

PREVALENCE OF ISCHEMIC HEART DISEASE RISK FACTORS IN ISCHEMIC STROKE

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Objective: To determine the prevalence of cardiac risk factors in patients presenting with acute ischemic stroke.

Methods: We collected retrospective data of all stroke patients more than 16-years of age seen by the neurology section over a two year period (January 1, 2011–December 31, 2012). Charts having complete history and relevant investigations were reviewed.

Results: There were a total of 200 stroke patients with a mean age of 55 years. 176 (88%) patients had ischemic stroke. 50/176 (25%) patients had a least one of the cardiac risk factors for ischemic stroke: 25 (50%) has a hypokinetic / akinetic left ventricular segment, 10 (20%) had atrial fibrillation, 5 (10%)

had mitral annular calcification, 5 (10%) had a history of recent myocardial infarction, 3 (6%) had cardiomyopathy and 2 (4%) patient had a mechanical valve.

Conclusion: Hypokinetic / akinetic left ventricular segment with or without compromised systolic function was the most prevalent cardiac risk factor of ischemic stroke followed by atrial fibrillation.

Key words: Ischemic stroke, cardiac risk factors, hypokinetic / akinetic left ventricular wall.

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INTRODUCTION

There is a strong association between heart disease and stroke. Cerebral embolism from cardiac source (CECS) is considered to be the cause of 15-45% of all strokes and it is believed that it is more prevalent in patients younger than 45-years age.¹ Of all strokes, one is every six occurs in patients with atrial fibrillation.² The risk of stroke with non valvular atrial fibrillation is 4.1% years in patients without prior stroke and 13% years in patients with prior stroke.³ Systemic thromboembolism is a serious complication of

rheumatic mitral stenosis. This risk increases by several-fold in the presence of atrial fibrillation. Rheumatic mitral stenosis even in the absence of atrial fibrillation is associated with an increased incidence of systemic thromboembolism.⁴

There is a strong correlation between ischemic stroke and worsening reduction in left ventricular ejection fraction (LVEF).^[5] Patients with left ventricular segmental wall motion abnormality (SWMA) have underlying depressed LVEF accounting for the higher stroke risk. However SWMA even in the presence of mildly depressed LVEF may increase the risk for ischemic stroke.⁵

The classical cardiac conditions associated with CECS are atrial fibrillation, acute myocardial infarction, ventricular aneurysm, rheumatic heart disease and prosthetic valves. Some studies have correlated specific entities as less common potential cardiac source of cerebral

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embolism: mitral valve prolapse, mitral annular calcification, nonbacterial thrombotic endocarditis, calcified aortic valve stenosis, myxoma, paradoxical embolism, congenital heart disease, non ischemic dilated cardiomyopathy and infective endocarditis.¹

METHODS

We collected retrospective data of all patients more than 16 years age seen by the neurology department over the previous two years (January 1, 2000 to December 31, 2012). Charts were reviewed and the following data were collected from all case records: age, gender, marital status, past or present history of stroke, cardiac risk factors including Atrial fibrillation (AF), cardiomyopathy, recent MI, mechanical valve, hypokinetic/akinetic left ventricular segment, left ventricular ejection fraction and mitral annular calcification, presence of comorbid disease (including hypertension, diabetes mellitus, cigarette smoking, dyslipidemia, coronary artery disease) laboratory, vascular and radiological investigations.

The results of relevant investigations were recorded and analyzed. Analysis was performed using Statistical Package for Social Sciences (SPSS) version 10.0. Data were summarized using frequency counts and descriptive statistics. Charts with incomplete data were excluded.

RESULTS

There were a total of 200 stroke patients with a mean age of 55 years. Out of that, 176 (88%) patients had ischemic stroke. 50/176 (25%) patients had atleast one cardiac risk factor for ischemic stroke. Of the 50 patients 5 patients were below the age of 45 years. 25 patients were between 45-65 years age group and 20 patients were above 65 years of age. Out of the five young stroke patients one was female and four were male, two have left ventricular SWMA, one has AF, one has cardiomyopathy one has mitral annular calcification. 35 patients also has hypertension, 25

also had diabetes mellitus, 15 had a history of smoking, 25 had ischemic heart disease and 25 had dyslipidemia. Carotid Doppler study was available in 40 patients, of which 8 had a >50% stenosis including 4 patients with complete occlusion.

