Change In Dicrotic Notch Index Predicts Outcomes in Patients Undergoing Transcatheter Edge-to-Edge Repair for Mitral Regurgitation

Background

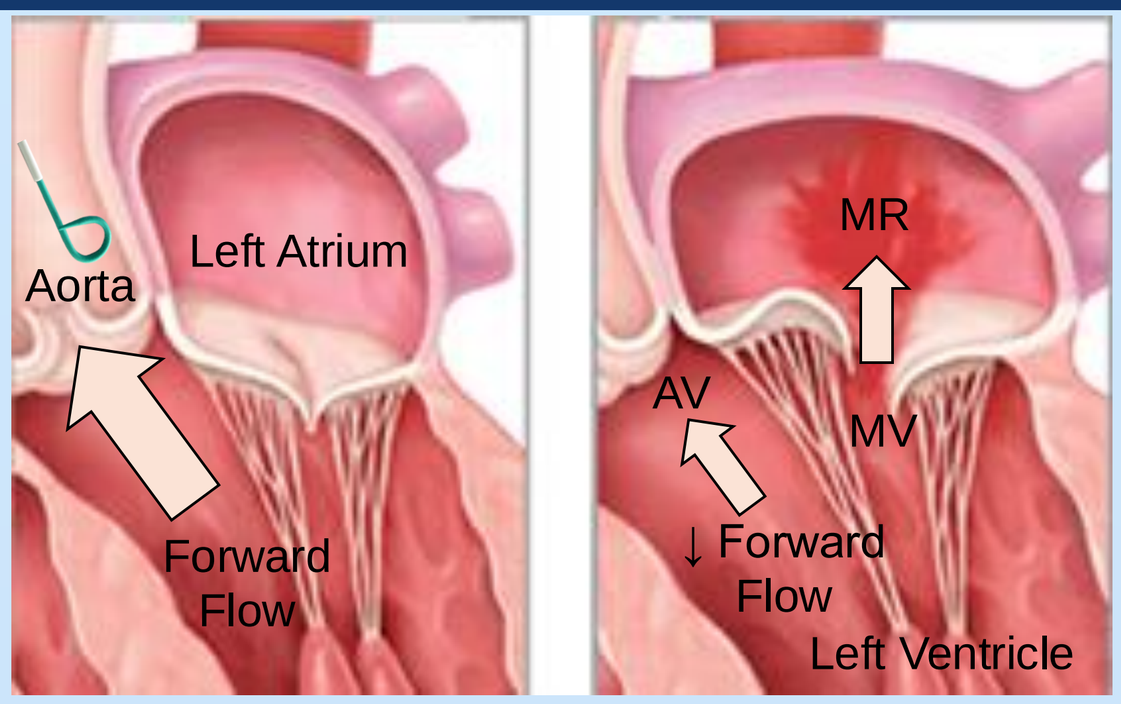

Figure 1: Normal valve (left) and mitral regurgitation (right).[1,2]
MV = Mitral valve; AV = aortic valve.

- **Mitral regurgitation (MR)** is the backflow of blood from the left ventricle to the left atrium caused by incomplete closure of the mitral valve and can lead to heart failure and death[1]
- **Mitral transcatheter edge-to-edge repair (M-TEER)** is a treatment option to percutaneously repair the mitral valve[3]
- The **dicrotic notch** is a feature of the aortic pressure waveform occurring when the aortic valve closes[4]
- Characteristics of the dicrotic notch, including **dicrotic notch index (DNI)**, have not been studied in the context of M-TEER outcomes and success

Methods

Clinical Information

- Demographic and outcome information was collected through electronic chart review after IRB approval

