

<u>AUTHOR, YEAR</u>	<u>N(PATIENTS)/Method</u>	<u>CLINICAL SITUATION</u>	<u>SPECKLE TRACKING PARAMETERS</u>	<u>FOLLOW UP</u>	<u>OUTCOMES</u>
Meucci et al. 2022¹	197 PATIENTS	>MODERATE AFMR	LV GLS , LAS	69 m	LV GLS <-16.3% associated with negative prognosis LAS not associated with outcome
Malagoli et al. 2022²	286 patients with HF _r EF	FMR (EROA>0.1CM ²)	PALS*	4.1y	EROA>0.3cm ² associated with CV events regardless of LA function In less severe FMR, PALS<14%-cutoff value for negative prognosis
Bierrsmith et al. 2022³	12 (9 with PMR and 3 with SMR)	3+ and 4+ MR patients undergoing TEER	PALS, LAKE	POSTCLIP	LAKE increased, Peak atrial strain in early diastole significantly decreased, PACS did not change
Stassen et al. 2022⁴	340	at least moderate FMR undergoing CRT implantation	LARS	6mo post resynch	A significant reduction in MR severity at 6 months after CRT implantation -> associated with an increase in LARS. Increase in LARS is independently associated with lower all-cause mortality
Ro et al. 2022⁵	50 pts with PMR or SMR	PMR-SMR undergoing MitraClip	LV GLS, LAS conduit	1 mo post clip	Significant increase in LVGLS and reduction in left atrial strain conduit after repair in both PMR and SMR
Kotrc et al. 2022⁶	110	Symptomatic SMR undergoing isolated MV repair using a minimally invasive surgical approach	LV-GLS, LASr	7.7y	LV-GLS & LASr predictors of reverse remodelling and prognosis

Stassen et al. 2022⁷	666	More than mild SMR	LARS	1-, 2-, 5 years	Patients with LARS < 9.8% had significantly lower survival rates at 1-, 2-, and 5-year follow-up
Mesi et al. 2021⁸	283	AFMR 14%	Longitudinal LA strain	22mo	Worse LA strain prognosis vs PMR
Scislo et al. 2021⁹	28	FMR undergoing TMVR	LV, LA, RV strains	2.5d	No LV, RV-GLS, LAsC change LASr and LASc deter. post-op
Inciardi et al. 2020¹⁰	102	88 secondary MR	PALS, PACS, Conduit strain, PASP	-	ERO significantly associated with PALS, PACS, PASP and TAPSE/PASP
Sugimoto et al. 2020¹¹	196	115 SMR	LARS and Strain Rate at rest and exercise	-	Impaired LARS in MR, Worse LARS in secondary MR and exercise
Öztürk et al. 2020¹²	50	>mod FMR	Atrial GS, LA EF	6-12mo	Baseline aGS strongest predictor of mortality, no significant change in FU
Avenatti et al. 2018¹³	35	FMR (14pts)	LA stiffness	1mo post clip	LA stiffness decreased after MitraCli, irrespective of MR etiology
Lisi et al. 2018¹⁴	37	Severe MR, LVEF>60%	PALS	3mo post repair	In severe MR, EROA correlate with symptoms and LA PALS; LA PALS further deteriorated after surgery PALS predictor of AF

Gucuk et al. 2018¹⁵	87	Degenerative MR patients undergoing: 38 MVR, 49 MitraClip	LA strain, Strain Rate	12 mo post clip or MVR	Only Peak early diastolic strain rate significantly decreased in both groups. In patients with normal or high baseline strain, successful MR reduction by either method resulted in the return of LA strain to normal
Toprak et al. 2016¹⁶	25	25 FMR undergoing TEER	LARS, LACS	12 mo	Improved LARS, LACS after TEER
van Garsse et al. 2013¹⁷	95	Chronic ischemic MR– patients underwent CABG and undersized mitral ring annuloplasty	LA peak global Strain and Strain Rate (SR)	41.5 mo post annuloplasty	Left atrial peak global strain, peak systolic SR, and peak early diastolic SR associated to recurrent MR

**PALS is an equivalent term for LARS*

AF = Atrial Fibrillation; AFMR = Atrial Functional Mitral Regurgitation; aGS = atrial Global Strain; FMR = Functional Mitral Regurgitation; GLS = Global Longitudinal Strain; LA = Left Atrium; LARS = Left Atrial Reservoir Strain; LACS = Left Atrial Conduit Strain; LAKE = Left Atrial Kinetic Energy; LASc = Left Atrial Strain contraction; LASct = Left Atrial Strain conduit; LASr = Left Atrial Strain-reservoir; LV = Left Ventricle; MR = Mitral Regurgitation; PALS = Peak Atrial Longitudinal Strain; PACS = Peak Atrial Contraction Strain; PMR = Primary Mitral Regurgitation; Pts = Patients; RV = Right Ventricle; SMR = Secondary Mitral Regurgitation; TEER = Transcatheter Edge-to-edge Repair.

Supplementary Table 1. LA Strain studies in Secondary mitral regurgitation.

References:

1. Meucci MC, Stassen J, Tomsic A, et al. Prognostic impact of left ventricular global longitudinal strain in atrial mitral regurgitation. *Heart*. 2023 Feb 23;109(6):478-484. doi: 10.1136/heartjnl-2022-321698. PMID: 36270784.

