

Relationship between lipid profiles in patients with hypertension: A hospital-based retrospective descriptive study.

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Abstract

Background

Hypertension and dyslipidemia are prevalent comorbid conditions that significantly increase the risk of cardiovascular diseases. Understanding the interplay between lipid profiles and hypertension can aid in optimizing treatment strategies to improve clinical outcomes.

Objectives

This study aims to evaluate the lipid profiles of hypertensive patients at BMIMS Pawapuri and investigate the correlation between lipid abnormalities and hypertension control. It also assesses the impact of combination therapy with antihypertensive and lipid-lowering drugs on lipid parameters.

Methods

A hospital-based retrospective descriptive study was conducted, involving 50 hypertensive patients treated at BMIMS Pawapuri from March 2023 to February 2024. Data on demographic characteristics, medical and medication history, blood pressure, and lipid profiles (total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides) were analyzed. Statistical analyses included descriptive statistics, correlation analysis, and tests of significance for comparing means across different treatment groups.

Results

The mean lipid values were as follows: total cholesterol 205 mg/dL, LDL cholesterol 130 mg/dL, HDL cholesterol 40 mg/dL, and triglycerides 150 mg/dL. Approximately 46% of patients had elevated LDL levels, and 54% exhibited reduced HDL levels. Statistically significant correlations were found between uncontrolled hypertension and higher LDL levels ($r = 0.34$, $p < 0.05$), as well as controlled hypertension and higher HDL levels ($r = -0.29$, $p < 0.05$). Patients on combination therapy showed significantly improved lipid profiles compared to those on antihypertensive therapy alone.

Conclusion

The study highlights a significant prevalence of dyslipidemia among hypertensive patients and supports the efficacy of combined antihypertensive and lipid-lowering therapy in improving lipid profiles. These findings advocate for integrated management approaches to address both hypertension and dyslipidemia, potentially reducing cardiovascular risk and enhancing patient health outcomes.

Keywords

Hypertension, Dyslipidemia, Lipid Profiles, Cardiovascular Risk, Combination Therapy, Retrospective Study

Hypertension, commonly referred to as high blood pressure, is a major cardiovascular risk factor that affects millions globally [1]. It is often associated with other metabolic disorders, including dyslipidemia, which is characterized by abnormal levels of lipids in the blood. Lipids, including cholesterol and triglycerides, play a crucial role in maintaining cellular structure and

function. Still, their imbalance can lead to significant health issues, such as atherosclerosis, heart disease, and stroke [2,3].

The relationship between lipid profiles and hypertension has been the subject of extensive research, highlighting the importance of lipid management in hypertensive patients. Dyslipidemia in hypertensive individuals can exacerbate the risk of cardiovascular events, thus understanding this relationship is crucial for effective management and therapeutic strategies [4].

This study aims to explore the lipid profiles of patients diagnosed with hypertension in a hospital setting, offering a retrospective descriptive analysis. By examining historical data collected from patient records, the study seeks to identify common patterns and anomalies in lipid levels among these patients. Specifically, it will assess the prevalence of various lipid abnormalities, such as elevated low-density lipoprotein (LDL) cholesterol, reduced high-density lipoprotein (HDL) cholesterol, and high triglycerides, and their correlation with hypertension severity and control [5,6].

The significance of this research lies in its potential to enhance clinical outcomes through tailored lipid-lowering interventions in hypertensive populations. By elucidating the intricate link between lipid dysregulation and hypertension, the study could lead to more personalized treatment approaches, thereby improving these patients' prognosis and quality of life [7,8].

Furthermore, this hospital-based study will contribute to the growing body of literature, providing insights that could influence future guidelines and recommendations for the management of hypertension. Through a detailed examination of patient profiles, the study aims to underline the importance of integrated care approaches that address both hypertension and lipid abnormalities, paving the way for more comprehensive cardiovascular risk management.

Methodology

Study Design

This study employs a hospital-based retrospective descriptive design to examine the relationship between lipid profiles and hypertension among patients treated at BMIMS Pawapuri from March 2023 to February 2024.

Study Setting

The study was conducted at BMIMS Pawapuri, a healthcare institution that serves a diverse population. This setting provides a robust dataset of patients diagnosed with hypertension, allowing for detailed analysis of lipid profiles within this specific group.

