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"A Study on Lipoprotein (A) Levels in Ischemic Stroke among Diabetics and Non-Diabetics"

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Abstract : ***Introduction****: Cerebrovascular accident is defined as the abrupt onset of focal neurological deficit. Type 2 diabetes mellitus is a major risk factor. Dyslipidaemia also plays a major role as a risk factor for stroke.* ***Background:*** *Studies in the past have demonstrated that patients with increased lipoprotein (a) and diabetes have an increased risk of stroke. High lipoprotein (a) predicts risk of early atherosclerosis independently of other risk factors including LDL.* ***Objective****: To compare lipoprotein (a) levels in type 2 diabetics and non-diabetic patients with ischaemic stroke.* ***Methods****: Cross sectional, prospective study done at the Institute of Internal Medicine, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai from August 2016 to June 2017. 100 patients with ischaemic stroke were included, with 50 patients who were type 2 diabetics, and 50 patients who were non-diabetics.* ***Results:*** *Total of 100 patients were included in our study. 50 patients had type 2 diabetes and 50 patients were non-diabetic. 62 patients were male and 38 patients were female. The mean age was 57 years, with a range from 42 to 73 years. Lipoprotein (a) values of 15-30 was present in 17 diabetic patients and 27 non-diabetic patients, and a value of 30-50 was present in 33 diabetic patients and 23 non-diabetic patients. This association between lipoprotein (a) value and ischaemic stroke is significant (p value 0.044).*

Keywords *– Lipoprotein (a), Diabetes mellitus, Cerebrovascular accident, Stroke*

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I. Introduction

Stroke is defined as rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting for 24 hours or more, it is the most common neurological disorder worldwide. Stroke is known as cerebrovascular accident (CVA), derived from Greek word which means 'Struck down with violence'[1].Dyslipidaemia, liporprotein (a) and diabetes are risk factors for ischaemic stroke. Lipoprotein (a) has atherogenic and thrombotic properties. This potential of lipoprotein (a) could be increased in diabetes patients.

Atherogenicity of lipoprotein (a) at molecular and cellular level is caused by

- Interference with fibrinolytic system
- Affinity to secretory phospholipase A2
- Interaction with extracellular matrix glycoprotein
- Binding scavenger receptor on macrophage

Lipoprotein (a) is an important factor that links microvascular and macrovascular complications of diabetes mellitus.In previous studies contribution of lipoprotein (a) to enhanced risk of vascular disease in diabetes mellitus population is not clearly defined.

Lipoprotein (a) can promote thrombosis, inflammation and foam cell formation.EPK study already clearly discussed that lipoprotein (a) and risk of CAD and stroke is well established and also added.

Lipoprotein (a) associated with peripheral artery disease, coronary artery disease and ischaemic stroke.

All these previous studies clearly show high lipoprotein (a) is an independent risk factor for the development of cerebral infarctionLp (a) must be measured by uniform methods in future and its involvement in pathogenesis of stroke subtypes is still unsettled.This study evaluates whether the lipoprotein (a) level can serve as a marker of increased risk of ischaemic stroke in patients with type II diabetes mellitus.Whether lipoprotein (a) can act as an early marker or early predictor for worse prognosis in diabetic patients with ischaemic stroke when compared to non-diabetics was unclear. Studies have also shown that high lipoprotein (a) predicts risk of early atherosclerosis independently of other stroke risk factors including LDL cholesterol.

II. Objectives

1. To compare lipoprotein (a) levels among diabetic and non-diabetic patients with ischaemic stroke

III. Methodology

Study design:
Cross sectional, Human subjects, unicenter, cross-sectional prospective study.

Study Centre:
Institute of internal medicine Madras medical college and Rajiv Gandhi government general hospital, Chennai

Study duration:
August 2016 to June 2017

Inclusion criteria:
1. Patients with stroke diagnosed clinically and proven radiologically
2. Age above 40 years

Exclusion criteria:
1. Patients with haemorrhagic stroke
2. Patients with cardio-embolic stroke
3. Patients with liver disease
4. Patients with smoking and alcoholism
5. Patients taking anti-epileptic drugs

Sample size:
Total of 100 patients – 50 with diabetes mellitus, and 50 without diabetes mellitus

Methodology:
Study was conducted in 100 patients of ischaemic stroke (CT proven). Subjects were divided into two groups – 50 patients with type II diabetes and 50 patients without diabetes. Patients are subjected to routine blood investigations, CBC, RFT, LFT, and fasting lipid profile, lipoprotein (a), fasting blood sugar, HbA1C, CT brain.

Observations:
In our study, among 100 patients, the mean age was 57.06, with a range from 42 to 73 years. As age increases the risk of stroke also increases (p value 0.05). 62 patients were male and 38 patients were female. 51 patients were smokers and 49 patients were non-smokers. 34 patients were alcoholics and 66 patients were non-alcoholic

		Type II diabetic		Non-diabetic	
		Count	**Table %**	**Count**	**Table %**
Sex	**Male**	32	32.0%	30	30.0%
	Female	18	18.0%	20	20.0%
Smoker	**Yes**	25	25.0%	26	26.0%
	No	25	25.0%	24	24.0%
Alcoholic	**Yes**	20	20.0%	14	14.0%
	No	30	30.0%	36	36.0%

The association between lipoprotein (a) and ischaemic stroke is significant (p value 0.044)

		Type II diabetic	**Non-diabetic**	**Total**
Lipoprotein (a) value	<14	0	0	0
	15-30	17	27	44
	30-50	33	23	56
	>50	0	0	0
Total		50	50	100

IV. Results

In our study, 100 patients were considered who had ischaemic stroke, with 50 patients who were diabetic and 50 patients who were non-diabetic. The study population was predominantly male (n=62) with an age range from 42 to 73 years, and a mean age of 57.06 years. There were approximately equal numbers of

smokers and non-smokers in both groups, and 34 patients were alcoholics while 66 patients were not. The lipoprotein (a) levels were higher in patients with type 2 diabetes who developed stroke than for patients without diabetes who developed stroke, and this association was found to be statistically significant (p value 0.044).

V. Conclusion

1. In our study, a significant association of lipoprotein (a) concentration with ischaemic stroke was inferred (p value 0.044)
2. Increased levels of lipoprotein (a) in type II diabetic patients was found to have increased predilection to ischaemic stroke when compared to non-diabetics

LIMITATIONS

1. Sample size of the study was small with only 100 patients with ischaemic stroke
2. Controls were matched only for age and sex and not for other risk factors which would have been ideal
3. Seriously ill patients admitted in intensive care units were not included in this study due to difficulty in obtaining consent. This might have led to selection bias.

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