DISCUSSION

Placenta is a crucial organ required for maintaining pregnancy and promoting normal fetal development. It is the most accurate record of the infants' prenatal experiences. Study of placental morphology and circulatory changes is an indicator of intrauterine fetal life status. It is also considered as important indicator of neonatal outcome and overall fetal development status especially in cases of placental insufficiency as in cases of pregnancy induced hypertension.

The present studies comprised of total 150 cases, out of which100 cases were preeclamptic patients (91 patients were mild preeclampsia and 9 patients were severe preeclampsia) with mean gestational age of 38w±10days. Among these, maximum number of patients was in the age group of 26-30 years. Most patients in present study were multipara (34 patient were Primiparous, 66 were multipara) and complications like edema and proteinuria were seen in most of them, Out of which, 73 patients presented with edema and 64 patients presented with dip stick test for proteinuria more than (++).

The aim of this study is to correlate between the placental morphological (site, grade, weight, circumference, central thickness, number of cotyledons, site of cord insertion and presence of areas of hemorrhage or infarctions) and circulatory changes (Doppler study of uterine arteries, umbilical artery and retro-placental blood flow indices) with neonatal outcomes (neonatal weight, Apgar score and NICU admission). By the mean of, we correlate the placental anatomy or morphology with placental function (presented by Doppler study of utero-placental circulation) with neonatal outcomes.

This study is comprised of two groups of pregnant women. Group (A): composed of 50 cases of normo-tensive uncomplicated pregnancy (control group), Group (B) composed of 100 pregnant cases complicated with preeclampsia further divided into Group (B1): composed of 91 cases of pregnancy complicated with mild pre-eclampsia and Group (B2): composed of 9 cases of pregnancy complicated with severe pre-eclampsia.

In this study average placental weight in control group (normo-tensive women) was 604.8±128.9gms, in group B1(women with mild preeclampsia) was 539.2±117.5gms while in group B2 (women with severe preeclampsia) was 344.4±39gms.Which means that there is significant statistical difference in the mean placental weight regarding severe pre-eclamptic group in relation to mild and control groups with (P=0.001), while there was insignificant difference between mild preeclamptic group and control group (P>0.05).

In agreement with our study,Sumit Gupta [45] studied pregnancy outcome in 100 pre-eclamptic patient (among them 70 cases were mild pre-eclampsia and 30 cases were severe pre-eclampsia) and 100 uncomplicated pregnant cases. He found that the placentas of severe pre-eclamptic patients were significantly smaller than the mild pre-eclamptic and normo-tensive cases and the coefficient of variation got higher with increasing severity of pre-eclampsia, suggesting that the pathologic process interferes with the normal placental growth.

SeguptaKishwara[46] also observed a reduction of placental weight in preeclampsia. He stated that the difference in placental weights is the result of significant decrease in parenchymal tissue.

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In this study we found the average neonatal weight in control group was 3399±414gms, in group (B1) was3329±332gms while in group (B2) was2355±272gms. Which means that there is significant statistical difference in the mean neonatal weight regarding severe pre-eclamptic group in relation to mild and control groups with (P=0.001), while there was insignificant statistical difference between mild preeclamptic group and control group (P>0.05).

In agreement with the present results,Sumit Gupta [45] found that the birth weight was decreased with increasing severity of pre-eclampsia and the birth weight of babies were directly proportional to placental weight and size. He stated that in hypertension; arrangement of the intra-cotyledonous vasculature is altered resulting in low birth weight of the babies.

this study revealed significantly higher feto-placental weight ratio in severe pre-eclamptic group in relation to mild and control groups with (p=0.046).

In agreement with our study,IfraSaeed [47] and Shinya I et al [48] found that both the fetal and placental weight were less in pre-eclampsia but the feto-placental weight ratio get more and the placental index get less with increasing severity of preeclampsia as a result of marked placental affection.

These results indicate that, the rate of reduction of fetal weight was less than the rate of reduction of placental weight in pre-eclampsia. This can be explained by, the high placental functional reserve which can still nourish the fetus although obvious reduction in placental mass (size and weight).

The present study revealed that the morphometric measures of placenta (i.e. weight, circumference, central thickness, number of cotyledons) were significantly of lower values in severe pre-eclamptic group when compared to mild pre-eclamptic and control groups with (P=0.001, 0.0001, 0.001, 0.001) respectively while they were insignificantly of lower values in mild pre-eclamptic group in relation to control group.

