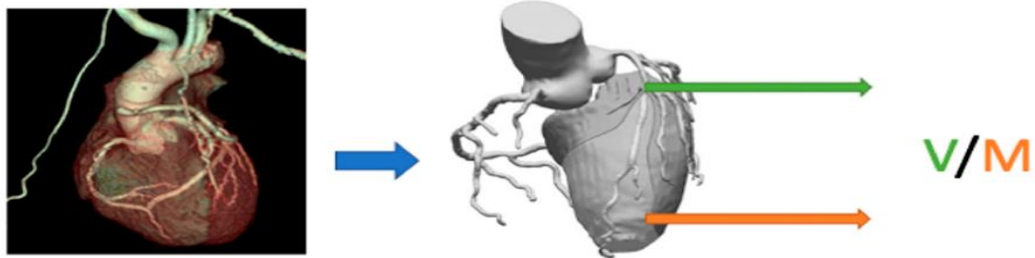


Figure 2. Calculation of V/M ratio from coronary computed tomography angiography (CTA) involves computation of the coronary volume (V, shown in green) and myocardial mass (M, shown in orange). A ratio of <2 denotes coronary microvascular dysfunction (CMD) in the absence of significant epicardial stenosis.

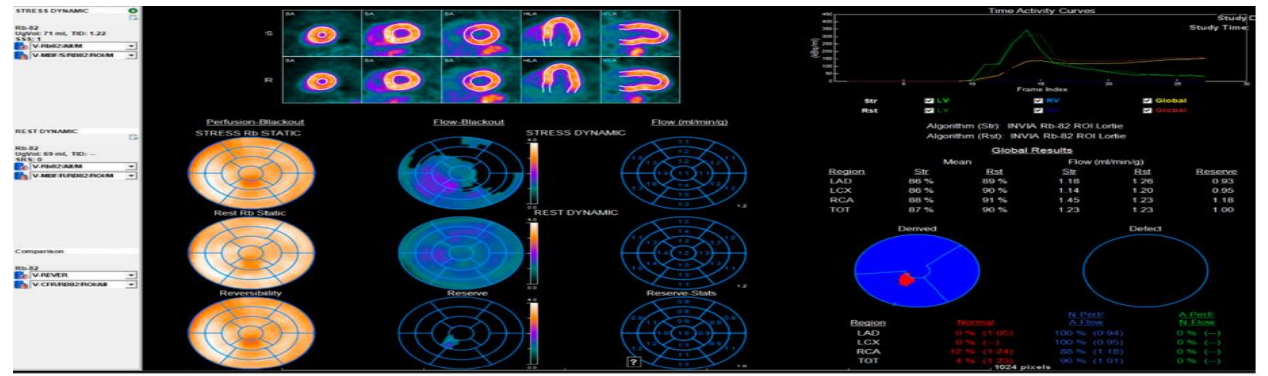


Figure 3. Rubidium-82 regadenoson stress-rest PET (positron emission tomography) in a 64-year-old man with persistent, recurring angina and only mild epicardial CAD (coronary artery disease) on invasive angiography done at an outside hospital. There is abnormal global myocardial perfusion reserve (MPR) <2 consistent with CMD (coronary microvascular dysfunction). He was prescribed Ranolazine and high intensity statin therapy, and had dramatic improvement in 1 months' time. LAD = Left anterior descending coronary artery, RCA = Right coronary artery, LCX = Left circumflex

