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**Title:** CHANGES IN THE RIGHT VENTRICULAR GLOBAL LONGITUDINAL STRAIN AFTER BALLOON MITRAL VALVULOPLASTY: A COMPARISON BETWEEN HIGH GRADIENT VERSUS LOW GRADIENT VERY SEVERE RHEUMATIC MITRAL STENOSIS

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**Background & Aims**: Very severe mitral stenosis (VSMS) is characterized by the narrowing of the mitral valve area (MVA) by planimetry ≤ 1 cm² and usually corresponds to a high trans-mitral gradient (≥ 10 mmHg) at a normal heart rate. However, VSMS with a low trans-mitral gradient (<10 mmHg) is also common in clinical practice. The impact of successful Balloon Mitral Valvuloplasty (BMV) on right ventricular (RV) function, particularly through RV global longitudinal strain (RV-GLS) analysis, in patients with very severe rheumatic mitral stenosis of both high gradient (HG) and low gradient (LG) has not been fully understood.

**Methods**: We prospectively evaluated rheumatic VSMS patients, aged more than 18-year-old, who underwent successful BMV at National Cardiovascular Center Harapan Kita Jakarta from March 2019 to March 2021. All patients underwent echocardiography examination 1-2 days before BMV and within 2-7 days after BMV. Then we compared the changes in hemodynamic factors before and after BMV, including RV-GLS, and compared it between the HG and the LG VSMS group. Strain imaging using the two-dimensional speckle tracking echocardiography method was performed to measure the RV-GLS and it was the average of 6 strains from the free wall and septal segments. The hemodynamic changes before and after BMV were described by percent delta (%Δ), using a formula %Δ = (after value - before value) / before value x 100%.

**Results**: From 55 subjects, 23 patients (41.8%) had LG, and 32 patients (58.2%) had HG. The mean age was older in the LG group (49 ± 10.09 vs. 40 ± 9.52, p 0.002) and atrial fibrillation was more frequent in the LG group (69.6% vs. 40.6%, p 0.034). The mean mitral valve gradient (mMVG) before BMV in the HG was 15.46 ± 5.05 and 7.97 ± 1.57 in the LG (p <0.001). The baseline of MVA was 0.58 ± 0.21 in the HG and 0.69 ± 0.15 in the LG (p 0.032). The baseline RV-GLS was not different between both groups (HG -15.01 ± 4.38 vs. LG -16.35 ± 3.93, p 0.248). The RV-GLS significantly improved after BMV for both HG (before -15.01 ± 4.38 vs. after -19.09 ± 4.47, p <0.001) and LG (before -16.35 ± 3.93 vs. after -18.66 ± 3.11, p <0.001). The %Δ mMVG (HG -65.12 ± 14.62 vs. LG -38.10 ± 18.24, p <0.001), %Δ net atrioventricular compliance (HG 405.86 ± 304.89 vs. LG 159.20 ± 90, 14, p <0.001) and %Δ RV-GLS (HG 31.25 ± 21.36 vs. LG 16.83 ± 14.95, p 0.007) were significantly different between the two groups. Further analysis of the relationship between other variables and the %Δ RV-GLS revealed that only LG exhibited a significant association with %Δ RV-GLS after BMV compared to baseline. There was a significant difference (p 0.047) in %Δ RV-GLS which was lower by -11.91% (-23.53 - -0.19, 95% CI) in the LG compared to the HG group.

**Conclusions**: The baseline RV-GLS before BMV was not different between the HG and LG VSMS groups, but the RV-GLS significantly improved after BMV for both groups. The changes in RV-GLS before and after BMV differed between the HG and LG VSMS groups, and the improvement was greater in the HG VSMS group.