ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Original Article

A study of correlation between serum triglyceride levels and severity of stroke in patients admitted in a rural teaching Hospital, Sangareddy.

Sravani Kolli[1*], Nagababu Pyadala[2], Imtijungla T Ozukum [3]

1. Assistant Professor, Department of Biochemistry, Bhaskar Medical College, Ranga Reddy district, Hyderabad, Telangana- 500075.
2. Professor, Department of Biochemistry, MNR Medical College & Hospital, Sangareddy, Telangana-502294.
3. Assistant Professor, Department of Obstetrics and Gynaecology, MNR College of Nursing, Sangareddy, Telangana-502294.

- **Corresponding Author:**
Dr. Sravani Kolli,
Assistant Professor,
Department of Biochemistry,
Bhaskar Medical College,
Ranga Reddy district,
Telangana.

Abstract:

Background: Worldwide, stroke is one of the leading causes of morbidity and mortality, representing burden on public health, particularly in developed and developing nations like India. **Aim:** The present study was aimed to investigate the significance of serum triglycerides levels among stroke patients admitted in a rural teaching hospital and additionally, aimed to explore the severity of stroke with serum triglycerides levels. **Materials and Methods:** The present study was carried out at MNR Medical college & Hospital situated in sangareddy, Telangana. A total of 60 patients presenting with acute ischemic stroke, occurring within 24 hours, confirmed by CT scan admitted in medicine ward, during the period between august 2022 to July 2024. **Results:** The total number of patients was 60 of which 35 were males and 25 were females. Of the 60 patients 27 were aged ≥65 years and the rest were below 65 years of age. In this study the number of patients with severe stroke were 22 of which 21 had TG≤2.3mmol/l and only 1 patient had

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

TG>2.3mmol/l while those with mild to moderate stroke were 38 of which 28 had TG≤2.3mmol/l and 10 patients had TG>2.3mmol/l. The mean triglyceride level amongst the patients was found to be 1.56 ±0.86mmol/l. But the mean triglyceride levels amongst patients with severe stroke was found to be 1.002+/-0.385 mmol/l and that in patients with mild to moderate stroke was 1.790+/-0.887 mmol/l. There is a statistically significant difference between TG levels which are associated with lower and higher values of SSS (severe and mild to moderate stroke respectively) with p value being 0.00006.**Conclusion:** In this study, mean serum triglyceride levels were significantly lower in patients with severe stroke when compared to the levels in patients with mild to moderate stroke.

Key Words: Stroke, Triglyceride, Scandinavian stroke scale, Diabetes mellitus.

Introduction:

Worldwide, stroke is one of the leading cause of morbidity and mortality, representing burden on public health, particularly in developed and developing nations like India [1-3]. According to the Horton et al., 2011 life expectancy among Indians increased to over 60 years of age, leading to an increase in age- related, non- communicable diseases [4-7].

In recent years, India has experienced a rise in stroke incidence due to increased prevalence of non- communicable diseases, inadequate health care access and lifestyle changes. According to report published by directorate general of health services 2019, stroke was India's fifth leading cause of disability and fourth leading cause of death [8].

Strokes can be categorized into Ischemic and Hemorrhagic strokes. Among all the cases ischemic strokes is the most common type, accounts for about 87% of all strokes [1,3] and risk factors includes Diabetes mellitus, high blood pressure, obesity, smoking and hyperlipidemia. According to reports published the role of elevated total cholesterol and low-density lipoprotein cholesterol (LDL-C) and low levels of High - density lipoprotein cholesterol (HDL-C) in the pathogenesis of ischemic stroke. Among lipids triglycerides are a type of fat found in the blood. However the relationship between serum triglycerides in stroke pathogenesis remains a subject on debate and also not fully understood, especially among Indian population [9-12]. So the present study was aimed to investigate the significance of serum triglycerides levels among stroke patients admitted in a rural teaching hospital and additionally, aimed to explore the severity of stroke with serum triglycerides levels.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Materials and Methods:

The present study was carried out at MNR Medical college & Hospital (700 bedded teaching hospital catering to rural population) situated in sangareddy, Telangana. A total of 60 patients presenting with acute ischemic stroke, occurring within 24 hours, confirmed by CT scan admitted in medicine ward, during the period between august 2022 to July 2024. This study was approved by institutional ethical committee and investigations were carried out in the biochemistry laboratory, MNR Medical College & Hospital, Sangareddy.

Inclusion Criteria:

Patients with first ever ischemic stroke occurring within 24 hours, confirmed by CT scan, admitted in MNR Hospital.

