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DYSLIPIDEMIA IN ELDERLY PATIENTS WITH CEREBROVASCULAR ACCIDENTS: A CROSS-SECTIONAL STUDY.

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ABSTRACT

Background

Dyslipidemia is a significant risk factor for cerebrovascular accidents (CVA), especially among the elderly, due to age-related metabolic changes. This demographic is more vulnerable to lipid abnormalities, which increase the risk and severity of ischemic strokes. Despite established guidelines, dyslipidemia remains poorly controlled in elderly populations, underlining the need for targeted lipid management. This study aimed to examine the prevalence of dyslipidemia in elderly CVA patients.

Methods

A study was conducted at MGM Institute of Health Sciences, Navi Mumbai, over 1.5 years, involving 150 elderly CVA patients. Participants underwent lipid profile assessments, and data were collected on demographic, clinical, and lifestyle factors. Statistical analyses were performed using SPSS version 22.0, with chi-square tests and logistic regression applied to determine associations between dyslipidemia and risk factors.

Results

Of the 150 participants, 74.7% had dyslipidemia, with high LDL levels in 60% and low HDL levels in 70.7% of cases. Dyslipidemia was significantly associated with hypertension (OR 2.58, $p < 0.01$) and diabetes (OR 1.98, $p = 0.02$). Patients with severe CVA had significantly higher LDL and total cholesterol levels than those with milder CVA presentations ($p < 0.05$).

Conclusion

The study reveals a high prevalence of dyslipidemia in elderly CVA patients, particularly among those with hypertension and diabetes. Dyslipidemia is associated with increased CVA severity, suggesting that lipid abnormalities may exacerbate stroke outcomes in elderly individuals.

Recommendations

Regular lipid screenings and targeted lipid management should be prioritized in elderly patients with CVA, especially those with hypertension and diabetes. Implementing effective lipid management strategies may reduce morbidity and improve outcomes in this high-risk population.

Keywords: *Dyslipidemia, Elderly, Cerebrovascular Accident, Hypertension, Diabetes, Lipid Management*
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INTRODUCTION

Dyslipidemia, a common metabolic disorder characterized by abnormal lipid levels, is a well-established risk factor for cardiovascular diseases (CVD) and cerebrovascular accidents (CVA), especially in elderly populations. The aging process is associated with metabolic changes that predispose individuals to lipid abnormalities, which can significantly increase the risk of ischemic stroke and other cerebrovascular events [1]. Elderly patients, in particular, are more vulnerable to dyslipidemia due to factors such as decreased physical activity, increased comorbidities, and changes in lipid metabolism [2]. This underscores the importance of understanding lipid profile patterns among elderly CVA patients and addressing modifiable risk factors to improve outcomes.

Dyslipidemia contributes to atherogenesis, where the buildup of fatty deposits narrows blood vessels and impedes blood flow, which is a primary mechanism for ischemic stroke [3]. High low-density lipoprotein (LDL) and low high-density lipoprotein (HDL) levels are particularly linked to stroke risk, as they accelerate atherosclerosis and impair vascular health [4]. Additionally, elevated triglycerides are increasingly recognized as an independent risk factor for CVA, contributing to pro-inflammatory and pro-thrombotic pathways [5]. Studies in recent years have reinforced the role of lipid abnormalities in recurrent strokes, emphasizing the need for targeted lipid management in stroke prevention protocols [6].

Aging societies globally are experiencing a higher incidence of CVA, and managing dyslipidemia in elderly

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patients is now a crucial element of stroke prevention strategies [7]. Despite established guidelines for lipid management, dyslipidemia remains poorly controlled in elderly populations, primarily due to limited access to regular lipid screenings and potential undertreatment (8). Effective management of dyslipidemia in elderly stroke patients may significantly reduce morbidity and mortality rates, as well as improve quality of life.

This study aims to investigate the prevalence of dyslipidemia among elderly CVA patients.

METHODOLOGY

Study Design

A prospective cross-sectional study.

Study Setting

The study was conducted at Mahatma Gandhi Mission Institute of Health Sciences (MGM IHS), Navi Mumbai, over a duration of 1.5 years (April 2022 to October 2024).

Participants

A total of 150 elderly patients diagnosed with CVA were included in the study.

Inclusion Criteria

- Patients aged 60 years and above.
- Diagnosed cases of cerebrovascular accidents.
- Willingness to participate in the study with informed consent.

Exclusion Criteria

- Individuals with pre-existing lipid disorders unrelated to CVA.
- Patients with severe comorbid conditions that could impact lipid metabolism, such as advanced renal or hepatic disease.

Bias

To minimize selection bias, participants were consecutively selected as they presented at the hospital. Efforts were made to standardize data collection and avoid interviewer or measurement bias.

Variables

Variables included age, sex, medical history, lifestyle factors (e.g., smoking, alcohol use), and medications, lipid profile parameters, including total cholesterol, LDL, HDL, and triglycerides levels.

Data Collection

Data were collected through a combination of patient interviews, medical records, and laboratory reports. Lipid profiles were measured for each participant at the time of diagnosis and periodically as per clinical guidelines.

