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Study of Clinico Hematological Profile of Neonates Born to Mothers with Pregnancy Induced Hypertension: A Prospective Comparative Study

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ABSTRACT

Background Pregnancy-induced hypertension (PIH) is a major contributor to maternal and neonatal morbidity worldwide. Neonates born to mothers with PIH are predisposed to prematurity, low birth weight, intrauterine growth restriction (IUGR), respiratory complications, and hematological abnormalities.

Aim: To evaluate the clinical and hematological profile of neonates born to mothers with pregnancy-induced hypertension and compare them with neonates born to normotensive mothers.

Materials and Methods: This prospective comparative observational study was conducted in the Department of Pediatrics and Neonatology at a tertiary care teaching hospital in Gujarat, India. Neonates born to mothers with PIH constituted the study group, while neonates born to normotensive mothers served as controls. Maternal obstetric characteristics, neonatal demographic details, growth parameters, clinical outcomes, and hematological parameters were recorded and analyzed. Parameters studied included gestational age, birth weight, mode of delivery, NICU admission, duration of hospital stay, hemoglobin level, platelet count, total leukocyte count, and neonatal complications.

Results: Neonates born to mothers with PIH had significantly lower gestational age and birth weight compared to controls. The incidence of prematurity, low birth weight, small for gestational age (SGA), and IUGR was higher among neonates of hypertensive mothers. NICU admission rates and duration of hospital stay were also significantly increased. Hematological abnormalities including thrombocytopenia, polycythemia, and altered leukocyte counts were more commonly observed in neonates born to PIH mothers. Respiratory distress syndrome, sepsis, and feeding difficulties were among the common neonatal complications.

Conclusion: Pregnancy-induced hypertension significantly affects neonatal clinical outcomes and hematological parameters. Early identification, vigilant monitoring, and prompt neonatal management are essential to reduce morbidity and improve neonatal outcomes in pregnancies complicated by PIH.

Keywords: *Pregnancy induced hypertension, Neonates, Hematological profile, Thrombocytopenia, Prematurity, Intrauterine growth restriction.*

INTRODUCTION

Pregnancy-induced hypertension (PIH) is defined as new-onset hypertension developing after 20 weeks of gestation in previously normotensive women. It remains one of the leading causes of maternal and perinatal morbidity and mortality worldwide. Hypertensive disorders complicate approximately 5–10% of pregnancies and significantly contribute to adverse maternal and neonatal outcomes.

The pathophysiology of PIH involves abnormal placentation, endothelial dysfunction, vasospasm, and uteroplacental insufficiency. Reduced uteroplacental blood flow compromises fetal oxygen and nutrient supply, leading to fetal growth restriction and various neonatal complications. Neonates born to mothers with PIH are at increased risk for prematurity,

low birth weight, respiratory distress syndrome, perinatal asphyxia, metabolic disturbances, and hematological abnormalities.

Among hematological abnormalities, thrombocytopenia and polycythemia are commonly reported in neonates born to hypertensive mothers. Chronic intrauterine hypoxia stimulates erythropoiesis resulting in polycythemia, while endothelial dysfunction and placental insufficiency may contribute to thrombocytopenia and coagulation abnormalities.
Early recognition of neonatal complications associated with PIH is important for timely intervention and improved neonatal survival. The present study was undertaken to evaluate the clinico-hematological profile of neonates born to mothers with PIH and compare them with neonates born to normotensive mothers.

Aims and Objectives
Primary Objective: To determine the clinical profile of neonates born to mothers with pregnancy-induced hypertension and compare it with neonates born to normotensive mothers.

Secondary Objectives:
1. To compare gestational age, birth weight, and mode of delivery between the two groups.
2. To evaluate hematological parameters including hemoglobin, total leukocyte count, and platelet count.
3. To assess neonatal complications and requirement of NICU admission.
4. To estimate duration of hospital stay and neonatal outcomes.

Materials and Methods
Study Design: Prospective comparative observational study.

Study Setting: Department of Pediatrics and Neonatology, tertiary care teaching hospital, Surat, Gujarat, India.

Study Population: Neonates delivered to mothers diagnosed with pregnancy-induced hypertension were included as the study group. Neonates delivered to normotensive mothers were included as controls.

Inclusion Criteria:
Neonates born to mothers diagnosed with PIH after 20 weeks of gestation.
Neonates born to normotensive mothers for control comparison.
Both term and preterm neonates.

