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Impact of Maternal Diabetes and Hypertension on Postoperative Outcomes in Neonates Undergoing Major Abdominal Surgery: A Retrospective Study

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ABSTRACT:

Objective: This study aimed to assess the impact of maternal Type 2 Diabetes Mellitus (T2DM) and Hypertensive Disorders of Pregnancy (HDP) on postoperative outcomes in neonates undergoing major abdominal surgery.

Methods: We conducted a retrospective cohort study of neonates who underwent abdominal surgery for congenital gastrointestinal anomalies between January 2020 and December 2024 at a tertiary care center. Maternal medical history, neonatal demographics, surgical interventions, and postoperative outcomes were analyzed. The primary outcome was the incidence of postoperative complications within 30 days. Secondary outcomes included sepsis, duration of mechanical ventilation, length of hospital stay, and mortality. Statistical significance was set at $p<0.05$.

Results: Out of 204 neonates included, 62 (30.4%) were born to mothers with T2DM and/or HDP. These neonates had a higher incidence of postoperative sepsis (45.2% vs. 26.8%, p=0.008), prolonged mechanical ventilation (>5 days) (38.7% vs. 22.3%, p=0.015), and hospital stay >15 days (56.5% vs. 35.7%, p=0.012). Multivariate logistic regression revealed maternal T2DM (aOR 2.25, 95% CI: 1.18–4.29) and HDP (aOR 1.89, 95% CI: 1.05–3.39) as independent predictors of adverse postoperative outcomes.

Conclusion: Maternal diabetes and hypertension significantly increase the risk of postoperative complications in neonates undergoing abdominal surgery. Early identification and optimized management of maternal comorbidities may improve surgical outcomes.

Keywords: *Neonatal surgery, maternal diabetes, hypertension, postoperative complications, congenital anomalies*

1. INTRODUCTION

Neonatal abdominal surgery, often necessitated by congenital anomalies such as intestinal atresia, necrotizing enterocolitis (NEC), and gastroschisis, presents significant clinical challenges. Postoperative morbidity in these cases is influenced by several factors, including birth weight, gestational age, and maternal health [1].

Maternal conditions like Type 2 Diabetes Mellitus (T2DM) and Hypertensive Disorders of Pregnancy (HDP) are known to compromise fetal development, contributing to complications such as prematurity, low birth weight, and neonatal hypoxia [2,3]. Despite this, their specific impact on neonatal surgical outcomes remains under-explored.

This study investigates the association between maternal T2DM and HDP and short-term postoperative outcomes in neonates undergoing abdominal surgery over a five-year period.

Methods:

Study Design and Population:

A retrospective cohort study was conducted at a tertiary neonatal surgical center from January 2020 to December 2024. Medical records of neonates (<28 days old) who underwent major abdominal surgery were reviewed. Exclusion criteria included syndromic anomalies, missing maternal medical data, or surgery performed beyond the neonatal period.

Data Collection:

Maternal variables included age, T2DM, HDP (including preeclampsia and gestational hypertension), antenatal care, and mode of delivery. Neonatal variables included gestational age, birth weight, Apgar score, type of surgery, sepsis, duration of mechanical ventilation, and mortality.

Outcomes:

- **Primary outcome:** 30-day postoperative complications (including sepsis, wound dehiscence, anastomotic leak)
- **Secondary outcomes:** Duration of mechanical ventilation, hospital stay (>15 days), and mortality

Statistical Analysis:

Data were analyzed using SPSS version 26.0. Chi-square test and independent t-tests were used for univariate analysis. Multivariate logistic regression was applied to adjust for potential confounders. Significance was considered at $p<0.05$.

2. RESULTS

Table 1: Baseline Characteristics

Variable	Total (n=204)	T2DM/HDP (n=62)	No T2DM/HDP (n=142)	p-value
Birth weight <2.5 kg	112 (54.9%)	42 (67.7%)	70 (49.3%)	0.013
Preterm delivery (<37 weeks)	79 (38.7%)	31 (50%)	48 (33.8%)	0.028
Apgar <7 at 5 min	41 (20.1%)	17 (27.4%)	24 (16.9%)	0.081

Table 2: Postoperative Outcomes

Outcome	T2DM/HDP (n=62)	No T2DM/HDP (n=142)	p-value
Sepsis	28 (45.2%)	38 (26.8%)	0.008
Ventilation >5 days	24 (38.7%)	31 (22.3%)	0.015
Hospital stay >15 days	35 (56.5%)	51 (35.7%)	0.012
30-day Mortality	8 (12.9%)	11 (7.7%)	0.228

Multivariate Logistic Regression:

Variable	aOR	95% CI	p-value
Maternal T2DM	2.25	1.18–4.29	0.013
Maternal HDP	1.89	1.05–3.39	0.034

3. DISCUSSION

This study demonstrates that maternal T2DM and HDP significantly increase the risk of postoperative complications in neonates undergoing abdominal surgery. These findings are consistent with previous research indicating that maternal comorbidities negatively impact neonatal outcomes through mechanisms like impaired placental perfusion, fetal hypoxia, and metabolic stress [2,3,4].

Our results are in line with Tita et al., who showed that adverse maternal health significantly influences neonatal morbidity in surgical and non-surgical settings [5]. Studies by Kamana et al. and Metzger et al. also support the link between maternal hyperglycemia or hypertensive disorders and adverse perinatal outcomes [6,7].

Although mortality differences did not reach statistical significance, the higher trend among exposed neonates highlights the need for close monitoring. Preventive strategies during pregnancy and early neonatal life may mitigate risks.

4. CONCLUSION

Maternal T2DM and HDP are associated with increased postoperative morbidity in neonates undergoing abdominal surgery. Integrating obstetric and neonatal surgical care can potentially improve outcomes in high-risk pregnancies.

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