Exclusion Criteria:

- Patients admitted to the hospital > 24 hours after stroke onset.
- Previous history of stroke
- Previous history of transient ischemic attack
- Haemorrhagic stroke
- Patients with space occupying lesions
- Patients with CVT

Method of Collection of Data:

ACT scan head (MRI brain where required) was taken within 24 hours after stroke onset for all patients with first ever stroke admitted in MNR Hospital, Sangareddy. Stroke severity on admission was assessed using Scandinavian stroke scale (SSS). The patients were divided into 2 groups: those with severe stroke (SSS < 25) and those with mild/moderate stroke (SSS >25). Were Arterial hypertension was diagnosed when at least 2 readings of blood pressure 140 mm Hg (systolic) or 90 mm Hg (diastolic) after the acute phase of stroke. Ischemic heart disease was diagnosed when a history of angina pectoris or myocardial infarction was present. Diabetes mellitus was diagnosed if its presence was documented in medical records or if the patient is taking insulin or oral hypoglycaemic agents or if plasma glucose is 126 mg/dl or greater after an overnight fast or if the patient has symptoms of diabetes mellitus and a random plasma glucose of 200mg/dl or greater, or if oral glucose tolerance test with plasma glucose of 200mg/dl or greater at 2 hours after 75g of glucose

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

load. A patient was defined as a smoker if there is a history of cigarette/beedi smoking during the past 5 years. Abdominal obesity was diagnosed if the waist circumference was >102 cm in men and >88 cm in women. In addition to routine investigations as per standard protocol in the evaluation of stroke patient, fasting serum triglyceride level and total cholesterol were measured between 12 and 36 hours after stroke onset using commercially available kits [13-17]. Hypertriglyceridemia was diagnosed if TG >2.3 mmol/l.

Statistical Analysis:

The data was entered into Microsoft Excel and statistical analysis was done using SPSS Software. The mean levels of triglyceride levels are correlated with severity of stroke. Relevant statistical methods were applied like 'X2' test and student't' test to see the significant difference in mean values between groups and to know the correlation between inter and intra group variations. Level of significance was set at p-value < 0.05. A p-value less than 0.05 were considered as the minimum value for statistical significance.

Results:

The total number of patients in present included in present study was 60 with an age range of 40 years to 84 years. The patients were divided into 2 groups: those with severe stroke (SSS ≤25) and those with mild/moderate stroke (SSS >25). Fasting serum TG levels were estimated in each patient. The total number of patients studied was 60 of which 35 were males and 25 were females. Of the 60 patients 27 were aged ≥65 years and the rest were below 65 years of age as shown in table 1.

Table 1: Association between triglycerides levels with age.

	Triglycerides levels (mmol/L)			
Age	<2.3 mmol/L	>2.3 mmol/L	Total	X^2 value
<65	27	6	33	0.001
>65	22	5	27	
Total	49	11	60	

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

The number of patient's <65 years were 33 of which 27 had triglycerides <2.3 mmol/L and 6 patients had triglycerides <2.3 mmol/L. A total number of patient's in the age group >65 were 27 of which 22 had <2.3 mmol/L and 5 patients had >2.3 mmol/L (shown in table 1).

Table 2: Statistical analysis for significance of the TG levels associated with SSS ≤25 and SSS >25

TG levels Associated with SSS ≤25 Mean +/- SD	TG levels Associated with SSS >25 Mean +/- SD	T-Value	P- Value
1.002+/-0.385 mmol/l	1.790+/-0.887 mmol/l	4.97	0.00006

* SSS: Scandinavian stroke scale

The mean of TG levels in patients with severe stroke is 1.002+/-0.385 mmol/l and that in patients with mild to moderate stroke is 1.790+/-0.887mmol/l. There is a statistically significant difference between TG levels which are associated with lower and higher values of SSS (severe and mild to moderate stroke) as shown in table 2.

Discussion:

The present study involved 60 patients of acute ischemic stroke. The mean triglyceride levels amongst them are 1.56 ±0.86mmol/l. But the mean triglyceride levels amongst patients with severe stroke (SSS≤25) was found to be 1.002+/-0.385 mmol/l and that in patients with mild to moderate stroke (SSS>25) was 1.790+/-0.887 mmol/l. There is a statistically significant difference between TG levels which are associated with lower and higher values of SSS (severe and mild to moderate stroke respectively) with p value being 0.00006. Tomasz Dziedzic, Agnieszka Slowik and others in their study on 863 patients with acute ischemic stroke found that lower serum triglyceride levels are seen in patients with severe stroke than in patients with mild/moderate stroke (1.4±0.6 versus 1.7±1.3 mmol/l). They concluded that patients with triglyceride >2.3 mmol/l had lower risk of severe stroke than those with triglyceride ≤2.3 mmol/l (OR: 0.58; 95% CI: 0.35 to 0.95) after adjusting for

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

age, gender, atrial fibrillation, diabetes mellitus, obesity, and ischemic heart disease [18]. Another study consisting of 121 consecutive acute ischemic stroke patients have showed that a lower infarct volume (p=0.014) in association with higher (>1.70 mmol/l) fasting serum triglyceride levels (within 24 h after admission) [19].

