

# Frequency of Ischemic Stroke in Patients of Mitral Stenosis

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## ABSTRACT

**Objective:** To assess the frequency of ischemic stroke in patients of mitral stenosis.

**Study Design:** Cross-sectional multi-centre study

**Place and Duration of Study:** This study was conducted at Sheikh Zayed Hospital, Rahima Yar Khan and Liaquat National Hospital Karachi from 1<sup>st</sup> January 2016 to 31<sup>st</sup> December 2016.

**Materials and Methods:** One hundred patients of mitral stenosis, age between 16-60 years and either gender were included. Registered patients of mitral stenosis were followed-up in OPD for 1 year.

**Results:** The mean age of 38.70±13.40 years. There were 49 (49%) males while 51 (51%) females. The mean BMI of patients was 20.02±2.37kg/m<sup>2</sup>. The mean duration of mitral stenosis was 3.09±1.46years. Ischemic stroke was found to develop in 28% cases of mitral stenosis. The relationship of ischemic stroke was found to be insignificant (P>0.05) with age, gender, duration of mitral stenosis and BMI.

**Conclusion:** The frequency of ischemic stroke is high in patients of mitral stenosis registered in multiple healthcare centers of Lahore.

**Key Words:** Ischemic stroke, Mitral stenosis, Frequency

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## INTRODUCTION

Defined simple mitral stenosis is the narrowing of the mitral valve of the heart,<sup>1</sup> which is usually caused by rheumatic fever.<sup>1</sup> The prevalence of rheumatic disease is higher in India (100-150 cases per 100,000) then, Africa (35 cases per 100,000).<sup>2</sup> Therapy is directed at infective endocarditis prophylaxis, treating heart failure, controlling the ventricular rate in case of atrial fibrillation, and thereby preventing thromboembolic phenomena.<sup>3</sup>

Almost all mitral stenosis is due to rheumatic fever so prophylaxis against group A beta-hemolytic streptococci is must.<sup>4</sup> Complications of mitral stenosis include systemic embolism. Cerebral embolism originates in the heart of the patients with several acquired diseases like rheumatic valvular heart disease, myocardial infarction and dilated cardiomyopathy.<sup>5</sup> Since stroke causes huge morbidity and mortality, determining the mechanism of stroke is crucial for effective care and therapy. 14-30% of all cerebral infarctions are attributed to stroke.<sup>6-8</sup>

Ischemic stroke is not one disease and occurs due to a myriad of pathologic processes and small infarctions can cause major disability in the brain. Ischemia is responsible for 85% of all strokes.<sup>9</sup> The high risk cardiac conditions resulting in stroke are atrial fibrillation, recent myocardial infarction and mitral rheumatic stenosis.<sup>10,11</sup>

## MATERIALS AND METHODS

This cross-sectional multi-centres study was carried out at Sheikh Zayed Hospital, Rahima Yar Khan and Liaquat National Hospital Karachi from 1<sup>st</sup> January 2016 to 31<sup>st</sup> December 2016. One hundred cases of mitral stenosis, already registered in teaching hospitals of Lahore were included. Patients of 16-60 years of either gender were included in the study through Simple Random sampling technique. The patients were registered on from January 2016 to December 2016 and were on follow-up with medical management. During follow-up period, patients were advised to report to the respective hospital in case of any complication including stroke. If patient presented with symptoms, including partial paralysis, unconsciousness, the CT scan was performed for confirmation of stroke. All this information was collected using structured questionnaire.

The data was entered in SPSS-20 and analysed. Mean±SD were calculated for age, BMI and duration of mitral stenosis, while frequency and percentage were calculated for gender and ischemic stroke. Data stratification was done for age, gender, BMI and duration of mitral stenosis. Both Chi-square test and P-value were calculated. P-value ≤0.05 was considered as significant.

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## RESULTS

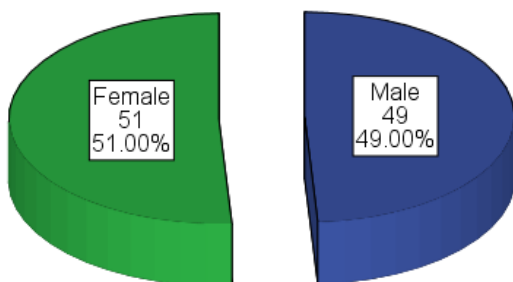
Hundred patients were included with the mean age of  $38.70 \pm 13.40$  years. There were 49 (49%) males while 51 (51%) females (Fig. 1). The mean BMI of patients was  $20.02 \pm 2.37 \text{ kg/m}^2$ . The mean duration of mitral stenosis was  $3.09 \pm 1.46$  years (Table 1). Ischemic stroke was found to develop in 28% cases of mitral stenosis (Fig. 2). In patients of age <20 years, 5 (55.6%) patients had stroke, in patients of age 20-40 years, 9 (19.6%) patients had stroke while in old age group (41-60 years), 14 (31.1%) patients had stroke. Frequency of stroke was equal in males (14 (28.6%)) and females (14 (27.5%)).