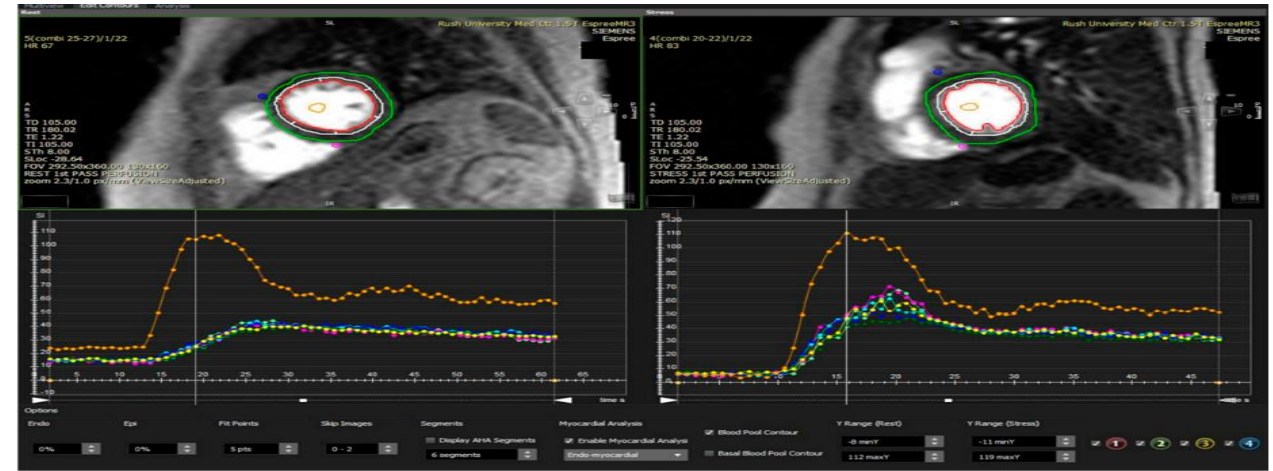
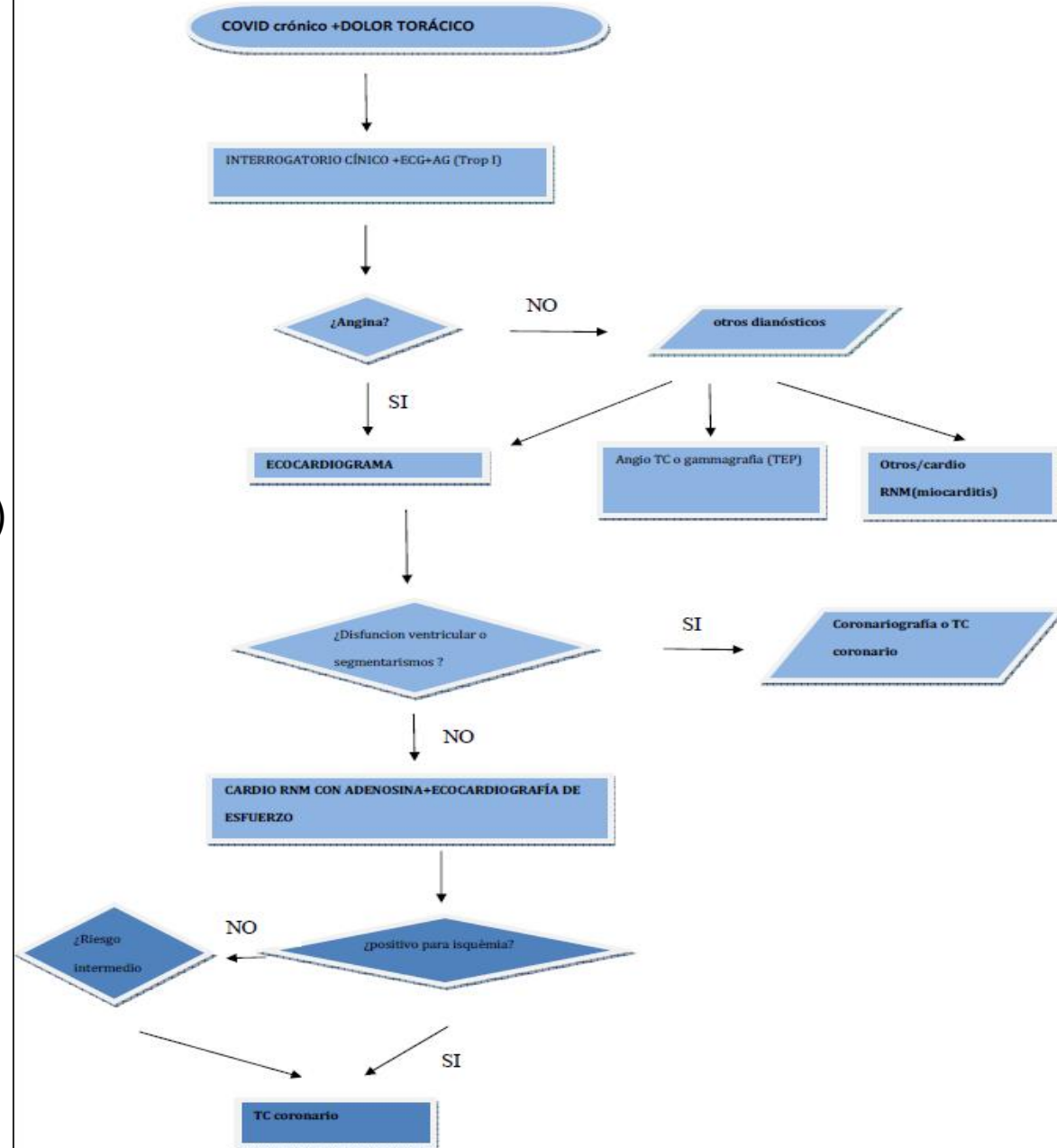


