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Role of Triglycerides, VLDL and Smokingin Non-diabetic Stroke

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Abstract
Background: *Stroke is an acute neurological injury which occurs due to vascular pathology with many modifiable risk factors,dyslipidemia being one of them. In this study lipid profile was studied in non-diabetic patients with stroke, because diabetes itself is associated with hyperlipidemia.*
Materials And Methods: *The study was conducted on 60 non-diabetic stroke patients and 60 age and sex matched controls who did not have stroke,after obtaining consent.*
Results: *The study shows the effect of Triglycerides, VLDL and Smoking on stroke.*
Conclusion: *This study showed significant association of Triglycerides and VLDL in non-diabetics with stroke. High levels of Triglycerides and VLDL were associated with a higher level of stroke.And smoking is associated with a higher level of stroke.*
Keywords*: cholesterol, diabetes mellitus, dyslipidemia, smoking, stroke, triglycerides.*

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I. Introduction

Stroke is characterized by acute onset of focal neurological deficit due to a cerebral vascular pathology, which persists beyond 24 hours. Focal deficit which is usually a hemiplegia can also involve higher functions (like speech, memory) along with sensory loss, visual field defect or a brainstem deficit[1]. Stroke is a medical emergency. Stroke is caused by 2 major mechanisms: ischemia and hemorrhage.

Ischemia constitutes 80% of the total stroke. It is due to diminished or absent blood supply to the neurons resulting in deprivation of essential substances to neurons. Ischemic damage is rapid because brain has no glucose stores. Glucose is the chief source of energy metabolism and brain is not able to metabolize glucose anaerobically. Intracerebral hemorrhage constitutes 10-15% of all strokes. Bleeding originates from deep penetrating vessels and leading to pressure effects and disruption of connecting pathways. Also certain biochemical substances may cause tissue damage by different mechanisms.The risk factors of stroke have been identified[2]. Ischemic stroke is common in males with a ratio of 3.2:1 in ischemic stroke[3]. The modification of risk factors in stroke has decreased both mortality and morbidity of stroke remarkably in the last 30 years[4]. Age, smoking, hypertension are some other risk factors for stroke. Dyslipidemia is a major risk factor for stroke. It is a correctable risk factor.It has been shown that reduction of triglycerides and VLDL has decreased the incidence of stroke.

In our study lipid profile(Triglycerides and VLDL) and Smoking was studied in non-diabetics with stroke. Diabetes itself is associated with hyperlipidemia and increases atherosclerosis which makes it an undisputable risk factor for stroke. The atherogenecity of diabetics and non-diabetics is different. So non-diabetic patients were included in the study. TIA occurs when all neurological signs and symptoms resolve within 24 hours regardless of whether permanent brain injury is present. If the ischemia last more than 24 hours but less than 7 days, Reversible Ischemic Neurologic Deficit occur.

Aim of the Study
To study the effect of VLDL, Triglycerides and Smoking in Non-diabetics with stroke.

II. Materials and Methods

This is a Case Control Study conducted over a period of six months at Kilpauk medical college, Chennai.
Detailed history was taken.Clinical examination,radiological examination was done.Serum Triglycerides and VLDL were estimated by enzymatic method. Smoking history is noted.

INCLUSION CRITERIA**:**
All patients with infarct in CT Brain.

EXLUSION CRITERIA:
Patients with diabetes mellitus.
Patients with drugs for dyslipidemia.
Patients on dietary modification for dyslipidemia.
Cerebral infarct associated with trauma or tumor.

III. Results and Analysis

The study was conducted over a period of six months at Kilpauk Medical College, Chennai.

- The data also shows association of non-diabetics with stroke and control with VLDL cholesterol[5]. 56.7% of non-diabetics showed VLDL>30. 43.3%of patients showed VLDL >30. In control group 86.7% had VLDL <30 and 13.3% of control had VLDL more than or equal to 30. Significance calculated was 0.000 $p<0.001$ which is highly significant.
- The data shows association of non-diabetics with stroke and their controls with triglycerides [6]. 58.3% of non-diabetics with stroke had normal triglycerides and 41.7% of non-diabetics had elevated triglycerides. In control group 86.7% had normal triglycerides and 13.3% had elevated triglycerides. The significance calculated was 0.002($p<0.05$)which is significant.
- The date shows association between non-diabetics with stroke and their control with smoking. In non-diabetics with stroke, smokers constituted 23.3% and control group had no smokers. The significance was 0.000 ($p<0.001$) and is highly significant.

IV. Discussion

Dyslipidemia is a modifiable risk factor for stroke. Increased age, Male sex are associated with dyslipidemia. Dyslipidemia is associated with 1.8 – 2.6 times the relative risk of stroke. Fasting Lipid Profile provides a better guide to treatment of dyslipidemia.

Diet consists of saturated fat < 7% of total calories, Monounsaturated fat up-to 20% of total calories, Polyunsaturated fat up-too 10% of total calories, Cholesterol content less than 200mg/dl.

