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ORIGINAL RESEARCH

Maternal and Perinatal Outcome in PIH with or without Anemia

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Abstract

Introduction: Pregnancy induced hypertension is one of the high risk conditions which can give rise to life threatening complications if not dealt well in time. Also, anemia remains a major health problem in the developing countries. The present study was conducted to know the combined effect of the two conditions in the pregnancy.

Materials and methods: The study was conducted at Post graduate Department of Obstetrics and Gynaecology SMGS Hospital, Jammu on patients attending the OPD in third trimester diagnosed with PIH .Total 200 PIH patients were recruited in the study as per inclusion criteria. They were divided into two groups as: Group 1 (PIH with anemia) and Group 2 (PIH without anemia). Patients in both the groups were followed up till the postnatal period. Demographic variables, maternal and neonatal complications were studied in both the groups.

Results: 50 patients were there in Group 1 and 150 patients were included in Group 2.Out of this, 20 out of 50 patients i.e.40% were greater than 30 years in Group 1 and 49 out of 150 i.e. 32% were greater than 30 years in Group 2 .Maximum patients were grand multipara in both the groups(60% in Group 1 and 40% in Group 2).Maximum patients had educational status till middle standard in both the groups(46% in Group 1 and 44% in Group 2).Majority of the patients were from working status in both the groups(66% in Group 1 and 51% in Group 2).Patients in both the groups preferred junk. Patients in group1 had habit of consuming beverages multiple times a day and those in Group 2 consumed beverages once daily or least. Most common complication was preterm rupture of membranes in Group 1 being 56% and preterm labour in Group 2 being 40%. The frequency of complications namely preterm rupture of membranes, pre term labor, preeclampsia, eclampsia, HELLP, abruption placenta, congestive cardiac failure, pulmonary edema, post partum haemorrhage, post partum collapse, intrauterine death, high BP after delivery, intracranial bleed, maternal death was 56%, 42%, 26%, 8%, 20%, 22%, 6%, 8%, 18%, 2%, 4%, 12%, ,4% and 2% respectively in Group 1 whereas it was 29%, 40%, 6%, 6%, 6%, 6%, 0.6%, 0.6%, 1.3%, nil, ,nil, 1.3%, 0.6% and nil respectively in Group 2. Most common mode of delivery was vaginal delivery in both the groups.68% infants were delivered as low birth weight and 26% were admitted to NICU in Group 1 whereas it was 52% and 14% respectively in Group 2.Neonatal mortality was 8% in Group 1 and 2.6% in Group Statistically significant maternal complications in group 1 were prom, pre ecclampsia, abruption placenta, pulmonary edema, post partum hemorrhage and high BP after delivery. Statistically significant neonatal

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complications in group 1 were prematurity , Apgar score less than 7 at 1 minute and increased rate of NICU admissions.
Conclusion: The frequency of maternal and perinatal morbidity and mortality was increased in Group 1. So, PIH with anemia should be dealt carefully to improve the obstetric and perinatal outcome.

Introduction

Anemia remains a major health problem in developing countries.[1] Maternal and newborn health during and after pregnancy is the most urgent reproductive health issue in the world [2]. India has contributed to 12 % maternal deaths with leading cause being obstetric haemorrhage with underlying causes such as anemia and pregnancy induced hypertension[3,4].Pregnancy induced hypertension is one of the high risk conditions which needs to be dealt carefully. Combination of anemia and pregnancy induced hypertension is seen quite often in clinical practice and it poses grave consequences for maternal and neonatal health.[5]Lack of research articles depicting interaction between PIH and anemia adds to gap in our understanding of the two conditions thus validating the need for the present study.