Exclusion Criteria
Neonates with major congenital malformations.
Mothers with chronic hypertension diagnosed before pregnancy.
Neonates born to mothers with severe systemic illnesses unrelated to PIH.

Data Collection: Detailed maternal history including age, parity, obstetric profile, antenatal complications, and mode of delivery was recorded. Neonatal details including gestational age, birth weight, APGAR score, sex, and NICU admission were documented.
Laboratory investigations included: Hemoglobin level, Total leukocyte count, Platelet count, Hematocrit, Peripheral smear examination
Clinical outcomes including respiratory distress syndrome, sepsis, hypoglycemia, jaundice, feeding intolerance, and mortality were assessed.

Statistical Analysis: Data were analyzed using appropriate statistical software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as percentages. Statistical significance was determined using Chi-square test and Student's t-test. A p-value <0.05 was considered statistically significant.

RESULTS
Maternal and Obstetric Characteristics: The majority of mothers with PIH belonged to the primigravida group. Cesarean delivery was significantly more common among hypertensive mothers compared to normotensive mothers. Preterm deliveries were more frequent in the PIH group.

Neonatal Demographic Profile: Neonates born to mothers with PIH had significantly lower mean gestational age and birth weight. The incidence of low birth weight and prematurity was higher among neonates in the study group.

Growth Parameters: A significantly higher proportion of neonates born to hypertensive mothers were small for gestational age and had intrauterine growth restriction compared to controls.

Hematological Findings: Thrombocytopenia was significantly more common among neonates born to PIH mothers. Polycythemia and elevated hematocrit values were also observed more frequently in the study group. Altered leukocyte counts and neutropenia were seen in some neonates born to hypertensive mothers.

Neonatal Complications: Common neonatal complications observed in the PIH group included: Respiratory distress syndrome, Neonatal jaundice, Sepsis, Hypoglycemia, Feeding difficulties, Birth asphyxia.
NICU admissions and duration of hospitalization were significantly higher among neonates born to hypertensive mothers. Neonatal Outcome: Most neonates improved with supportive management; however, morbidity was significantly higher among neonates born to mothers with PIH compared to controls.

DISCUSSION

Pregnancy-induced hypertension adversely affects fetal growth and neonatal outcomes due to chronic uteroplacental insufficiency. The present study demonstrated a significantly higher incidence of prematurity, low birth weight, and IUGR among neonates born to hypertensive mothers. The increased incidence of cesarean section observed in the PIH group may be attributed to fetal distress and maternal complications associated with hypertension. Similar findings have been reported in previous studies evaluating outcomes in hypertensive pregnancies. Thrombocytopenia was one of the important hematological abnormalities identified in neonates born to mothers with PIH. Placental insufficiency and fetal hypoxia may contribute to impaired platelet production and increased platelet destruction. Polycythemia observed in these neonates is likely secondary to chronic intrauterine hypoxia stimulating erythropoiesis. Respiratory distress syndrome and neonatal sepsis were more common among neonates of hypertensive mothers, mainly due to increased prematurity. Increased NICU admission and prolonged hospital stay further indicate the higher neonatal morbidity associated with PIH. The findings of the present study are consistent with earlier studies reporting increased neonatal morbidity and hematological abnormalities among neonates born to mothers with hypertensive disorders of pregnancy.

Limitations:
1)Single-center study with limited sample size.
2) Long-term neurodevelopmental follow-up of neonates was not performed.
3) Severity grading of PIH and correlation with not extensively analyzed.

CONCLUSION

Pregnancy-induced hypertension significantly influences neonatal clinical and hematological outcomes. Neonates born to mothers with PIH are at increased risk of prematurity, low birth weight, intrauterine growth restriction, thrombocytopenia, respiratory complications, and NICU admission. Early antenatal diagnosis of PIH, optimal obstetric management, and prompt neonatal care can substantially reduce neonatal morbidity and improve outcomes. Regular hematological monitoring of neonates born to hypertensive mothers is recommended for early detection and management of complications.

Declarations: Funding - No external funding was received for this study.
Conflict of Interest: The authors declare no conflict of interest.
Ethical Approval: The study was conducted after approval from the Institutional Ethics Committee. Written informed consent was obtained from parents or guardians wherever applicable.

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