

Histopathological assessment of placenta in PIH patientsNeetu Punia¹, Shivani Dua², Sachin Chauhan³, Isha Gupta^{4*}¹Associate Professor, Department of Gynaecology, NC Medical College & Hospital, Israna, Panipat, Haryana, India²Associate Professor, Department of Pathology, NC Medical College & Hospital, Israna, Panipat, Haryana, India³Assistant Professor, Department of Pathology, NC Medical College & Hospital, Israna, Panipat, Haryana, India⁴Associate Professor, Department of Pathology, NC Medical College & Hospital, Israna, Panipat, Haryana, India

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Abstract

Background: The occurrence of infection, haemorrhage and hypertensive disorders of pregnancy has great impact on mother and foetal well-being. The present study was conducted to perform histopathological assessment of placenta in PIH patients. **Materials & Methods:** 74 cases with normal and hypertensive pregnancies were selected and were classified patients into 2 groups of 37 each. Group I comprised of patients with hypertension (>140/90 mm Hg) and group II were normal pregnancy. Parameters recorded were gestational age, mean birth weight, mean placenta weight, mean fetoplacental birth ratio. Morphology of placenta was studied. **Results:** Maximum patients (19) were seen in age group 20-25 years in group I and 18 in group II. Minimum patients (3) in group I and in group II (3) were present in age group 30-35 years and <20 years respectively. Gestational age 37 weeks was seen in 12 in group I and 11 in group II, 38 weeks in 8 in group I and 7 in group II, 39 weeks in 6 in group I and 9 in group II, 40 weeks in 3 in group I and 2 in group II and 41 weeks in 1 in group I and 1 in group II. The mean birth weight was 2862.4 grams in group I and 2548.5 grams in group II, mean placental weight was 482.4 grams in group I and 476.2 grams in group II and fetoplacental ration found to be 6.52 in group I and 6.10 in group II. The mean Syncytial knots/100 villi was 71.4 in group I and 30.5 in group II, hyalinized villi/ 10 lpf was 6.8 in group I and 1.2 in group II, fibrinoid necrosis/100 villi was 12.5 in group I and 3.1 in group II, calcified areas/ 10 lpf was 2.4 in group I and 0.45 in group II and cytotrophoblastic proliferation/ 100 villi was 16.8 in group I and 3.4 in group II. **Conclusion:** The occurrence of syncytial knots, hyalinized villi, fibrinoid necrosis, calcified areas and cytotrophoblastic proliferation was more in PIH group than control subject.

Key words: Hypertension, Pregnancy, Eclampsia

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Introduction

Hypertensive disorders in pregnancy are not uncommon. The occurrence of infection, haemorrhage and hypertensive disorders of pregnancy has great impact on mother and foetal well-being[1]. Pregnancy induced hypertension (PIH) predisposes placental changes such as thrombus formation, placental vasculopathy, stone formation and trophoblastic proliferation. All these changes in turn cause hypoxia in placenta owing to less flow of blood and insufficiency in uteroplacental[2]. Studies revealed that the major cause of foetal deaths is placental infarcts. The reason for less blood flow in placenta is maternal vasospasm which in turns causes narrowing of foetal blood vessels. It leads to low birth weight and premature deliveries[3]. Hypertensive placentae encounter syncytial knot formation, formation of fibrin plaque and cytotrophoblastic cellular proliferation as confirmed by histopathology[4]. Severe preeclampsia poses great change in placenta. All these changes can be evident through histopathological analysis. The changes are identical to those seen during placental ischemia. It is also evident that in patients with PIH, the size of placenta remains small[5]. Extensive research has been done in this regard and many studies have conflicting results. Various theories have been put forward, but the occurrence of placenta ischemia is common among all explanations[6].

The present study was conducted to perform histopathological assessment of placenta in PIH patients.