**Table No.1: Baseline characteristics of patients (n = 100)**

Age (Years)	$38.70 \pm 13.40$
BMI ( $\text{kg/m}^2$ )	$20.01 \pm 2.37$
Duration of mitral stenosis (years)	$3.09 \pm 1.46$

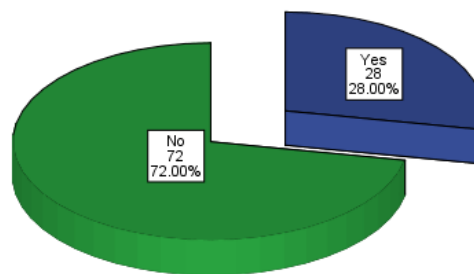
**Table No.2: Distribution of stroke in patients**

Variable	Stroke		Total	P value
	Yes	No		
Age (years)				
<20	5 (55.6%)	4 (44.4%)	9	0.073
20-40	9 (19.6%)	37 (80.4%)	46	
41-60	14 (31.1%)	31 (68.9%)	45	
Sex				
Male	14 (28.6%)	35 (71.4%)	49	0.901
Female	14 (27.5%)	37 (72.5%)	51	
Body Mass Index				
Under weight	11 (28.9%)	27 (71.1%)	38	0.869
Normal weight	17 (27.4%)	45 (72.6%)	62	
Duration (years)				
1 – 2	9 (26.5%)	25 (73.5%)	34	0.807
3 - 5	19 (28.8%)	47 (71.2%)	66	



**Figure No. 1: Gender distribution of patients**

Among underweight, stroke occurred in 11 (28.9%) however, in normal BMI patients, stroke occurred in 17 (27.4%). The patients who had duration of mitral stenosis 1-2 years, stroke occurred in 9 (26.5%) while in patients having mitral stenosis for 3-5 years, stroke occurred in 19 (28.8%) cases (Table 2).



**Figure No. 2: Distribution of stroke in patients.**

## DISCUSSION

The two well known factors for stroke, rheumatic valvular heart disease and mechanical prosthetic valves are independent of atrial fibrillation. In turn the most well known valve defects are mitral stenosis and calcific aortic stenosis.<sup>11,12</sup>

In our study, we included 100 patients of mitral stenosis who were registered in different teaching hospitals of Lahore district. Patients mean age was  $38.70 \pm 13.40$  years (16-60 years). There were 49 (49%) males while 51 (51%) females. The mean BMI of patients was  $20.02 \pm 2.37 \text{ kg/m}^2$ . The mean duration of mitral stenosis was  $3.09 \pm 1.46$  years. In our study, ischemic stroke was found to develop in 28% cases of mitral stenosis. Arboix and Alió showed that only 1.2% cases of mitral stenosis developed stroke.<sup>13</sup> Akdemir et al<sup>14</sup> showed that the incidence of stroke was found to be 24.5% in patients with mitral stenosis.

Although the role of anticoagulants in the prevention of thromboembolic events in atrial fibrillation not caused by rheumatic fever is established, but their role recent transient ischaemic attacks (TIAs) /minor ischaemic stroke is still debated.<sup>15</sup>

We stratified data for age, gender, duration of mitral stenosis and BMI of patients to check the significance of these factors on occurrence of stroke in mitral stenosis patients. In patients of age <20 years, 5 (55.6%) patients had stroke, in patients of age 20-40 years, 9 (19.6%) patients had stroke while in old age group (41-60 years), 14 (31.1%) patients had stroke. This showed that age, although insignificant, but has effect on stroke occurrence. In this sample, we can see that in patients aged >40 years, number of patients with stroke is higher. Thus as age increases along with mitral stenosis can cause higher chances of stroke.

Frequency of stroke was equal in males (14 (28.6%)) and females (14 (27.5%)), showing no gender discrimination in occurrence of stroke. Among underweight patients, stroke occurred in 11 (28.9%) however, in normal BMI patients, stroke occurred in 17 (27.4%). This showed that weight or BMI of patient did not affect the occurrence of stroke. The patients who had duration of mitral stenosis 1-2 years, stroke occurred in 9 (26.5%) while in patients having mitral

stenosis for 3-5 years, stroke occurred in 19 (28.8%) cases, showing no effect on occurrence of stroke.

## CONCLUSION

Ischemic stroke is a risk in 25% of patients with mitral stenosis. But regular screening of mitral stenosis patients should be done for cerebrovascular elements to prevent the patients from cerebrovascular events.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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