From the above study, it is inferred that increase in Triglycerides and VLDL are associated with an increase in risk of stroke, and smoking is associated with an increase in risk of stroke.

V. Conclusion

Our study was conducted on 60 non diabetic stroke patients and 60 controls. Exclusion of diabetic patients was done because diabetes is associated with hyperlipidemia and atherosclerosis.

This study showed significant association of Triglycerides and VLDL in non-diabetics with stroke. High levels of Triglycerides and VLDL were associated with a higher level of stroke and smoking is associated with a higher level of stroke.

Dyslipidemia is a tip of an iceberg. The hidden cases are to be diagnosed and treated. Dyslipidemia if properly treated can reduce the incidence of stroke[3] thereby reducing the morbidity and mortality of stroke leading to a healthier society.

Smoking cessation is imperative for decreasing stroke risk.

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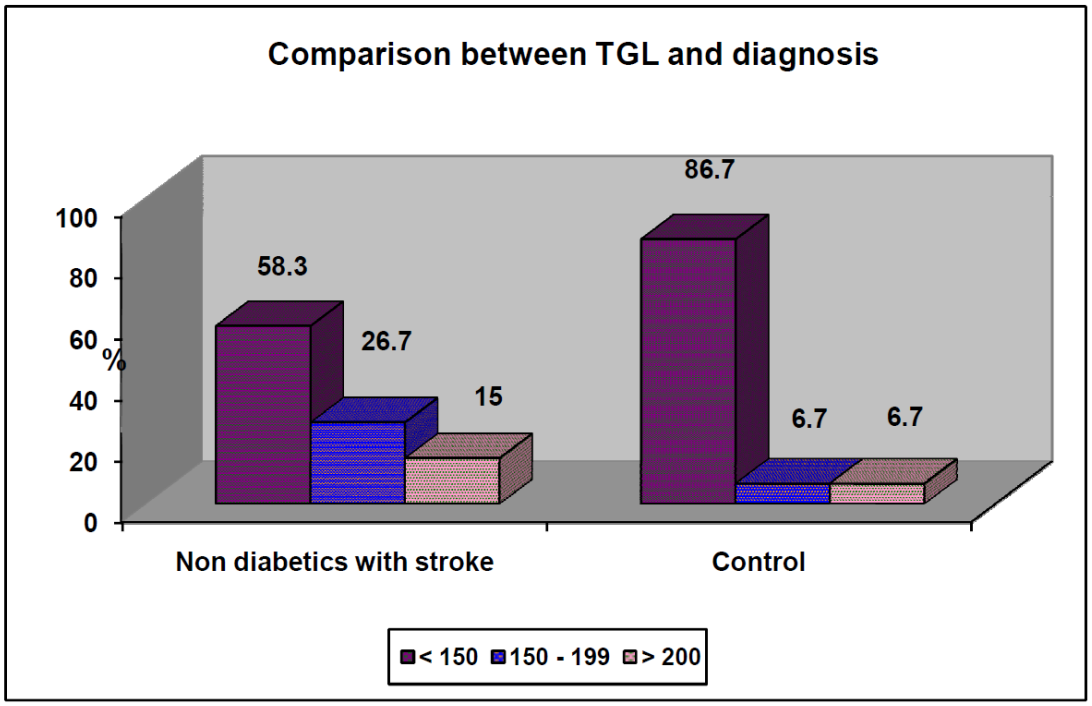
Triglycerides
Tables and Charts

			Diagnosis		
			Non Diabetics with stroke	Control	Total
TGL	< 150	Count	35	52	87
		% within Diagnosis	58.3%	86.7%	72.5%
	150 - 199	Count	16	4	20
		% within Diagnosis	26.7%	6.7%	16.7%
	>_ 200	Count	9	4	13
		% within Diagnosis	15.0%	6.7%	10.8%
Total		Count	60	60	120
		% within Diagnosis	100.0%	100.0%	100.0%

CHI-SQUARE TESTS

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.445[a]	2	.002
Likelihood Ratio	13.027	2	.001
Linear-by-Linear Association	8.828	1	.003
N of Valid Cases	120		