Materials & Methods

The present study comprised of 74 females of normal and hypertensive pregnancies. All were informed regarding the study and their written consent was obtained. Inclusion criteria were cases complicated by pre-eclampsia/ eclampsia. Exclusion criteria was placentae complicated by conditions like diabetes mellitus, multiple pregnancies etc.

Data such as name, age etc. was recorded. Patients were classified patients into 2 groups of 37 each. Group I comprised of patients with hypertension (>140/90 mm Hg) and group II were normal pregnancy. Parameters recorded were gestational age, mean birth weight, mean placenta weight, mean fetoplacental birth ratio. During macroscopic examination, placentae were washed off all blood clots followed by storing it in a container containing 10% formalin for 24 hours. Gross examination of the placentae was performed. During microscopic examination, sectioning was performed and staining with haematoxylin and eosin stain was done. Morphology of placenta was studied. Various histopathological changes were noted. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

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Results

Table I Distribution of patients

| Age groups (years) | Group I | Group II | P value |
|--------------------|---------|----------|---------|
| <20 | 3 | 3 | 0.92 |
| 20-25 | 19 | 18 | |
| 25-30 | 5 | 12 | |
| 30-35 | 3 | 4 | |

Table I shows that maximum patients (19) were seen in age group 20-25 years in group I and 18 in group II. Minimum patients (3) in group I and in group II (3) were present in age group 30-35 years and <20 years respectively. A non-significant difference was observed (P> 0.05).

Table II Distribution based on gestational age

| Gestational age (weeks) | Group I | Group II | P value |
|-------------------------|---------|----------|---------|
| 37 | 12 | 11 | 0.81 |
| 38 | 8 | 7 | |
| 39 | 6 | 9 | |
| 40 | 3 | 2 | |
| 41 | 1 | 1 | |

Table II, Graph I shows that gestational age 37 weeks was seen in 12 in group I and 11 in group II, 38 weeks in 8 in group I and 7 in group II, 39 weeks in 6 in group I and 9 in group II, 40 weeks in 3 in group I and 2 in group II and 41 weeks in 1 in group I and 1 in group II. A non-significant difference between both groups was found (P> 0.05).

