

# Role of Strain Echocardiography in The Assessment for Asymptomatic Aortic Valve Stenosis

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## BACKGROUND:

Calcific aortic stenosis (AS) is the most common form of valvular heart disease in developed countries and now regarded as a growing health problem.

The natural history of aortic stenosis involves a prolonged latent asymptomatic period, during which progressive worsening of left ventricular (LV) outflow obstruction leads to hypertrophic changes in the left ventricle.

Classic symptoms of aortic stenosis include dyspnea and other symptoms of heart failure, angina and syncope. The onset of these classic symptoms indicates hemodynamically significant aortic stenosis and is a critical point for making management decisions.

Doppler echocardiography is the recommended initial test for patients with classic symptoms of aortic stenosis. It is helpful for estimating aortic valve area, peak and mean transvalvular gradients, and maximum aortic velocity.

Speckle-tracking echocardiography is a sophisticated non-invasive new echocardiographic technique that bypasses the limitations of Doppler techniques, provides

a comprehensive analysis of global and regional myocardial deformation evaluated in all spatial directions.

## OBJECTIVE:

To evaluate the role of strain echocardiography in the assessment of left ventricular systolic function in patients with severe asymptomatic aortic valve stenosis.

## PATIENTS AND METHODS:

This study included 56 patients divided into two groups, patients' group which included 36 patients with isolated senile degenerative asymptomatic severe aortic valve stenosis and the control group which included 20 normal healthy age and sex matched subjects.

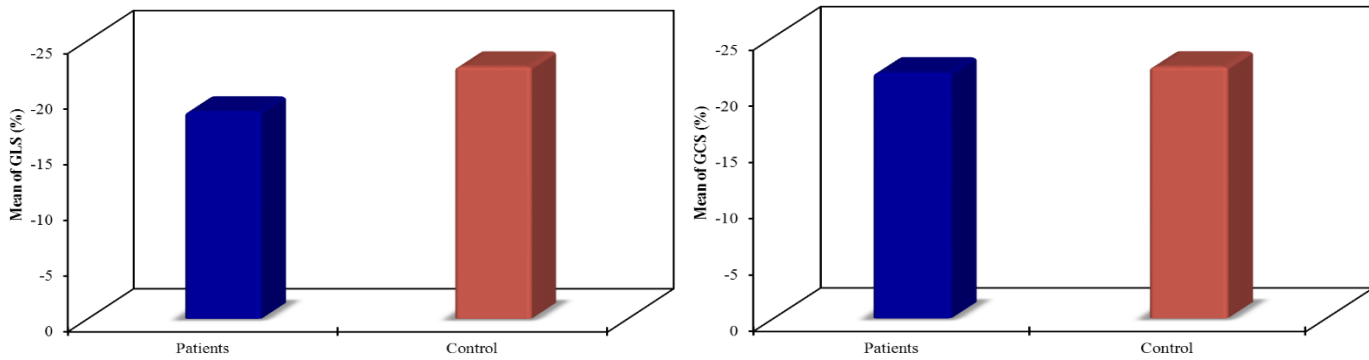
All subjects were evaluated by history taking, clinical examination, routine laboratory investigations and a 12-lead ECG, conventional 2D echocardiography and the global longitudinal and circumferential strain were calculated.

All patients were followed up clinically and the development of any symptom of the cardinal symptoms of aortic stenosis was recorded.

## RESULTS:

|                              | Total (n=56)               | Patients (n=36) | Control (n=20) | P value |
|------------------------------|----------------------------|-----------------|----------------|---------|
| <b>Age (years)</b>           |                            | 73.31 ± 4.39    | 75.15 ± 4.57   | 0.143   |
| <b>Sex</b>                   | <b>Males</b>               | 19              | 11             |         |
|                              | <b>Females</b>             | 17              | 9              |         |
| <b>Risk Factors</b>          | <b>DM</b>                  | 20 (55.6%)      | 10 (50%)       | 0.690   |
|                              | <b>HTN</b>                 | 15 (41.7%)      | 10 (50%)       | 0.548   |
|                              | <b>Smoking</b>             | 14 (38.9%)      | 10 (50%)       | 0.773   |
|                              | <b>Dyslipidemia</b>        | 19 (52.8%)      | 10 (50%)       | 0.842   |
| <b>Clinical examination</b>  | <b>Systolic BP (mmHg)</b>  | 127.78 ± 25.31  | 133.0 ± 29.93  | 0.491   |
|                              | <b>Diastolic BP (mmHg)</b> | 81.39 ± 16.24   | 85.0 ± 15.39   | 0.420   |
|                              | <b>HR (bpm)</b>            | 77.36 ± 11.05   | 78.40 ± 12.25  | 0.747   |
| <b>Laboratory</b>            | <b>Hb (g/dl)</b>           | 12.81 ± 0.92    | 12.55 ± 0.51   | 0.178   |
|                              | <b>Creatinine (mg/dl)</b>  | 0.95 ± 0.08     | 0.98 ± 0.05    | 0.107   |
| <b>Ejection Fraction (%)</b> |                            | 57.14 ± 4.24    | 59.65 ± 6.11   | 0.113   |

Results are represented as number (%) or mean ± standard deviation, DM = Diabetes Mellitus, HTN = Hypertension, BP = Blood Pressure, HR = Heart Rate, Hb = Hemoglobin, ACEIs = Angiotensin converting enzyme inhibitors, ARBs = Angiotensin receptor blockers, bpm = beats per minute, \* significant P value < 0.05



By comparing the global longitudinal strain (GLS) in the two groups, the mean GLS in the patient group was  $-18.61 \pm 2.03$  % and in the control group was  $-22.65 \pm 1.23$  % with a statistically significant difference. ( $p < 0.001$ )

The mean global circumferential strain (GCS) was  $-21.83 \pm 1.32$  % in the patient group and in the control group was  $-22.35 \pm 1.04$  % with no statistically significant ( $p = 0.138$ ).

### CONCLUSION:

GLS can be used for the assessment of the subclinical left ventricular systolic dysfunction in patients with asymptomatic aortic valve stenosis.

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