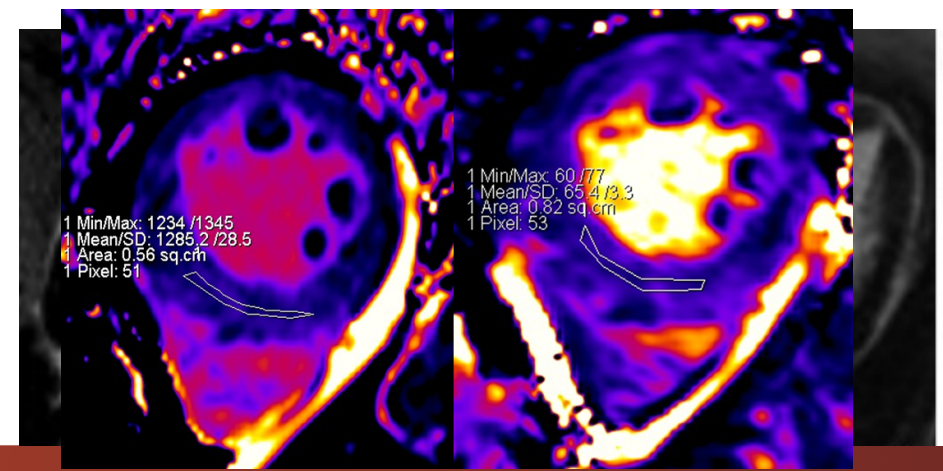
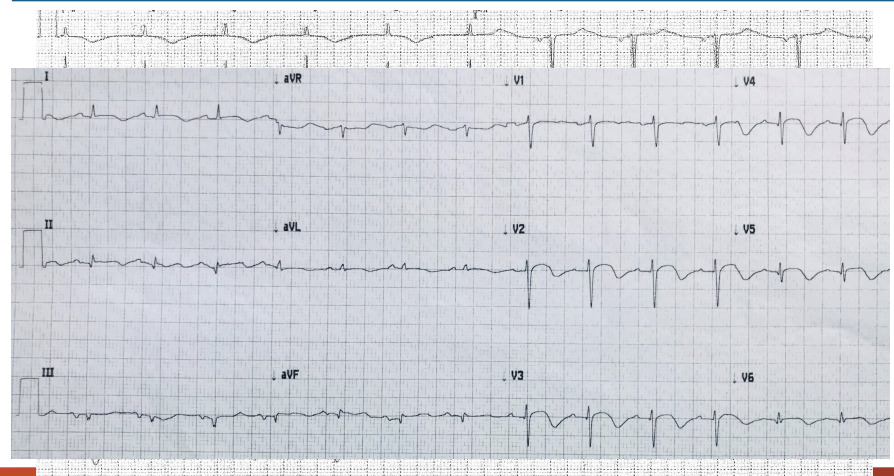
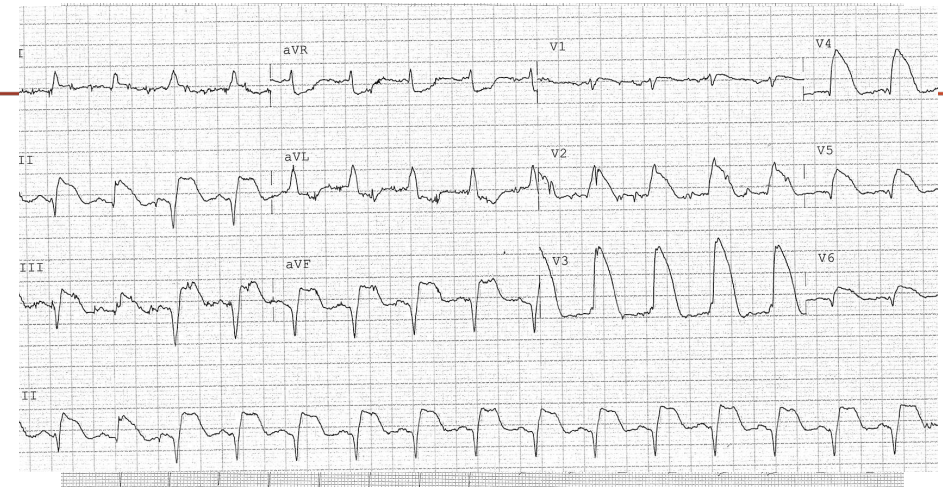
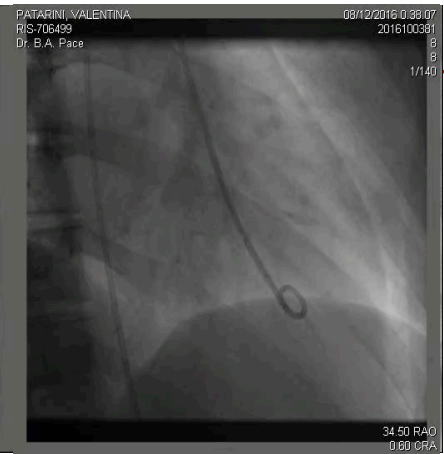
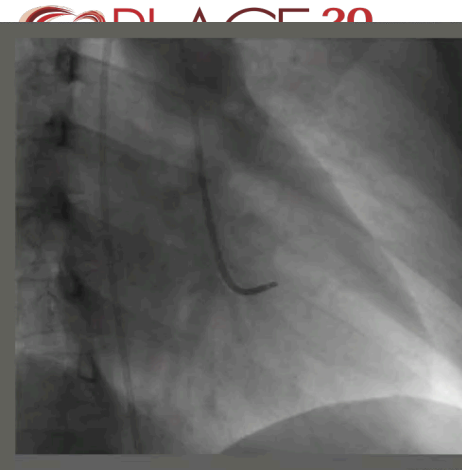


IL CONTINUUM CARDIOLOGIA D'URGENZA - UTIC PARTE I

Prognosi e Terapia della Sindrome Tako-Tsubo

ARCARI Luca
Ospedale Madre
Giuseppina Vannini, Roma



JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY

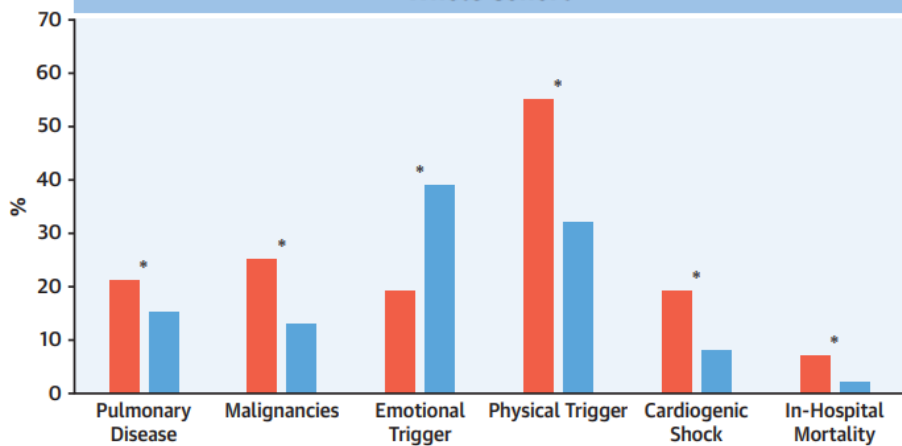
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PUBLISHED BY ELSEVIER

Gender Differences in Takotsubo Syndrome

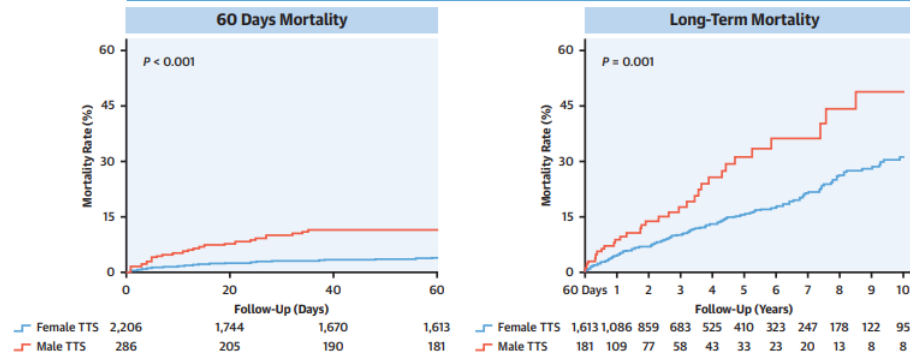
Luca Arcari, MD,^{a,*} Iván J. Núñez-Gil, MD, PhD,^{b,*} Thomas Stiermaier, MD,^c

Whole Cohort

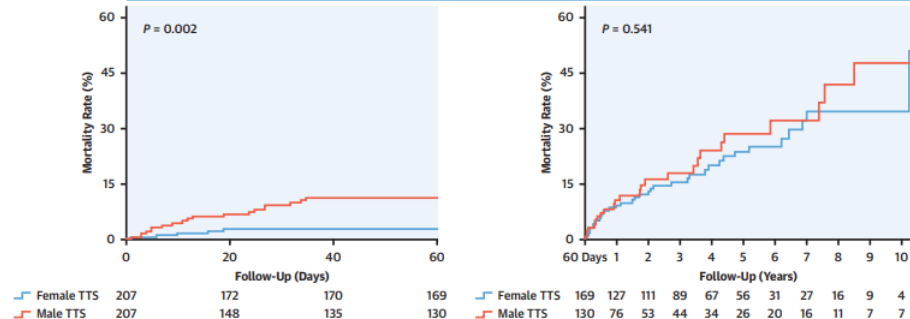


CENTRAL ILLUSTRATION Outcomes of Male Patients With Takotsubo Syndrome

2,942 Consecutive TTS Patients Enrolled in the GEIST Registry: Gender and Outcome



Matched Cohort (n = 207, 1:1 Matched Male TTS): Gender and Outcome



Arcari L, et al. J Am Coll Cardiol. 2022;79(21):2085-2093.