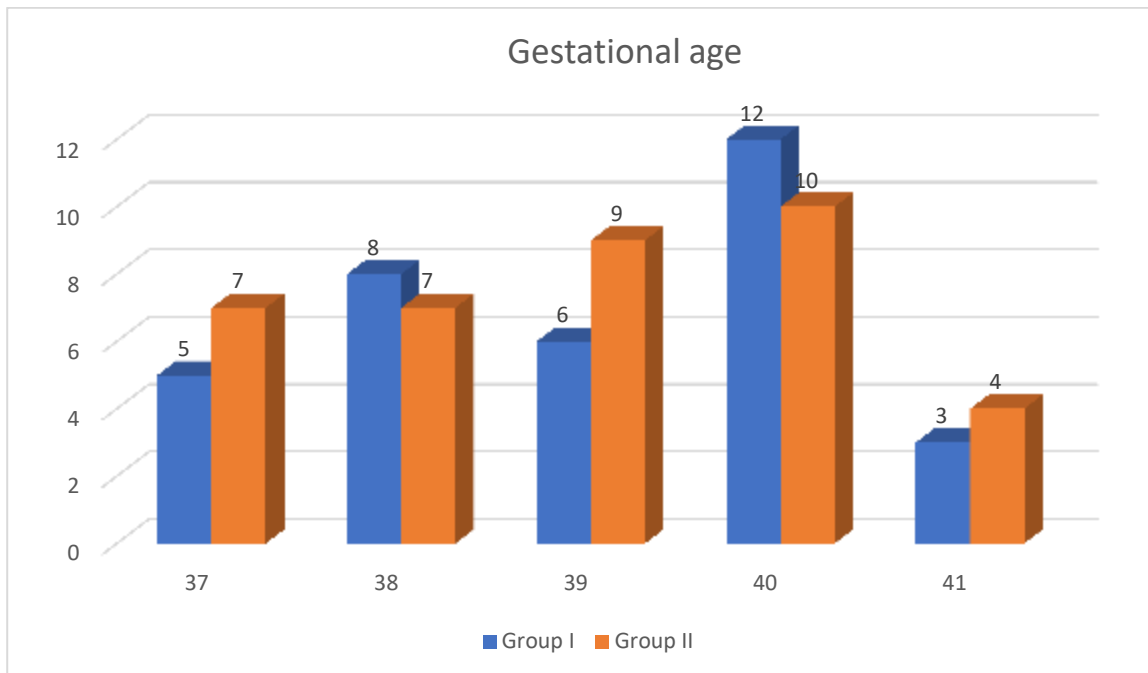


Figure I Distribution based on gestational age

Table III Assessment of parameters

| Parameters | Group I | Group II | P value |
|--------------------------|---------|----------|---------|
| Birth weight (grams) | 2548.5 | 2862.4 | 0.04 |
| Placental weight (grams) | 482.4 | 476.2 | 0.02 |
| Fetoplacental ratio | 6.52 | 6.10 | 0.09 |

Table III shows that the mean birth weight was 2548.5 grams in group I and 2862.4 grams in group II, mean placental weight was 482.4 grams in group I and 476.2 grams in group II and fetoplacental ratio found to be 6.52 in group I and 6.10 in group II. A difference was significant (P< 0.05).

Table IV Placental morphology in both groups

| Parameters | Group I | Group II | P value |
|--|---------|----------|---------|
| Syncytial knots/100 villi | 71.4 | 30.5 | <0.05 |
| Hyalinized villi/ 10 lpf | 6.8 | 1.2 | <0.05 |
| Fibrinoid necrosis/100 villi | 12.5 | 3.1 | <0.05 |
| Calcified areas/ 10 lpf | 2.4 | 0.45 | <0.05 |
| Cytotrophoblastic Proliferation/ 100 villi | 16.8 | 3.4 | <0.05 |

Table IV shows that the mean syncytial knots/100 villi was 71.4 in group I and 30.5 in group II, hyalinized villi/ 10 lpf was 6.8 in group I and 1.2 in group II, fibrinoid necrosis/100 villi was 12.5 in group I and 3.1 in group II, calcified areas/ 10 lpf was 2.4 in group I and 0.45 in group II and cytotrophoblastic proliferation/ 100 villi was 16.8 in group I and 3.4 in group II. A significant difference between both groups was seen ($P < 0.05$).