Conclusion: In this study, mean serum triglyceride levels were significantly lower in patients with severe stroke when compared to the levels in patients with mild to moderate stroke. As per this study smoking, obesity, hypertension, diabetes mellitus, age and gender of an individual do not influence levels of serum triglyceride levels.

Reference:

1. Feigin VL, Forouzanfar MH, Krishnamurthi R, et al. Global and regional burden of stroke during 1990–2010: findings from the Global Burden of Disease Study 2010. Lancet 2014; 383: 245–255.
2. Jones SP, Baqai K, Clegg A, Georgiou R, Harris C, Holland EJ, et al. Stroke in India: A systematic review of the incidence, prevalence, and case fatality. Int J Stroke. 2022;17(2):132- 40.
3. Kalita J, Bharadwaz MP, Aditi A. Prevalence, contributing factors, and economic implications of strokes among older adults: a study of North-East India. Sci Rep. 2023;13(1):16880.
4. Horton R and Das P. Indian health: the path from crisis to progress. Lancet 2011; 15: 181–183.
5. Sulaja S. Old age mortality in India? An exploration from life expectancy at age 60. Int J Asian Social Sci 2016; 6: 698–704.
6. Dalal P, Bhattacharjee M, Vairale J and Bhat P. UN millennium development goals: can we halt the stroke epidemic in India? Ann Ind Acad Neurol 2007; 10: 130.
7. Naik KR. Challenges in delivering stroke care in India. Ind J Health Sci Biomed Res (KLEU) 2016; 9: 245–246.
8. Directorate General of Health Services: Ministry of Health and Family Welfare. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Diseases and Stroke. Government of India 2019, July 13, https://main.mohfw.gov.in/MajorProgrammes/non-communicable-diseases-injury-trauma/ Non-Communicable-Disease-II/National-Programmefor-Prevention-and-Control-of-Cancer-DiabetesCardiovascular-diseases-and-Stroke-NPCDCS (2019, accessed 21 September 2020).

9. Kamalakannan S, Gudlavalleti ASV, Gudlavalleti VSM, et al. Incidence and prevalence of stroke in India: A systematic review. Indian J Med Res. 2017;146:175-85.

10. Akhtar N, Singh R, Kamran S, Joseph S, Morgan D, Uy RT, et al. Association between serum triglycerides and stroke type, severity, and prognosis. Analysis in 6558 patients. BMC Neurol. 2024;24(1):88. doi: 10.1186/s12883-0 24-03572-9.

11. Asia Pacific Cohort Studies Collaboration. Serum triglycerides as a risk factor for cardiovascular diseases in the Asia-Pacific region. Circulation. 2004;110:2678-86.
12. Patel AP, Wang M, Kartoun U, Ng K, Khera AV. Quantifying and understanding the higher risk of atherosclerotic cardiovascular disease among South Asian individuals. Circulation. 2021;144:410-22.
13. Pyadala N, Bobbiti RR, Kesamneni R, Borugadda R, Kumar R. B. N, R. Vijayaraghavan, Rathnagiri Polavarapu. Association of Glycosylated hemoglobin and Lipid profile levels among Type 2 diabetic patients in Sangareddy. Research Journal of Pharmaceutical, biological and chemical Sciences. 2016;7(5):2849.
14. Pyadala N, Bobbiti RR, Borugadda R, Bitinti S, Maity SN, Mallepaddi PC, Polavarapu R. Assessment of lipid profile among hypertensive patients attending to a rural teaching hospital, Sangareddy. Int J Med Sci Public Health 2017;6:71-74
15. Sujaya Raghavendra, Tarun Kumar Dutta, Tumbanatham A, K R Sethuraman, K Jayasingh, Nagababu Pyadala. Fasting and postprandial lipid profile in type 2 diabetes mellitus: a comparative study. International Journal of Contemporary Medicine Surgery and Radiology. 2018;3(1):161-165.
16. Bandi A, Pyadala N, Srivani N, Borugadda R, Maity SN, Ravi Kumar BN, Polavarapu R. A comparative assessment of thyroid hormones and lipid profile among

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

hypothyroid patients: A hospital based case control study. IAIM, 2016; 3(9): 108-114.

17. Dundi VD, Pyadala N, Polavarapu R. Assessment of liver dysfunction among type 2 diabetic patients attending to a rural teaching hospital. J Biotechnol Biochem. 2018;4(4):1-4.

18. Tomasz D, Agnieszka S, Elzbieta AG, Szczudlik A. Lower serum triglyceride level is associated with increased stroke severity. Stroke 2004;35:e151-e152.

19. Pikija S, Milevcić D, Trkulja V, Kidemet-Piskac S, Pavlicek I, Sokol N. Higher serum triglyceride level in patients with acute ischemic stroke is associated with lower infarct volume on CT brain scans. Eur Neurol. 2016;55(2):89-92.