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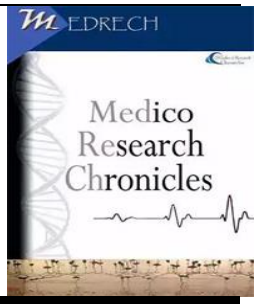

A Study of Maternal Risk Factors and Investigative Profile in Neonatal Polycythemia in a rural tertiary care hospital in western Maharashtra

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ABSTRACT

ORIGINAL RESEARCH ARTICLE

Aims and objectives: To Study the Maternal Risk Factors and Investigative Profile in Neonatal Polycythemia.
Materials and methods: This is hospital based descriptive longitudinal prospective study in Dr. Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni. It was carried out over a period of 1 year that is from September 2022 to September 2023. All neonates with venous hematocrit >65% or venous hemoglobin concentration of more than 22g/dl were included in study. Neonates with venous hematocrit <65% and Neonates with dehydration are excluded from the study.
Results: The most common maternal risk factor observed was PIH(52.3%) followed by GDM(19.7%), Multiple pregnancy(5.8%) and APH(4.6%). In the present study, we observed that most of the symptomatic babies presented with Hypoglycemia(82%), 75% babies presented with Jaundice.
Conclusion: So, babies with maternal risk factors like Hypertension, Diabetes, APH and Multiple Pregnancy should be actively screened. As most common laboratory anomaly is hypoglycemia in polycythemia babies it is important to closely monitor these infants in an effort to reduce morbidity and promote better growth, development, and survival.

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INTRODUCTION

Polycythemia and secondary hyperviscocity are common problems in the new born period with reported incidence ranging from 1%- 5% in total newborn population[1,2] . The most widely accepted definition is venous hematocrit 65% or greater[1,2,3]. Secondary hyperviscocity may have lasting effects on brain, heart, kidneys intestines and approximately 40% of babies have long term neurological and developmental sequel. Small for gestational

age babies[3] and infant of diabetic mother[4], are known to have an increased incidence of polycythemia and hyperviscocity. The most common presenting symptoms are plethora, feeding problems, and hypoglycemia. Other symptoms include irritability, jitteriness, tachycardia, hypotonia, and cyanosis. The diagnosis of polycythemia requires detection of a venous hematocrit of at least 65%. Peripheral venous hematocrit sample is preferred to measure polycythemia[5,6,7] Treatment of polycythemia includes[8]

1)Hematocrit >65% asymptomatic and < 70% = IV fluids2)Hematocrit >65% symptomatic or >70% = Partial exchange transfusion.

METHODOLOGY

This is hospital based descriptive longitudinal prospective study in Dr. Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni. It was carried out over a period of 1 year that is from September 2022 to September 2023. All neonates with venous hematocrit >65% or venous hemoglobin concentration of more than 22g/dl were included in study.

A detailed maternal history was elicited to find out etiology of neonatal polycythemia with regards to maternal hypertension syndromes [toxemia, renal disease] ,maternal heart disease, gestational diabetes and overt diabetes mellitus, maternal smoking , and use of propranolol or other drugs.

Baby will be observed for the sign and symptoms of the polycythemia. Peripheral venous samples were taken and all necessary investigations like Complete Hemogram, LFT, RFT, RBS, CRP were done among all admissions in the hospital.

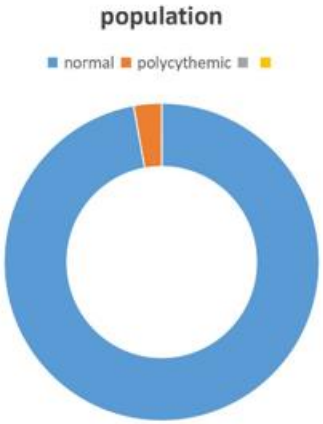
STATISTICAL ANALYSIS

Data was entered into Microsoft excel data sheet and was analyzed using SSPS 22.0 version software. The independent student 't' test is used. The p- value <0.05 was considered as statistically significant.

OBSERVATION AND RESULTS:

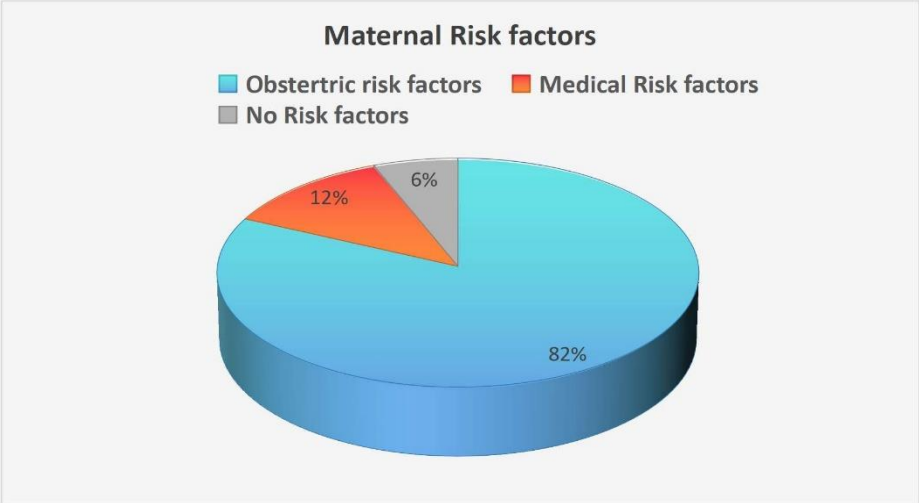
Proportion of polycythemia babies:

Polycythemia babies	Total admissions	Proportion of Polycythemia among admissions
86	3016	2.85%



From September 2022 to September 2023. 3016 babies were admitted to NICU where in 86 newborns were found out to be polycythemia. Relationship between Maternal Risk Factors and Polycythemia

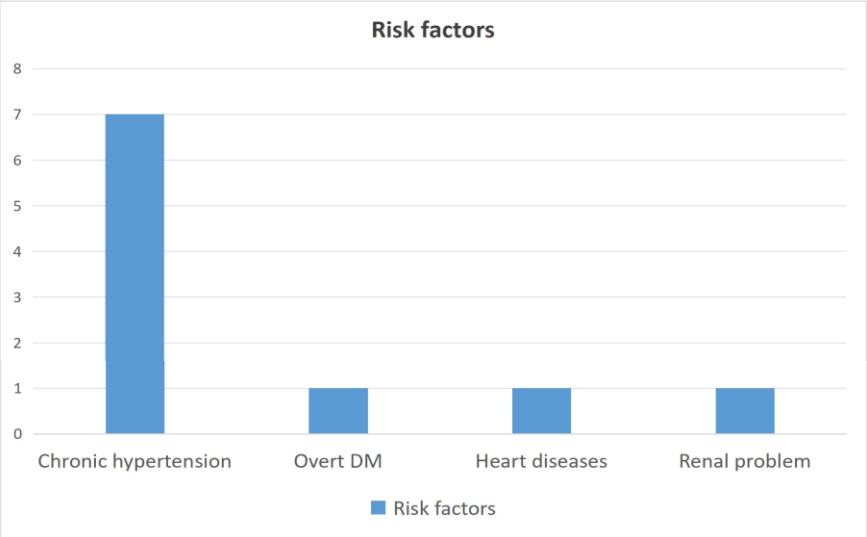
Maternal Risk factors	Number	Percentage
Obstetric Risk factors	71	83%
Medical Risk factors	10	12%
No Risk factors	5	5%



In the present study maternal history of all the 86 babies who had polycythemia was taken, out of these, 71 (82%) had a significant obstetric history and 10(12%) had a history of medical risk factors while only 5(6%) had neither.

Relationship between Maternal Medical Risk Factors and Neonatal Polycythemia.

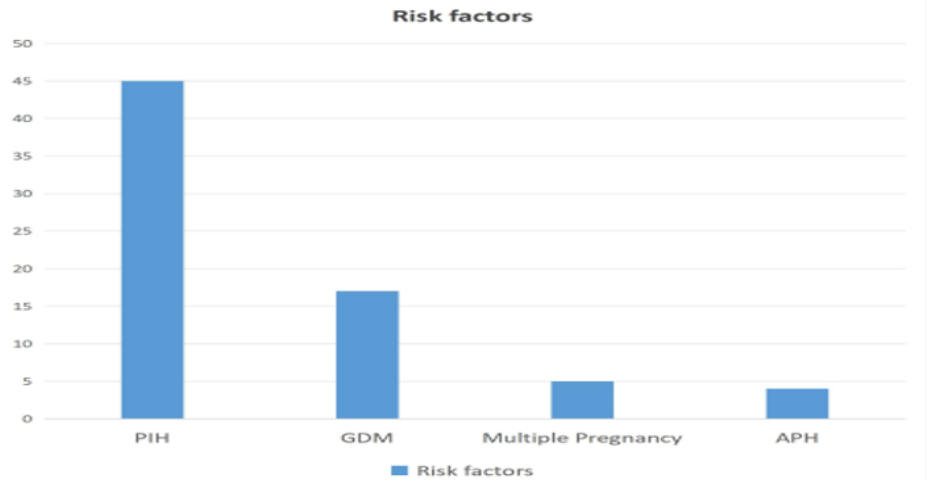
Risk factors	Number	Percentage
Chronic Hypertension	7	8.1%
Overt DM	1	1.1%
Heart Diseases	1	1.1%
Renal Problem	1	1.1%



A total of 10 mothers out of 86, whose children had polycythemia in the first week had a significant medical illness before the onset of pregnancy. Out of 10, the most common risk factor was chronic hypertension, as 7(8.1%) mothers were known hypertensives. Other medical maternal complications were less common in this study sample, with 1(1.16%) case each of overt diabetes mellitus, heart disease and renal disorder.

Relationship between Maternal Obstetrics Risk Factors and Neonatal Polycythemia.