Figure 4. Stress CMR (Cardiovascular Magnetic Resonance) perfusion in a 67-year-old woman with angina and negative coronary CTA (computed tomography angiography) that had shown minimal calcific plaque with <10% stenosis in the proximal left anterior descending artery. After regadenoson stress, no visual reversible perfusion defect was noted, indicating the absence of ischemia from epicardial stenosis; however, the MPRI (myocardial perfusion reserve index) is computed at 1.97, consistent with the diagnosis of CMD (coronary microvascular dysfunction). She was initiated on amlodipine, a high intensity statin and long-acting nitrate therapy and had resolution of anginal symptoms after 2 weeks. In the top panel, Green contours depict epicardium of the left ventricle, Red depicts the endocardial border, and White is the mid myocardium. In the bottom panel, the Orange curve is the signal intensity of blood pool in the left ventricle plotted against time—during Stress regadenoson imaging on the right, and at Rest on the left. The other colored curves depict various segments of the left ventricular myocardium.

ANGI-COVID

ANGI-COVID Protocol

- Clinical evaluation and ECG (*Cardiology department*)
- Echocardiography (*Cardiology department*)
- Stress echocardiography (*Cardiology department*)
- Cardio MRI pharmacological test with adenosine (*Creu Blanca*)
- Coronary computerized axial tomography (*Creu Blanca*)



COVID-19 persistente y angina microvascular

Long COVID-19 and microvascular disease-related angina

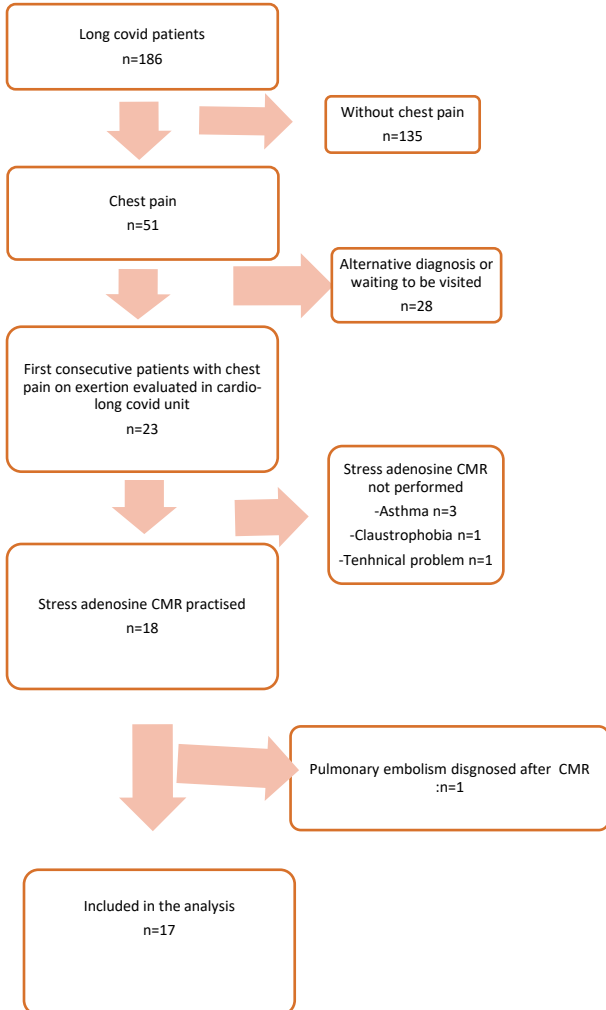
Nuria Vallejo Camazón^a, Albert Teis^{a,b}, María José Martínez Membrive^a, Cinta Llibre^a, Antoni Bayés-Genís^{a,◊}, Lourdes Mateu^{c,◊}