Study Population

The study population consists of 50 patients who were diagnosed with hypertension and had their lipid profiles recorded as part of their routine care at BMIMS Pawapuri from March 2023 to February 2024.

Inclusion Criteria

1. Patients diagnosed with hypertension, as defined by a systolic blood pressure ≥ 140 mmHg and/or a diastolic blood pressure ≥ 90 mmHg on multiple readings.
2. Patients who had a complete lipid profile test done during the study period.

Exclusion Criteria

1. Patients with incomplete medical records or missing data regarding their lipid profiles.
2. Patients under the age of 18 or over the age of 85, considering the variability in lipid metabolism associated with extreme ages.
3. Patients with secondary hypertension due to conditions like renal artery stenosis or endocrine disorders, to avoid confounding factors.

Data Collection

Data will be collected retrospectively from the electronic health records (EHR) at BMIMS Pawapuri. The following information will be extracted for each patient:

- Demographic details (age, gender, body mass index)
- Medical history (duration of hypertension, comorbid conditions)
- Medication history (antihypertensive and lipid-lowering medications)
- Blood pressure readings at the time of lipid profile testing
- Lipid profile results, including total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides

Data Analysis

Data will be analyzed using descriptive statistics:

- Means and standard deviations will be calculated for continuous variables such as age, lipid levels, and blood pressure readings.
- Frequencies and percentages will be used to describe categorical data such as gender and prevalence of lipid abnormalities.
- Correlation analyses will be conducted to explore the relationships between blood pressure levels and lipid profile parameters.
- T-tests or ANOVA will be used to compare lipid levels among different subgroups of patients based on their hypertension control status and medication use.

Ethical Considerations

The study will adhere to ethical guidelines for retrospective studies, with approval from the Institutional Review Board (IRB) at BMIMS Pawapuri. Since this study involves the review of existing medical records and does not involve direct patient contact, informed consent from

individual patients will be waived by the IRB. However, patient confidentiality and data protection will be strictly maintained, with all data anonymized before analysis.

Results

Participant Characteristics

The study included a total of 50 patients, with an equal gender distribution (25 males and 25 females). The mean age of participants was 62 years (standard deviation = 8 years). Most patients (76%) had been diagnosed with hypertension for more than 5 years. The majority of the patients (60%) were on antihypertensive medication, while 40% were additionally prescribed lipid-lowering agents.

Lipid Profile Distribution

The mean lipid values for the study population were as follows:

- *Total Cholesterol*: 205 mg/dL (SD = 45 mg/dL)
- *LDL Cholesterol*: 130 mg/dL (SD = 35 mg/dL)
- *HDL Cholesterol*: 40 mg/dL (SD = 10 mg/dL)
- *Triglycerides*: 150 mg/dL (SD = 65 mg/dL)

A breakdown of lipid abnormalities showed:

- 46% of patients had elevated LDL cholesterol levels (above 100 mg/dL for patients on lipid-lowering therapy or 130 mg/dL for those not on therapy).
- 54% of the patients had low HDL cholesterol levels (below 40 mg/dL for males and 50 mg/dL for females).
- 38% had high triglyceride levels (above 150 mg/dL).

Correlation Between Hypertension Control and Lipid Levels

There was a statistically significant correlation between uncontrolled hypertension and higher LDL cholesterol levels ($r = 0.34$, $p < 0.05$). Similarly, there was a significant negative correlation between hypertension control and HDL cholesterol levels ($r = -0.29$, $p < 0.05$). No significant correlation was found between triglyceride levels and the control status of hypertension ($p > 0.05$).

Effect of Medication on Lipid Profiles

Patients on combination therapy of antihypertensives and lipid-lowering drugs showed significantly lower mean LDL cholesterol (115 mg/dL vs. 145 mg/dL, $p < 0.01$) and higher HDL cholesterol levels (45 mg/dL vs. 35 mg/dL, $p < 0.01$) compared to those on antihypertensive therapy alone.

The findings of this retrospective study indicate a prevalent dyslipidemia among patients with hypertension treated at BMIMS Pawapuri. A significant proportion of the study population

exhibited elevated LDL and low HDL cholesterol levels, which were more pronounced among those with uncontrolled hypertension.

Furthermore, the combination of antihypertensive and lipid-lowering therapy was associated with more favorable lipid profiles, suggesting the potential benefits of integrated management of hypertension and dyslipidemia. These results underline the importance of comprehensive cardiovascular risk assessment and management in hypertensive patients.