Echocardiographic Measurements

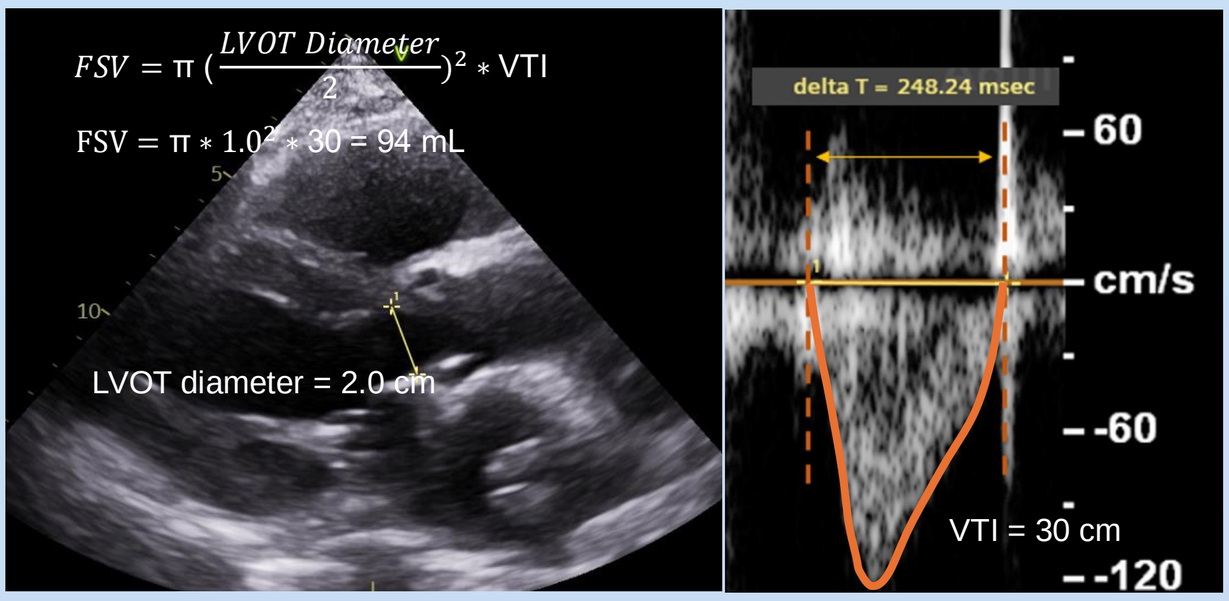

Figure 2: Forward stroke volume (FSV) measurement.
LVOT = Left ventricular outflow tract; VTI = Velocity time integral.[5]

Pressure Measurements

- Dicrotic notch characteristics, including DNI, were measured using aortic waveforms

Statistical Analysis

- Statistical tests – including two-tailed paired t-test, Pearson's test, and maximally selected rank statistics – were performed using SPSS and R software

Results

$$DNI = \frac{\text{Systolic Pressure} - \text{DN Pressure}}{\text{Systolic Pressure} - \text{Diastolic Pressure}}$$

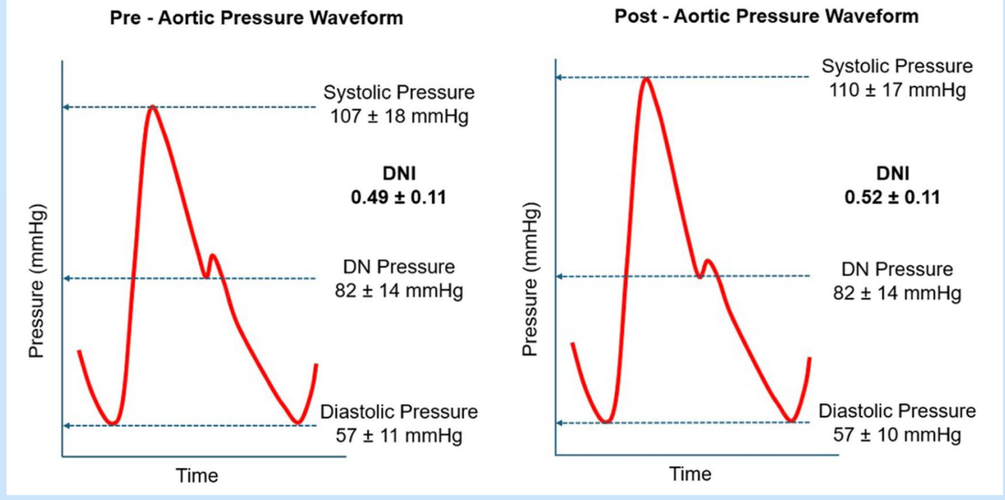

Figure 3: Aortic tracings showing DNI calculation before and after M-TEER with mean hemodynamic parameters. Note statistically significant increase in DNI ($p < 0.001$).[5]