ORIGINAL ARTICLE

Clinical Features and Outcomes of Takotsubo (Stress) Cardiomyopathy

C. Templin, J.R. Ghadri, J. Diekmann, L.C. Napp, D.R. Bataiosu, M. Jaguszewski, V.L. Cammann, A. Sarcon, V. Geyer, C.A. Neumann, B. Seifert, J. Hellermann, M. Schwytzer, K. Eisenhardt, J. Jenewein, J. Franke, H.A. Katus, C. Burgdorf, H. Schunkert, C. Moeller, H. Thiele, J. Bauersachs, C. Tschöpe, H.-P. Schultheiss, C.A. Laney, L. Rajan, G. Michels, R. Pfister, C. Ukena, M. Böhm, R. Erbel, A. Cuneo, K.-H. Kuck, C. Jacobshagen, G. Hasenfuss, M. Karakas, W. Koenig, W. Rottbauer, S.M. Said, R.C. Braun-Dullaues, F. Cuculi, A. Banning, T.A. Fischer, T. Vasankari, K.E.J. Airaksinen, M. Fijalkowski, A. Rynkiewicz, M. Pawlak, G. Opolski, R. Dworakowski, P. MacCarthy, C. Kaiser, S. Osswald, L. Galiuto, F. Crea, W. Dichtl, W.M. Franz, K. Empen, S.B. Felix, C. Delmas, O. Lairez, P. Erne, J.J. Bax, I. Ford, F. Ruschitzka, A. Prasad, and T.F. Lüscher

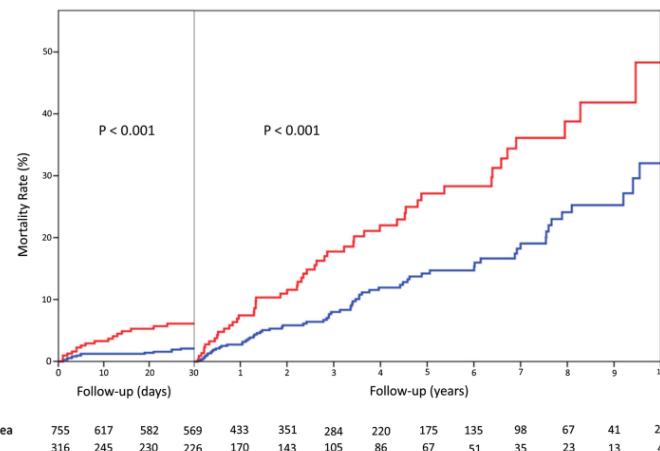
Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Takotsubo Cardiomyopathy		Acute Coronary Syndrome	P Value†
	Total Cohort (N = 1750)	Matched Cohort (N = 455)	Matched Cohort (N = 455)	
Female sex — no. (%)	1571 (89.8)	411 (90.3)	411 (90.3)	1.00
Age — yr	322/438 (73.5)		361/403 (89.6)	
Chest pain — no./total no. (%)	208/439 (47.4)		128/363 (35.3)	
Dyspnea — no./total no. (%)				

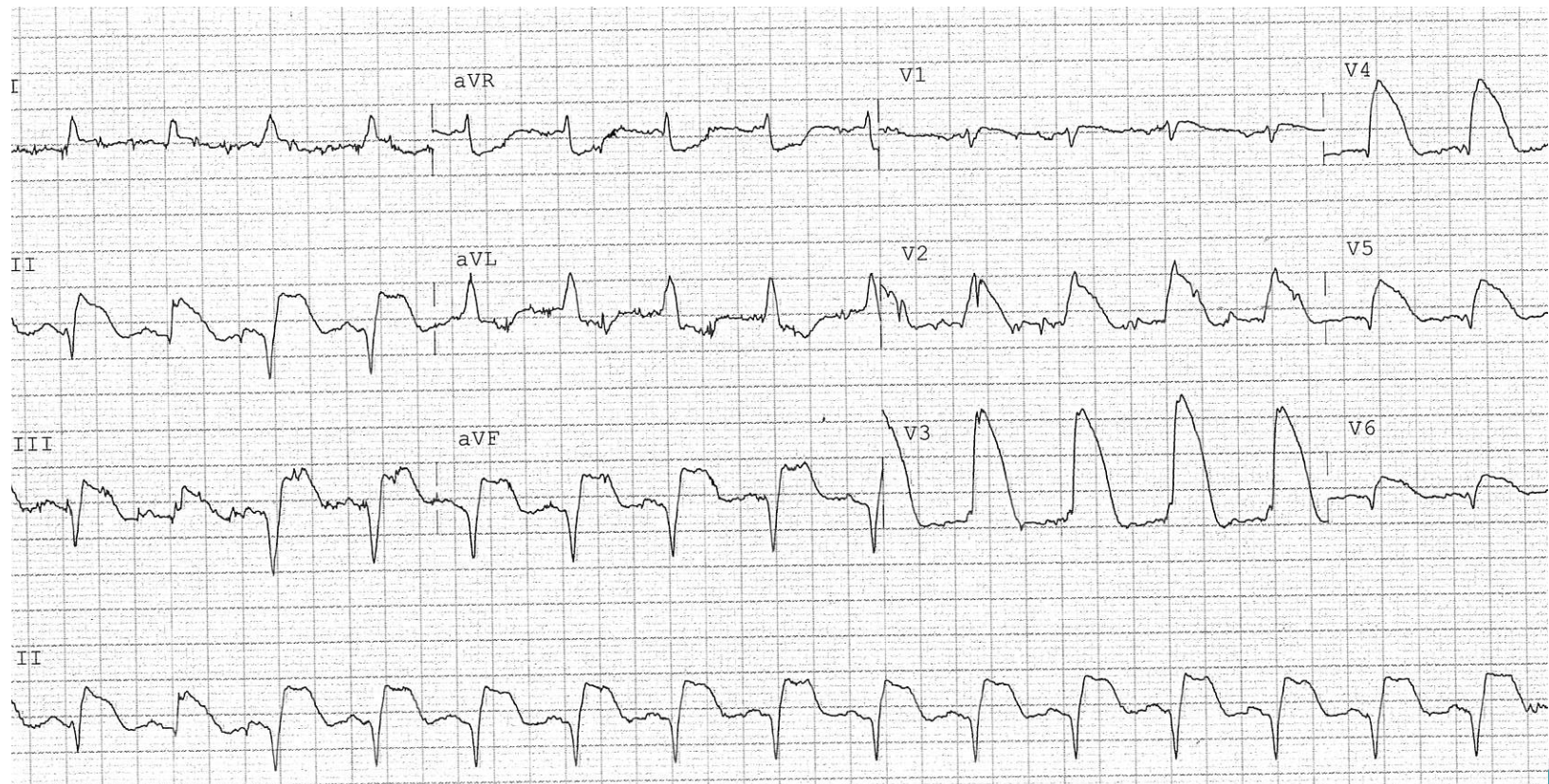
OPEN

Incidence, determinants and prognostic relevance of dyspnea at admission in patients with Takotsubo syndrome: results from the international multicenter GEIST registry

Luca Arcari^{1,12}, Maria Beatrice Musumeci^{1,12}, Thomas Stiermaier², Ibrahim El-Battrawy³.