^a Servicio de Cardiología, Hospital Universitari Germans Trias i Pujol, Badalona, Barcelona, España

^b Cardiodiagnosis, Clínica Creu Blanca, Barcelona, España

^c Unitat Malalties Infeccioses, Hospital Universitari Germans Trias i Pujol, Badalona, Barcelona, España

ANGI COVID

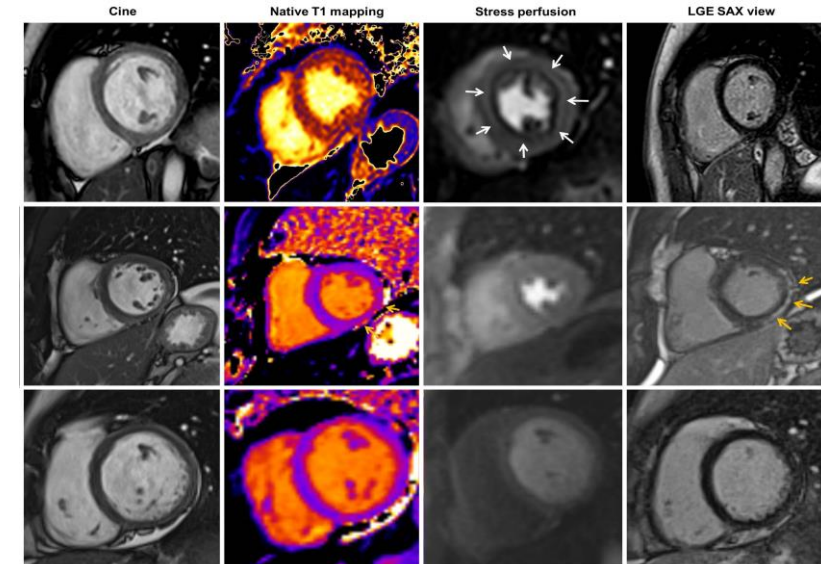


- Edad media 45 años, 76% mujeres
- 64% COVID leve
- 17% HTA, 17% DLP, 5% DM(1)
- TIEMPO A DT 6.9 días (0-230)
- 8 ecos esfuerzo, 1 positiva
- RNM basal normal salvo 2 miocarditis

9 positivas (1 mixta) (53%), 1 miocarditis

Otras causas DT:

- costocondritis/articular
- Miopericarditis
- TEP
- Disfunción autonómica



TAQUICARDIA SINUSAL-TSI/POTS



Inappropriate sinus tachycardia in post-COVID-19 syndrome

Júlia Aranyó¹, Víctor Bazan¹, Gemma Lladós², Maria Jesús Dominguez³, Felipe Bisbal¹, Marta Massanella⁴, Axel Sarrias¹, Raquel Adeliño¹, Ariadna Riverola¹, Roger Paredes⁴, Bonaventura Clotet^{2,4}, Antoni Bayés-Genís^{1,5,6}, Lourdes Mateu^{2,6,7,8} & Roger Villuendas^{1,5,6,8}✉

SCI Reports Dic 2021

TACHOVID protocol

-FC>90 reposo
->30 con bipedestación o TSI en Holter

- Electrocardiogram (*Cardiology department*)
- Minnesota Living with Heart Failure Questionnaire (*Cardiology department*)
- 24-hour Holter monitoring (*Cardiology department*)
- Six-minute walking test (*Cardiology department*)
- Echocardiography (only first visit) (*Cardiology department*)
- Vagus tone study (*Neurology department*).