Materials and Methods

A prospective study was carried out at SMGS Hospital for a period of one year i.e. April 2023 to March 2024 where patients in third trimester of pregnancy diagnosed with PIH with or without anemia who satisfied the inclusion criteria were taken as the subjects.
Criteria for diagnosis of PIH was the standard criteria of 2 blood pressure readings of greater than 140/90 mm hg 6 hours apart. Anemia was classified as per WHO classification as

Moderate or severe [with anemia]	Mild or no anemia [without anemia]
Hb less than 9	Hb greater than 9

Inclusion criteria

1. Singleton pregnancy attending obstetrical OPD in third trimester of pregnancy diagnosed with PIH

Exclusion criteria

1. Pregnant women diagnosed with PIH having other medical disorders like GDM, cholestasis, chronic hypertension or other medical disorders.
2. Multiple pregnancy with PIH
3. Pregnant women with history of recurrent pregnancy loss
4. Pregnant women unwilling to participate

Total 200 subjects were recruited and recruited subjects were classified into 2 groups as given below:
Group 1: PIH with anemia [Hb<9]
Group 2: PIH without anemia [Hb>9]
Participants were informed about the study and written consent was taken from them. Data was collected in three parts. First part collected demographic details viz. age, education, working status, eating habits, lifestyle and history of hypertension in the family. Second part collected details on clinical variables as Gravidity, BMI, SBP, DBP, Hb and urine for albumin.
Third part collected data on maternal and fetal complications. Patients were followed up in the antenatal period till the early post natal period and record of complications was kept. Mode of delivery was recorded.

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Maternal complications included Preterm rupture of membranes (PROM),preterm labour, preeclampsia, eclampsia, abruption placenta, congestive cardiac failure, pulmonary edema, post partum haemorrhage, post partum collapse, intracranial bleed, septic shock, IUD, development of higher level of systolic BP post delivery.
Neonatal parameters in the form of birth weight, gestational age of the baby, APGAR score, NICU admission, neonatal mortality was recorded.
Data was tabulated and suitable statistical analysis was done.

Table 1: Data on demographic variables in two groups

Parameter	Group 1 (PIH with anemia)	PIH without anemia
AGE		
<20	15 [30%]	49 [32%]
20-25	8 [16%]	22 [14%]
25-30	7 [14%]	38 [25%]
>30	20 [40%]	41 [27%]
Gravidity		
Primi	15 [30%]	47 [31%]
G2	5 [10%]	42 [28%]
G>=3	30 [60%]	61 [40%]
Education		
Middle	23 [46%]	67 [44%]
Secondary	12 [24%]	40 [26%]
SSE	9 [18%]	20 [13%]
Graduate	5 [10%]	11 [7%]
Post graduate	1 [2%]	6 [4%]
Working status		
Working	33 [66%]	77 [51%]
Non working	17 [11%]	63 [42%]
Eating habit		
Junk	36 [72%]	61 [40%]
Simple	14 [28%]	29 [19%]
LIFESTYLE		
Sedantary	30 [60%]	95 [63%]
Moderate work	20 [40%]	55 [36%]
Consumption of tea/coffee		
Once daily	10 [20%]	122 [81%]
More than once	40 [80%]	28 [19%]
History of hypertension in family		
Yes	31 [62%]	100 [66%]
NO	19 [38%]	50 [33%]

Majority of the patients i.e. 40% were greater than 30 years of age in Group 1 whereas majority of patients (32%) were less than 20 years of age in Group 2. Grand multiparas were affected the most in both the groups(60% in Group 1 and 40% in Group 2).Educational status belonged to the middle standard in majority of the patients in both the groups(46% in Group 1 and 44% in Group 2).Most of the patients belonged to working class (66% in Group 1 and 51% in Group 2).Majority of the patients had the habit of eating junk food(72% in Group 1 and 40% in Group 2).Maximum patients consumed beverages more than once daily in Group 1(80%) and maximum patients consumed beverages once daily in Group 2(81%).