Procedure

Upon obtaining informed consent, participants underwent a thorough clinical examination and their medical history was recorded. Blood samples were collected to analyze lipid profiles. Data on potential risk factors and other relevant medical information were also gathered.

Statistical Analysis

Statistical analysis was performed using SPSS software, version 22.0. Descriptive statistics, including mean and standard deviation, were calculated for continuous variables, while categorical variables were summarized as frequencies and percentages. Inferential statistics were used to assess associations between dyslipidemia and demographic or clinical variables, with significance set at $p < 0.05$.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

RESULTS

This study examined 150 elderly patients with cerebrovascular accidents (CVA) to assess the prevalence and patterns of dyslipidemia. The results are organized by patient demographics, lipid profile distributions, and correlations between dyslipidemia and risk factors.

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Table 1. Demographics and Clinical Characteristics

Characteristics	N	Percentage (%)
Age (mean ± SD)	-	71.4 ± 5.9
Male	88	58.7
Female	62	41.3
Smoking History	39	26.0
Clinical Characteristics		
- Hypertension	95	63.3
- Diabetes Mellitus	64	42.7

Table 2. Lipid Profile Distributions

Lipid Parameter	Mean (mg/dL)	SD	% with Abnormal Levels
Total Cholesterol	210.3	38.7	53.3
LDL Cholesterol	136.5	31.2	60.0
HDL Cholesterol	42.1	10.5	70.7 (low HDL)
Triglycerides	174.6	45.3	46.0

Among the 150 patients, the mean age was 71.4 years (SD = 5.9), with a range from 60 to 85 years. There were 88 males (58.7%) and 62 females (41.3%). A history of hypertension was noted in 63.3% of patients, while 42.7% had diabetes mellitus, and 26.0% were smokers.

The lipid profiles of patients were evaluated based on total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglycerides. The mean values for each lipid parameter are presented below, along with the proportion of patients with abnormal levels based on clinical dyslipidemia cutoffs.

Out of the 150 participants, 112 patients (74.7%) had at least one abnormal lipid parameter, meeting the criteria for dyslipidemia. The distribution of dyslipidemia patterns is shown in Table 3.

Table 3. Prevalence of Dyslipidemia

Dyslipidemia Type	n	Percentage (%)
Isolated High LDL	27	18.0
Isolated Low HDL	15	10.0
Hypertriglyceridemia	22	14.7
Mixed Dyslipidemia (High LDL + Low HDL)	32	21.3
Mixed Dyslipidemia (High LDL + Hypertriglyceridemia)	16	10.7
Mixed Dyslipidemia (High LDL + Low HDL + Hypertriglyceridemia)	14	9.3

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Table 4. Association Between Dyslipidemia and Risk Factors

Risk Factor	Crude Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (>70 years)	1.25	0.73–2.13	0.25
Male	1.12	0.65–1.91	0.55
Hypertension	2.58	1.44–4.61	0.001
Diabetes Mellitus	1.98	1.10–3.56	0.02
Smoking History	1.35	0.78–2.31	0.19

Table 5. Lipid Levels and CVA Severity

CVA Severity	n	Total Cholesterol (Mean ± SD)	LDL (Mean ± SD)	p-value
Mild	48	192.5 ± 32.1	124.4 ± 28.3	0.03
Moderate	62	213.8 ± 36.5	137.2 ± 29.8	0.01
Severe	40	225.1 ± 42.2	145.6 ± 33.1	<0.01

The relationship between dyslipidemia and various risk factors (age, sex, hypertension, diabetes, and smoking) was assessed using chi-square tests and logistic regression analysis. Statistically significant associations were found between dyslipidemia and hypertension, as well as dyslipidemia and diabetes mellitus ($p < 0.05$).

The severity of CVA, classified as mild, moderate, or severe based on clinical criteria, showed a correlation with lipid profile abnormalities. Patients with severe CVA had significantly higher mean levels of LDL and total cholesterol compared to those with mild and moderate CVA (ANOVA, $p < 0.05$).

DISCUSSION

The study involved 150 elderly patients diagnosed with cerebrovascular accidents (CVA), with a mean age of 71.4 years (SD = 5.9). The cohort consisted of 58.7% males and 41.3% females. Common comorbidities included hypertension (63.3%) and diabetes mellitus (42.7%), both of which have established associations with dyslipidemia and CVA outcomes. A history of smoking was observed in 26.0% of participants.

The lipid profile analysis revealed that 74.7% of participants had at least one abnormal lipid parameter, indicating a high prevalence of dyslipidemia in this population. Total cholesterol levels were elevated in 53.3% of patients, LDL levels in 60.0%, and HDL levels were low in 70.7% of participants. Triglycerides were elevated in 46.0% of the sample. These findings suggest that dyslipidemia, particularly high LDL and low HDL, is prevalent among elderly CVA patients, potentially contributing to the recurrence or severity of CVAs.