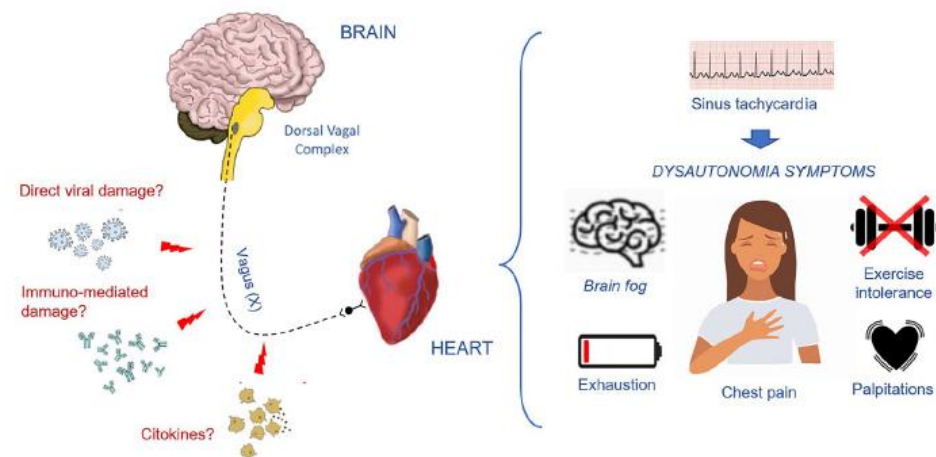
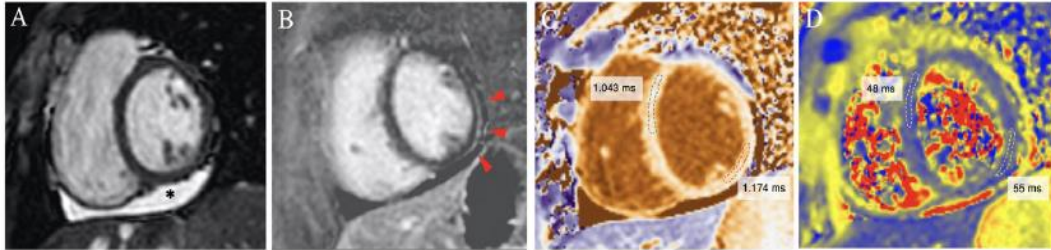


Figure 3. Illustration of the pathophysiological mechanisms underlying Post-COVID-19 syndrome.

OTROS :MIOCARDITIS

R. Eiros et al./Rev Esp Cardiol. 2022;xx(x):xxx-xxx



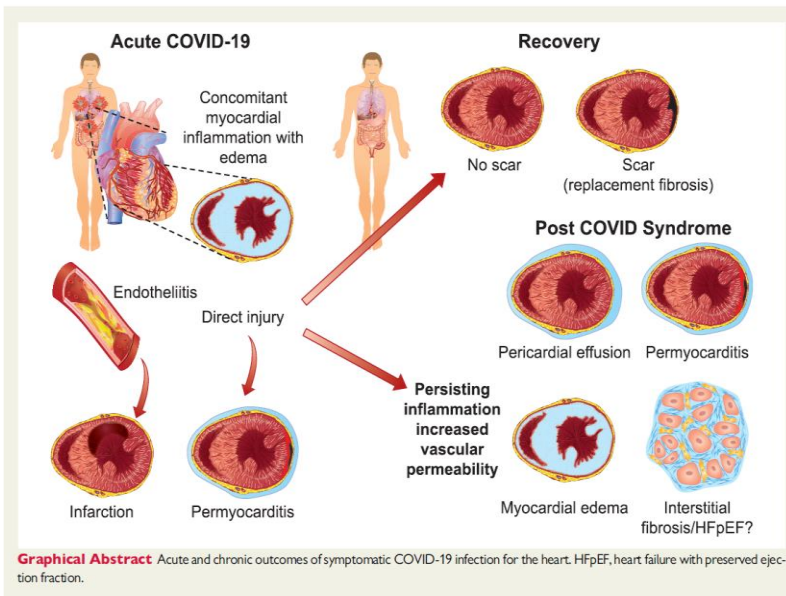
-Mas frecuente en fase “aguda” (casos post vacuna tb): daño viral directo o respuesta autoinmune(pericarditis .DP)

-En PACS ¿persistencia reservorio viral en miocito con respuesta inflamatoria crónica?

-Dx no invasivo por criterios de RNM .

