American Journal of Medical Case Reports, 2026, Vol. 14, No. 1, 1-4
Available online at http://pubs.sciepub.com/ajmcr/14/1/1
Published by Science and Education Publishing
DOI:10.12691/ajmcr-14-1-1

Extreme Clinico-Echocardiographic Discordance in End-Stage Degenerative Mitral Regurgitation: A Fatal Case of Silent Ventricular Burn-Out

O. Taoussi*, M. Zoubidi, M. Mokhtari, G. Benouna, FZ. Merzouk

Department of Cardiology, Mohammed VI International University Hospital, Mohammed VI Foundation of Health and Sciences, Casablanca, Morocco
*Corresponding author: taoussi75@gmail.com

Received November 27, 2025; Revised December 29, 2025; Accepted January 05, 2026

Abstract Chronic degenerative mitral regurgitation (MR) can lead to profound, often asymptomatic, left ventricular (LV) remodeling. We report an exceptional and fatal case of end-stage MR, illustrating a dramatic mismatch between preserved clinical status and catastrophic structural damage on echocardiography. A patient with long-standing, untreated degenerative MR presented with minimal symptoms despite transthoracic echocardiography revealing extreme LV dilatation (end-diastolic diameter 105 mm), severe systolic dysfunction (ejection fraction 10-15%), torrential regurgitation (effective regurgitant orifice area 2.44 cm²), and massive left atrial enlargement. Strikingly, the clinical course was not dominated by heart failure symptoms but terminated abruptly in cardiac arrest due to ventricular fibrillation, likely precipitated by advanced LV dilatation, fibrosis, and electrical instability. This case underscores that end-stage degenerative MR can progress silently to an irreversible, lethal stage dominated by arrhythmic death, reinforcing the critical need for timely intervention before the onset of terminal remodeling.

Keywords: *End-Stage Mitral Regurgitation, Left Ventricular Remodeling, Echocardiography, Ventricular Fibrillation, Sudden Cardiac Death, Clinical Discordance*

Cite This Article: O. Taoussi, M. Zoubidi, M. Mokhtari, and FZ. Merzouk, "Extreme Clinico-Echocardiographic Discordance in End-Stage Degenerative Mitral Regurgitation: A Fatal Case of Silent Ventricular Burn-Out." *American Journal of Medical Case Reports*, vol. 14, no. 1 (2026): 1-4. doi: 10.12691/ajmcr-14-1-1.

1. Introduction

Degenerative mitral valve disease represents a leading cause of chronic primary mitral regurgitation (MR) and is characterized by a prolonged asymptomatic phase despite progressive left ventricular (LV) remodeling [1]. This deceptive clinical quiescence frequently delays intervention until the development of irreversible myocardial damage or overt symptoms, a stage associated with prohibitive surgical risk and poor outcomes [2]. Consequently, current guidelines strongly advocate early surgical referral based on objective echocardiographic markers of LV dysfunction or enlargement rather than symptom status alone [3]. We report a compelling case of a patient who declined surgical intervention 13 years earlier and later presented electively, only to be found in an inoperable, end-stage condition. This case visually delineates the "point of no return" in chronic MR and underscores sudden arrhythmic death as a potential terminal event.

2. Case Presentation

A male patient in his seventh decade, with a known history of severe degenerative mitral regurgitation diagnosed 13 years prior, presented to our clinic. At the initial diagnosis, surgical mitral valve repair was strongly recommended but was declined by the patient. He now presented not for symptoms, reporting only mild, non-disabling fatigue (NYHA Class II) and denying any orthopnea or peripheral edema, but with the intention to finally undergo the long-postponed operation.

Admission Electrocardiogram showed atrial fibrillation with a controlled ventricular response and broad QRS complexes (QRS duration >120 ms), consistent with significant intraventricular conduction delay in the setting of extreme dilatation.

Physical examination revealed a holosystolic murmur at the apex radiating to the axilla. He was normotensive. There was no clinical evidence of acute heart failure.

Echocardiographic Findings (The Core of the Case):

Transthoracic echocardiography revealed catastrophic progression to an end-stage phenotype:

Extreme LV Remodeling: The parasternal long-axis view demonstrated a colossal LV with an end-diastolic diameter of 105 mm (indexed 68 mm/m²) and severe global wall thinning (Figure 1). Global systolic function was catastrophically depressed, with an LVEF of 10-15% and diffuse hypokinesia.