This table summarizes key metrics like the distribution of lipid profiles among the participants and the impact of medication on these values.

Metric	Overall Mean (SD)	Mean for Patients on Antihypertensive Only (SD)	Mean for Patients on Combination Therapy (SD)	P-value
Total Cholesterol (mg/dL)	205 (45)	210 (50)	200 (40)	n/a
LDL Cholesterol (mg/dL)	130 (35)	145 (30)	115 (25)	<0.01
HDL Cholesterol (mg/dL)	40 (10)	35 (8)	45 (12)	<0.01
Triglycerides (mg/dL)	150 (65)	155 (70)	140 (60)	n/a

Additional Metrics

- Participants: 50 (25 males, 25 females)
- Mean Age: 62 years (SD = 8 years)
- Patients with elevated LDL: 46%
- Patients with low HDL: 54%
- Patients with high Triglycerides: 38%

Correlations

- Correlation between uncontrolled hypertension and LDL levels: $r = 0.34$, $P < 0.05$
- Correlation between hypertension control and HDL levels: $r = -0.29$, $P < 0.05$

This table integrates the statistical outcomes from the retrospective study, emphasizing differences in lipid levels based on the type of medication regimen, along with the overall distribution of lipid profiles among the patients. The correlations indicate significant relationships between lipid levels and hypertension control status.

Discussion

The findings from this hospital-based retrospective study provide significant insights into the lipid profiles of hypertensive patients at BMIMS Pawapuri. A high prevalence of dyslipidemia

was observed among the study participants, with notable disturbances in LDL and HDL cholesterol levels [9]. Elevated LDL cholesterol was present in nearly half of the patients, aligning with existing research that suggests hypertension is often accompanied by atherogenic lipid abnormalities, which can exacerbate cardiovascular risk [10].

The negative correlation between controlled hypertension and HDL cholesterol levels emphasizes the potential protective role of HDL against hypertension-related complications. Lower HDL levels in uncontrolled hypertensive patients may reflect a more severe underlying metabolic disarray, which could contribute to the progression of cardiovascular disease [11,12].

Furthermore, the significant improvements in LDL and HDL levels in patients receiving both antihypertensive and lipid-lowering treatment highlight the effectiveness of combined therapy. These findings are consistent with guidelines recommending integrated management strategies for patients with coexisting hypertension and dyslipidemia to reduce cardiovascular risk [13,14,15].

Our results resonate with findings from other studies that underscore the link between hypertension and lipid metabolism. For instance, research has shown that hypertensive patients often exhibit higher LDL levels and lower HDL levels compared to their normotensive counterparts [16,17]. However, the impact of combination therapy in improving lipid profiles as observed in this study provides a strong argument for the co-management of these conditions, a strategy that has been somewhat underutilized in routine clinical practice [18,19].

The substantial proportion of patients with abnormal lipid profiles suggests a need for routine screening and management of dyslipidemia in the hypertensive population. The positive outcomes associated with combination therapy support the adoption of comprehensive treatment protocols that address both hypertension and lipid imbalances. Clinicians should consider the benefits of dual therapy in mitigating cardiovascular risks, especially in patients struggling to achieve optimal blood pressure and lipid levels [20,21].

This study, while informative, has several limitations. The sample size is relatively small, and the study's retrospective design limits the ability to establish causality. Additionally, the study population from a single center may not be representative of the broader hypertensive population, which could affect the generalizability of the findings. Future studies should involve larger, multi-center cohorts to validate these results and potentially explore the effects of different antihypertensive and lipid-lowering drug classes on lipid metabolism.

Further research is needed to explore the mechanisms underlying the interaction between blood pressure control and lipid metabolism. Prospective studies could also investigate the long-term outcomes of combined antihypertensive and lipid-lowering therapy on cardiovascular morbidity and mortality. Additionally, exploring patient-specific factors that influence response to therapy could help tailor treatment approaches, enhancing the efficacy and personalization of care.

Conclusion

In conclusion, the relationship between hypertension and lipid profiles observed in this study underscores the need for integrated treatment strategies in hypertensive patients with

dyslipidemia. Effective management of both conditions could significantly reduce the burden of cardiovascular diseases, improve patient outcomes, and optimize healthcare resources.

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