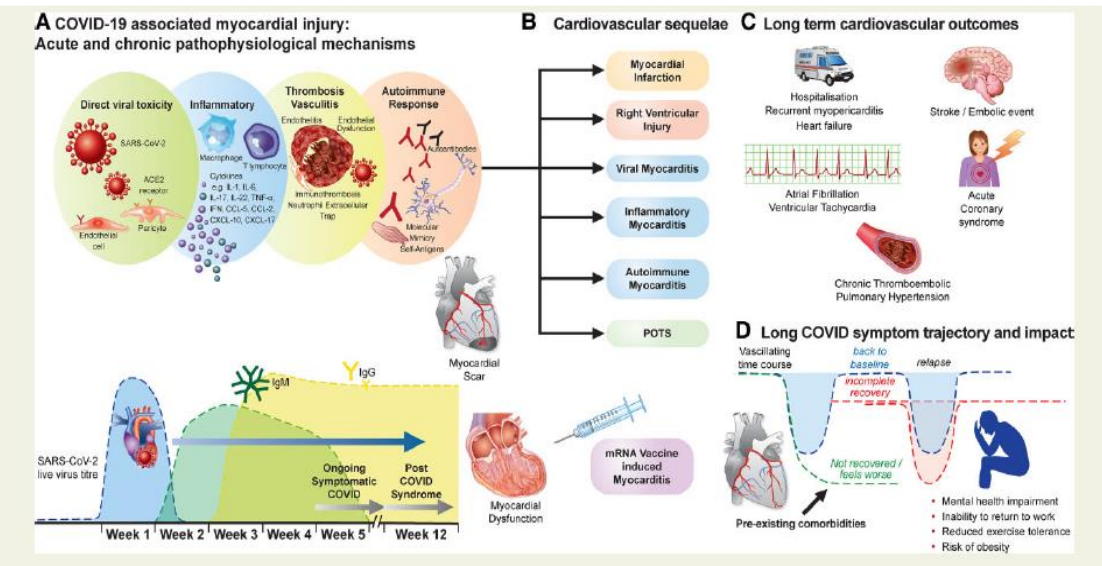
-Tto incierto en “miocarditis crónica”(PACS) , normalmente FEVI normal. Valorar colchicina /AINES sintomático sobre todo si derrame pericárdico.

-A valorar Biopsia EM si dudas dx/no respuesta tto/disfunción VI .



Long COVID: post-acute sequelae of COVID-19 with a cardiovascular focus

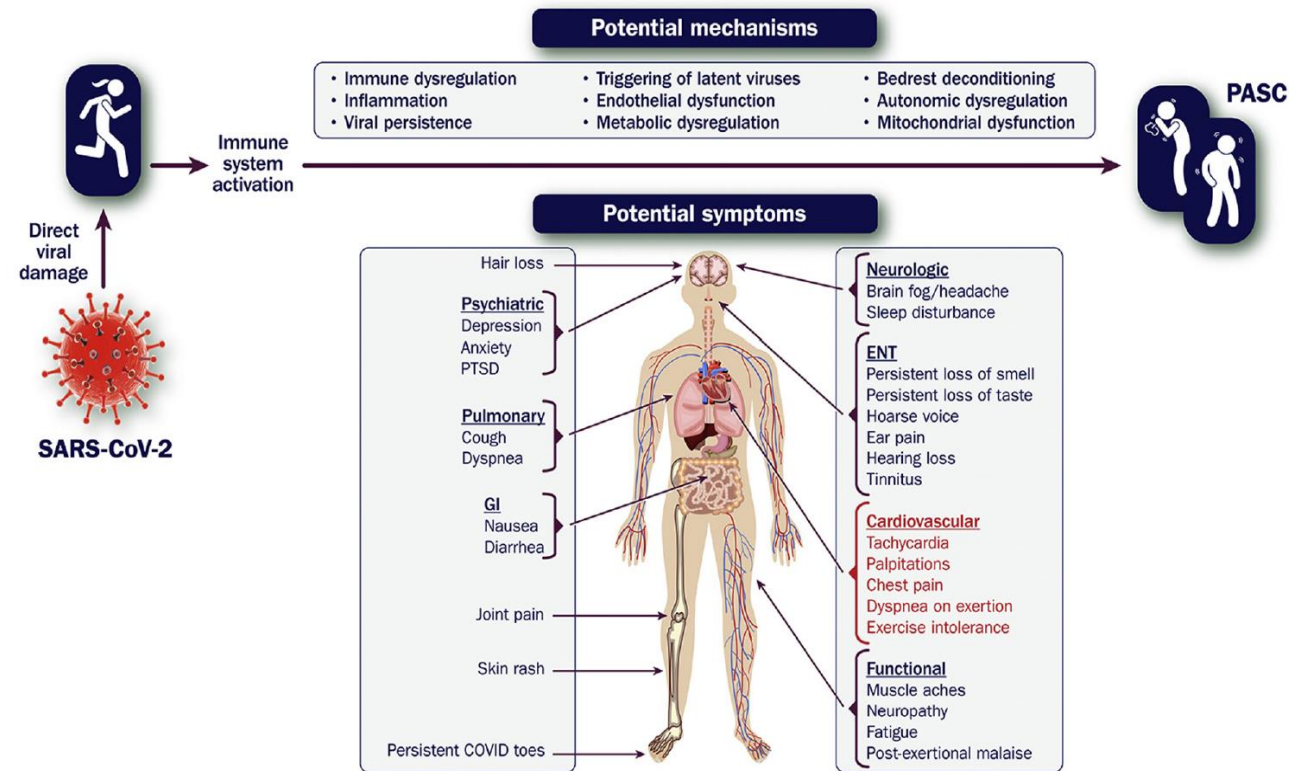
Betty Raman ^{1*}, David A. Bluemke ^{2,3}, Thomas F. Lüscher ^{4,5}, and Stefan Neubauer ¹