Echocardiogram was abnormal in 50 patients. 20 patients had an ejection fraction of <40%. Left ventricular hypertrophy was present in 18 patients. Left atrial enlargement was documented in 10 patients. Intracardiac thrombus was present in three patients, of which 2 had thrombus in left ventricle and one in the left atrium. Cardiac valvular abnormalities included: mitral regurgitation in 10 patients, aortic regurgitation in 6 patients, mitral stenosis in 3 patients.

Of the cardiac abnormalities reviewed in our study, 25 patients also had hypokinetic/akinetic left ventricular segment. 5 of these patients with segmental wall motion abnormality had a mean ejection fraction of >40%. Atrial fibrillation was seen in 10 patients. 5 patients had mitral annular calcification. 5 had a recent myocardial infarction. 3 patients had cardiomyopathy and 2 patients had a mechanical valve.

In a study of ischemic stroke in patients with atrial fibrillation, of the 71 ischemic strokes, 46 (65%) were cardioembolic, 13 (18%) were non-cardioembolic and 12 (17%) were of uncertain.

TABLE NO. 2: CO MORBID DISEASES AND CARDIAC RISK FACTORS

Risk factors	Frequency (%)
Hypertension	35(70)
Diabetes Mellitus	25(50)
Smoking	15(30)
Ischemic heart disease	25(50)
Dyslipidaemia	25(50)
Atrial fibrillation	10(20)
Cardiomyopathy	3(6)
Recent MI	5(10)
Mechanical Valve	2(4)
Hypokinetic /akinetic left ventricular segment	25(50)
Mitral annular calcification	5(10)

DISCUSSION

Cardioembolic stroke accounts for 15%-20% of all ischemic strokes.⁵ 25% of our patients had at least one cardiac risk factor for stroke. Our study showed the most prevalent cardiac pathology to be hypokinetic/akinetic left ventricular segment which was seen in 25/50 (50%) patients followed by atrial fibrillation in 10/50(20%).

Previous studies have shown the association of left ventricular systolic dysfunction (LVSD) with stroke risk. LVSD of any degree was more frequent in stroke patients (24.1%) than in controls (4.9%) ($p < 0.0001$). The association between LVSD of any degree and stroke was present in all age, gender and race-ethnicity subgroup. LVSD even of mild degree is independently associated with an increased risk of ischemic stroke.^{7,8}

In another study of determine whether left ventricular segmental wall motion abnormality (SWMA) is a potential cause of ischemic stroke, data indicated that in ischemic stroke patients with multiple cardioembolic risk factors and SWMA, a higher frequency of lacunar strokes can be found⁹ cause. Patients developing non-cardioembolic strokes, relative to cardioembolic strokes were more likely to have left ventricular wall motion abnormalities by two-dimensional echocardiography ($p = 0.002$).¹⁰

Atrial fibrillation predisposes to left atrial thrombus formation and carries a six fold increased risk for stroke. About 16-25% of ischemic strokes are associated with AF. Its presence increases the risk of recurrent stroke as well. The risk of recurrent stroke in AF patient without antithrombotic treatment is 12% year.¹¹

The prevalence of AF increases with age and the attributable risk of stroke from AF rises from 1.5% in individuals in their fifties to 15% in individuals in their seventies and further rises to 23.5% for those in their eighties.¹³

There is no correlation between neurological presentation and the severity of coronary artery disease. There is a 2% year risk of stroke in patients with low ejection fraction (EF). The risk of stroke increases with decreasing EF because of the increased formation of new thrombus in the left ventricle. For every decrease of 5 percentage points in the EF there was an 18% increase in risk of stroke.¹²

Prior to the advent of thrombolysis, stroke complicated 0.8% to 5.5% of acute MI were almost uniformly ischemic and were generally thought to be embolic.. Although 90% of the cerebral embolic events occur within the first two weeks after acute MI, stroke risk continues for 4-6 months with a minority of patients at life long risk.¹⁴

Our study lends strength to the current observation that left ventricular SWMA is independently associated with an increased risk of stroke even in patients with mildly depressed systolic function. However the exact mechanism underlying this association remains unclear. It is possible that in this subgroup of patients, microemboli form and lead to ischemic stroke. Alternatively, patients with mild LV dysfunction and SWMA may have a higher incidence of intracerebral small vessel atherosclerosis accounting for the increased stroke risk. Whatever the exact etiology is, it appears reasonable that in patients with mildly depressed or even preserved LVEF and incidental finding of SWMA, antiplatelet therapy should be considered and for those who have suffered a stroke, long term oral anticoagulation (warfarin) should be strongly considered.

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