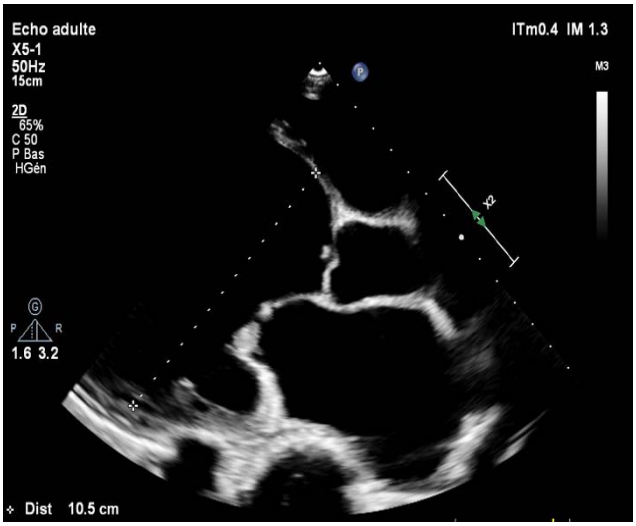

Figure 1. Parasternal long-axis view of end-stage left-ventricular remodeling: Parasternal long-axis view showing extreme left-ventricular dilatation (end-diastolic diameter 105 mm, indexed LVEDD 68 mm/m²) with marked wall thinning, consistent with terminal ventricular remodeling secondary to long-standing untreated degenerative mitral regurgitation

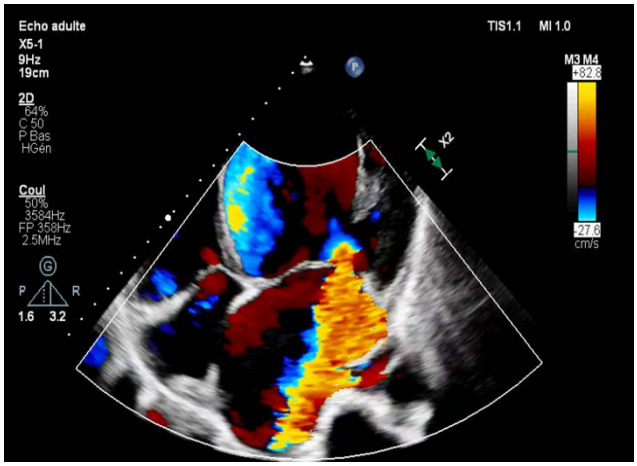

Figure 2. Apical four-chamber color Doppler view of torrential mitral regurgitation. Apical four-chamber view demonstrating a massive holosystolic mitral regurgitant jet extending deep into the pulmonary veins, consistent with severely elevated left-atrial pressures

⇒ Massive Left Atrial Enlargement: The left atrium was profoundly dilated, with a volume of 198 mL (indexed 58 mL/m²).

⇒ Torrential Mitral Regurgitation: Color Doppler showed a giant holosystolic regurgitant jet completely filling the enlarged atrium, with systolic flow reversal in the pulmonary veins (Figure 2).

⇒ Quantitative assessment confirmed the severity of regurgitation: the PISA method yielded an effective regurgitant orifice area (EROA) of 2.44 cm² and a regurgitant volume of 251 mL (Figure 3A). Continuous-wave Doppler showed a dense, triangular, early peaking systolic envelope (Figure 3B).

⇒ Valve Morphology: The parasternal long-axis view revealed advanced myxomatous degeneration with leaflet thickening and a wide coaptation defect (Figure 4).

Clinical Course and Outcome:

Coronary angiography showed no significant obstructive disease. The heart team unanimously concluded that the risk of any surgical or transcatheter (MitraClip) intervention was prohibitively high due to the extreme LV dysfunction and dimensions, representing a "futility scenario."

During hospitalization for further evaluation and optimization of palliative therapy, the patient suffered an in-hospital cardiac arrest. The presenting rhythm was ventricular fibrillation (VF). Resuscitation efforts were unsuccessful, and death was attributed to refractory VF in the context of end-stage MR-induced cardiomyopathy.