- Más “luz “ en cuanto a síntomas y cronología (incluyendo sintomatología cardiovascular)
- Muchos “gaps” en cuanto a mecanismos y ttos.

2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults: Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play

FIGURE 5 Symptoms of PASC and Potential Mechanisms



COVID-19 = novel coronavirus disease 2019; ENT = ear, nose, and throat; GI = gastrointestinal; PASC = post-acute sequelae of SARS-CoV-2 infection; PTSD = posttraumatic stress disorder; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

2022 ACC Expert Consensus Decision Pathway on Cardiovascular Sequelae of COVID-19 in Adults: Myocarditis and Other Myocardial Involvement, Post-Acute Sequelae of SARS-CoV-2 Infection, and Return to Play

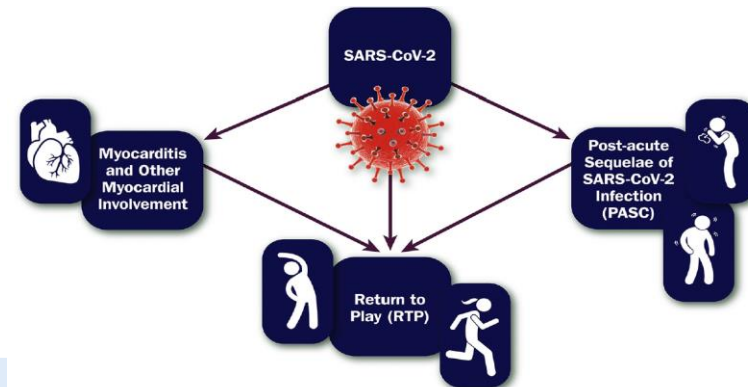
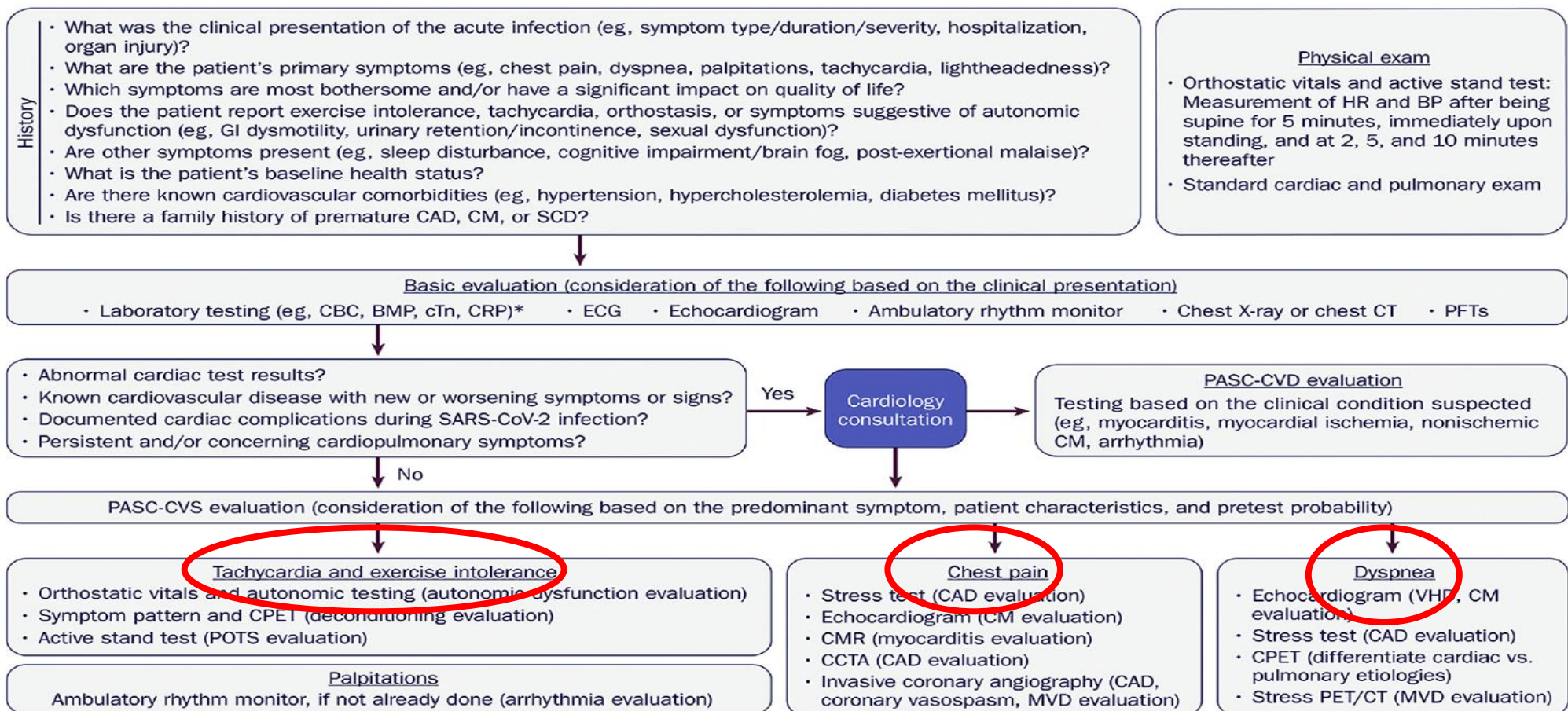


FIGURE 7 Evaluation of Cardiovascular Symptoms Suggestive of PASC



POSIBLES TRATAMIENTOS

- POTS/TSI/ INTOLERANCIA /ESFUERZO:
 - Entreno progresivo(mejor no supino)
 - Volemia: sal, beber, medias compresion,elevar cabezal
 - Fcos: BB, ivrabadina, fludrocortisone