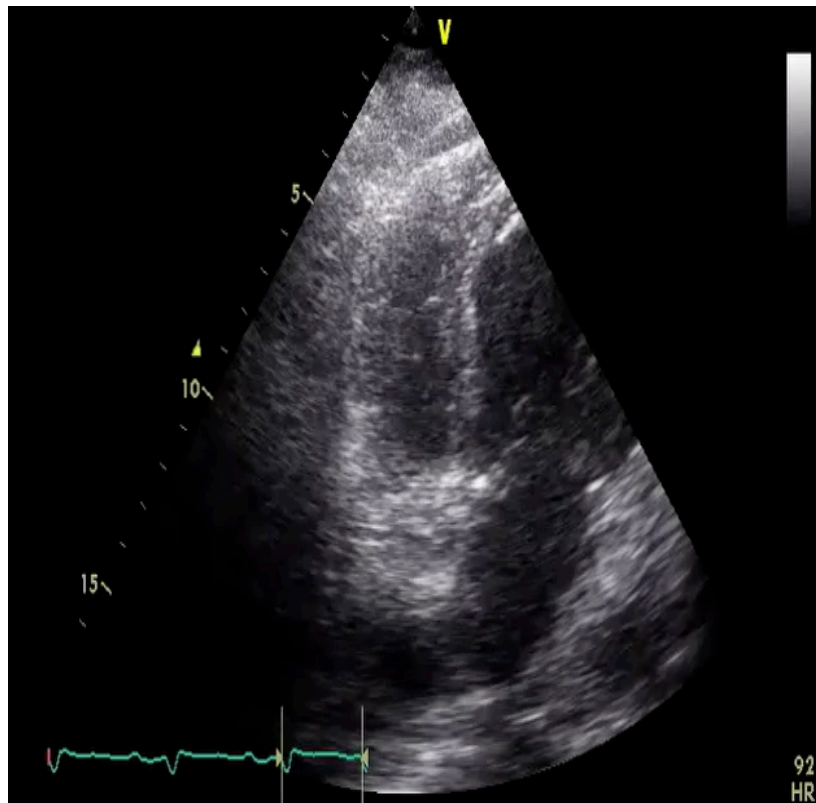
2. ECG – Lambda wave = prognosi peggiore



Reference:
Tarantino N et
al. Ann
Noninvasive
Electrocardiol.
2018



3. Ecocardio



Predittori Prognostici:

- Frazione di eiezione [1]
- Coinvolgimento Ventricolo Destro [2]
- LVOT obstruction (solo prognosi in acuto)[3]
- E/e' [4]
- Insufficienza mitralica [4]

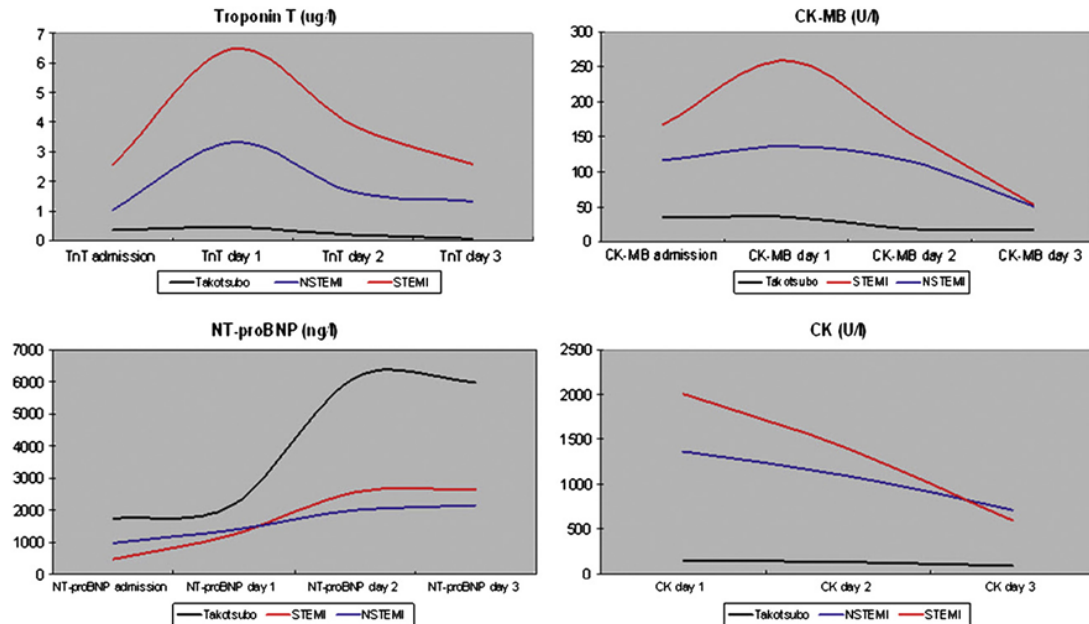
References

1. Arcari L et al. Scientific Report 2021
2. El-Battrawy I et al. Chest 2021
3. Di Vece D et al. JACC: Cardiovascular Imaging 2024
4. Citro R et al. JACC: Cardiovascular Imaging 2014



4. Marcatori sierici

G.M. Fröhlich et al. / International Journal of Cardiology 154 (2012) 328–332



References

1. Stiermaier T et al. Clinical Res Cardiology 2018
2. Staehli B et al. Europ J Clinical Investigation 2025

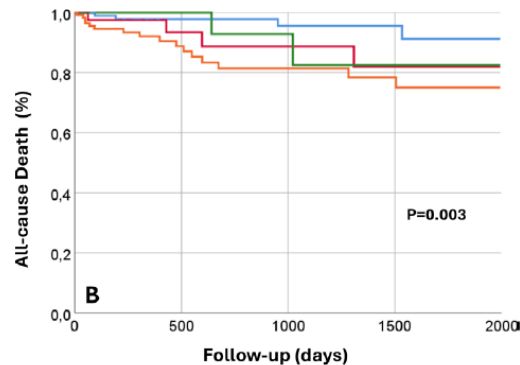
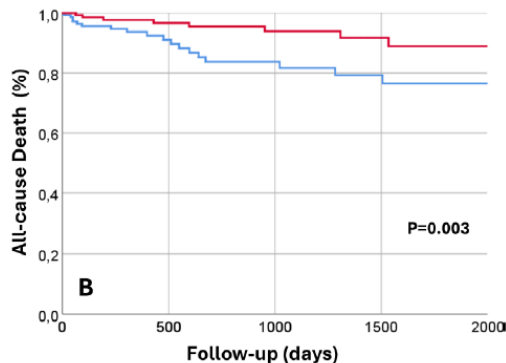
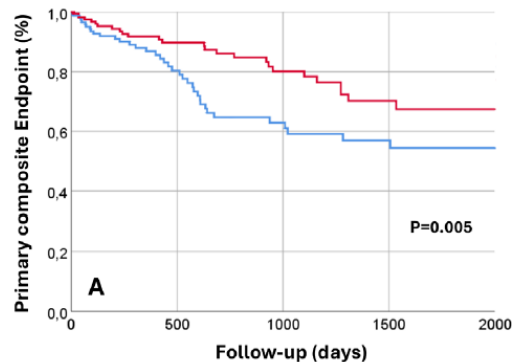
- L'incremento di Troponina è minore rispetto ad un IMA
- L'incremento di BNP è maggiore rispetto a un IMA
- Il picco di BNP si osserva dopo 48 ore
- Admission NT-Pro-BNP predice la prognosi [1]
- Troponina di picco predice la prognosi [2]



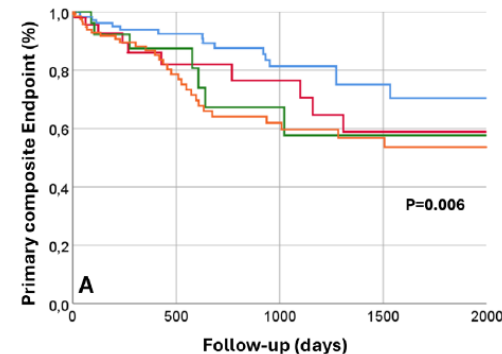
Original research

Independent prognostic value of left ventricular stroke volume index in patients with takotsubo syndrome: insights from the EVOLUTION registry

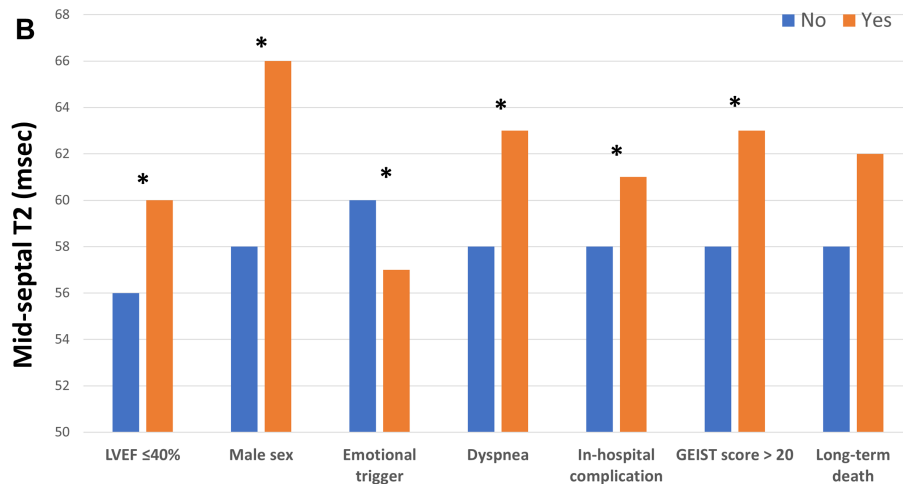
Luca Arcari ¹, Riccardo Cau, ² Gianluca Pontone, ^{3,4} Giuseppe Muscoiuri, ⁵