In agreement with the present study Majumdar S [49] found that the morphometric measures of placenta (weight, circumference, central thickness and number of cotyledons) were significantly of lower values in severe pre-eclamptic group when compared to mild pre-eclamptic and control groups.

Also in agreement with this study PO Abu et.al [50]they foundthat the average placental weight, circumference central thickness were lower in pre-eclamptic patient than in normo-tensive cases and it get lower with increasing severity of pre-eclampsia. He also found that there was significant positive correlation between placental thickness and the estimated fetal weight during the second trimester (r = 0.616, p < 0.05) and during the third trimester (r = 0.570, p < 0.05) respectively.

Habib FA [51] stated that low birth weight infants can be predicted from ultrasound measurement of placental thickness and circumference, and the diminished placental size precedes fetal growth restriction in cases of preeclampsia.

The morphometric changes in the placenta (whether they are a cause or a consequence of the disease) are more manifest in severe preeclamptic cases while mild cases of preeclampsia do not show significant morphological changes.

In the present study other anatomic features of placentas (i.e. placental site, placental grade, areas of hemorrhage and infarction and site of cord insertion) were of the higher values in severe pre-eclamptic group in relation to mild pre-eclamptic group and control group but it was of no statistical significance with (P= 0.54, 0.79, 0.06 and 0.06) respectively.

In agreement with this study Bahavina K [52] as he found that the placental site, placental grade,areas of heamorrhage and infarction and site of cord insertion are not significantly affected in cases of mild preeclampsia

These results were not in concurrence with the results ofMajumdar S et.al [49] who observed a significant increase in the incidence of placental infarction with increasing severity of toxemia. This difference may be explained by smaller sample size of Majumdar S (He carried his study upon 50 cases with uncomplicated pregnancy and 50 cases with pregnancy induced hypertension divided as 30 cases of pregnancy induced hypertension without proteinuria and 20 cases of pre-eclampsia).

The present study revealed significant difference between three studied groups regarding uterine artery Doppler indices, with abnormal Doppler indices (S/D ratio, RI and PI) in pre-eclamptic groups comparing to normal Doppler indices in normo-tensive group, the highest values were in group B2 (severe pre-eclamptic patients) with P values of (<0.001).

In agreement with this results B. MallikarJunappa[53] hefoundthat uterine artery Doppler indices (S/D ratio, RI and PI) are high in preeclamptic cases than normo-tensive cases and the indices get higher with increasing severity of pre-eclampsia.

Also Fleischer et.al [54]found significant difference between the two studied group regarding uterine artery Doppler indices, they were higher in pre-eclamptic group compared to normo-tensive group.

The higher uterine artery Doppler indices in preeclamptic group could be explained by defective trophoblastic invasion and the preserved elasticity of spiral arterial walls resulting in increased impedance to uterine artery flow.

This study revealed significantly higher umbilical artery Doppler indices (S/D ratio, RI and PI) in severe pre-eclamptic cases in relation to mild and control groups with (P<0.001) while there was no significant statistical difference between mild pre-eclamptic cases and control group. Our findings are in line with the study performed byOzeren et.al [55] He could not find any difference in umbilical artery Doppler study between normal pregnancies and mild pre-eclamptic patients, while severe pre-eclamptic group with IUGR showed a significantly higher umbilical artery impedance to flow.

Trudingeret al [56] stated that increased resistance to umbilical arterial blood flow cannot be observed unless at least 60% of the placental bed is occluded.

AlsoBibiShahnaz[57] concluded that the umbilical artery Doppler indices (RI and PI) increases in pre-eclampsia and these changes tend to be greater in severe pre-eclampsia.

These results explained by that in sever preeclampsia there is sever pathological changes resulting in loss of placental functional reserve leading to reduction of the end

diastolic blood flow until it become absent or reversed. So the umbilical artery flow impedance gets higher with increasing severity of preeclampsia.

The present results showed highly significant statistical negative correlation of placental morphometric measurements (circumference, central thickness and weight), F/P ratio and placental index with uterine artery Doppler indices(S/D ratio, RI and PI) with (P<0.001).

These results were consistent with KadirGuzin[58] as he found highly significant correlation between abnormal uterine artery Doppler findings with both the extent of myometrial spiral artery trophoblast invasion and gross morphologic changes of the placenta in pre-eclamptic group (P<0.001).