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Table 2: Maternal complications

Maternal complication	PIH with anemia	PIH without anemia	P-value
PROM	28 [56%]	44 [29%]	<0.001*
PRETERM LABOR	21 [42%]	60 [40%]	0.803
PRE ECCLAMPSIA	13 [26%]	10 [6%]	<0.001*
ECCLAMPSIA	4 [8%]	9 [6%]	0.619
HELLP	10 [20%]	9 [6%]	0.004*
ABRUPTIO PLACENTA	11 [22%]	9 [6%]	0.002*
CONGESTIVE CARDIAC FAILURE	3 [6%]	1 [0.6%]	0.081Ma
PULMONARY EDEMA	4 [8%]	1 [0.6%]	0.019*
POST PARTUM HEMORRHAGE	9 [18%]	2 [1.3%]	<0.001*
BALLOON TAMOPONADE	3 [6%]	Nil	0.015*
HYSTERECTOMY	1 [2%]	Nil	0.251
MEDICAL MANAGEMENT	5 [10%]	2 [1.3%]	0.015*
POST PARTUM COLLAPSE	1 [2%]	Nil	0.251
SEPTIC SHOCK	Nil	Nil	
IUD	2 [4%]	Nil	0.062
HIGH BP AFTER DELIVERY	6 [12%]	2 [1.3%]	0.004*
INTRACRANIAL BLEED	2 [4%]	1 [0.6%]	0.314
MATERNAL DEATH	1 [2%]	Nil	0.563

***Statistically Significant Difference (P-value<0.05)**

Most common complication was prom in Group 1 whereas it was preterm labor in Group 2. Frequency of all the complications mentioned in the tabulated form were high in Group 1 (PIH with anemia group). Maternal complications namely PROM, pre ecclampsia, abruption placenta, pulmonary edema, post partum hemorrhage and high BP after delivery were seen in higher percentage in Group 1 and were statistically significant. Even one maternal death occurred in PIH with anemia group where a grand multiparous woman with severe PIH with anemia, underwent LSCS for acute fetal distress, suffered from intracranial bleed in the form of a large capsulothalamic bleed, was intubated and could not be revived. Another patient in Group 1 who had BMI in the overweight range underwent LSCS for previous LSCS with risk of impending rupture and suffered from post partum collapse in the early post partum period, luckily she revived through cpr. 2 patients met with intrauterine death in Group 1 whereas no such mishap was noted in Group 2.

Table 3: Mode of delivery in two groups

Mode of delivery	PIH with anemia	PIH without anemia	P-value
Normal	28 [56%]	120 [80%]	<0.001*
LSCS	22 [44%]	30 [20%]	

***Statistically Significant Difference (P-value<0.05)**

The most common mode of delivery was normal vaginal delivery in both the groups. However, percentage of cesarean section was higher in PIH with anemia group.

Table 4: Neonatal parameters in two groups

Neonatal parameter	PIH with anemia [n=50]	PIH without anemia [n=150]	P-value
Birth weight <2.5	34 [68%]	78 [52%]	0.184

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>2.5	16 [32%]	72 [48%]	
Gestational age at birth 28-34 34-37 >37	 22 [44%] 16 [32%] 12 [24%]	 15 [10%] 81 [54%] 54 [36%]	<0.001*
APGAR AT1 MIN <7 >7	 19 [38%] 31 [62%]	 24 [16%] 126 [84%]	0.009*
APGAR at 5 minutes <7 >7	 11 [22%] 39 [78%]	 19 [12%] 131 [87%]	0.109
NICU admission	13 [26%]	21 [14%]	0.045*
Neonatal mortality	4 [8%]	4 [2.6%]	0.211

***Statistically Significant Difference (P-value<0.05)**

68% infants were delivered as low birth weight in Group 1 whereas 52% infants were delivered as low birth weight in Group 2.44% infants were born with extreme prematurity in Group 1 whereas 10% infants were born with extreme prematurity in Group 2.26% neonates were admitted to NICU in PIH with anemia group whereas 14% neonates were admitted to NICU in PIH without anemia group. Neonatal mortality was observed in 8 % of the neonates in Group 1 and in only 2.6% of the neonates in Group 2.In our study,prematurity , Apgar score less than 7 at 1 minute and increased rate of NICU admissions was seen in Group 1 and results were statistically significant.