- Cardio RM eseguita a 7 giorni dal ricovero
- FE media 48%, SV indicizzato medio: 37 ml/m²
- Predittori prognostici: **SV indicizzato >> FE**

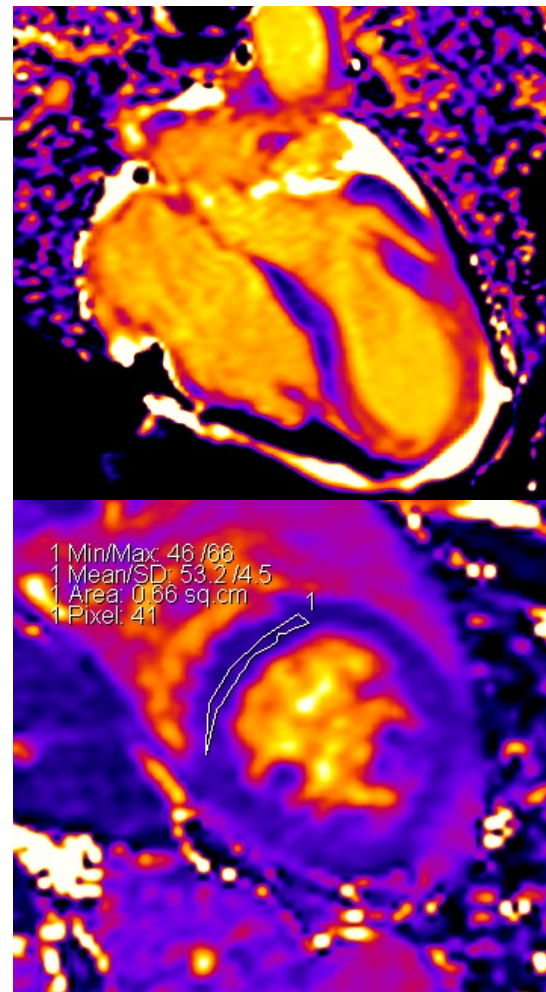


5. Cardio RM

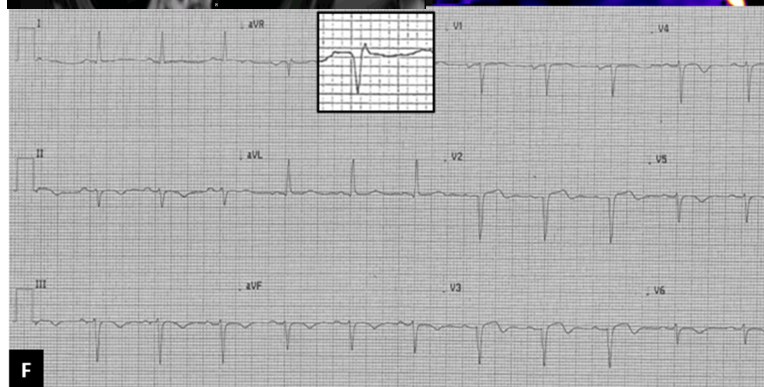
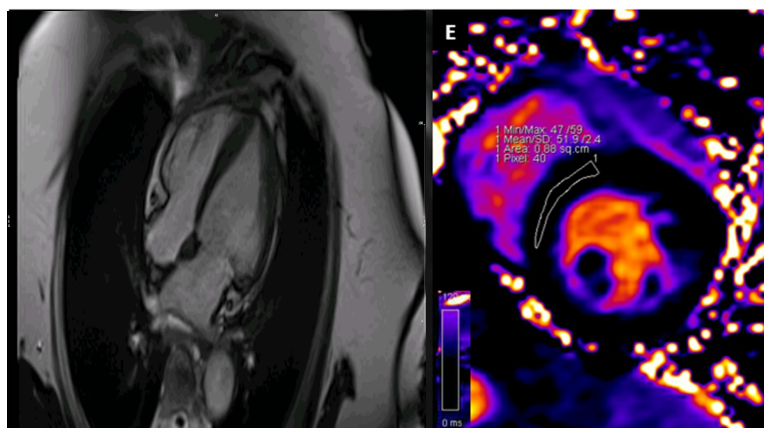
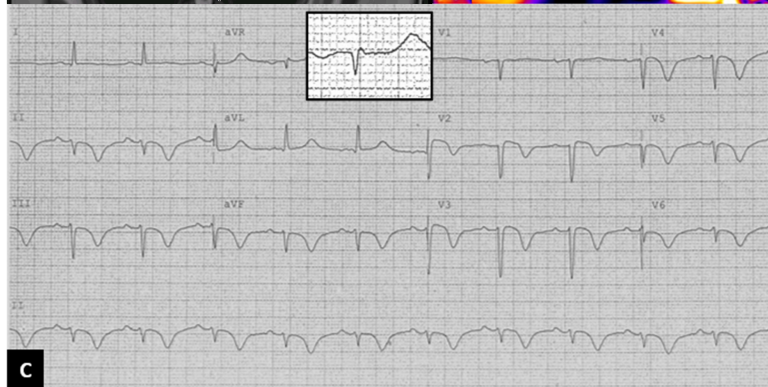
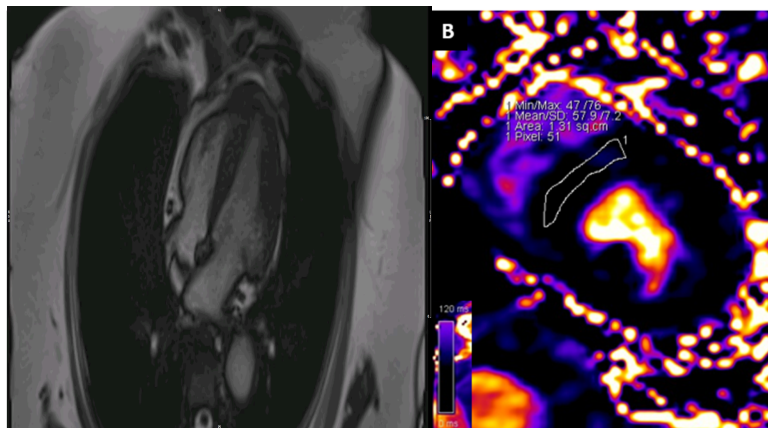


Edema miocardico associato a:

- Assenza di trigger emotivo
- Frazione di eiezione
- GEIST score (severità clinica)



