

Mitral Valve Annular Calcification is Associated with Poor Short-term Outcomes after Spontaneous Intracerebral Hemorrhage

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Objective

To determine if mitral valve annular calcification (MAC; Fig. 1) is a potential marker of poor outcome in patients with spontaneous intracerebral hemorrhage (ICH).

Background

Spontaneous ICH constitutes 10-15% of strokes (1).

MAC is an an ultrasound finding often associated with chronic hypertension (2) (Fig. 2).

MAC has been shown to be associated with left ventricular hypertrophy (LVH) and diastolic dysfunction (3), as well as atherosclerosis and other vascular events including stroke (4-6).

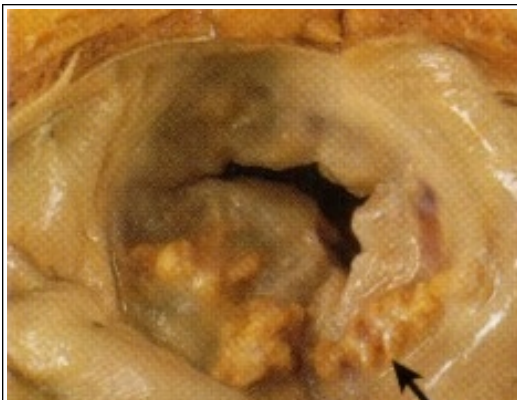


Fig. 1: Gross Specimen of Mitral Valve Annular Calcification (arrow)

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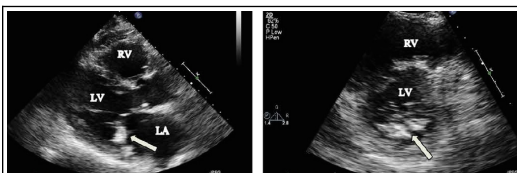


Fig. 2: MAC on Transthoracic Echocardiography (5)

Methods

ICH patients consecutively admitted to our stroke center (07/2008-08/2014) were analyzed retrospectively using a previously collected stroke registry (Fig. 3).

Univariate and multivariate logistic regression modeling was performed based on the presence of MAC with adjustment for covariates.

Results

Among 296 eligible, 180 pts met inclusion criteria. 1 in 4 ICH patients had MAC on transthoracic echocardiogram (TTE). Patients with MAC were older ($p < 0.001$) and a significant proportion were female ($p = 0.047$). Patients with MAC had a significantly higher incidence of previous stroke ($p = 0.044$).

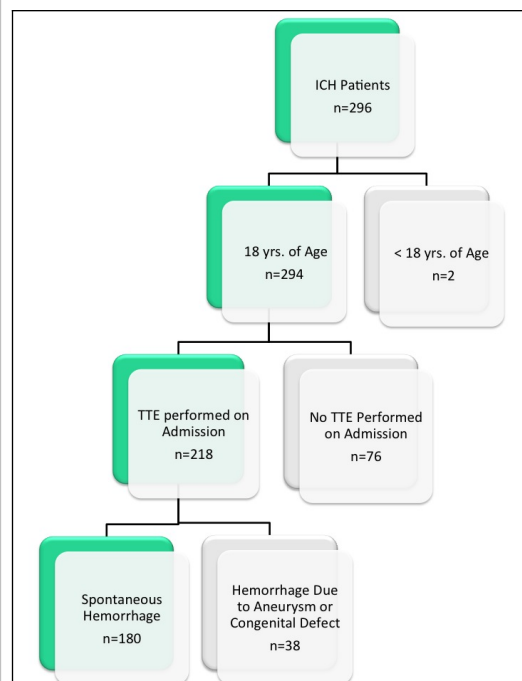


Fig. 3: Study Characteristics

Results

TTE findings revealed that patients with MAC had a significantly greater frequency of left atrial enlargement (LAE; $p = 0.013$). Additionally, grade of diastolic dysfunction (DD) differed significantly across patients with and without MAC ($p = 0.017$).

Inpatient complications more frequently occurred in MAC patients ($p = 0.023$). Modified Rankin Scale (mRS) on discharge differed significantly in patients with and without MAC ($p = 0.047$; Table 1.). Compared to those without MAC, pts with MAC had significantly increased odds of unfavorable discharge disposition defined as not discharged to home or inpatient rehabilitation (OR=2.63, 95%CI 1.3-5.2, $p = 0.007$). Significance remained after controlling for age and ICH score, but not for baseline NIHSS, baseline glucose, and presence of diastolic dysfunction on TTE.

	No mitral valve annular N=136	Mitral valve annular N=45	p-value
Age, median (range)	59 (20-92)	67 (24-94)	< 0.001
Gender, No. (% female)	55 (40.74)	26 (57.78)	0.047
Black Race, No. (% Black)	96 (72.59)	30 (66.67)	0.448
ICH Score, median (range)	1 (0-4)	1 (0-5)	0.389
History of Hypertension, No. (%)	106 (80.3)	37 (88.1)	0.250
History of Hyperlipidemia, No. (%)	39 (29.55)	16 (38.1)	0.299
History of Diabetes, No. (%)	30 (22.9)	13 (31.71)	0.256
Prior Stroke, No. (%)	27 (20.48)	15 (36.71)	0.044
National Institutes of Health Stroke Scale (NIHSS) Stroke Severity Baseline, median (range)	13 (0-40)	16 (0-40)	0.229
HbA1C, median (range)	5.7 (3.5-14.3)	5.9 (3.5-11.5)	0.171
Creatinine baseline, median (range)	1.1 (0.5-18)	1.1 (0.6-8.7)	0.787
Left atrial enlargement, No. (%)	51 (38.64)	27 (60)	0.013
Left ventricular hypertrophy, No. (%)	48 (35.82)	22 (50)	0.095
Diastolic dysfunction, No. (%)	95 (83.33)	33 (94.29)	0.082
Grade Diastolic Dysfunction, No. (%)			0.017
Grade 1 Diastolic Dysfunction	86 (94.51)	25 (80.65)	
Grade 2 Diastolic Dysfunction	4 (4.4)	6 (19.35)	
Grade 3 Diastolic Dysfunction	1 (1.1)	0 (0)	
Inpatient Complication, No. (%)	44 (33.08)	23 (62.27)	0.023
Unfavorable Discharge Disposition, No. (%)	36 (26.67)	22 (48.89)	0.006
Modified Rankin Scale (mRS) Discharge, median (range)	4 (0-6)	4 (0-6)	0.047
Inpatient Mortality, No. (%)	12 (8.89)	8 (17.78)	0.089

Conclusions

Our study demonstrates an association between MAC and worse short-term outcome in ICH patients even in the absence of known stroke predictors.

This is the first study to examine and determine an association between the presence of MAC on TTE with respect to worse short-term outcome in patients with acute spontaneous ICH.

In our study population, MAC was the only finding on TTE that was shown to be an independent predictor of unfavorable discharge disposition (not discharged home or to an inpatient rehabilitation center) even after adjusting for age and ICH score.

MAC may serve as a marker for patients with worse natural histories following ICH.

References

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