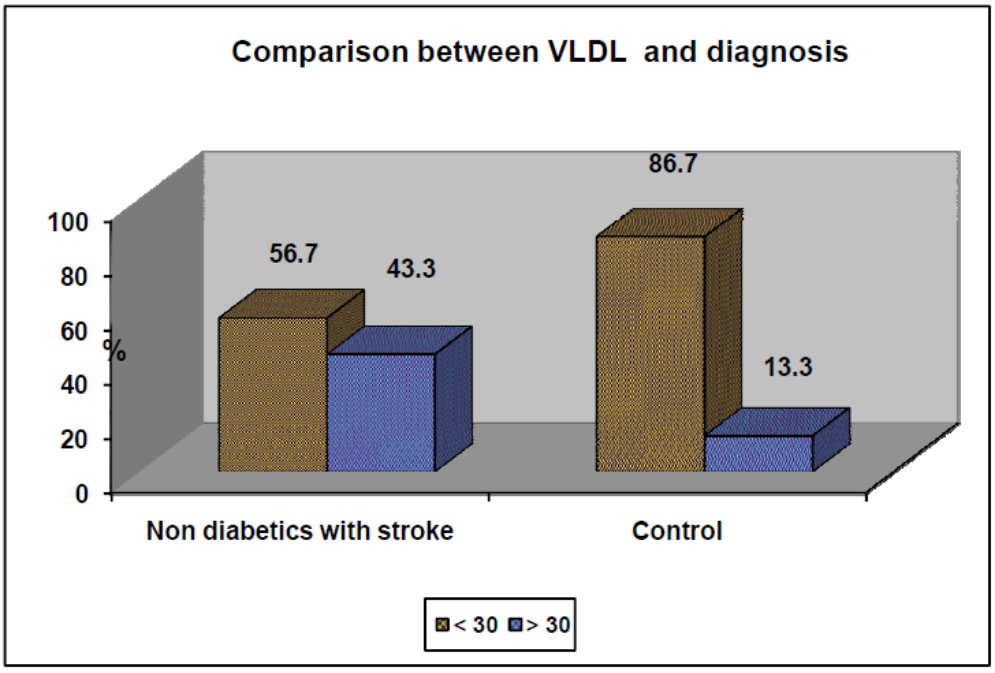


VLDL

Crosstab

			Diagnosis		
			Non Diabetics with stroke	Control	Total
VLDL	< 30	Count	34	52	86
		% within Diagnosis	56.7%	86.7%	71.7%
	>_ 30	Count	26	8	34
		% within Diagnosis	43.3%	13.3%	28.3%
Total		Count	60	60	120
		% within Diagnosis	100.0%	100.0%	100.0%

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13.297[b]	1	.000		
Continuity Correctio	11.860	1	.001		
Likelihood Ratio	13.829	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	13.186	1	.000		
N of Valid Cases	120				

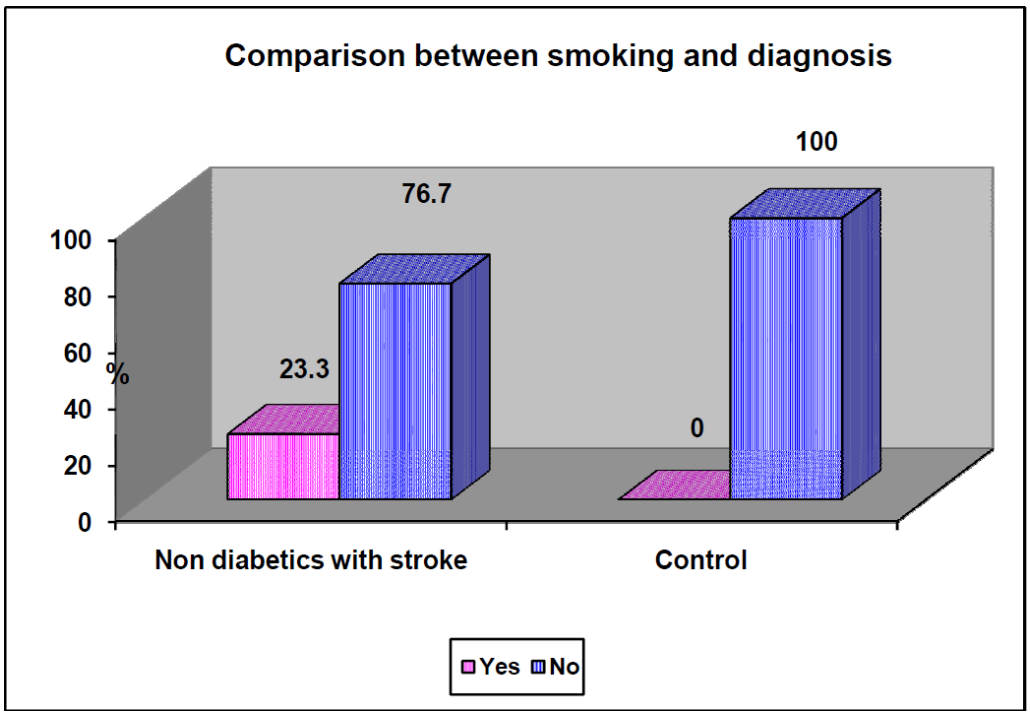


Smoking

			Diagnosis		
			Non Diabetics with stroke	Control	Total
Smoking	Yes	Count	14	0	14
		% within Diagnosis	23.3%	.0%	11.7%
	No	Count	46	60	106
		% within Diagnosis	76.7%	100.0%	88.3%
Total		Count	60	60	120
		% within Diagnosis	100.0%	100.0%	100.0%

CHI SQUARE TESTS

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.849[b]	1	.000		
Continuity Correction[a]	13.666	1	.000		
Likelihood Ratio	21.263	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.717	1	.000		
N of Valid Cases	120				



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