5. Cardio RM

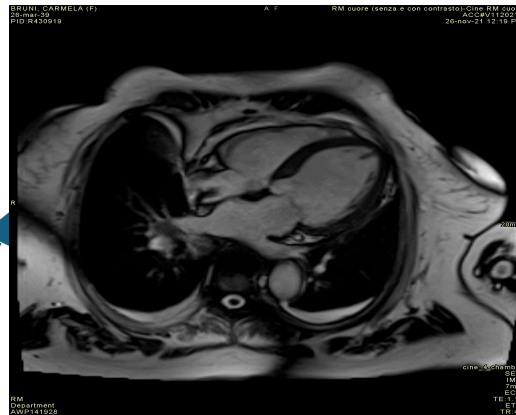


Arcari L [...]
Cacciotti L Eur Heart
J Cardiovasc
Imaging 2023

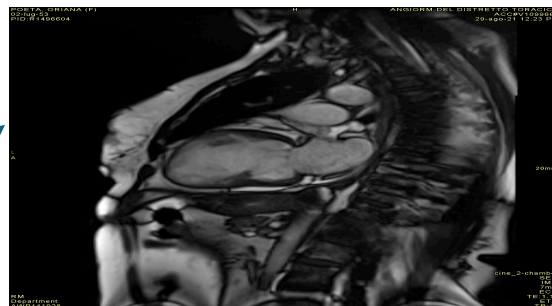


CENTRAL ILLUSTRATION

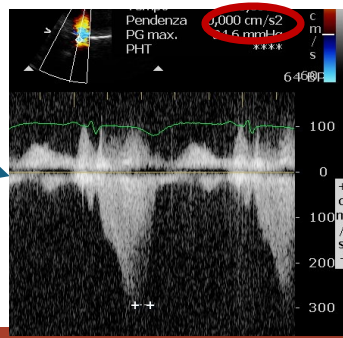
HFrEF



Coinvolgimento
ventricolo destro



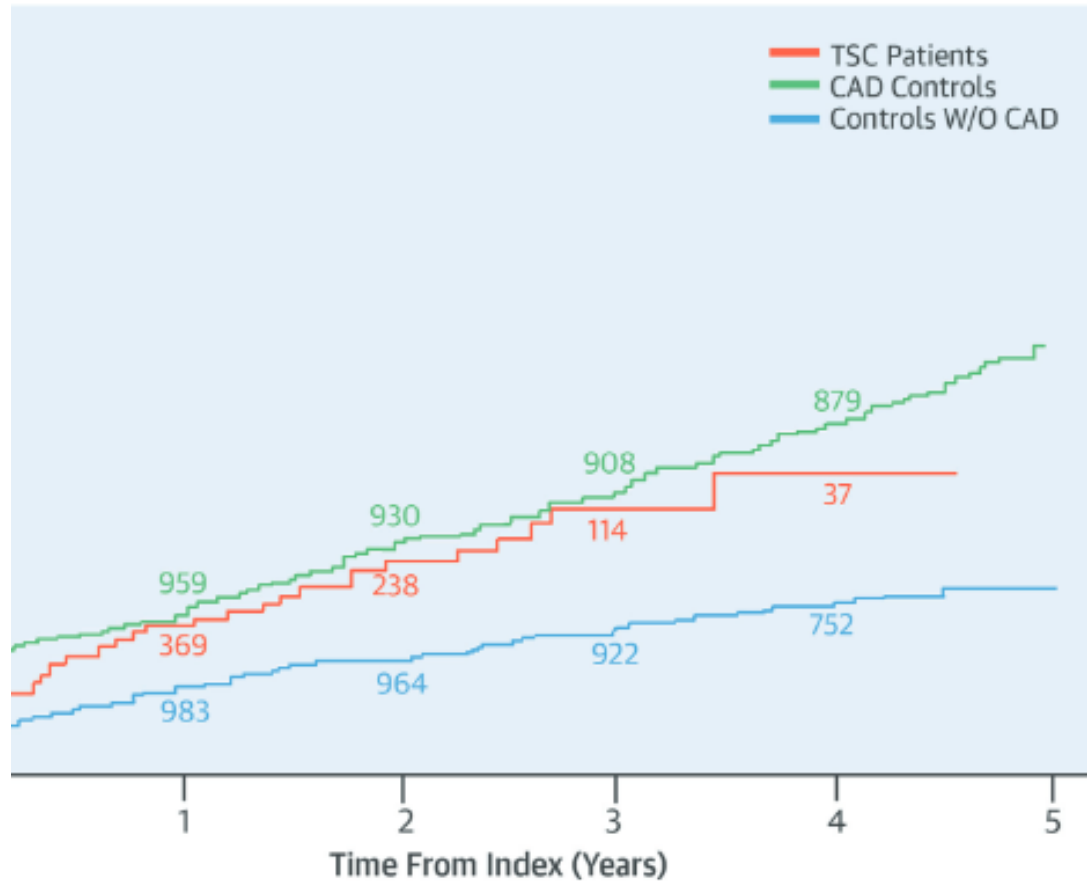
Severa disfunzione
ventricolo sinistro



Ostruzione del
tratto di efflusso



STRATIFICATION Mortality in Takotsubo Stress Cardiomyopathy

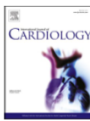




Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard



Contents lists available at ScienceDirect

European Journal of Internal Medicine

journal homepage: www.elsevier.com/locate/ejim



Renal impairment and outcome in Takotsubo syndrome: Insights from a national multicentric cohort

Ravi Vazirani^a, Manuel Almendro Delia^b, Emilia Blanco-Ponce^c, Agustín C. Martín-García^d, Clara Fernández-Cordón^e, Aitor Uribarri^f, Mireia Andrés^g, Oscar Vedia^a, Alessandro Sionis^h, Miguel Corbí-Pascual^h, Jorge Salamañaⁱ, Alberto Pérez-Castellanos^j, José David Martínez Carmona^k, Sergio Raposeiras-Roubín^l, David Ariza-Conty^m, Javier Lopez-Paísⁿ, Marta Guillén-Marzo^o, Carmen Lluç-Requerey^p, Juan Manuel Escudier^q, Manuel Martínez-Sellés^{r,s}, Iván J. Núñez-Gil^{a,s,*}, on behalf of RETAKO Investigators

JOURNAL ARTICLE

Coexistence and outcome of coronary artery disease in Takotsubo syndrome

Get access >

L Christian Napp, Victoria L Cammann, Milosz Jaguszewski, Konrad A Szawan, Manfred Wischniewsky, Sebastiano Gili, Maike Knorr, Susanne Heiner, Rodolfo Citro, Bossone ... Show more

European Heart Journal, Volume 41, Issue 34, 7 September 2020, Pages 3255–3268,

ORIGINAL ARTICLE

Neurological
Syndrome: Clinical
Outcomes

Neurologic
Disease

Francesco Santoro^a, MD, PhD^{*}; Iván J. Núñez-Gil^a, MD, PhD^{*}; Ibrahim El-Battrawy^a, MD, PhD; Beatrice Musumeci^a, MD; Roberta Montisci^a, MD; Ilaria Ragnatela^a, MD; Javier Lopez Pais, MD; Agustín Martín, MD, PhD; Francesco Bartolomucci, MD, PhD; Ibrahim Al-Thomas^a, MD; Thomas Stiermaier, MD^{*}; Natale Daniele Brunetti^a, MD, PhD^{*}

Syndrome: Insights From the International, Multicenter GEIST Registry

Thomas Stiermaier^a; Francesco Santoro^a; Ibrahim El-Battrawy^a; Christian Möller^a; Tobias Graf^a; Enrica Mariano^a; Francesco Romeo^a; Pasquale Caldarola^a; Mario Fanelli^a; Holger Thiele^a; Natale Daniele Brunetti^a; Ingo Eitel^a

ROMA, 25–27 Giugno 2020



CKD

CAD

Original Article

Clinical characteristics and outcomes of Takotsubo syndrome in patients with chronic obstructive pulmonary disease^{☆,☆☆}

Luca Arcari^{a,b,*}, Giacomo Tini^c, Michela Zuccanti^c, Giovanni Camastra^a, Alessandro Cianci^a, Emanuela Belmonte^a, Giulio Montefusco^a, Riccardo Sanna^c, Claudia Malarba^a, Fabrizio Luongo^a, Emanuele Iacconi^a

Exploring the influence of takotsubo syndrome on oncologic patients' mortality

Giacomo Tini^{1*}, Luca Arcari², Matteo Sclafani¹, Paolo Spallarossa³, Giovanni Camastra², Allegra Battistoni¹, Camillo Autore¹, Massimo Volpe¹, Beatrice Musumeci¹, Pietro Ameri^{3,4} and Luca Cacciotti²

JACC: CLINICAL ELECTROPHYSIOLOGY
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LETTERS

Diabete

Fibrillazione
Atriale

and
me
lysis From the GEIST and

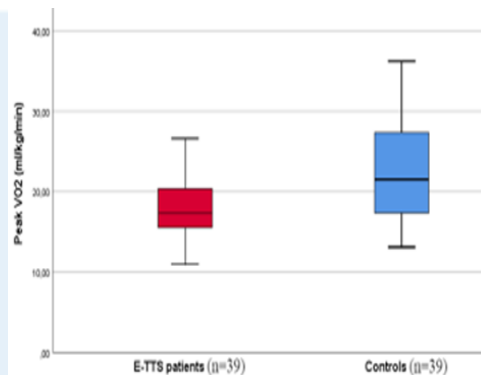
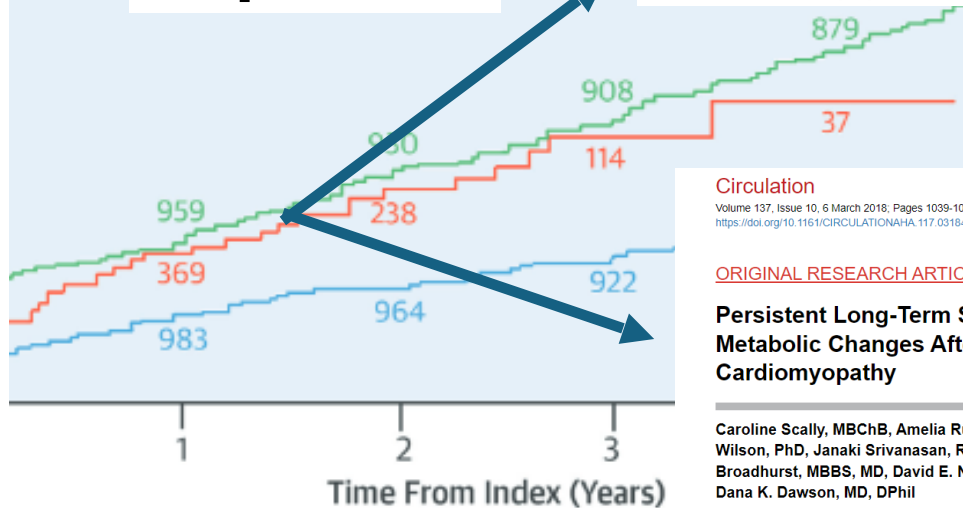
LUCA ARCARI, MD, PHD; IVÁN J. NÚÑEZ-GIL, MD, PhD^{*}; THOMAS STIERMAIER, MD^{*}; DANILLO MENICHELLI, MD, PhD^{*}