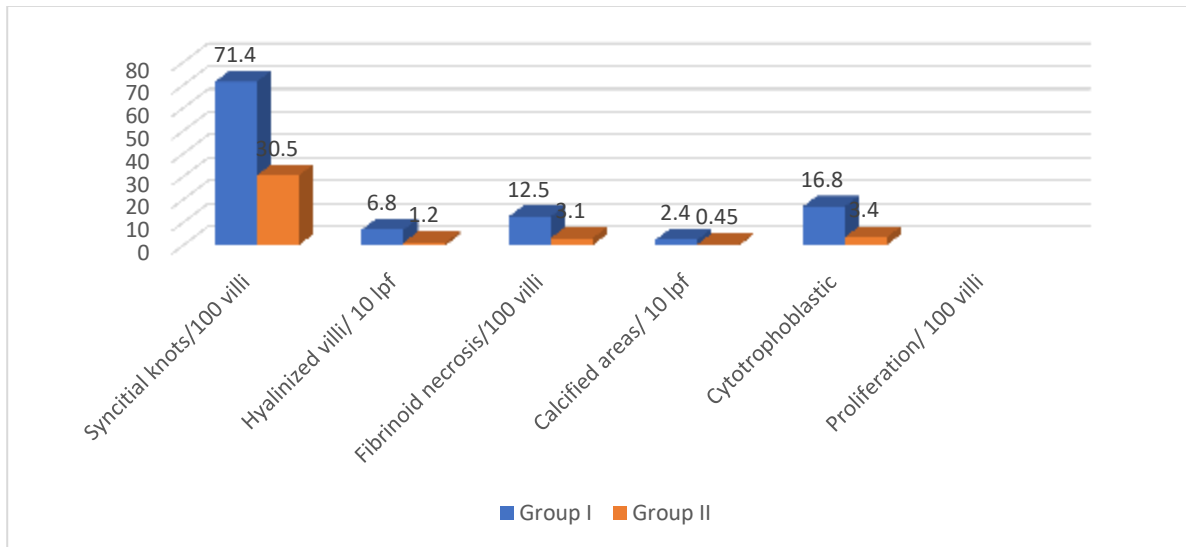


Figure II Placental morphology in both groups

Discussion

The placenta is the temporary organ that is formed during pregnancy. A careful assessment of placenta is needed for maternal and foetal well-being and can reveal evidence which is imperative for later management[7]. Pre-eclampsia and eclampsia are common in pregnancy which affect pregnancy significantly. Pre-eclampsia is evident in approximately 2-10% of pregnancies. Both conditions are responsible for more than 50,000 maternal mortalities universally[8]. There are different opinions regarding Pre-eclampsia and eclampsia. Earlier it was considered that these subsides following delivery[9]. It has effect on many body systems and nervous system is commonly involved[10]. The occurrence is common in mid and late stages of gestation. It is diagnosed due to presence of PIH, increased protein level in urine and edema[11]. Eclampsia indicates dysfunction of organs and presence of convulsions leading to deterioration of functions[12]. The present study was conducted to perform histopathological assessment of placenta in PIH patients.

We found that maximum patients (19) were seen in age group 20-25 years in group I and 18 in group II. Minimum patients (3) in group I and in group II (3) were present in age group 30-35 years and <20 years respectively. Gore et al[13] in their study on 30 placentae with PIH and 30 normal pregnancy found that maximum cases in both groups were within age group 21-25 years. Akhlaq et al[14] in their study found that maximum patients were I age group 24-28 years in control (56%), pre-eclampsia (50%) and eclampsia (50%).

We observed that gestational age 37 weeks was seen in 12 in group I and 11 in group II, 38 weeks in 8 in group I and 7 in group II, 39 weeks in 6 in group I and 9 in group II, 40 weeks in 3 in group I and 2 in group II and 41 weeks in 1 in group I and 1 in group II. Gore et al[13] found that PIH group had 40 weeks of gestational age and 38 weeks and 40 weeks in control group.

We observed that the mean birth weight was 2862.4 grams in group I and 2548.5 grams in group II, mean placental weight was 482.4 grams in group I and 476.2 grams in group II and fetoplacental ration found to be 6.52 in group I and 6.10 in group II. In a study by Akhlaq et al[14] found that maximum normal subjects (62%) had gestational age in 38-42 weeks, 58% pre-eclampsia in 33-37 weeks and 44% eclampsia patients in 33-37 weeks of gestation.

We found that the mean syncytial knots/100 villi was 71.4 in group I and 30.5 in group II, hyalinized villi/ 10 lpf was 6.8 in group I and 1.2 in group II, fibrinoid necrosis/100 villi was 12.5 in group I and 3.1

in group II, calcified areas/ 10 lpf was 2.4 in group I and 0.45 in group II and cytotrophoblastic proliferation/ 100 villi was 16.8 in group I and 3.4 in group II. Gore et al[13] found that PIH group had mean fetoplacental weight ratio of 6.14 whereas 6.03 was seen in control group. Similarly mean birth weight was more in control (2853 grams) as compared to PIH (2516) in PIH group.

Conclusion

Authors found that the occurrence of syncytial knots, hyalinized villi, fibrinoid necrosis, calcified areas and cytotrophoblastic proliferation was more in PIH group than control subject.

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