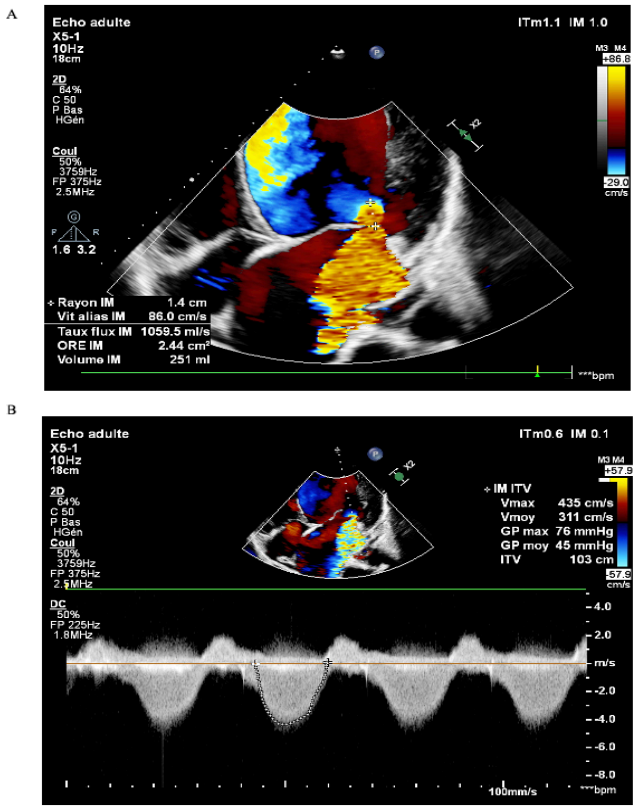

Figure 3. (A–B) Quantitative assessment of torrential mitral regurgitation (PISA and CW Doppler): (A) Color Doppler apical view showing a large proximal isovelocity surface area (PISA) with a measured radius of 1.4 cm and an aliasing velocity of 86 cm/s. The calculated regurgitant flow rate (1059 ml/s), effective regurgitant orifice area (EROA = 2.44 cm²), and regurgitant volume (251 ml) confirm torrential mitral regurgitation. (B) Continuous-wave Doppler tracing demonstrating a dense, triangular, holosystolic jet, consistent with massive mitral regurgitation and markedly elevated left-atrial pressures

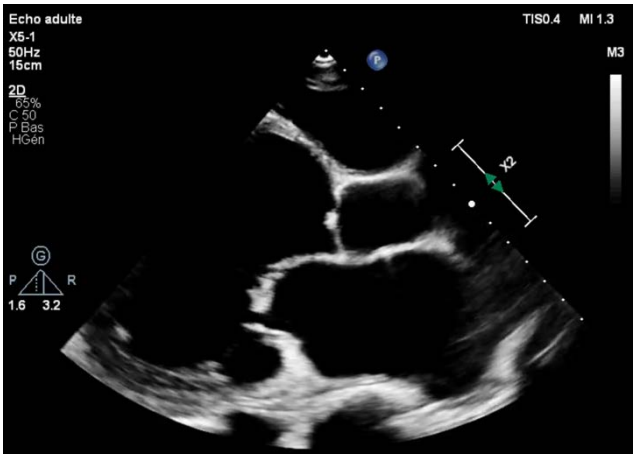

Figure 4. Parasternal long-axis 2D view showing advanced LV dysfunction and structural valve degeneration Parasternal long-axis view showing severe LV systolic dysfunction with wall thinning, leaflet thickening, posterior leaflet restriction with mild anterior prolapse, and a wide coaptation defect consistent with advanced degenerative mitral regurgitation

3. Discussion

1. The window of opportunity and the "point of no return": This patient's clinical course exemplifies a missed therapeutic window. Despite a clear recommendation for intervention 13 years earlier, he re-presented only after progression to an irreversible "burned-out" ventricular phenotype. The echocardiographic parameters observed (LVEF <20%, LVEDD >100 mm) define a threshold beyond which the hemodynamic benefits of valve intervention become negligible and perioperative mortality markedly increases [4]. His elective presentation despite minimal symptoms underscores the dangerous dissociation between perceived clinical stability and ongoing silent myocardial injury.

2. Arrhythmic death as a terminal pathway in end-stage MR: Although death in advanced valvular disease is often attributed to progressive pump failure, sudden cardiac death has emerged as an important competing mechanism, particularly in the setting of severe LV dilatation and dysfunction [5]. Massive chamber enlargement, extensive interstitial fibrosis, and increased wall stress create a highly arrhythmogenic substrate conducive to re-entrant ventricular arrhythmias [6]. The presence of atrial fibrillation and broad QRS complexes further reflects advanced electrical remodeling. The occurrence of fatal VF in the absence of overt pulmonary edema illustrates that malignant arrhythmias may represent the final and abrupt mode of death in end-stage MR.