BPC
O

Cancer

**?
HFpEF ?**



Jabbour J, Arcari L et al. JCM
2024

**CPET: riduzione VO2
max
RM: incremento T1
nativo**

Circulation

Volume 137, Issue 10, 6 March 2018; Pages 1039-1048
<https://doi.org/10.1161/CIRCULATIONAHA.117.031841>

ORIGINAL RESEARCH ARTICLE

**Persistent Long-Term Structural, Functional, and
Metabolic Changes After Stress-Induced (Takotsubo)
Cardiomyopathy**

Caroline Scally, MBChB, Amelia Rudd, RDCS, BSE, Alice Mezincescu, MD, Heather Wilson, PhD, Janaki Srivanasan, RDCS, BSE, Graham Horgan, BA, MSc, PhD, Paul Broadhurst, MBBS, MD, David E. Newby, PhD, DM, Anke Henning, BSc, MSc, PhD, and Dana K. Dawson, MD, DPhil



Circulation

Volume 126, Issue 6, 7 August 2012; Pages 697-706
<https://doi.org/10.1161/CIRCULATIONAHA.112.111591>



HEART FAILURE

High Levels of Circulating Epinephrine Trigger Apical Cardiodepression in a β_2 -Adrenergic Receptor/ G_i -Dependent Manner

A New Model of Takotsubo Cardiomyopathy

Helen Paur, PhD, Peter T. Wright, MSc, Markus B. Sikkil, MD, Matthew H. Tranter, BSc, Catherine Mansfield, PhD, Peter O'Gara, BSc, Daniel J. Stuckey, PhD, Viacheslav O. Nikolaev, PhD, Ivan Diakonov, PhD, Laura Pannell, MSc, Haibin Gong, PhD, Hong Sun, PhD, Nicholas S. Peters, MD, Mario Petrou, PhD, Zhaolun Zheng, PhD, Julia Gorelik, PhD, Alexander R. Lyon, MD, PhD^{*}, and Sian E. Harding, PhD^{*}



European Society of Cardiology
European Heart Journal (2025) 46, 1582–1585
<https://doi.org/10.1093/eurheartj/ehaf020>

VIEWPOINT
Interventional cardiology

Takotsubo is an acute myocardial ischaemic syndrome

Robert Sykes^{1,2}, Daniel T.Y. Ang^{1,2}, and Colin Berry ^{1,2,*}

¹School of Cardiovascular and Metabolic Health, University of Glasgow, University Place, Glasgow G12 8TA, UK; and ²West of Scotland Heart and Lung Centre, Golden Jubilee National Hospital, Agarnemmon Street, Clydebank G81 4DY, UK

Online publish-ahead-of-print 11 February 2025



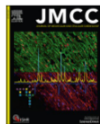
Journal of Molecular and Cellular Cardiology 191 (2024) 1–6



Contents lists available at ScienceDirect

Journal of Molecular and Cellular Cardiology

journal homepage: www.elsevier.com/locate/yjmcc



Review article

An update on the mechanisms of Takotsubo syndrome: “At the end an acute coronary syndrome”

Filippo Crea^{a,b,*}, Giulia Iannaccone^b, Giulia La Vecchia^b, Rocco A. Montone^a

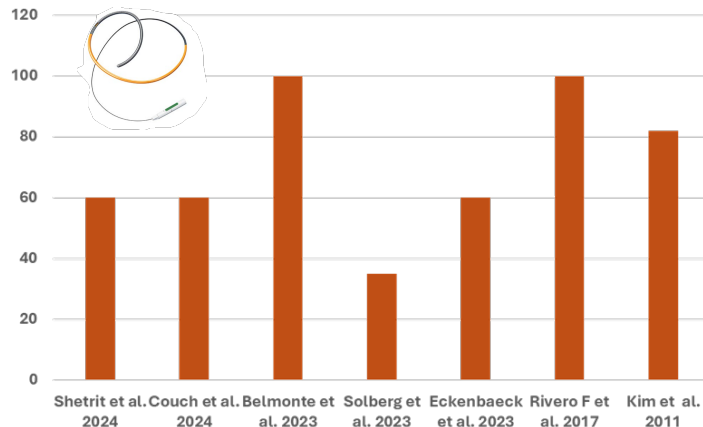


POSTGRADUATE MEDICINE
2026, VOL. 138, NO. 1, 10–23
<https://doi.org/10.1080/00325481.2026.2616899>

REVIEW

Microvascular dysfunction in Takotsubo syndrome: a systematic review

Luca Arcari^{a,b,*}, Lucrezia Netti^{b,*}, Giovanni Camastra^a, Patrizia Spedicato^a, Beatrice Musumeci^c, Emanuela Belmonte^a, Vittoria Cammisotto^d, Gianluca Di Pietro^d, Francesco Marino^a, Riccardo Improta^d, Salvatore Musarò^a, Emanuele Barbato^c, Pasquale Pignatelli^d, Viviana Maestrini^{d,*} and Luca Cacciotti^{a,*}



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*«Le parole
sono
importanti!»*



La Takotsubo è una sindrome ischemica?



ESC

European Society
of Cardiology

European Heart Journal (2023) 44, 3720–3826
<https://doi.org/10.1093/eurheartj/ehad191>

ESC GUIDELINES

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)

Authors/Task Force Members: Robert A. Byrne *,†, (Chairperson) (Ireland),

Recommendations for antiplatelet and anticoagulant therapy in acute coronary syndrome

Antiplatelet therapy

Aspirin is recommended for all patients without contraindications at an initial oral LD of 150–300 mg (or 75–250 mg i.v.) and an MD of 75–100 mg o.d. for long-term treatment.

I

A

In all ACS patients, a P2Y₁₂ receptor inhibitor is recommended in addition to aspirin, given as an initial oral LD followed by an MD for 12 months unless there is high bleeding risk.

I

A

Recommendations

In patients with a working diagnosis of MINOCA, CMR imaging is recommended after invasive angiography if the final diagnosis is not clear.^{544,545}

Class^a

Level^b

I

B

Lipid-lowering therapy

It is recommended that high-dose statin therapy is initiated or continued as early as possible, regardless of initial LDL-C values.^{787,865–867}

I

A





ESC

European Society
of Cardiology

European Heart Journal (2021) 42, 3599 – 3726
doi:10.1093/eurheartj/ehab368

ESC GUIDELINES

2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure

Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)

Management of HFrEF

To reduce mortality - for all patients

ACE-I/ARNI

BB

MRA

SGLT2i

STATE-OF-THE-ART REVIEW

Heart Failure With Improved Ejection Fraction

Is it Possible to Escape One's Past?

Gaurav Gulati, MD, James E. Udelson, MD

Recommendation

Class^a

Level^b

An intensive strategy of initiation and rapid up-titration of evidence-based treatment before discharge and during frequent and careful follow-up visits in the first 6 weeks following a HF hospitalization is recommended to reduce the risk of HF rehospitalization or death.^{c,d,e 16}

I

B



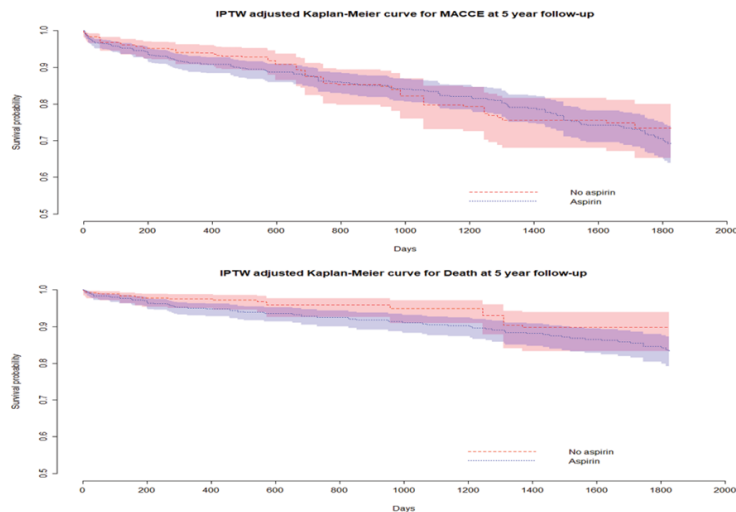
ESC
European Society
of Cardiology

European Journal of Heart Failure (2020) 22, 330–337
doi:10.1002/ehf.1698

RESEARCH ARTICLE

Impact of aspirin on takotsubo syndrome: a propensity score-based analysis of the InterTAK Registry

Fabrizio D'Ascenzo^{1*}, Sebastiano Gili², Maurizio Bertaina¹, Mario Iannaccone¹,