- DOLOR TORACICO:
 - Articular o miopericarditis : AINES±colchicina
 - Angina: BB, ACA, nitratos, ranolazine ..(extracto remolacha y L-argignina?precursor NO) estatinas?AAS?.....



03064

Baricitinib treatment in Post Covid-19 Condition

12. COVID-19

12c. Clinical features, case management, outcome (incl long-term)

Gemma Lladós ¹, Ivette Casafont ², Nuria Vallejo ³, Sergio España ¹, Jose Ramón Santos ⁴, Cristina López ⁴, Cora Loste ⁴, Cinta Llibre ⁵, Albert Teis ⁵, Carles Quiñones ⁶, Antoni Bayés ⁵, Bonaventura Clotet ⁷, Marta Massanella ⁸, Roger Paredes ⁷, Lourdes Mateu ⁷

Conclusiones, preguntas y retos

- **Sintomatología establecida clara (dolor torácico, TSI, intolerancia al ejercicio, POTS) (más en pacientes primera ola prevacunas..inmunomediado/inflamación)**
- **Mecanismos “no del todo” aclarados.**
- **Angina por disfunción microvascular: dx pruebas no invasivas (RNM stress), poca respuesta a ttos “clásicos.**
- **Duración? Cronología? Respuesta a nuevos ttos?**

Condición **POST COVID-19**

Un largo camino hacia la recuperación



Ningún camino es largo con una buena compañía