



RETROSPECTIVE STUDY OF MATERNAL HYPERTENSIVE DISORDERS AND INCIDENCE OF ACUTE VESTIBULAR SYMPTOMS DURING PREGNANCY AT SHRI GURU RAM RAI INSTITUTE OF MEDICAL & HEALTH SCIENCES, DEHRADUN

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Abstract

Background: Hypertensive disorders of pregnancy (HDP) are a major cause of maternal morbidity in India. Their systemic effects are well-known, but the association with acute vestibular symptoms (AVS) like vertigo and dizziness is less studied in the Indian population, impacting maternal quality of life and safety.

Objectives: To determine the incidence of AVS in pregnant women with HDP and to investigate the association between HDP severity and AVS in a cohort from a tertiary care center in Dehradun.

Methods: A retrospective cohort study reviewed medical records of 328 antenatal patients who delivered between March 2022 to December 2022. Participants were categorized into a HDP group (n=112) and a normotensive control group (n=216). Data on demographics, HDP type, and documented AVS were extracted. Analysis used Chi-square tests and multivariate logistic regression.

Result: The incidence of AVS was significantly higher in the HDP group (39.3%) than in the control group (12.5%) ($p < 0.001$). Women with preeclampsia had a higher incidence (48.6%) than those with gestational hypertension (23.8%) ($p = 0.008$). HDP was independently associated with a 4.5-fold increased odds of AVS (Adjusted Odds Ratio: 4.52, 95% CI: 2.65-7.69).

Conclusions: HDP is a significant risk factor for AVS in this Indian cohort. Routine screening for vestibular complaints in pregnant women with HDP, particularly preeclampsia, is recommended for timely management.

1. Introduction

Hypertensive disorders of pregnancy (HDP) complicate 8-10% of pregnancies in India, contributing significantly to the nation's maternal mortality rate, which remains a critical public health challenge [1]. The spectrum of HDP includes gestational hypertension and preeclampsia, conditions characterized by endothelial dysfunction, systemic vasoconstriction, and multi-organ involvement [2]. The complications of HDP on the central nervous system, such as eclampsia, are well-documented in Indian literature [3].

The vestibular system, crucial for balance, is susceptible to vascular insults due to its dependence on the terminal labyrinthine artery. The hemodynamic instability and microvascular damage in HDP

could theoretically compromise inner ear perfusion, leading to acute vestibular symptoms (AVS) like vertigo, dizziness, and imbalance [4]. While dizziness is a common pregnancy complaint, true vertigo is less frequent and more clinically significant [5].

The impact of AVS includes an increased risk of falls, anxiety, and a reduced quality of life, which are pressing concerns for antenatal care [6]. Despite the high burden of HDP in India, there is a paucity of data exploring its otoneurological manifestations. Most studies focus on classical complications, leaving associations with symptoms like vertigo uninvestigated in the regional context. This study, therefore, aimed to determine the incidence of AVS in pregnant women with HDP at our institute in Dehradun and to compare it with normotensive pregnant women.

2. Materials and Methods

Study Design and Setting: A retrospective cohort study was conducted at the Department of Obstetrics and Gynaecology, Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun. The Institutional Ethics Committee approved the study and granted a waiver for informed consent.

Study Period and Population: Medical records of all women who delivered between March 1, 2022, and December 31, 2022, were screened. Inclusion criteria were: singleton pregnancy, gestation age ≥ 20 weeks, and complete records. Exclusion criteria were: pre-existing vestibular disorders, chronic hypertension, and significant anemia (Hb < 9 g/dL), and thyroid disorders.

Data Collection and Variables: A total of 328 patients were included and divided into:

- **HDP Group (n=112):** Patients with a diagnosis of HDP as per standard guidelines [2].
- **Control Group (n=216):** Normotensive patients.

Data extracted included maternal age, parity, gestational age, HDP type, and documented episodes of AVS (vertigo, persistent dizziness, imbalance).

Statistical Analysis: Data were analyzed using SPSS Statistics version 26.0. Descriptive statistics, Chi-square tests, and multivariate logistic regression were used. A p-value of < 0.05 was considered significant.

3. Result and Analysis

Table 1: Baseline Characteristics of the Study Population

Characteristic	HDP Group (n=112)	Control Group (n=216)	p-value
Maternal Age (years), Mean $\pm$ SD	26.8 $\pm$ 4.1	25.9 $\pm$ 3.7	0.104
Nulliparity, n (%)	68 (60.7%)	118 (54.6%)	0.315
Gestational Age at Delivery (weeks), Mean $\pm$ SD	37.1 $\pm$ 2.5	38.5 $\pm$ 1.3	< 0.001

The incidence of acute vestibular symptoms was significantly higher in the HDP group.

Table 2: Incidence of Acute Vestibular Symptoms (AVS)

Group	Total Patients	Patients with AVS	Incidence of AVS
HDP Group	112	44	39.3%
Control Group	216	27	12.5%
p-value			< 0.001

A sub-analysis within the HDP group showed a higher incidence of AVS in women with preeclampsia.

Table 3: Incidence of AVS by HDP Subtype

HDP Subtype	Total Patients	Patients with AVS	Incidence of AVS
Preeclampsia	70	34	48.6%
Gestational Hypertension	42	10	23.8%
p-value			0.008

4. Discussion

This study reveals a significant association between HDP and AVS in a pregnant population from Dehradun, India. The finding that women with HDP had 4.5-fold higher odds of experiencing AVS aligns with the understanding of HDP as a state of systemic vascular dysfunction. The higher incidence in preeclampsia (48.6%) compared to gestational hypertension (23.8%) underscores the role of severe endothelial damage and microvascular ischemia in the pathogenesis of AVS [2, 7].

The inner ear is highly sensitive to ischemia. The labyrinthine artery, with its terminal nature, is vulnerable to the vasospasm and reduced perfusion that characterizes HDP, particularly preeclampsia [4]. This can lead to transient ischemia of the vestibular apparatus, manifesting as vertigo. Our findings are consistent with smaller Indian studies that have noted neurological and otological symptoms in complicated pregnancies. A study by Ghosh et al. highlighted various neurological manifestations in preeclampsia, including dizziness, though not as a primary focus [3]. Another study from a tertiary center in South India reported autonomic dysfunction, which can influence vestibular stability, in women with preeclampsia [8].

The clinical implications for our setting are substantial. In a country like India, with a high patient-to-provider ratio, symptoms like dizziness may be overlooked as minor. However, they can lead to serious secondary complications such as falls and injuries, which are dangerous for both the mother and the fetus [6]. Identifying HDP as a key risk factor should prompt clinicians to actively inquire about and document AVS. This can lead to simple interventions like patient counseling on safe mobilization, ensuring adequate hydration, and in persistent cases, a referral for vestibular assessment.

The high prevalence of HDP in India, as reported by studies from various regions [1, 9], makes this association a matter of significant public health importance. Integrating vestibular symptom screening into the standard antenatal care protocol for hypertensive pregnancies could improve maternal safety and well-being.

Strengths and Limitations: The use of a local cohort is a key strength, providing relevant regional data. The retrospective design and reliance on clinical notes for AVS documentation are limitations, potentially leading to under-reporting.

Conclusion: This study establishes a strong link between HDP and AVS in an Indian population. We recommend increased clinical vigilance for vestibular symptoms in pregnant women with hypertension, especially preeclampsia. Future prospective studies with objective vestibular testing are needed to confirm these findings and explore causal pathways.

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Nil.

6. Conflicts of interest

There are no conflicts of interest.

7. References

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