Contents lists available at ScienceDirect

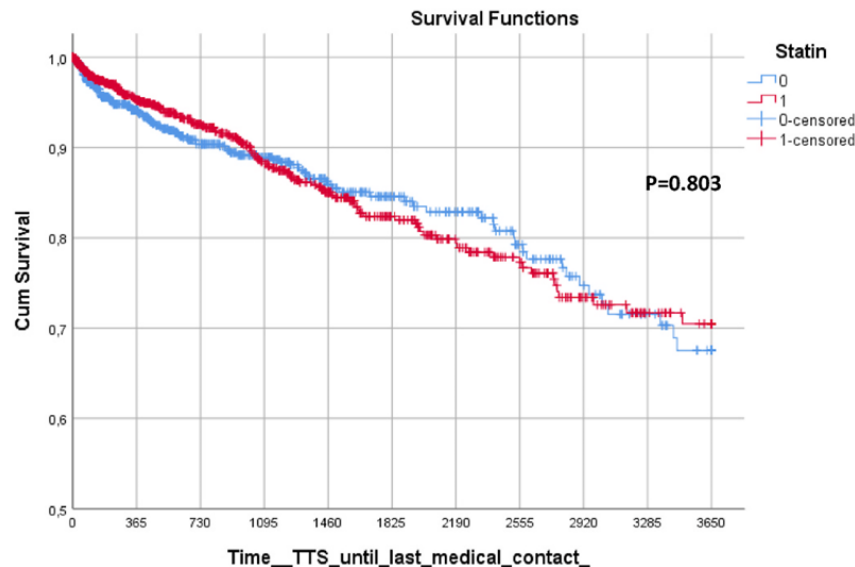
Atherosclerosis

journal homepage: www.elsevier.com/locate/atherosclerosis



Statin therapy and outcome in Takotsubo syndrome patients: Results from the multicenter international GEIST registry

Giuseppina Novo^{a,*,1}, Luca Arcari^{b,c,1}, Thomas Stiermaier^d, Chiara Alaimo^a, Ibrahim El-Battrawy^{e,p,q}, Luca Cacciotti^b, Federico Guerra^f, Beatrice Musumeci^g, Enrica Mariano^h,



6. Trattamento: RASi

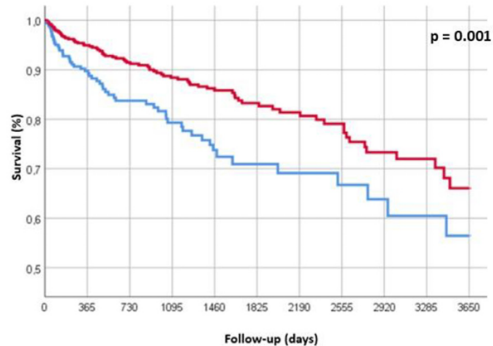
Renin angiotensin system inhibitors and outcome in patients with takotsubo syndrome: A propensity score analysis of the GEIST registry

Francesco Santoro, MD, PhD^{a,e}, Thomas Stiermaier, MD^{b,e}, Iván J. Núñez Gil, MD, PhD^{c,d,e}, Ibrahim El-Battrawy, MD^{c,f,g}, Toni Pätz, MD^b, Luca Cacciotti, MD, PhD^b, Federico Guerra, MD^h, Giuseppina Novo, MD, PhDⁱ, Beatrice Musumeci, MD^k, Massimo Volpe, MD^{k,l}, Enrica Mariano, MD, PhD^m, Pasquale Caldarola, MDⁿ, Roberta Montisci, MDⁿ, Ilaria Ragnatela, MDⁿ, Rosa Cetera, MD^a, Ravi Vazirani, MD^c, Carmen Lluch, MD^p, Aitor Uribarri, MD^q, Miguel Corbi-Pascual, MD^r, David Ariza Conty Cardona, MD^s, Ibrahim Akin, MD^{c,d}, Emanuele Barbato, MD^k, Holger Thiele, MD^l, Natale Daniele Brunetti, MD, PhD^a, Ingo Eitel, MD^{b,e}, and Luca Arcari, MD^{h,u,e}

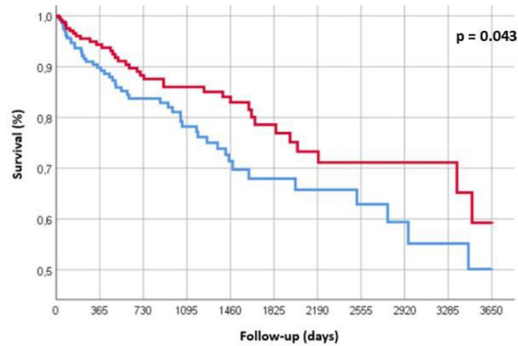


RAS-inhibitors and long-term mortality among Takotsubo syndrome patients with admission LVEF ≤ 40%

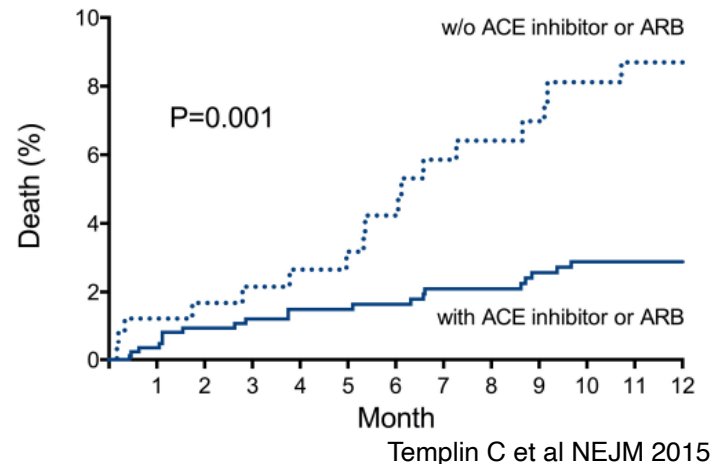
Overall cohort



Matched cohort

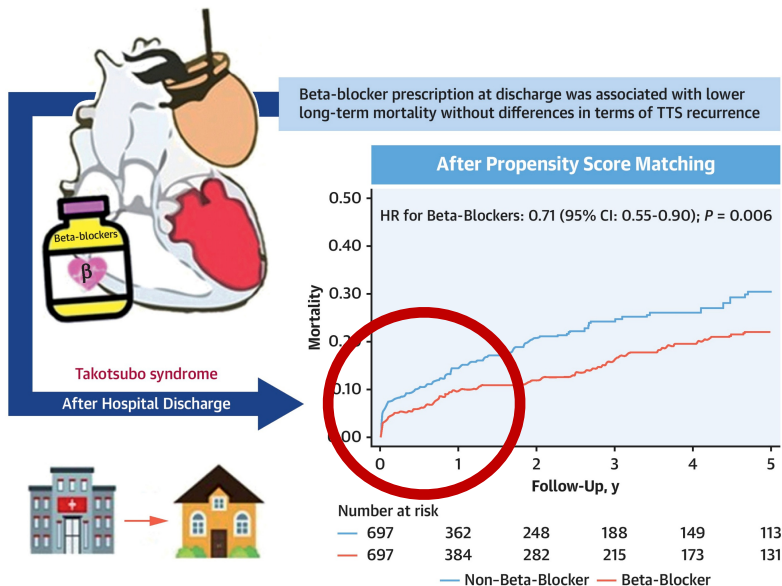


A

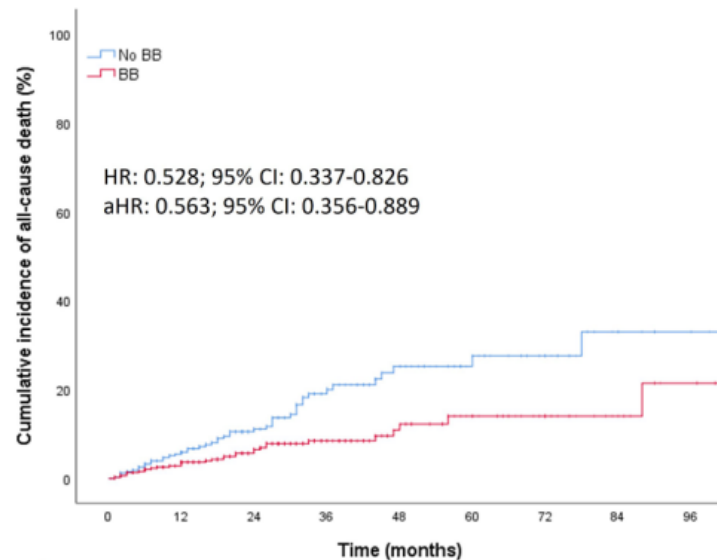


6. Trattamento: Beta-Bloccanti

CENTRAL ILLUSTRATION: Beta-Blockers After TTS



Raposeiras-Roubin S, et al. JACC Heart Fail. 2025;13(5):815-825.