3. The imperative of timely intervention and patient education: This outcome reinforces guideline-based recommendations for early intervention guided by objective echocardiographic criteria (LVEF ≤60%, LVESD ≥40 mm) rather than symptom burden alone [3]. Evidence consistently demonstrates superior outcomes when intervention precedes severe LV dysfunction [7]. The case also highlights a persistent challenge in valvular heart disease management: ensuring patient adherence to follow-up and acceptance of pre-symptomatic intervention. Effective patient education must emphasize that severe MR is a mechanical disorder requiring timely mechanical correction before irreversible myocardial damage occurs.

4. Conclusion

In conclusion, this case highlights the devastating natural history of untreated severe degenerative MR and illustrates how irreversible myocardial damage may progress silently despite minimal symptoms. It emphasizes that once advanced LV remodeling and dysfunction are established, outcomes are determined not by valve severity alone but by the extent of myocardial injury and electrical instability. This report reinforces the critical importance of proactive echocardiographic surveillance, timely intervention before irreversible ventricular remodeling, and sustained patient education to prevent progression beyond the therapeutic point of no return.

ACKNOWLEDGEMENTS

The authors thank the cardiology department at Mohammed VI International University Hospital for its support. No external funding was received for this work.

Competing Interests

The authors declare that they have no competing interests.

List of Abbreviations

ECG – Electrocardiogram
EROA – Effective Regurgitant Orifice Area
ESC/EACTS – European Society of Cardiology / European Association for Cardio-Thoracic Surgery
LV – Left Ventricular (ou Left Ventricle)
LVEDD – Left Ventricular End-Diastolic Diameter
LVEF – Left Ventricular Ejection Fraction
LVESD – Left Ventricular End-Systolic Diameter
MIDA – Mitral Regurgitation International Database
MR – Mitral Regurgitation
NEJM – The New England Journal of Medicine
NYHA – New York Heart Association
PCI – Percutaneous Coronary Intervention
PISA – Proximal Isovelocity Surface Area
QRS – Représente les ondes Q, R et S de l'électrocardiogramme (durée d'un complexe ventriculaire)
VF – Ventricular Fibrillation

References

[1] Enriquez-Sarano M, Akins CW, Vahanian A. Mitral regurgitation. Lancet. 2009 Apr 18; 373(9672): 1382-94.

[2] Tribouilloy C, Rusinaru D, Grigioni F, Michelena HI, Vanoverschelde JL, Avierinos JF, Barbieri A, Pislaru SV, Russo A, Pasquet A, Théron A, Szymanski C, Lévy F, Enriquez-Sarano M; Mitral Regurgitation International Database (MIDA) Investigators. Long-term mortality associated with left ventricular dysfunction in

mitral regurgitation due to flail leaflets: a multicenter analysis. Circ Cardiovasc Imaging. 2014 Mar; 7(2): 363-70.

[3] Praz F, Borger MA, Lanz J, Marin-Cuartas M, Abreu A, Adamo M, Ajmone Marsan N, Barili F, Bonaros N, Cosyns B, De Paulis R, Gamra H, Jahangiri M, Jeppsson A, Klautz RJM, Mores B, Pérez-David E, Pöss J, Prendergast BD, Rocca B, Rossello X, Suzuki M, Thiele H, Tribouilloy CM, Wojakowski W; ESC/EACTS Scientific Document Group. 2025 ESC/EACTS Guidelines for the management of valvular heart disease. Eur Heart J. 2025 Nov 21; 46(44): 4635-4736.

[4] Otto CM. Timing of surgery in mitral regurgitation. Heart. 2003 Jan; 89(1): 100-5.

[5] Grigioni F, Enriquez-Sarano M, Ling LH, Bailey KR, Seward JB, Tajik AJ, Frye RL. Sudden death in mitral regurgitation due to flail leaflet. J Am Coll Cardiol. 1999 Dec; 34(7): 2078-85.

[6] Kitkungvan D, Nabi F, Kim RJ, Bonow RO, Khan MA, Xu J, Little SH, Quinones MA, Lawrie GM, Zoghbi WA, Shah DJ. Myocardial Fibrosis in Patients With Primary Mitral Regurgitation With and Without Prolapse. J Am Coll Cardiol. 2018 Aug 21; 72(8): 823-834.

[7] Stone GW, Lindenfeld J, Abraham WT, Kar S, Lim DS, Mishell JM, Whisenant B, Grayburn PA, Rinaldi M, Kapadia SR, Rajagopal V, Sarembock IJ, Brieke A, Marx SO, Cohen DJ, Weissman NJ, Mack MJ; COAPT Investigators. Transcatheter Mitral-Valve Repair in Patients with Heart Failure. N Engl J Med. 2018 Dec 13; 379(24): 2307-2318.