This study showed highly significant statistical negative correlation of placental morphometric measurements, F/P ratio and placental index with abnormal umbilical artery Doppler indices (S/D ratio, RI and PI) with (P<0.001).

These results were consistent Kevin Joseph[59]as he conducted across sectional study upon 90 pre-eclamptic cases divided into two groups group I composed of 47 cases with umbilical artery (RI<0.70), and group II consisting of 43 cases with umbilical artery (RI>0.70) he found that the abnormally high umbilical artery resistive index was associated with low placental weight, thickness, circumference and earlier placental maturity.

The present results showed highly significant linear correlation of placental morphometric measurements, F/P ratio and placental index with the neonatal outcome parameters (neonatal weight, Apgar score and NICU admission) with (P<0.001).

These results were consistent with the study of Bahavina K [52] as he stated that when the pathology progress to severe pre-eclampsia it results in marked placental morphological and circulatory insufficiency which in turn increases the fetal demands so; the reduction in placental morphological parameters might be the reason for the reduction in fetal growth and outcome.

Also Sumit Gupta [45] was in agreement with my results as he concluded that, the pregnancy induced hypertension adversely influences the placental weight and fetal out come. Thus the examination of placental morphology can predict the status of the fetus in neonatal life as it can act as an indicator to the overall development of the fetus in presence of preeclampsia.

In this study the correlation between uterine artery pulsitilityindix(PI) and neonatal outcome parameters showed high statistically significant negative correlation with neonatal weight and Apgar score with(p< 0.0001) and high statistically significant positive correlation with NICU admission.

In agreement with our study A Fichera [60]found that the mean uterine artery PI represent a good independent indicator for peri-natal outcome especially gestational age at delivery and birth weight percentile with (P<0.05).

Also in agreement with the present result was Gudmundsson S, et.al [61]. He found that abnormal uterine artery Doppler velocimetry was seen in 120 (33.4%) pregnancies and

there was statistically significant correlation between abnormal uterine artery Doppler study and adverse peri-natal outcome.

The placenta has high anatomical and functional capacities. They are diminished if there is severe placental pathology resulting in increased fetal demands and poor neonatal outcomes. So; the placental anatomy, morphology and function are correlated with peri-natal and early neonatal outcomes.

SUMMARY

Placenta has been described as the "diary of intrauterine life" as it plays several roles throughout pregnancy so it can reflect the interactions between the fetus and mother. Also it plays a fundamental role in Preeclampsia and eclampsia as these two such disorders originates in the placenta causing variable maternal and fetal problems which resolve by delivery of placenta. Therefore, placenta is a focus of interest for studying.

Different morphological changes are found in the placenta of preeclamptic mothers e.g. reduction in weight, diameter and volume. The abnormal placentation is the earliest event in the development of preeclampsia particularly lack of the endovascular trophoblastic infiltration resulting in lack of uterine spiral arteriols dilatation compromising blood flow to the maternal-fetal interfaces so it is the starting point in the genesis of preeclampsia as the resulting placental hypoxia activates placental factors and induces systemic heamodynamic and placental morphological changes and subsequently the development of other risk factors responsible for the adverse perinatal outcome.

The aim of is this study was to identify the relation between the placental morphological and circulatory changes and the neonatal short term outcomes in cases of preeclampsia.

Our study was conducted on 150 pregnant women attended El Shatby University maternity hospital which is a tertiary center from January 2013-July 2013. The cases were allocated into 2 main groups: Group (A): 50 normo-tensive pregnant women (control group). Group (B) composed of 100 pregnant cases complicated with preeclampsia further divided into Group (B1): composed of 91 cases of pregnancy complicated with mild pre-eclampsia and Group (B2): composed of 9 cases of pregnancy complicated with severe pre-eclampsia. Diagnosis of pre-eclampsia, assessment of placentation, Doppler study (uterine artery, umbilical artery and retro placental vascular space) and assessment of neonatal outcomes (neonatal weight, Apgar score and NICU admission) were done. The subjects enrolled in the study had no previous history of chronic hypertension, diabetes, renal disease, multiple gestation or abnormal placentation and thus considered as a homogenous population for statistical analysis. We studied placentation and Doppler indices of the uterine artery and umbilical artery and their association with neonatal outcome.

Our results were that the placental morphometric measures and circulatory changes are significantly affected in sever preeclampsia and they have significant correlation with neonatal outcomewith (P<0.001) but they almost not affected in cases of mild preeclampsia and have no predictive value with (P>0.05) as a result of high placental functional reserve.