Innovative Journal of Medical and Health Science

IJMHS 9 (12), 697–701 (2019) ISSN (O) 2277:4939 | (P) 2589:9341

A RETROSPECTIVE STUDY ON EFFECTS OF SERUM CHOLESTEROL ON MORTALITY AND MORBIDITY OF STROKE

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DOI: https://doi.org/10.15520/ijmhs.v9i11.272

Reviewed By: Dr. Daniel V.
Department: Medical

ABSTRACT

Introduction:

Stroke or cerebrovascular accident or Intracranial Hemorrhage (ICH) is defined as an abrupt onset of a neurological deficit that is attributable to a focal vascular cause. Stroke is the second leading cause of death worldwide causing 6.2 million deaths in 2011. Relation of high total cholesterol and triglycerides with ischemic heart disease is well established worldwide. High cholesterol level are estimated to cause 56% of ischemic heart disease. However, dyslipidemia as a risk factor for ischemic stroke has been quite controversial in recent times. It has been observed in several studies that higher cholesterol and triglyceride levels are associated with better outcome after ischemic stroke.

Aim:

The purpose of this study is to determine the effects of serum cholesterol on the mortality and morbidity of stroke.

MaterialsandMethod:

We retrospectively included 100 consecutive patients over age 18 with Stroke or cerebrovascular accident or Intracranial Hemorrhage (ICH) who were admitted in Sree Mookambika Institute of Health Sciences, confirmed by CT within 12 hours after onset. Patients with traumatism, brain tumor, previous ICH, hemorrhagic transformation of ischemic stroke, vascular cerebral malformations, and patients who required neurosurgical procedures were excluded. Data was collected with meticulous history, clinical examination with detailed neurological examinations along with appropriate investigations. A structured questionnaire was used to obtain data on family history of diabetes

mellitus, history of hypertension, past and present illness, dietary pattern, addiction and medication. NIH stroke scale (NIHSS) were evaluated at admission. Descriptive and analytical statistics were performed by SPSS version 16.IEC clearance and a written informed consent were obtained from patient or patients attenders. A P value of less than 0.05 was considered statistical significant.

Results:

Out of the 100 patients that were included in the study, the average age was 58.6 ± 12.15. Male to female ratio was 3:1(75:25) which clearly states that men are more prone to develop stroke compared to females. Among the patients who had stroke, risk factors like hypercholesterolemia(75%), hypertension(65%), diabetes mellitus(24%), smoking(40%), alcoholism(40%) were identified. Regarding the stroke severity, 39% of the patients had a minor stroke, 44% had a moderate intensity stroke while 17% of the patient had a severe stoke. A high morbidity rate i.e., 80% was seen in patients who had had high total cholesterol(75%) then compared to patients who had normal lipid profile with a significant p value (<0.02).Only 2 passed away who was also found to have high cholesterol and triglycerides.

Conclusion:

Our study concluded a positive correlation between serum total cholesterol. Thus early detection of dyslipidemia and treatment with drugs along with dietary modifications & lifestyle changes can reduce the risk of stroke.

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Keywords: ICH, Stroke, Total Cholesterol, Cerebrovascular accident

INTRODUCTION

Stroke or cerebrovascular accident or intracranial hemorrhage (ICH) is defined as an abrupt onset of a neurological deficit that is attributable to a focal vascular cause. Stroke is a common disease worldwide resulting in significant morbidity and mortality. It is the second leading cause of death above the age of 60 years and the fifth leading cause in patients aged 15 to 59 years old.1 Globally the number of stroke patients each year is on the rise. According to WHO, up to 15 million people worldwide suffer from stroke each year. Out of these 5 million die and another 5 million are left permanently disabled.

Paradoxically, 80% people who suffer from stroke live in areas of low and mid income countries.2 According to Indian council of Medical research there were 990, 985 case of stroke in India.3

It is difficult to treat and the treatment is still not effective. Prevention is the best option but ability to forecast the stroke is challenging making the detailed study of risk factors essential. The risk factors of stroke include various fixed and modifiable risk factors, notable among them are age, gender, heredity, diabetes mellitus, hypertension, dyslipidemia, smoking, atherosclerosis, excessive intake of alcohol and

other rare causes. There is good evidence that modification of risk factors will reduce the risk of stroke.4

Several clinical trials showed an association between high concentrations of serum cholesterol and ischaemic stroke.5,6 men screened from the multiple risk factor intervention trial.8

MATERIALS AND METHODS:

After obtaining clearance from IEC and consent from patients, we retrospectively included 100 consecutive patients over age 18 with Stroke or cerebrovascular accident or Intra cranial haemmorhage(ICH) who were admitted in Sree Mookambika Institute of Health Sciences from February 2019 to July 2019. ICH was confirmed by CT within 12 hours after onset. Patients with traumatism, brain tumor, previous ICH, hemorrhagic transformation of ischemic stroke, vascular cerebral malformations, and patients who required neurosurgical procedures were excluded. Data was collected with meticulous history, clinical examination with detailed neurological examinations along with appropriate investigations. A structured questionnaire was used to obtain data on family history of diabetes mellitus, history of hypertension, past and present illness, dietary pattern, addiction and medication. Blood samples are collected for CBC, fasting and post prandial blood sugars, HbA1c, and total cholesterol. NIH stroke scale (NIHSS)9 were evaluated at admission. Descriptive and analytical statistics were performed by SPSS version 16.IEC clearance and a written informed consent were obtained from patient or patients attenders. A P value of less than 0.05 was considered statistical significant.

RESULTS:

The demographic data of the patients enrolled are enlisted in Table 2.

Table 2: Patient' characteristics (N = 100)

Variable	%(n)
Age, years(mean)	58.6 ± 12.15
Male: female	75:25(75:25)
Risk Factors	
Hypercholesterolemia	75(75)
Hypertension(HTN)	65(65)
Diabetes Mellitus(DM)	24(24)
Both HTN and DM	15(15)
Smoking	40(40)
Alcoholism	40(40)

Table 3: Correlation between Total Cholesterol and Triglycerides with Morbidity and Mortality of Stroke:

Lipid profile	%(n)	Incidence of morbidity %(n)	Incidence of mortality %(n)
Total Cholesterol			
<200MG/DL	25(25)	48(12)	
>200MG/DL	**75(75)**	80(60)	2.6(2)
P value <0.02 which was significant			

Out of the 100 patients that were included in the study, the average age was 58.6 ± 12.15.Male to female ratio was 3:1(75:25) which clearly states that men are more prone to develop stroke

compared to females. Among the patients who had stroke, risk factors like hypercholesterolemia (75%), hypertension(65%), diabetes mellitus(24%), smoking(40%), alcoholism(40%) were identified. Regarding the stroke severity, 39% of the patients had a minor stroke, 44% had a moderate intensity stroke while 17% of the patient had a severe stoke.

A high morbidity rate i.e., 80% was seen in patients who had had high total cholesterol(75%) then compared to patients who had normal lipid profile with a significant p value (<0.02)

Only 2 passed away who was also found to have high cholesterol.

DISCUSSION:

Stroke is a common neurological emergency presenting to the tertiary care hospitals all over the world. The risk factors and the factors affecting the stroke outcome are still poorly understood and controversial. Approximately 50% of patients are left with permanent disability. Effective risk factor interventions offer a real hope of reducing stroke morbidity and mortality. Certain risk factors have been consistently identified as significant predictor of stroke outcome, while some are less consistent.

The patients in our study group were aged above 18 years with the average age being 58.6 ± 12.15. In a study by Khan et al, the patients were found to be between 45-70 years age and also supported by another study by Sreedhar et al (40-60 yrs).[10,11]

The male to female ratio was 3:1 which clearly states that men are more prone to stroke than women which is supported by Similar results seen in the stroke study done in Nepal by Naik, et al in which, total of 150 stroke patients studied, out of whom 104 males and 46 females with male: female 2.3:1 was observed.[12]

Mumtaz AM, et al in Pakistan, also in their study showed that out of 88 stroke patients, 62 (70.5%) were males and 26 (29.5%) were females.[13]

A high morbidity rate i.e 80% was seen in patients who had had high total cholesterol(75%) respectively then compared to patients who had normal lipid profile with a significant p value (<0.02). In an overview of 10 prospective studies examining the relation between total cholesterol and subsequent stroke, Qizilbash et al concluded that there was a significant association.[14] The Copenhagen City Heart Study18 showed a non-log linear pattern between plasma cholesterol and the risk of ischaemic cerebrovascular disease.[15] The independent risk factors which were identified with stroke were hypertension(64%), diabetes(24%), smoking(40%) and alcoholism(40%). This is in agreement with published data

High serum cholesterol and triglycerides have always been considered as a risk factor for the cardiovascular diseases including the ischemic stroke.[16]

CONCLUSION

Our study concluded a positive correlation between serum total cholesterol. Thus early detection of dyslipidemia and treatment with drugs along with dietary modifications & lifestyle changes can reduce the risk of stroke.

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