Risk factors	**Number**	**Percentage**
PIH	45	52.3%
GDM	17	19.7%
Multiple Pregnancy	5	5.8%
APH	4	4.6%



The most common obstetric risk factor was pregnancy induced hypertension as 45 (52.3%) mothers of babies with polycythemia were diagnosed with PIH. Next most common obstetric risk was GDM, with 17(19.7%) mothers being diagnosed as GDM in the second trimester. Other less common obstetric risk factors were multiple pregnancy and antepartum hemorrhage, with 5(5.8%) and 4(4.6%) cases respectively.

The incidence of polycythemia babies was significantly higher in these mothers with the above-mentioned risk factors.

By applying Chi-square test , it was found that there was significant association between the maternal risk factors and incidence of polycythemia . The observed PVALUE is < 0.0001 ,which denotes that these variables are significantly associated.

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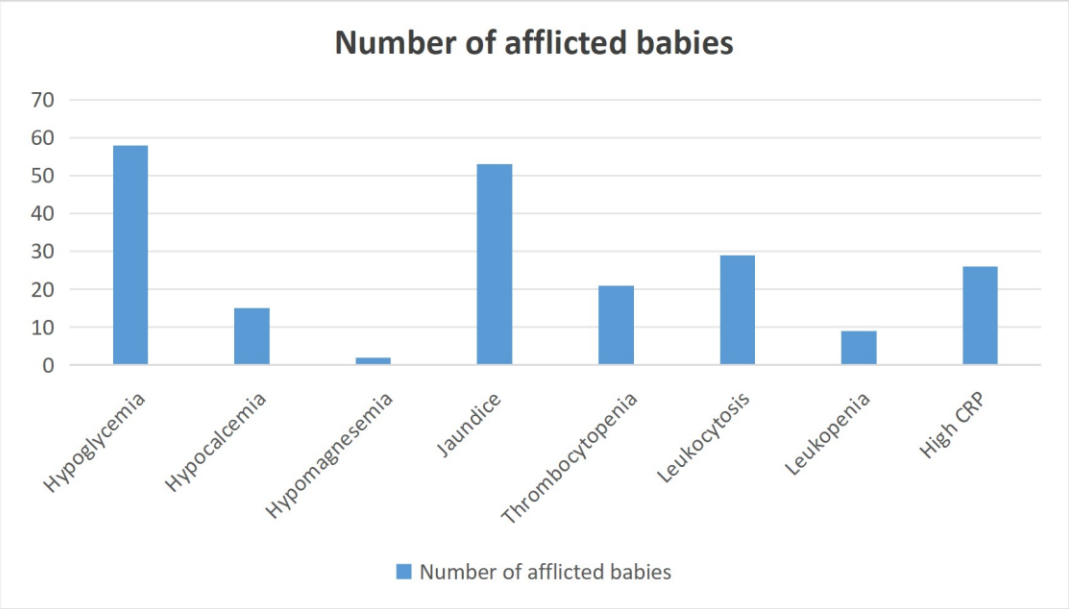
Laboratory Anomalies in Neonatal Polycythemia.

LABORATORY ANOMALY	**NUMBER OF AFFLICTED BABIES**	**PERCENTAGE OF SYMPTOMATIC BABIES**
HYPOGLYCEMIA	58	82.85%
HYPOCALCEMIA	15	21.42%
HYPOMAGNESIA	2	2.85%
JAUNDICE	53	75.71%
THROMBOCYTOPENIA	21	30.00%
LEUKOCYTOSIS	29	41.42%
LEUCOPENIA	9	12.85%
HIGH CRP	26	37.14%



In the present study, we observed that most of the symptomatic babies presented with Hypoglycemia(82%), 75% babies presented with Jaundice. 54% of babies had deranged leucocyte counts.

DISCUSSION

Among the maternal risk factors for the development of neonatal polycythemia, the present study showed the babies delivered to mothers with PIH had significantly (p=<.00001) higher risk of development of neonatal polycythemia. This was similarly seen in studies conducted by Viginia (20.7%), L. Krishnan (27%) and Alfasadi et al (18%).

Increased risk to the babies was also seen in mothers with diabetes and multiple pregnancies. This was similarly observed in the studies by Abbas et al and Alfasadi et al.

In the present study, we observed that nearly two- third (67%) of the babies had hypoglycemia and nearly 60% babies had hyperbilirubinemia. These were similar to the findings observed by Wiswell et al and Krishnan et al.

CONCLUSION

The most common maternal risk factor observed was PIH(52.3%) followed by GDM(19.7%), Multiple pregnancy(5.8%) and APH(4.6%).It was observed that babies born to mothers with GDM were 24 times likely to be polycythemia as compared to mothers had no risk factors. In PIH, APH and Multiple Pregnancy, babies were 8 times likely to be polycythemia. So, babies with maternal risk factors like Hypertension, Diabetes, APH and Multiple Pregnancy should be actively screened.

Among the laboratory parameters, hypoglycemia(83%) was most common followed by jaundice(75%), deranged TLC(54%), thrombocytopenia (30%), hypocalcemia(22%) and hypomagnesemia(3%). 45% neonates had evidence of sepsis in form of either low TLC, high TLC or elevated CRP.

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