Original Research Article

DOI: http://dx.doi.org/10.18203/2349-3933.ijam20195659

Clinical study of 2D Echo cardiography findings in strokeischemic patients

Rajendraprasad Saligommula, Krishna Chaitanya Alam*

Department of General Medicine, Malla Reddy Institute of Medical Sciences, Suraram, Hyderabad, Telangana, India

Received: 05 November 2019 **Accepted:** 28 November 2019

*Correspondence:

Dr. Krishna Chaitanya Alam, E-mail: kcalam@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The Echocardiography is the mainstay investigation tool used in stroke patients. Stroke has acquired third place as leading cause of death with ischemic stroke being very common among all the types of the stroke. Objective of the study was to evaluate 2D Echo cardiography findings in the stroke (ischemic) patients.

Methods: Hospital based cross sectional study was carried out among the confirmed 50 patients of ischemic stroke. Routine investigations has been done to all the patients included in the study, specific investigations like 2D echo and CT brain (Plain), Doppler study of carotids and fasting lipid profile has been done.

Results: Majority of the study subjects belonged to the age group of 60-69 years i.e. 36% followed by the age group of 50-59 years. The most common risk factor for this ischemic stroke found out in the present study was hypertension in 66% of the cases. The prevalence of ischemic stroke was 70% in the males and 30% in the females. Out of 50 cases, 43 cases i.e. 86% were having abnormal lipid profile. Bilateral carotid atherosclerosis (64%) is more common than the unilateral carotid atherosclerosis (36%) on color Doppler study. Mitral annular calcification was the most common finding in 2D ECHO study in 52% of the cases.

Conclusions: Males are more affected than females. Hypertension and smoking are two major and predominant risk factors for stroke. Elderly age group is commonly affected. Bilateral carotid atherosclerosis is common finding on color Doppler study and Mitral annular calcification the most common finding in 2D ECHO study.

Keywords: 2D Echo cardiography, Clinical study, Color doppler study, Ischemic, Patients, Stroke

INTRODUCTION

Disability of long term in nature and of serious kind is mainly caused by stroke. In the industrialized world, stroke has acquired third place as an important cause of death. It has been estimated that annually >50 lakh people die due to stroke. The risk of second attack of the stroke in coming five years is one out of every six first stroke attacks. But most of these second attacks can be seen within one year of first attack of stroke. It has been pointed out that annually seven lakh people in USA develop stroke and one lakh seventy thousand die. Stroke incidence for people living in Europe is 1.5 to 2 cases of

stroke for every one thousand population annually. Relapse rate for stroke has been estimated to be $30\%.^1$

Of all the types of stroke, ischemic stroke is the most common and it has been estimated that it accounts for 70-80% of all the types among stroke. Ischemic stroke is usually caused by occlusion in the vessels of the cerebrum which can be due emboli or thrombotic. Atherosclerosis in the large artery is the main cause of ischemic stroke. Around 30% of the ischemic stroke cases are due to emboli moving from heart. But undetermined cases also form a majority.²

If a person develops stroke where the emboli was formed from the heart then that patient shows the signs of poor prognosis. Recurrence rate is more in such cases and are associated with more risk of death compared to stroke due to all other causes.³

Echocardiography is the mainstay investigation tool used in stroke patients. As mentioned above stroke has acquired third place as leading cause of death with ischemic stroke being very common among all the types of the stroke. Ischemic stroke can be classified as stroke due to atherosclerosis in large vessels and then the thrombi or emboli causing it. Or stroke due to emboli which originated in the heart. Or stroke due to occlusion of the small blood vessel. Or stroke can be classified as due to other determined causes or due to undetermined nature. 15-40% of the stroke cases are due to origin of the emboli in the heart while 30-40% is cryptogenic in nature. Diagnosis of stroke due to emboli arising in the heart is not easy. Such patients should undergo "echocardiography of both the thoracic region as well as esophageal region which will aid in proper diagnosis.⁴

Present study was undertaken to evaluate 2D Echo cardiography findings in stroke (ischemic) patients

METHODS

Study design was hospital based cross sectional study. Sample size of a total number of 50 patients were studied which included both males and females sex group from 18 years and above who got admitted with symptoms of weakness (hemiplegia) during the period 2009 to 2011.

