



ORIGINAL RESEARCH PAPER

Anatomy

A STUDY OF HISTOLOGICAL CHANGES OF PLACENTA IN NORMOTENSIVE AND TOXAEMIA OF PREGNANCY WOMEN

KEY WORDS: placenta, Histological parameters, toxemia of pregnancy, eclampsia, severe preeclampsia, mild preeclampsia, control group.

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ABSTRACT

The placenta is a unique organ where maternal and foetal tissues come in direct contact without rejection, suggesting immunological acceptance of the foetal graft by the mother. The placenta is the most accurate record of infant's prenatal experiences. Structural and functional derangement of placenta evokes a considerable interest, as this may be the only yardsticks to measure adequacy of the foetal environment. Toxaemia of pregnancy is an important reason for large number of maternal deaths and there of foetal deaths. Maternal hypertension (Toxaemia of pregnancy) is diagnosed in 6-10% of all deliveries which is associated with 22% of perinatal foetal deaths and 30% of maternal death. The present study was done in 220 pregnant mothers, divided into four groups. 120 cases of Normotensive pregnant woman(control), 40 cases of pregnant woman with mild preeclamptic, 40 cases of pregnant woman with severe preeclampsia, 40 cases of pregnant woman with Eclampsia pregnant women admitted in the department of Obs and Gynae, Rama Medical College, Hospital and Research Centre, Mandhana, Kanpur, U.P(India).Histological parameters placenta such as syncytial knots, vasculosyncytial membrane, Cytotrophoblastic Proliferation and Tunica Media Proliferation of foetal blood vessels measured by standard procedures. It was observed histological parameters of placenta syncytial knots, Cytotrophoblastic Proliferation and Tunica Media Proliferation of foetal blood vessels measured were increased significantly in eclampsia, severe and mild preeclampsia group when compared with control group placenta whereas vasculosyncytial membrane of placenta reduced significantly. Abnormal histological changes of placenta in Toxaemia of pregnancy affects placenta adversely and leads significant gross changes as compared to control group, it was contributed by the insufficient blood supply to placenta due to preeclampsia. This study results provides useful adjunct in planning and management of future pregnancy in pregnancy induced hypertensive women.

INTRODUCTION:

The placenta is a unique organ, short lived by design. Its existence is essential for the survival of human embryo/foetus in the intra uterine environment. Human placenta is a discoid, circular, membranous vascular and haemo-chorio-deciduate organ, which connects the foetus with the uterine wall of the mother **Huppertz B et al (2007)**. It is a structure where maternal and foetal tissues come in direct contact without rejection, suggesting immunological acceptance of the foetal graft by the mother **Emin m et al., (2010)**. The placenta is the most accurate record of infant's prenatal experiences. Structural and functional derangement of placenta evokes a considerable interest, as this may be the only yardsticks to measure adequacy of the foetal environment **Benrischke k et al., (1990)**.

Hypertensive disorders (Toxaemia of pregnancy) are generating complications during pregnancy which are common and forming fatal characters along with haemorrhage and infection. Preeclampsia (PE) is a disease occurs during the pregnancy which is specified by the commencement of hypertension and the presence of protein in the urine in large amount **Costeloe KLet et al., (2012) and Moore T et al., (2012)**. Pre-eclampsia is considered if one or more of the following criteria are present: Blood pressure 140 mm Hg or higher systolic or 90 mm Hg or higher diastolic after 20 weeks of gestation in a woman with previously normal blood pressure. Proteinuria: 0.3g or more of protein in a 24-hours urine collection (usually correspond with 1+ or greater on a urine dipstick test) known as mild preeclampsia **Costeloe KL et al., (2012) and Moore T et al., (2012)**. When systolic blood pressure of 160 mm of Hg or higher or 110mm of Hg or higher diastolic on two occasions at least six hours apart in a woman on bed rest, it is associated with proteinuria and oliguria, cerebral or visual disturbances, pulmonary oedema of cyanosis, epigastric pain or right upper quadrant pain, impaired liver function, thrombocytopenia, foetal growth restriction condition is known as severe preeclampsia.

Eclampsia considered by presence of seizures during the pregnancy along with the signs and symptoms of severe preeclampsia **Costeloe KL et al., (2012) and Moore T et al., (2012)**.

Toxaemia of pregnancy is an important reason for large number of

maternal deaths and there of foetal deaths. Maternal hypertension (toxaemia of pregnancy) is diagnosed in 6-10% of all deliveries which is associated with 22% of perinatal foetal deaths and 30% of maternal death (**Fernando arias et al., 2000**).

MATERIALS AND METHODOLOGY

The present study was done in Dept of Anatomy in collaboration with Department of Obs and Gynae, Rama Medical College, Hospital and Research Centre, Mandhana, Kanpur, U.P(India). The permission has taken from the institution ethical committee prior to conduction of this study. All the cases and controls pregnant women have filled written consent form for willing to give their samples for this study.

The present study was done in 220 pregnant mothers, divided into four groups. 120 cases of Normotensive pregnant woman(control), 40 cases of pregnant woman with mild preeclamptic, 40 cases of pregnant woman with severe preeclampsia, 40 cases of pregnant woman with Eclampsia pregnant women.

Inclusion criteria:

Antenatal mothers diagnosed with toxemia of pregnancy with their blood pressure of 140/90 mm of Hg or more in to case group.