2. Malagoli A, Rossi L, Zanni A, et al. Quantified mitral regurgitation and left atrial function in heart failure with reduced ejection fraction: interplay and outcome implications. *Eur J Heart Fail.* 2022 Apr;24(4):694-702. doi: 10.1002/ejhf.2429. Epub 2022 Jan 26. PMID: 35014120.
3. Biersmith M, Orsinelli DA, Harfi TT, et al. Effect of mitral valve transcatheter edge-to-edge repair on indices of left atrial performance in chronic mitral regurgitation. *Echocardiography.* 2022 Nov;39(11):1420-1425. doi: 10.1111/echo.15470. Epub 2022 Oct 18.
4. Stassen J, Galloo X, Chimed S, et al. Clinical implications of left atrial reverse remodeling after cardiac resynchronization therapy. *Eur Heart J Cardiovasc Imaging* 2022; 2022 Jun; 23(6): 730–740. doi: 10.1093/ehjci/jeac042
5. Ro R, Prandi FR, Zaid S, et al. Acute effect of edge-to-edge repair of mitral regurgitation on left heart mechanics and health status. *J Cardiovasc Med (Hagerstown).* 2022 Dec 1;23(12):787-797. doi: 10.2459/JCM.0000000000001359. Epub 2022 Aug 17. PMID: 36166336
6. Kotrc M, Bartunek J, Benes J, et al. Global longitudinal strain and outcome after endoscopic mitral valve repair. *ESC Heart Fail.* 2022 Aug;9(4):2686-2694. doi: 10.1002/ehf2.14001. Epub 2022 Jun 6. PMID: 35670015; PMCID: PMC9288807.
7. Stassen J, Namazi F, van der Bijl P, van Wijngaarden SE, et al. Left Atrial Reservoir Function and Outcomes in Secondary Mitral Regurgitation. *J Am Soc Echocardiogr.* 2022 May;35(5):477-485.e3. doi: 10.1016/j.echo.2022.01.007.
8. Mesi O, Gad MM, Crane AD, et al. Severe Atrial Functional Mitral Regurgitation: Clinical and Echocardiographic Characteristics, Management and Outcomes. *JACC Cardiovasc Imaging.* 2021 Apr;14(4):797-808. doi: 10.1016/j.jcmg.2021.02.008. PMID: 33832663.
9. Scisło P, Rdzanek A, Pietrasik A, et al. The function of the heart after successful transcatheter mitral valve repair due to severe functional regurgitation. *Pol Arch Intern Med.* 2021 Aug 30;131(7-8):686-692. doi: 10.20452/pamw.16000. Epub 2021 May 18.
10. Inciardi RM, Rossi A, Bergamini C, et al. Mitral regurgitation, left atrial structural and functional remodeling and the effect on pulmonary hemodynamics. *Eur J Heart Fail.* 2020 Mar;22(3):499-506. doi: 10.1002/ejhf.1677. Epub 2019 Dec 2.
11. Sugimoto T, Bandera F, Generati G, et al. Left Atrial Dynamics During Exercise in Mitral Regurgitation of Primary and Secondary Origin: Pathophysiological Insights by Exercise Echocardiography Combined With Gas Exchange Analysis. *JACC Cardiovasc Imaging.* 2020 Jan;13(1 Pt 1):25-40. doi: 10.1016/j.jcmg.2018.12.031. Epub 2019 Mar 13. PMID: 30878440.
12. Öztürk C, Fasell T, Sinning JM, et al. Left atrial global function in chronic heart failure patients with functional mitral regurgitation after MitraClip. *Catheter Cardiovasc Interv.* 2020 Sep 1;96(3):678-684. doi: 10.1002/ccd.28775. Epub 2020 Feb 17. PMID: 32065722.

13. Avenatti E, Little SH, Barker CM, Nagueh SF. Changes in Left Atrial Function After Transcatheter Mitral Valve Repair. *Am J Cardiol*. 2018 Oct 1;122(7):1204-1209. doi: 10.1016/j.amjcard.2018.06.031. Epub 2018 Jul 5. PMID: 30097169.
14. Lisi M, Cameli M, Di Tommaso C, et al. Mitral regurgitation severity correlates with symptoms and extent of left atrial dysfunction: Effect of mitral valve repair. *J Clin Ultrasound*. 2018 Jan;46(1):32-40. doi: 10.1002/jcu.22521. Epub 2017 Sep 26. PMID: 28949022.
15. Gucuk Ipek E, Singh S, Vioria E, et al. Impact of the MitraClip Procedure on Left Atrial Strain and Strain Rate. *Circ Cardiovasc Imaging*. 2018 Mar;11(3):e006553. doi: 10.1161/CIRCIMAGING.117.006553. PMID: 29535132.
16. Toprak C, Kahveci G, Kilicgedik A, et al. Left atrial remodeling in patients undergoing percutaneous mitral valve repair with the MitraClip system: an advanced echocardiography study. *Echocardiography*. 2016 Oct;33(10):1504-1511. doi: 10.1111/echo.13288. Epub 2016 Jun 27.
17. van Garsse L, Gelsomino S, Lucà F, et al. Left atrial strain and strain rate before and following restrictive annuloplasty for ischaemic mitral regurgitation evaluated by two-dimensional speckle tracking echocardiography. *Eur Heart J Cardiovasc Imaging*. 2013 Jun;14(6):534-43. doi: 10.1093/ehjci/jes206. Epub 2012 Oct 10. PMID: 23053854.