Study duration was from January 2009 to April 2011. Study place of all patients who came to Osmania General Hospital with symptoms suggestive of stroke were taken into the study and were completely evaluated.

Inclusion criteria

- Age 18 years and above
- Only ischemic stroke confirmed cases
- Willing to participate in the present study

Exclusion criteria

- Cases of stroke other than ischemic stroke
- Age less than 18 years
- Rheumatic heart disease cases

After obtaining permission from Institution Ethics Committee, informed consent was taken from all consecutive patients included in the study. Detailed history was taken to ascertain age, risk factors like addiction of alcohol and tobacco smoking. The data was recorded in the predesigned, pretested semi structured study questionnaire. Blood pressure was recorded in the sitting position and three reading were taken at five minutes interval. Lowest reading was noted down for the

present study purpose. Early morning fasting blood sugar was measured after ensuring 6-8 hours of fasting in the ward. Routine investigations with CBP, ESR, Random Blood sugar, Blood urea, serum creatinine, serum electrolytes were carried out for all the patients. Radiological investigations - Chest x-ray, CT brain (Plain), Doppler study of carotids were carried out for all the patients. Specific investigations - 2D Echo cardiography (TTE) were carried out for all the patients. Fasting lipid profile was carried out for all the patients.

All the patients were enquired detailed history and clinical examination has been done with a provisional diagnosis of ischemic stroke were taken into the study. Routine investigations has been done to all the patients included in the study, specific investigations like 2D echo and CT brain (Plain), Doppler study of carotids and fasting lipid profile has been done.

Statistical analysis

The data was entered and expressed as percentages. Only proportions and descriptive statistics were used and hence no statistical could be applied.

RESULTS

Table 1 shows distribution of study subjects as per age. Majority of the study subjects belonged to the age group of 60-69 years i.e. 36% followed by the age group of 50-59 years. There was only one patient in the age group of 29-39 years. 20% of the cases were seen in the age group of 40-49 years while only 8% of the subjects were seen in the age group of 70 years and above. Thus, stroke is commonly seen in the age group of 50-69 years. few cases at and above 70 years of age may be due to more mortality after they develop stroke in the age group of 50-69 years.

Table 1: Distribution of study subjects as per age.

Age (years)	Number	%
29-39	1	2
40-49	10	20
50-59	17	34
60-69	18	36
70 and above	4	8
Total	50	100

Table 2: Distribution of study subjects as per risk factors.

Risk factors	Number	%
Hypertension	33	66
Diabetes mellitus	19	38
Hypertension + diabetes	10	20
Smoking	25	50
Smoking + alcohol	15	30

Table 2 shows distribution of study subjects as per risk factors. The most common risk factor for this ischemic stroke found out in the present study was hypertension in 66% of the cases while diabetes accounted for 38% of the cases of the ischemic stroke. 50% of the cases were due to smoking as a risk factor while 30% of the cases were due to combined effect of smoking and alcohol. 10 cases were having hypertension as well as diabetes.

Table 3: Distribution of study subjects as per sex.

Sex	Number	%
Male	35	70
Female	15	30
Total	50	100

Table 3 shows distribution of study subjects as per sex. It has been observed from the above table that ischemic stroke was more common in males as compared to females. There were 35 males affected by ischemic stroke compared to only 15 females in the present study. Thus it proves that males are more commonly affected by ischemic stroke than the females. The prevalence of ischemic stroke was 70% in the males and 30% in the females.

Table 4: Distribution of study subjects as per lipid profile findings.

Lipid profile	Number	%
Serum cholesterol >240 mg%	17	34
Serum HDL cholesterol <45 mg%	10	20
Serum LDL cholesterol >160 mg%	16	32
Normal	7	14
Total	50	100

Table 4 shows distribution of study subjects as per lipid profile findings. 17 patients i.e. 34% of the cases were found to have Serum cholesterol >240 mg%. 10 patients i.e. 20% of the cases were found to have Serum HDL cholesterol <45 mg%. 16 patients i.e. 32% of the cases were found to have Serum LDL cholesterol >160 mg% while seven patients i.e. 14% of the cases were found to have normal lipid profile values in the present study.