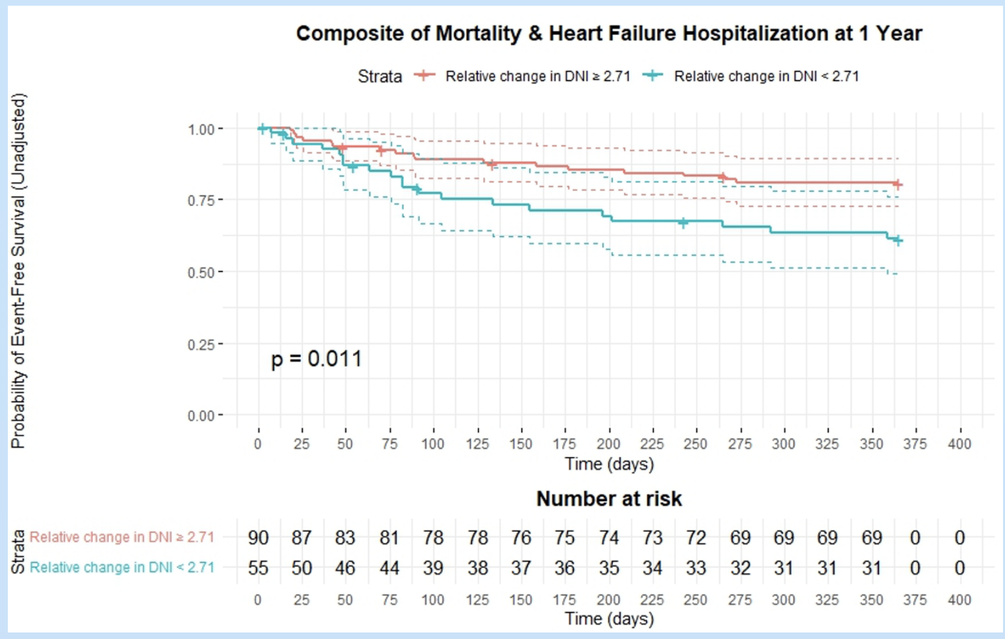

Figure 4: Change in DNI predicting mortality and heart failure hospitalization at 1 year after M-TEER. Cut point indicated higher probability of event free survival (0.81 vs. 0.60) at 1 year.[5]

Conclusions

- DNI significantly increased after M-TEER (Figure 3)
- Increased DNI was associated with lower mortality and heart failure hospitalization at 1 year after M-TEER (Figure 4)
- DNI provides a simple and practical approach as an additional determinant for the efficacy of M-TEER

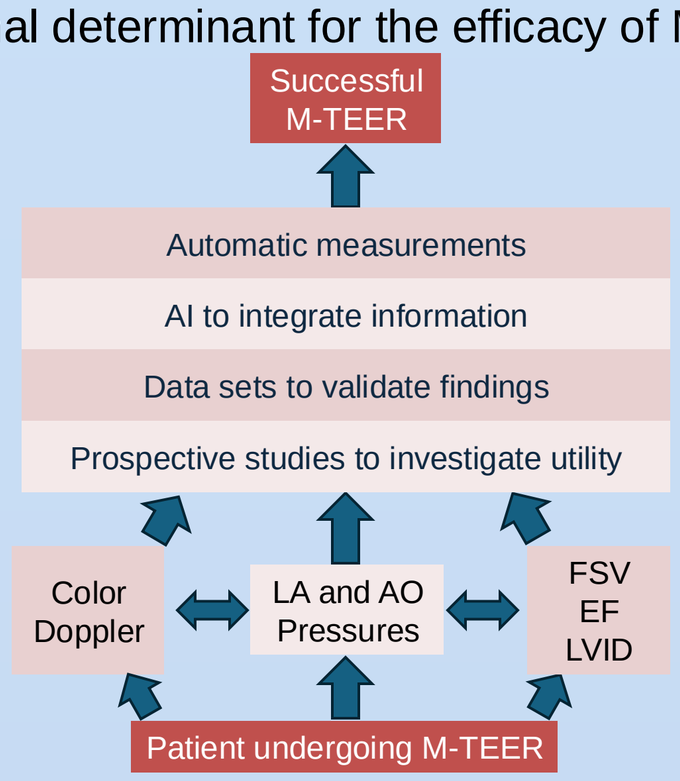

Figure 5: Future directions for study. FSV = Forward stroke volume; EF = Ejection fraction; LVID = Left ventricular internal diameter; LA = Left atrium; AO = Aorta.[5]

References

1. Enriquez-Sarano, M., Akins, C. W., & Vahanian, A. (2009). Mitral regurgitation. *Lancet*, *373*(9672), 1382-1394. https://doi.org/10.1016/S0140-6736(09)60692-9.
2. "Mitral Valve Regurgitation." https://www.thekeyholeheartclinic.com/services/valve-disorders/mitral-valve2/mitral-regurgitation/. Accessed 9 Feb 2025.
3. Hausleiter, J., Stocker, T. J., Adamo, M., Karam, N., Swaans, M. J., & Praz, F. (2023). Mitral valve transcatheter edge-to-edge repair. *EuroIntervention*, *18*(12), 957-976. https://doi.org/10.4244/EIJ-D-22-00725.
4. Gamrah, M., Xu, J., El Sawy, A., Aguib, H., Yacoub, M., Parker, KH. Mechanics of the dicrotic notch: An acceleration hypothesis. Proc Inst Mech Eng H. 2020;234(11):1253-1259. https://doi:10.1177/0954411920921628
5. Image self-created in 2025.