Discussion

Total 200 patients were included in the study out of which 50 had PIH with anemia (Group 1)and 150 had PIH with no or mild anemia(Group 2).Most common age group where PIH interplayed with anemia was greater than 30 years in our study(40%),the maximum age being 38 years in a G4P3L3 patient. On the other hand, the most common age group for PIH with no or mild anemia was age less than 20 years, followed by age greater than 30 years. So, the complications occurred at extremes of age.60 percent of the patients were grand multipara in Group 1; PIH with anemia occurred least common in second gravidas. PIH without anemia was most common in grand multipara followed by primipara. Again, PIH without anemia was least common in second gravidas. As far as educational status is concerned, PIH occurred in patients with lower educational status(till middle standard) in both the groups. As far as working status is concerned, both the groups had majority of patients falling into the working class. This is in contrast to the study conducted by Johnson A et al where most of the patients were in the non working strata.[6] PIH with or without anemia occurred most commonly in patients eating junk food instead of simple food. Sedantary lifestyle played the role of aggravating factor in both the groups. Patients in Group 1 viz PIH with anemia had a habit of drinking beverages multiple times a day.PIH without anemia group (Group 2) preferred to drink beverages once or the least. Both the groups had history of hypertension in the family.

Most common mode of delivery was vaginal delivery in both the groups. However, a study conducted in China showed that there was increased incidence of cesarean section in PIH with anemia group [7].Overall percentage of lscs in Group 1 was higher in our study.

Complications occurred with a higher frequency in Group 1. There were only 11 patients out of 50 in Group 1 who delivered without any complication. Rest patients had combination of complicating factors. Most common complication in Group 1 was preterm rupture of membranes (PROM) followed by pre term labor. Occurrence of pre eclampsia was high in

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Group 1 which was 26 percent and only 6% in Group 2.This finding was similar to findings in a research conducted at Sudan.[8] Another research from Ethiopa revealed women with anemia had higher incidence of developing pre eclampsia.[9] Low levels of Hb till 20 weeks of pregnancy is associated with pre eclampsia and after 20 weeks of gestation is associated with prom[6].This finding was similar to the results in our study where prom was the most common complication in PIH with anemia group. A study confirmed that pre eclampsia correlates with iron deficiency anemia, leading to pro inflammatory cytokines and lactoferrin especially in moderate to severe anemia.[10] This finding was consistent with our study where pre eclampsia occurred in 26% of the patients in Group 1 and in only 16% of the patients in Group 2. 18 percent of the patients suffered from post partum hemorrhage in Group 1 and there was need for hysterectomy for intractable PPH in one such patient whereas rest was managed medically. In Group 2, 1.3%% patients suffered from post partum haemorrhage and all were managed medically. 22% patients suffered from abruption in Group 1 and only 6% suffered from abruption in Group 2. A study in China demonstrated moderate or severe anemia in pregnancy to be the cause of severe pph, abruptio placenta, even maternal and neonatal deaths.[11]A study conducted in Madhya Pradesh reported significantly higher maternal complications in women with both PIH and anemia[12].Maternal anemia was found to be a predictor of poor maternal and neonatal outcome[13]As far as neonatal complications are concerned, patients in Group 1 delivered more low birth weight babies, preterm babies, added to NICU admissions and even suffered from neonatal deaths(68%,44%,26%,8% respectively in Group 1 and 52%,10%,14%,2.6% respectively in Group 2).This finding was similar to findings by Camera B et al[14]
The possible reason could be that anemia leads to low oxygen carrying capacity in the blood which exacerbates effect of PIH and its complications in pregnancy.[15]Lower Hb levels lead to increased nitric oxide levels which has role in reducing uterine muscle activity[16] In IUGR or pre eclampsia complicated pregnancy ,there is elevated expression of endothelial NOS which represents inadequate placental implantation[17].

Conclusion

This study emphasizes on segregating patients with PIH with respect to serum Hblevels.PIH Patients diagnosed with anemia should be carefully dealt because frequency and severity of complications is higher in this group of patients. Anemia should be addressed in all patients but anemia in conjunction with PIH should be managed with utmost care in order to improve the maternal and perinatal outcome in obstetrics.

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