Exclusion Criteria:

Twin pregnancy, pregnancy with - gestational diabetes, heart diseases, autoimmune disorders, chronic hypertension and placenta previa were excluded. Standard questionnaire was prepared to get the past and present medical/surgical history of cases and controls.

From each placenta whole thickness tissue blocks were taken from center and periphery. Tissue samples from placenta were processed and stained with hematoxylin and eosin and were observed under light microscope. 100 villi were studied from each placenta. Sections were then photographed by microphotography and transferred to the computer.

RESULTS:

The study sample was 220, Distributed in to 40 samples of mild preeclampsia, 40 samples of severe preeclampsia, 40 samples of eclampsia and 120 cases of normotensives mothers. For

comparing the histological parameters of placentae to determine its increasing or decreasing trends, the mean value for each group was determined.

Table 1: Mean no syncytial knots in control and study groups.

GROUP	NO OF SUBJECTS	Mean +/- S. D	P value compared with control group
Control	120	14.71±8.45	-----
Mild preeclampsia	40	30.18±6.90	0.0001
Severe preeclampsia	40	56.32±22.26	0.0001
Eclampsia	40	68.00±22.58	0.0001

In the present study it was observed mean no of villi showing syncytial knots were increased in eclampsia (68.00±22.58), severe (56.32±22.26) and pre-eclampsia (30.18±6.90) groups placenta when compared with control group (14.71±8.45) placenta. The difference between the different groups found significant statistically.

Table 2: Mean no vasculosyncytial membrane in control and study groups.

GROUP	NO OF SUBJECTS	Mean +/- S. D	P value compared with control group
Control	120	79.72±14.48	-----
Mild preeclampsia	40	52.78±12.64	0.0001
Severe preeclampsia	40	43.35±11.11	0.0001
Eclampsia	40	38.45±10.02	0.0001

Present study results demonstrate mean no of villi showing vasculo syncytial membrane were reduced significantly in pre, severe preeclampsia and eclampsia group when compared with control group placenta. The difference between the different groups of placentae was significant statistically. The vasculosyncytial membrane is the area of the cytoplasm of syncytiotrophoblast in close approximation with the capillary having minimal amount of stroma between the trophoblastic and endothelial basement membrane. The vasculosyncytial membrane is considered to be the principal site for gaseous transfer.

Table 3: Mean no cytotrophoblastic proliferation in control and study groups.

GROUP	NO OF SUBJECTS	Mean +/- S. D	P value compared with control group
Control	120	15.16±8.25	-----
Mild preeclampsia	40	35.42±15.58	0.0001
Severe preeclampsia	40	57.08±23.33	0.0001
Eclampsia	40	67.65±17.42	0.0001

Table 4: Mean no tunica media proliferation of foetal blood vessels in control and study groups.

GROUP	NO OF SUBJECTS	Mean +/- S. D	P value compared with control group
Control	120	4.22±1.72	-----
Mild preeclampsia	40	19.40±7.10	0.0001
Severe preeclampsia	40	26.55±6.31	0.0001
Eclampsia	40	48.18±11.35	0.0001

It was shown in the table no 3 & 4 mean no villi showing cytotrophoblastic proliferation and tunica media proliferation of foetal blood vessels were increased significantly in pre, severe preeclampsia and eclampsia group when compared with control group placenta. The difference between the groups also found significant statistically.

DISCUSSION:

Placenta is a vital organ maintaining pregnancy and promoting

fetal development, which functions as found upon which developing foetus derives its nutritional substance and obtains its metabolic and immunological requirements.

Siva Sree Ranga. M.K et al (2017) study mentioned no of placenta showing significant increased syncytial knots were 63% in preeclampsia group and 23% in normotensive group. The no of syncytial knots in preeclampsia and control group found significant statistically (p value 0.01).

Deepalaxmi Salmani et al., (2014) found structural changes such as significant number of syncytial knots. A significant increase in syncytial knot formation in placental villi indicates disturbance in the hormonal factors, which may lead to altered morphometry of placenta resulting in Pregnancy induced hypertension in the mother and to low birth weight in the new born.

Dhawle M.S et al., (2017) study results demonstrated 84% of placenta in eclampsia group having (VSD) vasculosyncytial membrane deficiency, no placenta showing vasculosyncytial deficiency in severe, mild preeclampsia group was 66% and 60% respectively. Overall 67% of placenta in toxemia of pregnancy group showing VSD. Only 7% of placenta in control group showing VSD. Paucity of the vasculosyncytial membrane is an index of fetal hypoxia. The paucity of the vasculosyncytial membrane was seen in higher grades of toxemia correlating with the severity of the disease.

A study done by Dhawle M.S et al., (2017) stated 76% of placenta in eclampsia group, in severe and mild preeclampsia group no of placenta in showing cytotrophoblastic proliferation was 66% and 65% respectively. 13% of placenta in control group having cytotrophoblastic proliferation. The difference between the four groups of the study show the significant statistically.

Deepalaxmi Salmani et al., (2014) found structural changes of placenta in toxemia of pregnancy condition such as tunica media proliferation of the foetal blood vessels found significantly higher in preeclampsia and eclampsia group than control group of the placenta. The difference between the three groups of the placenta found significant statistically.

CONCLUSION:

This study concludes that placenta and preeclampsia, eclampsia interlinked. Toxaemia of pregnancy affects placenta adversely and leads significant histological changes as compared to control group, it was contributed by the insufficient blood supply to placenta due to preeclampsia. This study results provides useful adjunct in planning and management of future pregnancy in pregnancy induced hypertensive women.

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