Table 5: Distribution of study subjects as per carotid doppler study.

Carotid doppler study	Number	%
Bilateral carotid atherosclerosis	32	64
Unilateral carotid atherosclerosis	18	36
Total	50	100

Table 5 shows distribution of study subjects as per carotid Doppler study. It has been observed from this table that 32 patients i.e. 64% of the cases had demonstrated bilateral carotid atherosclerosis when carotid Doppler study was performed. It has also been observed from this table that 18 patients i.e. 36% of the

cases had demonstrated presence of unilateral carotid atherosclerosis when carotid Doppler study was performed. Thus it can be concluded from this table that bilateral carotid atherosclerosis is more common than the unilateral carotid atherosclerosis.

Table 6: Distribution of study subjects as per 2D ECHO findings.

2D ECHO findings	Number	%
Mitral annular calcification	26	52
Sclerotic aortic valve	7	14
LV Apical clot	6	12
LV dysfunction	5	10
Altered diastolic compliance	4	8
with good LV function		
Normal study	2	4
Total	50	100

Table 6 shows distribution of study subjects as per 2D ECHO findings. It has been found that 26 patients i.e. 52% of the cases had Mitral annular calcification on 2D ECHO study. It has been found that 7 patients i.e. 14% of the cases had Sclerotic aortic valve on 2D ECHO study. It has been found that 6 patients i.e. 12% of the cases had LV Apical clot valve on 2D ECHO study. It has been found that 5 patients i.e. 10% of the cases had left ventricular dysfunction on 2D ECHO study. It has been found that 4 patients i.e. 8% of the cases had altered diastolic compliance with good LV function on 2D ECHO study. Two patients were found to have normal study. Thus Mitral annular calcification was the most common finding in 2D ECHO study

DISCUSSION

Majority of the study subjects belonged to the age group of 60-69 years i.e. 36% followed by the age group of 50-59 years. The most common risk factor for this ischemic stroke found out in the present study was hypertension in 66% of the cases. The prevalence of ischemic stroke was 70% in the males and 30% in the females. Out of 50 cases, 43 cases i.e. 86% were having abnormal lipid profile. Bilateral carotid atherosclerosis (64%) is more common than the unilateral carotid atherosclerosis (36%) on color Doppler study. Mitral annular calcification was the most common finding in 2D ECHO study in 52% of the cases.

Vaidya CV et al, carried out a retrospective study in stroke patients and found that males and elderly were commonly affected.⁵ This finding is in accordance with the present study findings. 72.6% of the cases in their study had hemiplegia. They found that hypertension was the most common risk factor and author also found similar observation.⁵ Togha M et al, conducted a cross sectional study in 258 acute stroke patients and found that majority cases were ischemic stroke.⁶ They noted that age, LDL values and cholesterol level were predictors of

ischemic stroke. Author also found similar findings. They concluded from their study that LDL was an important risk factor for both types of stroke. ⁶

Dey SK et al, observed that elderly age group was commonly affected by either types of stroke. Author also found that elderly age was commonly affected by ischemic stroke as this study did not include hemorrhagic stroke. Males were more affected than females which is similar to the present study findings. Middle class people war commonly affected. They also found that diabetes, smoking and hypertension were important risk factors which are similar to the present study.

Bansal M et al, carried out an observational study among 50 patients with ischemic stroke which is similar setting of the present study. They observed that 76% of the cases in their study had abnormalities found on echocardiography. In that ventricular wall hypokinesia was the most common abnormality. They also found that prevalence was similar across age groups and either sex. They concluded that 2D ECHO should be performed in all the cases of stroke.