When examining the types of dyslipidemia, the most common patterns were isolated high LDL (18.0%), low HDL (10.0%), and hypertriglyceridemia (14.7%). Mixed dyslipidemia, particularly high LDL combined with low HDL or elevated triglycerides, was present in 51.3% of the cases, emphasizing the complexity of lipid abnormalities in these patients.

Risk factor analysis revealed a significant association between dyslipidemia and hypertension ($p < 0.01$), with hypertensive patients having 2.58 times the odds of developing dyslipidemia compared to non-hypertensive patients. Similarly, diabetes mellitus was also significantly associated with dyslipidemia ($p = 0.02$), with diabetic patients having 1.98 times the odds of dyslipidemia. This underscores the importance of managing blood pressure and glucose levels in elderly CVA patients to mitigate lipid abnormalities and reduce the risk of adverse vascular events.

Furthermore, lipid profile abnormalities were correlated with the severity of CVA. Patients with severe CVA had significantly higher levels of LDL and total cholesterol compared to those with mild or moderate CVA ($p < 0.05$). This suggests that more severe CVA may be associated with greater lipid derangements, supporting the idea that dyslipidemia may exacerbate the severity of stroke outcomes.

Overall, this study highlights the high prevalence of dyslipidemia in elderly CVA patients, with significant associations between lipid abnormalities and hypertension, diabetes, and CVA severity. These findings emphasize the need for targeted lipid management in this population to potentially reduce the incidence and severity of cerebrovascular events.

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A study on stroke patients in Palestine, revealed that dyslipidemia was highly prevalent, with 61.3% of patients exhibiting low high-density lipoprotein (HDL) levels and 28.57% showing elevated low-density lipoprotein (LDL) levels. Additionally, other cardiovascular risk factors, such as high fasting blood glucose (FBG) and abnormal HbA1c levels, were common, suggesting that lipid and glucose dysregulation play a synergistic role in increasing stroke risk [8].

A study explored the relationship between dyslipidemia and CVA risk in elderly Indonesian patients, finding that dyslipidemic patients had a 5.9 times higher risk of stroke after controlling for other variables like hypertension, smoking, and family history of CVA. Dyslipidemia was present in 59.5% of stroke patients, underscoring its importance as a modifiable risk factor that significantly influences CVA incidence in the elderly population [9].

Further, a study investigated lipid profiles in elderly patients with different stroke subtypes, reporting that dyslipidemia, particularly low HDL, was more frequently associated with ischemic strokes than hemorrhagic strokes. In their cohort, 56.86% of CVA patients had dyslipidemia, with low HDL levels being the predominant abnormality, suggesting a need to focus on HDL management in stroke prevention and treatment strategies [10].

In addition to its direct impact on stroke occurrence, dyslipidemia in elderly CVA patients has been linked to post-stroke complications. A study observed that elderly patients with dyslipidemia were more susceptible to post-stroke complications, such as infections, which compounded recovery challenges and impacted overall health outcomes. Dyslipidemia, along with other factors like atrial fibrillation and obesity, contributed to higher complication rates in elderly stroke patients, indicating that comprehensive lipid management may mitigate these risks [11].

Research found that lipid profile abnormalities were strongly associated with stroke mortality. Their study showed that ischemic stroke patients with high LDL and low HDL levels experienced higher rates of severe outcomes and mortality, emphasizing that managing dyslipidemia could reduce stroke severity and improve survival rates among elderly patients [12].

Generalizability

The generalizability of the study findings is limited due to its single-center design, focusing on elderly patients with cerebrovascular accidents (CVA) treated at MGM Institute of Health Sciences, Navi Mumbai. While the study provides valuable insights into the high prevalence of dyslipidemia and its association with CVA severity, the results may not fully represent populations with different demographic, genetic, or healthcare access characteristics. Furthermore, the lack of a comparison group and potential geographic or institutional biases constrain the applicability of findings to broader or more diverse populations. Expanding the study to include multicenter data and varied patient cohorts could enhance its generalizability.

CONCLUSION

This study highlights the high prevalence of dyslipidemia among elderly patients with cerebrovascular accidents, with significant associations between lipid abnormalities and risk factors like hypertension and diabetes. Dyslipidemia, particularly high LDL and low HDL levels, correlates with increased stroke severity, suggesting that effective lipid management may reduce adverse outcomes in this vulnerable population. Regular lipid screening and targeted interventions for elderly CVA patients could play a crucial role in preventing recurrent strokes and improving patient prognosis.

LIMITATIONS

The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

RECOMMENDATION

Regular lipid screenings and targeted lipid management should be prioritized in elderly patients with CVA, especially those with hypertension and diabetes. Implementing effective lipid management strategies may reduce morbidity and improve outcomes in this high-risk population.

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LIST OF ABBREVIATIONS

CVA - Cerebrovascular Accident

LDL - Low-Density Lipoprotein

HDL - High-Density Lipoprotein

CVD - Cardiovascular Disease

SD - Standard Deviation

OR - Odds Ratio

CI - Confidence Interval

FBG - Fasting Blood Glucose

HbA1c - Hemoglobin A1c

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CONFLICT OF INTEREST

The authors have no conflicting interests to declare.

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