Silverio A et al EJPC 2023

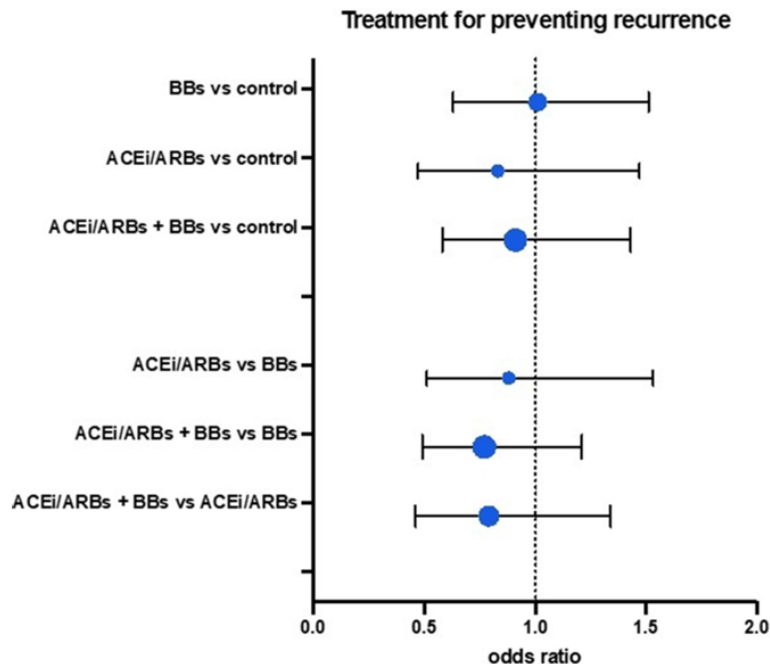


Systematic review



Beta-blockers and renin-angiotensin system inhibitors for Takotsubo syndrome recurrence: a network meta-analysis

Francesco Santoro¹ ●
Luca Arcari,^{5,6} Jose Ange
Ivan Javier Nuñez-Gil ●
Rosa Cetera,¹¹ Junichi N

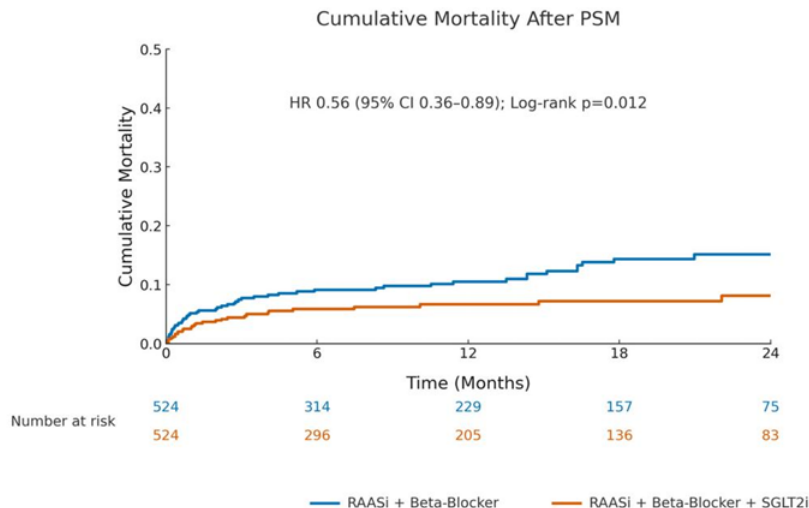


- RASi e/o Beta Bloccanti **NON** prevengono le recidive



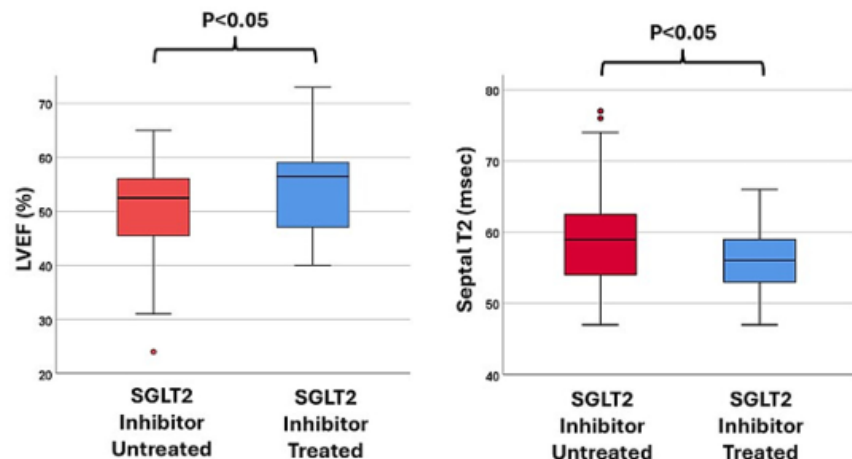
SGLT2 inhibitors are associated with improved long-term survival in Takotsubo syndrome: insights from large-scale real-world data

Elias Rawish^{1,2,3,*}, Felicitas Lemmer^{1,3}, Katharina Kurz^{1,2,3}, Matthias Mezger^{1,2,3}, Toni Pätz^{1,3}, Thomas Stiermaier^{1,2,3,†}, and Ingo Eitel^{1,2,3,*†}



SGLT2 inhibitors therapy in patients with acute Takotsubo syndrome

Luca Arcari^{a,*}, Giovanni Camastra^a, Matteo Sclafani^{b,c}, Federica Ciolina^d, Emanuela Belmonte^a, Teresa Castiello^e, Massimiliano Danti^d, Stefano Sbarbati^d, Luca Cacciotti^a

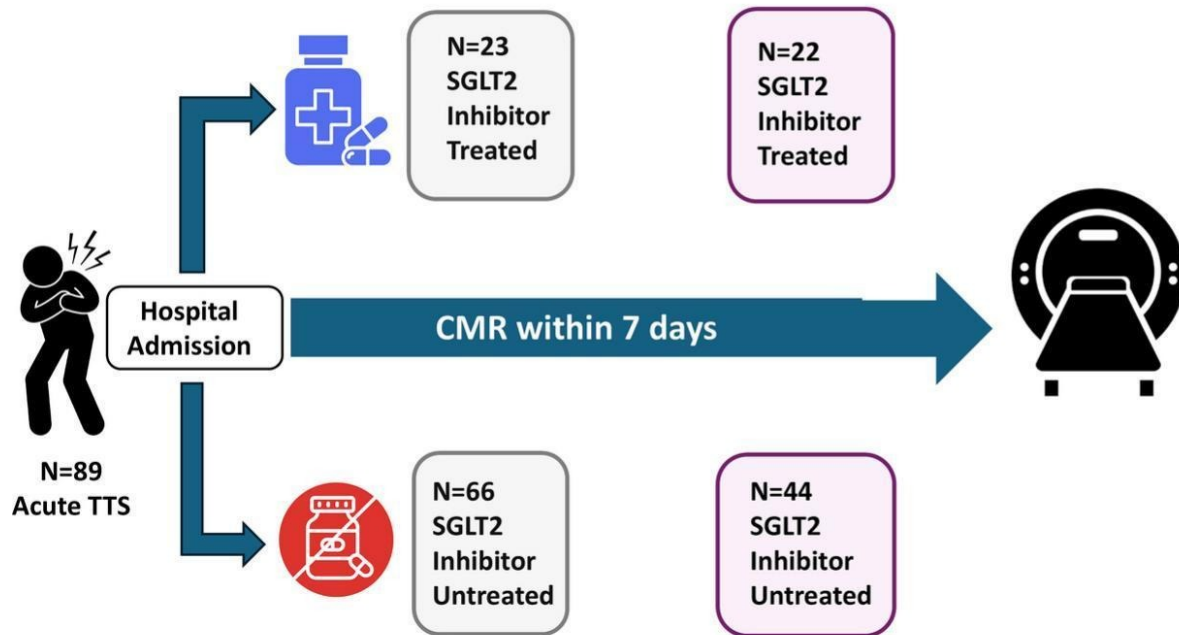


6. Trattamento: SGLT2 inibitori in acuto

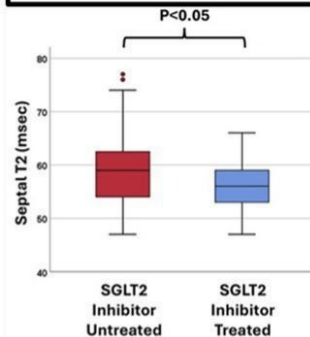
Overall

Propensity Matched

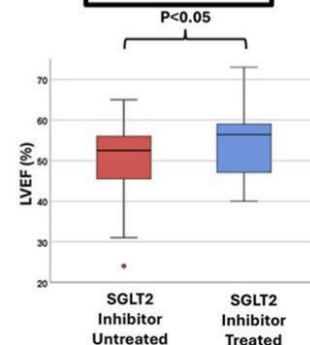
CMR Outcomes



Lower myocardial edema



Higher LVEF



Arcari L [...] Cacciotti L, Int J Cardiology 2026



7. Take Home Messages

- La prognosi a breve e lungo termine della Takotsubo è **eterogenea** e **NON** necessariamente benigna
- Il più delle volte, si muore **CON** la Takotsubo – non PER la Takotsubo
- Un «**Heart Failure Mindset**» ci può aiutare nella gestione clinica e terapeutica [1]