Devarapu C et al, studied 100 patients with acute stroke and found that 80% of them were the cases of the ischemic stroke. 64% of the cases have shown the abnormal ECG findings and 58% have shown abnormal echocardiography findings. Tachycardia was the most common ECG abnormality. 28.12% of the patients with abnormal ECG died compared to only 11.1% with normal ECG. Mortality rate was 31.03% in patients with abnormal echocardiography findings compared to 4.76% deaths with normal ECG.

Fernandes M et al, 10 found that males were more affected than females which are comparable to the findings of the present study. Hypertension was the most common risk factor which is also similar to the finding of the present study. Haq S et al, used CT scan to diagnose ischemic stroke in 50 patients. They found that ICA/CCA PSV ratio was able to predict stenosis in more than 60% of the cases. It was seen that plaque was commonly formed at carotid bulb. Similar to our findings, they also found that diabetes and hypertension were common risk factors for ischemic stroke.

CONCLUSION

Males are more affected than females. Hypertension and smoking are two major and predominant risk factors for stroke. Elderly age group is commonly affected. Bilateral carotid atherosclerosis is common finding on color Doppler study and Mitral annular calcification the most common finding in 2D ECHO study. Hence lipid profile, blood sugar and blood pressure should be regularly monitored in the general population and those at high risk of developing ischemic stroke should be advised to adopt a healthy lifestyle so that ischemic stroke can be

prevented. One should refrain from addictions like alcohol use and smoking or tobacco use.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- Counsell C, Boonyakarnkul S, Dennis M, Sandercock P, Bamford J, Burn J, et al. Primary intracerebral haemorrhage in the Oxfordshire community stroke project. Cerebro Dis. 1995;5(1):26-34.
- Kolominsky-Rabas PL, Weber M, Gefeller O, Neundoerfer B, Heuschmann PU. Epidemiology of ischemic stroke subtypes according to TOAST criteria: incidence, recurrence, and long-term survival in ischemic stroke subtypes: a population-based study. Stroke. 2001;32(12):2735-40.
- 3. Arboix A, García-Eroles L, Massons J, Oliveres M. Predictive clinical factors of in-hospital mortality in 231 consecutive patients with cardioembolic cerebral infarction. Cerebro Dis. 1998;8(1):8-13.
- 4. Brickner ME. Cardio embolic stroke. Am J Med. 1996;100:465-74.
- Vaidya CV, Majmudar DK. A retrospective study of clinical profile of stroke patients from GMERS Medical College and Hospital, Gandhinagar, Gujarat. Int J Clin Trials. 2014 Jul;1(2):62-6.
- 6. Togha M, Gheini MR, Ahmadi B, Khashaiar P, Razeghi S. Lipid profile in cerebrovascular accidents. Iranian J Neurol. 2011;10(1-2):1.
- 7. Dey SK, Ahmed S, Rahman KM, Uddin MJ, Alam MR, Bhattacharjee M, et al. Lipid profile among ischemic and haemorrhagic stroke patients. Mymensingh Med J: MMJ. 2010;19(2):176-80.
- 8. Bansal M, Singh J, Singh TP, Kaur A. An echocardiographic study in patients with non hemorrhagic cerebral infarction to find cardiac abnormalities. Int J Med Dent Sci. 2016;5(2):1171-7.
- Chandrababu Devarapu LS. A prospective study of electrocardiographic and echocardiographic changes in patients with cerebrovascular accidents. Int J Advan Med. 2018;5(4):891.
- Fernandes M, Keerthiraj B, Mahale AR, Kumar A, Dudekula A. Evaluation of carotid arteries in stroke patients using color Doppler sonography: A prospective study conducted in a tertiary care hospital in South India. Int J Applied Basic Med Res. 2016;6(1):38.
- 11. Haq S, Mathur M, Singh J, Kaur N, Sibia RS, Badhan R. Colour Doppler evaluation of extracranial carotid artery in patients presenting with acute ischemic stroke and correlation with various risk factors. J Clin Diagnostic Res: JCDR. 2017;11(3):TC01.

Cite this article as: Saligommula R, Alam KC. Clinical study of 2D Echo cardiography findings in stroke-ischemic patients. Int J Adv Med 2020;7:128-31.